Sinh

Notations

Traditional name

Hyperbolic sine

Traditional notation

$\sinh(z)$

Mathematica StandardForm notation

`Sinh[z]`

Primary definition

01.19.02.0001.01

$$\sinh(z) = \frac{e^z - e^{-z}}{2}$$

Specific values

Specialized values

01.19.03.0001.01

$$\sinh(\pi i m) = 0 \;/;\; m \in \mathbb{Z}$$

01.19.03.0002.01

$$\sinh\left(\pi i \left(\frac{1}{2} + m\right)\right) = i\,(-1)^m \;/;\; m \in \mathbb{Z}$$

Values at fixed points

01.19.03.0003.01

$$\sinh(0) = 0$$

01.19.03.0004.01

$$\sinh\left(\frac{\pi i}{12}\right) = i\,\frac{\sqrt{3} - 1}{2\sqrt{2}}$$

01.19.03.0005.01

$$\sinh\left(\frac{\pi i}{12}\right) = \left(z;\, 16 z^4 + 16 z^2 + 1\right)_2^{-1}$$

01.19.03.0006.01

$$\sinh\left(\frac{\pi i}{10}\right) = \frac{i}{4}\left(\sqrt{5} - 1\right)$$

01.19.03.0007.01

$$\sinh\left(\frac{\pi i}{10}\right) = \left(z;\, 16 z^4 + 12 z^2 + 1\right)_2^{-1}$$

01.19.03.0008.01

$$\sinh\left(\frac{\pi i}{9}\right) = \frac{\left(-1 + i\sqrt{3}\right)^{4/3} - \left(-1 - i\sqrt{3}\right)^{4/3}}{4\sqrt[3]{2}}$$

01.19.03.0009.01

$$\sinh\left(\frac{\pi i}{9}\right) = \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_4^{-1}$$

01.19.03.0010.01

$$\sinh\left(\frac{\pi i}{8}\right) = \frac{i\sqrt{2 - \sqrt{2}}}{2}$$

01.19.03.0011.01

$$\sinh\left(\frac{\pi i}{8}\right) = \left(z;\, 8 z^4 + 8 z^2 + 1\right)_2^{-1}$$

01.19.03.0012.01

$$\sinh\left(\frac{\pi i}{8}\right) = -\frac{1}{2}(-1)^{7/8}\left(-1 + \sqrt[4]{-1}\right)$$

01.19.03.0013.01

$$\sinh\left(\frac{\pi i}{7}\right) = \frac{1}{24}\left(2\left(i + \sqrt{3}\right) i \sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}} + \frac{2\sqrt{7}\left(i + \sqrt{3}\right)}{\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}}} + \sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}}\left(2 + 2 i\sqrt{3}\right) - 4\sqrt{7}\, i - \frac{2\sqrt{7}\left(-i + \sqrt{3}\right)}{\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}}}\right)$$

01.19.03.0014.01

$$\sinh\left(\frac{\pi i}{7}\right) = \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_4^{-1}$$

01.19.03.0015.01

$$\sinh\left(\frac{\pi i}{7}\right) = -\frac{1}{2}(-1)^{6/7}\left(-1 + (-1)^{2/7}\right)$$

01.19.03.0016.01

$$\sinh\left(\frac{\pi i}{6}\right) = \frac{i}{2}$$

01.19.03.0017.01

$$\sinh\left(\frac{\pi i}{5}\right) == \frac{i}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.19.03.0018.01

$$\sinh\left(\frac{\pi i}{5}\right) == \left(z;\, 16 z^4 + 20 z^2 + 5\right)_2^{-1}$$

01.19.03.0019.01

$$\sinh\left(\frac{2\pi i}{9}\right) == \frac{\sqrt[3]{-1+i\sqrt{3}} - \sqrt[3]{-1-i\sqrt{3}}}{2\sqrt[3]{2}}$$

01.19.03.0020.01

$$\sinh\left(\frac{2\pi i}{9}\right) == \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_6^{-1}$$

01.19.03.0021.01

$$\sinh\left(\frac{2\pi i}{9}\right) == -\frac{1}{2}(-1)^{7/9}\left(-1+(-1)^{4/9}\right)$$

01.19.03.0022.01

$$\sinh\left(\frac{\pi i}{4}\right) == \frac{i\sqrt{2}}{2}$$

01.19.03.0023.01

$$\sinh\left(\frac{2\pi i}{7}\right) == \frac{1}{12\, 2^{2/3}\sqrt[3]{7-21 i\sqrt{3}}}\left(-2 i\sqrt{7}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} + 2\sqrt{21}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - \right.$$
$$\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} - 2\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3} +$$
$$\left. 4\sqrt{7}\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}}\, i + 2\, 2^{2/3}\, 7^{5/6}\sqrt[3]{1-3 i\sqrt{3}}\, i + \sqrt{3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} i\right)$$

01.19.03.0024.01

$$\sinh\left(\frac{2\pi i}{7}\right) == \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_6^{-1}$$

01.19.03.0025.01

$$\sinh\left(\frac{2\pi i}{7}\right) == -\frac{1}{2}(-1)^{5/7}\left(-1+(-1)^{4/7}\right)$$

01.19.03.0026.01

$$\sinh\left(\frac{3\pi i}{10}\right) == \frac{i}{4}\left(\sqrt{5}+1\right)$$

01.19.03.0027.01

$$\sinh\left(\frac{3\pi i}{10}\right) == \left(z;\, 16 z^4 + 12 z^2 + 1\right)_4^{-1}$$

01.19.03.0028.01

$$\sinh\left(\frac{\pi i}{3}\right) == \frac{i\sqrt{3}}{2}$$

01.19.03.0029.01

$$\sinh\left(\frac{3\pi i}{8}\right) == \frac{i\sqrt{2+\sqrt{2}}}{2}$$

01.19.03.0030.01

$$\sinh\left(\frac{3\pi i}{8}\right) == \left(z;\, 8z^4 + 8z^2 + 1\right)_4^{-1}$$

01.19.03.0031.01

$$\sinh\left(\frac{3\pi i}{8}\right) == -\frac{1}{2}(-1)^{5/8}\left(-1 + (-1)^{3/4}\right)$$

01.19.03.0032.01

$$\sinh\left(\frac{2\pi i}{5}\right) == \frac{i}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.19.03.0033.01

$$\sinh\left(\frac{2\pi i}{5}\right) == \left(z;\, 16z^4 + 20z^2 + 5\right)_4^{-1}$$

01.19.03.0034.01

$$\sinh\left(\frac{5\pi i}{12}\right) == i\,\frac{1+\sqrt{3}}{2\sqrt{2}}$$

01.19.03.0035.01

$$\sinh\left(\frac{5\pi i}{12}\right) == \left(z;\, 16z^4 + 16z^2 + 1\right)_4^{-1}$$

01.19.03.0036.01

$$\sinh\left(\frac{3\pi i}{7}\right) == \frac{1}{12\, 2^{2/3}\sqrt[3]{7 - 21\, i\sqrt{3}}}\left(4\sqrt{7}\, i\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}} - 2\sqrt{7}\left(i + \sqrt{3}\right)\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}} + \right.$$
$$\left(14 + i\sqrt{7} + 3\sqrt{21}\right)^{2/3}\sqrt[3]{14 - i\sqrt{7} - 3\sqrt{21}} + 2\sqrt[3]{14 + i\sqrt{7} + 3\sqrt{21}}\left(14 - i\sqrt{7} - 3\sqrt{21}\right)^{2/3} +$$
$$\left. 2\, 2^{2/3}\, 7^{5/6}\sqrt[3]{1 - 3\, i\sqrt{3}}\; i + \sqrt{3}\left(14 + i\sqrt{7} + 3\sqrt{21}\right)^{2/3}\sqrt[3]{14 - i\sqrt{7} - 3\sqrt{21}}\; i\right)$$

01.19.03.0037.01

$$\sinh\left(\frac{3\pi i}{7}\right) == \left(z;\, 64z^6 + 112z^4 + 56z^2 + 7\right)_2^{-1}$$

01.19.03.0038.01

$$\sinh\left(\frac{3\pi i}{7}\right) == -\frac{1}{2}(-1)^{4/7}\left(-1 + (-1)^{6/7}\right)$$

01.19.03.0039.01

$$\sinh\left(\frac{4\pi i}{9}\right) = \frac{\left(1+i\sqrt{3}\right)\sqrt[3]{-1+i\sqrt{3}} + \left(i+\sqrt{3}\right)\sqrt[3]{-1-i\sqrt{3}}\, i}{4\sqrt[3]{2}}$$

01.19.03.0040.01

$$\sinh\left(\frac{4\pi i}{9}\right) = \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_2^{-1}$$

01.19.03.0041.01

$$\sinh\left(\frac{4\pi i}{9}\right) = -\frac{1}{2}(-1)^{5/9}\left(-1+(-1)^{8/9}\right)$$

01.19.03.0042.01

$$\sinh\left(\frac{\pi i}{2}\right) = i$$

01.19.03.0043.01

$$\sinh\left(\frac{5\pi i}{9}\right) = \frac{\left(1+i\sqrt{3}\right)\sqrt[3]{-1+i\sqrt{3}} + \left(i+\sqrt{3}\right)\sqrt[3]{-1-i\sqrt{3}}\, i}{4\sqrt[3]{2}}$$

01.19.03.0044.01

$$\sinh\left(\frac{5\pi i}{9}\right) = \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_2^{-1}$$

01.19.03.0045.01

$$\sinh\left(\frac{5\pi i}{9}\right) = -\frac{1}{2}(-1)^{4/9}\left(-1-\sqrt[9]{-1}\right)$$

01.19.03.0046.01

$$\sinh\left(\frac{4\pi i}{7}\right) = \frac{1}{12\, 2^{2/3}\sqrt[3]{7-21\, i\sqrt{3}}}\left(4\sqrt{7}\, i\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - 2\sqrt{7}\left(i+\sqrt{3}\right)\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}} + \right.$$
$$\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}} + 2\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} +$$
$$\left. 2\, 2^{2/3}\, 7^{5/6}\sqrt[3]{1-3\, i\sqrt{3}}\; i + \sqrt{3}\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\; i\right)$$

01.19.03.0047.01

$$\sinh\left(\frac{4\pi i}{7}\right) = \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_2^{-1}$$

01.19.03.0048.01

$$\sinh\left(\frac{4\pi i}{7}\right) = -\frac{1}{2}(-1)^{3/7}\left(-1-\sqrt[7]{-1}\right)$$

01.19.03.0049.01

$$\sinh\left(\frac{7\pi i}{12}\right) = i\,\frac{1+\sqrt{3}}{2\sqrt{2}}$$

01.19.03.0050.01

$$\sinh\left(\frac{7\pi i}{12}\right) == \left(z;\, 16 z^4 + 16 z^2 + 1\right)_4^{-1}$$

01.19.03.0051.01

$$\sinh\left(\frac{3\pi i}{5}\right) == \frac{i}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.19.03.0052.01

$$\sinh\left(\frac{3\pi i}{5}\right) == \left(z;\, 16 z^4 + 20 z^2 + 5\right)_4^{-1}$$

01.19.03.0053.01

$$\sinh\left(\frac{5\pi i}{8}\right) == \frac{i\sqrt{2+\sqrt{2}}}{2}$$

01.19.03.0054.01

$$\sinh\left(\frac{5\pi i}{8}\right) == \left(z;\, 8 z^4 + 8 z^2 + 1\right)_4^{-1}$$

01.19.03.0055.01

$$\sinh\left(\frac{5\pi i}{8}\right) == -\frac{1}{2}(-1)^{3/8}\left(-1-\sqrt[4]{-1}\right)$$

01.19.03.0056.01

$$\sinh\left(\frac{2\pi i}{3}\right) == \frac{i\sqrt{3}}{2}$$

01.19.03.0057.01

$$\sinh\left(\frac{7\pi i}{10}\right) == \frac{i}{4}\left(\sqrt{5}+1\right)$$

01.19.03.0058.01

$$\sinh\left(\frac{7\pi i}{10}\right) == \left(z;\, 16 z^4 + 12 z^2 + 1\right)_4^{-1}$$

01.19.03.0059.01

$$\sinh\left(\frac{5\pi i}{7}\right) == \frac{1}{12\, 2^{2/3}\sqrt[3]{7-21\, i\sqrt{3}}}\left(-2\, i\sqrt{7}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} + 2\sqrt{21}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - \left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} - 2\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3} + 4\sqrt{7}\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}}\, i + 2\, 2^{2/3}\, 7^{5/6}\sqrt[3]{1-3\, i\sqrt{3}}\, i + \sqrt{3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} i\right)$$

01.19.03.0060.01

$$\sinh\left(\frac{5\pi i}{7}\right) == \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_6^{-1}$$

01.19.03.0061.01

$$\sinh\left(\frac{5\pi i}{7}\right) == -\frac{1}{2}(-1)^{2/7}\left(-1-(-1)^{3/7}\right)$$

01.19.03.0062.01

$$\sinh\left(\frac{3\pi i}{4}\right) == \frac{i\sqrt{2}}{2}$$

01.19.03.0063.01

$$\sinh\left(\frac{7\pi i}{9}\right) == \frac{\sqrt[3]{-1+i\sqrt{3}}-\sqrt[3]{-1-i\sqrt{3}}}{2\sqrt[3]{2}}$$

01.19.03.0064.01

$$\sinh\left(\frac{7\pi i}{9}\right) == \left(z;\,64z^6+96z^4+36z^2+3\right)_6^{-1}$$

01.19.03.0065.01

$$\sinh\left(\frac{7\pi i}{9}\right) == -\frac{1}{2}(-1)^{2/9}\left(-1-(-1)^{5/9}\right)$$

01.19.03.0066.01

$$\sinh\left(\frac{4\pi i}{5}\right) == \frac{i}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.19.03.0067.01

$$\sinh\left(\frac{4\pi i}{5}\right) == \left(z;\,16z^4+20z^2+5\right)_2^{-1}$$

01.19.03.0068.01

$$\sinh\left(\frac{5\pi i}{6}\right) == \frac{i}{2}$$

01.19.03.0069.01

$$\sinh\left(\frac{6\pi i}{7}\right) == \frac{1}{24}\left(2\left(i+\sqrt{3}\right)i\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}}+\frac{2\sqrt{7}\left(i+\sqrt{3}\right)}{\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}}}+\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}}\left(2+2i\sqrt{3}\right)-4\sqrt{7}\,i-\frac{2\sqrt{7}\left(-i+\sqrt{3}\right)}{\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}}}\right)$$

01.19.03.0070.01

$$\sinh\left(\frac{6\pi i}{7}\right) == \left(z;\,64z^6+112z^4+56z^2+7\right)_4^{-1}$$

01.19.03.0071.01

$$\sinh\left(\frac{6\pi i}{7}\right) == -\frac{1}{2}\sqrt[7]{-1}\left(-1-(-1)^{5/7}\right)$$

01.19.03.0072.01

$$\sinh\left(\frac{7\pi i}{8}\right) == \frac{i\sqrt{2-\sqrt{2}}}{2}$$

01.19.03.0073.01

$$\sinh\left(\frac{7\pi i}{8}\right) == \left(z;\, 8z^4+8z^2+1\right)_2^{-1}$$

01.19.03.0074.01

$$\sinh\left(\frac{7\pi i}{8}\right) == -\frac{1}{2}\sqrt[8]{-1}\left(-1-(-1)^{3/4}\right)$$

01.19.03.0075.01

$$\sinh\left(\frac{8\pi i}{9}\right) == \frac{\left(-1+i\sqrt{3}\right)^{4/3}-\left(-1-i\sqrt{3}\right)^{4/3}}{4\sqrt[3]{2}}$$

01.19.03.0076.01

$$\sinh\left(\frac{8\pi i}{9}\right) == \left(z;\, 64z^6+96z^4+36z^2+3\right)_4^{-1}$$

01.19.03.0077.01

$$\sinh\left(\frac{8\pi i}{9}\right) == -\frac{1}{2}\sqrt[9]{-1}\left(-1-(-1)^{7/9}\right)$$

01.19.03.0078.01

$$\sinh\left(\frac{9\pi i}{10}\right) == \frac{i}{4}\left(\sqrt{5}-1\right)$$

01.19.03.0079.01

$$\sinh\left(\frac{9\pi i}{10}\right) == \left(z;\, 16z^4+12z^2+1\right)_2^{-1}$$

01.19.03.0080.01

$$\sinh\left(\frac{11\pi i}{12}\right) == i\,\frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.19.03.0081.01

$$\sinh\left(\frac{11\pi i}{12}\right) == \left(z;\, 16z^4+16z^2+1\right)_2^{-1}$$

01.19.03.0082.01

$$\sinh(\pi i) == 0$$

01.19.03.0083.01

$$\sinh\left(\frac{13\pi i}{12}\right) == -i\,\frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.19.03.0084.01

$$\sinh\left(\frac{13\pi i}{12}\right) == \left(z;\, 16z^4+16z^2+1\right)_1^{-1}$$

01.19.03.0085.01

$$\sinh\left(\frac{11\pi i}{10}\right) == -\frac{i}{4}\left(\sqrt{5}-1\right)$$

01.19.03.0086.01

$$\sinh\left(\frac{11\pi i}{10}\right) = \left(z;\, 16z^4 + 12z^2 + 1\right)_1^{-1}$$

01.19.03.0087.01

$$\sinh\left(\frac{10\pi i}{9}\right) = \frac{\left(-1 - i\sqrt{3}\right)^{4/3} - \left(-1 + i\sqrt{3}\right)^{4/3}}{4\sqrt[3]{2}}$$

01.19.03.0088.01

$$\sinh\left(\frac{10\pi i}{9}\right) = \left(z;\, 64z^6 + 96z^4 + 36z^2 + 3\right)_3^{-1}$$

01.19.03.0089.01

$$\sinh\left(\frac{10\pi i}{9}\right) = -\frac{1}{2}\sqrt[9]{-1}\left(1 + (-1)^{7/9}\right)$$

01.19.03.0090.01

$$\sinh\left(\frac{9\pi i}{8}\right) = -\frac{i}{2}\sqrt{2 - \sqrt{2}}$$

01.19.03.0091.01

$$\sinh\left(\frac{9\pi i}{8}\right) = \left(z;\, 8z^4 + 8z^2 + 1\right)_1^{-1}$$

01.19.03.0092.01

$$\sinh\left(\frac{9\pi i}{8}\right) = -\frac{1}{2}\sqrt[8]{-1}\left(1 + (-1)^{3/4}\right)$$

01.19.03.0093.01

$$\sinh\left(\frac{8\pi i}{7}\right) = \frac{1}{24}\left(2\left(1 - i\sqrt{3}\right)\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}} - \left(2 + 2i\sqrt{3}\right)\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}} + \frac{2\sqrt{7}\left(-i + \sqrt{3}\right)}{\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}}} + 4\sqrt{7}\, i - \frac{2\sqrt{7}\left(i + \sqrt{3}\right)}{\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}}}\right)$$

01.19.03.0094.01

$$\sinh\left(\frac{8\pi i}{7}\right) = \left(z;\, 64z^6 + 112z^4 + 56z^2 + 7\right)_3^{-1}$$

01.19.03.0095.01

$$\sinh\left(\frac{8\pi i}{7}\right) = -\frac{1}{2}\sqrt[7]{-1}\left(1 + (-1)^{5/7}\right)$$

01.19.03.0096.01

$$\sinh\left(\frac{7\pi i}{6}\right) = -\frac{i}{2}$$

01.19.03.0097.01

$$\sinh\left(\frac{6\pi i}{5}\right) == -\frac{i}{2}\sqrt{\frac{5-\sqrt{5}}{2}}$$

01.19.03.0098.01

$$\sinh\left(\frac{6\pi i}{5}\right) == \left(z;\, 16 z^4 + 20 z^2 + 5\right)_1^{-1}$$

01.19.03.0099.01

$$\sinh\left(\frac{11\pi i}{9}\right) == \frac{\sqrt[3]{-1-i\sqrt{3}} - \sqrt[3]{-1+i\sqrt{3}}}{2\sqrt[3]{2}}$$

01.19.03.0100.01

$$\sinh\left(\frac{11\pi i}{9}\right) == \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_5^{-1}$$

01.19.03.0101.01

$$\sinh\left(\frac{11\pi i}{9}\right) == -\frac{1}{2}(-1)^{2/9}\left(1+(-1)^{5/9}\right)$$

01.19.03.0102.01

$$\sinh\left(\frac{5\pi i}{4}\right) == -\frac{i\sqrt{2}}{2}$$

01.19.03.0103.01

$$\sinh\left(\frac{9\pi i}{7}\right) == \frac{1}{12\, 2^{2/3}\sqrt[3]{7-21 i\sqrt{3}}}\left(2\sqrt{7}\, i\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - 2\sqrt{21}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - 4 i\sqrt{7}\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}} - \right.$$
$$i\sqrt{3}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} + 2\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}} +$$
$$\left.\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} - 2\, 2^{2/3}\, 7^{5/6}\sqrt[3]{1-3 i\sqrt{3}}\; i\right)$$

01.19.03.0104.01

$$\sinh\left(\frac{9\pi i}{7}\right) == \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_5^{-1}$$

01.19.03.0105.01

$$\sinh\left(\frac{9\pi i}{7}\right) == -\frac{1}{2}(-1)^{2/7}\left(1+(-1)^{3/7}\right)$$

01.19.03.0106.01

$$\sinh\left(\frac{13\pi i}{10}\right) == -\frac{i}{4}\left(\sqrt{5}+1\right)$$

01.19.03.0107.01

$$\sinh\left(\frac{13\pi i}{10}\right) = \left(z;\,16z^4+12z^2+1\right)_3^{-1}$$

01.19.03.0108.01

$$\sinh\left(\frac{4\pi i}{3}\right) = -\frac{i\sqrt{3}}{2}$$

01.19.03.0109.01

$$\sinh\left(\frac{11\pi i}{8}\right) = -\frac{i}{2}\sqrt{2+\sqrt{2}}$$

01.19.03.0110.01

$$\sinh\left(\frac{11\pi i}{8}\right) = \left(z;\,8z^4+8z^2+1\right)_3^{-1}$$

01.19.03.0111.01

$$\sinh\left(\frac{11\pi i}{8}\right) = -\frac{1}{2}(-1)^{3/8}\left(1+\sqrt[4]{-1}\right)$$

01.19.03.0112.01

$$\sinh\left(\frac{7\pi i}{5}\right) = -\frac{i}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.19.03.0113.01

$$\sinh\left(\frac{7\pi i}{5}\right) = \left(z;\,16z^4+20z^2+5\right)_3^{-1}$$

01.19.03.0114.01

$$\sinh\left(\frac{17\pi i}{12}\right) = -i\,\frac{\sqrt{3}+1}{2\sqrt{2}}$$

01.19.03.0115.01

$$\sinh\left(\frac{17\pi i}{12}\right) = \left(z;\,16z^4+16z^2+1\right)_3^{-1}$$

01.19.03.0116.01

$$\sinh\left(\frac{10\pi i}{7}\right) = \frac{1}{6\,2^{2/3}\sqrt[3]{7-21i\sqrt{3}}}\left(\sqrt{7}\left(i+\sqrt{3}\right)\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}} - \frac{1}{2}i\left(4\sqrt{7}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} + \sqrt[3]{14-42i\sqrt{3}}\left(\left(-i+\sqrt{3}\right)\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} - 2i\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\right)\right) + 2^{2/3}\,7^{5/6}\sqrt[3]{1-3i\sqrt{3}}\,(-i)\right)$$

01.19.03.0117.01

$$\sinh\left(\frac{10\pi i}{7}\right) = \left(z;\,64z^6+112z^4+56z^2+7\right)_1^{-1}$$

01.19.03.0118.01

$$\sinh\left(\frac{10\pi i}{7}\right) = -\frac{1}{2}(-1)^{3/7}\left(1+\sqrt[7]{-1}\right)$$

01.19.03.0119.01

$$\sinh\left(\frac{13\pi i}{9}\right) = \frac{\left(-1-i\sqrt{3}\right)\sqrt[3]{-1+i\sqrt{3}}+\sqrt[3]{-1-i\sqrt{3}}\left(1-i\sqrt{3}\right)}{4\sqrt[3]{2}}$$

01.19.03.0120.01

$$\sinh\left(\frac{13\pi i}{9}\right) = \left(z;\,64z^6+96z^4+36z^2+3\right)_1^{-1}$$

01.19.03.0121.01

$$\sinh\left(\frac{13\pi i}{9}\right) = -\frac{1}{2}(-1)^{4/9}\left(1+\sqrt[9]{-1}\right)$$

01.19.03.0122.01

$$\sinh\left(\frac{3\pi i}{2}\right) = -i$$

01.19.03.0123.01

$$\sinh\left(\frac{14\pi i}{9}\right) = \frac{\left(-1-i\sqrt{3}\right)\sqrt[3]{-1+i\sqrt{3}}+\sqrt[3]{-1-i\sqrt{3}}\left(1-i\sqrt{3}\right)}{4\sqrt[3]{2}}$$

01.19.03.0124.01

$$\sinh\left(\frac{14\pi i}{9}\right) = \left(z;\,64z^6+96z^4+36z^2+3\right)_1^{-1}$$

01.19.03.0125.01

$$\sinh\left(\frac{14\pi i}{9}\right) = -\frac{1}{2}(-1)^{5/9}\left(1-(-1)^{8/9}\right)$$

01.19.03.0126.01

$$\sinh\left(\frac{11\pi i}{7}\right) = \frac{1}{6\,2^{2/3}\sqrt[3]{7-21i\sqrt{3}}}\left(\sqrt{7}\left(i+\sqrt{3}\right)\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}}-\frac{1}{2}i\left(4\sqrt{7}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}}+\sqrt[3]{14-42i\sqrt{3}}\left(\left(-i+\sqrt{3}\right)\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}-2i\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}}\right)\right)+2^{2/3}\,7^{5/6}\sqrt[3]{1-3i\sqrt{3}}\,(-i)\right)$$

01.19.03.0127.01

$$\sinh\left(\frac{11\pi i}{7}\right) = \left(z;\,64z^6+112z^4+56z^2+7\right)_1^{-1}$$

01.19.03.0128.01

$$\sinh\left(\frac{11\pi i}{7}\right) = -\frac{1}{2}(-1)^{4/7}\left(1-(-1)^{6/7}\right)$$

01.19.03.0129.01

$$\sinh\left(\frac{19\pi i}{12}\right) = -i\,\frac{\sqrt{3}+1}{2\sqrt{2}}$$

01.19.03.0130.01

$$\sinh\left(\frac{19\pi i}{12}\right) = \left(z;\,16z^4+16z^2+1\right)_3^{-1}$$

01.19.03.0131.01

$$\sinh\left(\frac{8\pi i}{5}\right) = -\frac{i}{2}\sqrt{\frac{5+\sqrt{5}}{2}}$$

01.19.03.0132.01

$$\sinh\left(\frac{8\pi i}{5}\right) = \left(z;\,16z^4+20z^2+5\right)_3^{-1}$$

01.19.03.0133.01

$$\sinh\left(\frac{13\pi i}{8}\right) = -\frac{i}{2}\sqrt{2+\sqrt{2}}$$

01.19.03.0134.01

$$\sinh\left(\frac{13\pi i}{8}\right) = \left(z;\,8z^4+8z^2+1\right)_3^{-1}$$

01.19.03.0135.01

$$\sinh\left(\frac{13\pi i}{8}\right) = -\frac{1}{2}(-1)^{5/8}\left(1-(-1)^{3/4}\right)$$

01.19.03.0136.01

$$\sinh\left(\frac{5\pi i}{3}\right) = -\frac{i\sqrt{3}}{2}$$

01.19.03.0137.01

$$\sinh\left(\frac{17\pi i}{10}\right) = -\frac{i}{4}\left(\sqrt{5}+1\right)$$

01.19.03.0138.01

$$\sinh\left(\frac{17\pi i}{10}\right) = \left(z;\,16z^4+12z^2+1\right)_3^{-1}$$

01.19.03.0139.01

$$\sinh\left(\frac{12\pi i}{7}\right) = \frac{1}{12\,2^{2/3}\sqrt[3]{7-21\,i\sqrt{3}}}\left(2\sqrt{7}\,i\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - 2\sqrt{21}\sqrt[3]{7+\frac{i\sqrt{7}}{2}+\frac{3\sqrt{21}}{2}} - 4\,i\sqrt{7}\sqrt[3]{7-\frac{i\sqrt{7}}{2}-\frac{3\sqrt{21}}{2}} - \right.$$
$$i\sqrt{3}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3}\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}} + 2\left(14+i\sqrt{7}+3\sqrt{21}\right)^{2/3}\sqrt[3]{14-i\sqrt{7}-3\sqrt{21}} +$$
$$\left.\sqrt[3]{14+i\sqrt{7}+3\sqrt{21}}\left(14-i\sqrt{7}-3\sqrt{21}\right)^{2/3} - 2\,2^{2/3}\,7^{5/6}\sqrt[3]{1-3\,i\sqrt{3}}\;i\right)$$

01.19.03.0140.01

$$\sinh\left(\frac{12\pi i}{7}\right) = \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_5^{-1}$$

01.19.03.0141.01

$$\sinh\left(\frac{12\pi i}{7}\right) = -\frac{1}{2} (-1)^{5/7} \left(1 - (-1)^{4/7}\right)$$

01.19.03.0142.01

$$\sinh\left(\frac{7\pi i}{4}\right) = -\frac{i\sqrt{2}}{2}$$

01.19.03.0143.01

$$\sinh\left(\frac{16\pi i}{9}\right) = \frac{\sqrt[3]{-1 - i\sqrt{3}} - \sqrt[3]{-1 + i\sqrt{3}}}{2\sqrt[3]{2}}$$

01.19.03.0144.01

$$\sinh\left(\frac{16\pi i}{9}\right) = \left(z;\, 64 z^6 + 96 z^4 + 36 z^2 + 3\right)_5^{-1}$$

01.19.03.0145.01

$$\sinh\left(\frac{16\pi i}{9}\right) = -\frac{1}{2} (-1)^{7/9} \left(1 - (-1)^{4/9}\right)$$

01.19.03.0146.01

$$\sinh\left(\frac{9\pi i}{5}\right) = -\frac{i}{2} \sqrt{\frac{5 - \sqrt{5}}{2}}$$

01.19.03.0147.01

$$\sinh\left(\frac{9\pi i}{5}\right) = \left(z;\, 16 z^4 + 20 z^2 + 5\right)_1^{-1}$$

01.19.03.0148.01

$$\sinh\left(\frac{11\pi i}{6}\right) = -\frac{i}{2}$$

01.19.03.0149.01

$$\sinh\left(\frac{13\pi i}{7}\right) = \frac{1}{24}\left(2\left(1 - i\sqrt{3}\right)\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}} - \left(2 + 2 i\sqrt{3}\right)\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}} + \frac{2\sqrt{7}\left(-i + \sqrt{3}\right)}{\sqrt[3]{7 + \frac{i\sqrt{7}}{2} + \frac{3\sqrt{21}}{2}}} + 4\sqrt{7}\, i - \frac{2\sqrt{7}\left(i + \sqrt{3}\right)}{\sqrt[3]{7 - \frac{i\sqrt{7}}{2} - \frac{3\sqrt{21}}{2}}}\right)$$

01.19.03.0150.01

$$\sinh\left(\frac{13\pi i}{7}\right) = \left(z;\, 64 z^6 + 112 z^4 + 56 z^2 + 7\right)_3^{-1}$$

01.19.03.0151.01

$$\sinh\left(\frac{13\pi i}{7}\right) = -\frac{1}{2}(-1)^{6/7}\left(1-(-1)^{2/7}\right)$$

01.19.03.0152.01

$$\sinh\left(\frac{15\pi i}{8}\right) = -\frac{i}{2}\sqrt{2-\sqrt{2}}$$

01.19.03.0153.01

$$\sinh\left(\frac{15\pi i}{8}\right) = \left(z;\, 8z^4+8z^2+1\right)_1^{-1}$$

01.19.03.0154.01

$$\sinh\left(\frac{15\pi i}{8}\right) = -\frac{1}{2}(-1)^{7/8}\left(1-\sqrt[4]{-1}\right)$$

01.19.03.0155.01

$$\sinh\left(\frac{17\pi i}{9}\right) = \frac{\left(-1-i\sqrt{3}\right)^{4/3}-\left(-1+i\sqrt{3}\right)^{4/3}}{4\sqrt[3]{2}}$$

01.19.03.0156.01

$$\sinh\left(\frac{17\pi i}{9}\right) = \left(z;\, 64z^6+96z^4+36z^2+3\right)_3^{-1}$$

01.19.03.0157.01

$$\sinh\left(\frac{17\pi i}{9}\right) = -\frac{1}{2}(-1)^{8/9}\left(1-(-1)^{2/9}\right)$$

01.19.03.0158.01

$$\sinh\left(\frac{19\pi i}{10}\right) = -\frac{i}{4}\left(\sqrt{5}-1\right)$$

01.19.03.0159.01

$$\sinh\left(\frac{19\pi i}{10}\right) = \left(z;\, 16z^4+12z^2+1\right)_1^{-1}$$

01.19.03.0160.01

$$\sinh\left(\frac{23\pi i}{12}\right) = -i\,\frac{\sqrt{3}-1}{2\sqrt{2}}$$

01.19.03.0161.01

$$\sinh\left(\frac{23\pi i}{12}\right) = \left(z;\, 16z^4+16z^2+1\right)_1^{-1}$$

01.19.03.0162.01

$$\sinh(2\pi i) = 0$$

01.19.03.0163.01

$$\sinh\left(\frac{\pi i}{17}\right) = \frac{i}{4}\sqrt{\left(8-\sqrt{\left(2\left(\sqrt{\left(2\left(8\sqrt{2\left(\sqrt{17}+17\right)}+6\sqrt{17}+\sqrt{2\left(17-\sqrt{17}\right)}-\sqrt{34\left(17-\sqrt{17}\right)}+34\right)\right)}+\sqrt{17}-\sqrt{2\left(17-\sqrt{17}\right)}+15\right)\right)}\right)}$$

01.19.03.0164.01

$$\sinh\left(\frac{\pi i}{30}\right) == \left(\frac{1}{4}\sqrt{\frac{3}{2}\left(5-\sqrt{5}\right)} - \frac{\sqrt{5}+1}{8}\right) i$$

$\sinh\left(\frac{n i \pi}{m}\right)$ can be expressed using only square roots if $n \in \mathbb{Z}$ and m is a product of a power of 2 and distinct Fermat primes $\{3, 5, 17, 257, \ldots\}$.

Values at infinities

01.19.03.0165.01

$$\sinh(\infty) == \infty$$

01.19.03.0166.01

$$\sinh(-\infty) == -\infty$$

01.19.03.0167.01

$$\sinh(\tilde{\infty}) == ¿$$

General characteristics

Domain and analyticity

$\sinh(z)$ is an entire analytical function of z which is defined over the whole complex z-plane.

01.19.04.0001.01

$$z \longrightarrow \sinh(z) :: \mathbb{C} \longrightarrow \mathbb{C}$$

Symmetries and periodicities

Parity

$\sinh(z)$ is an odd function.

01.19.04.0002.01

$$\sinh(-z) == -\sinh(z)$$

Mirror symmetry

01.19.04.0003.01

$$\sinh(\bar{z}) == \overline{\sinh(z)}$$

Periodicity

$\sinh(z)$ is a periodic function with period $2 \pi i$.

01.19.04.0009.01

$$\sinh(z + 2 \pi i) == \sinh(z)$$

01.19.04.0004.01

$$\sinh(z + 2 i \pi m) == \sinh(z) \;/;\; m \in \mathbb{Z}$$

01.19.04.0005.01

$$\sinh(z + i \pi m) == (-1)^m \sinh(z) \;/;\; m \in \mathbb{Z}$$

Poles and essential singularities

The function $\sinh(z)$ has only one singular point at $z = \tilde{\infty}$. It is an essential singular point.

01.19.04.0006.01

$$\mathcal{S}ing_z(\sinh(z)) == \{\{\tilde{\infty}, \infty\}\}$$

Branch points

The function $\sinh(z)$ does not have branch points.

01.19.04.0007.01

$$\mathcal{BP}_z(\sinh(z)) == \{\}$$

Branch cuts

The function $\sinh(z)$ does not have branch cuts.

01.19.04.0008.01

$$\mathcal{BC}_z(\sinh(z)) == \{\}$$

Series representations

Generalized power series

Expansions at $z == z_0$

For the function itself

01.19.06.0027.01

$$\sinh(z) \propto \sinh(z_0) + \cosh(z_0)(z - z_0) + \frac{1}{2}\sinh(z_0)(z - z_0)^2 + \ldots /; (z \to z_0)$$

01.19.06.0028.01

$$\sinh(z) \propto \sinh(z_0) + \cosh(z_0)(z - z_0) + \frac{1}{2}\sinh(z_0)(z - z_0)^2 + O\left((z - z_0)^3\right)$$

01.19.06.0029.01

$$\sinh(z) == \sum_{k=0}^{\infty} \frac{(-i)^k}{k!} \sinh\left(\frac{i \pi k}{2} + z_0\right)(z - z_0)^k$$

01.19.06.0030.01

$$\sinh(z) == \frac{1}{2}\left(e^{z_0}\, {}_0F_0(;; -(z - z_0)) - e^{-z_0}\, {}_0F_0(;; z - z_0)\right)$$

01.19.06.0031.01

$$\sinh(z) \propto \sinh(z_0)(1 + O(z - z_0))$$

01.19.06.0032.01

$$\sinh(z) == F_\infty(z, z_0) /;$$
$$\left(\left(F_n(z, z_0) == \sum_{k=0}^{n} \frac{(-i)^k}{k!} \sinh\left(\frac{i \pi k}{2} + z_0\right)(z - z_0)^k == \frac{1}{2}\left(e^z\, Q(n+1, -(z - z_0)) - e^{-z}\, Q(n+1, z - z_0)\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Expansions at $z == 0$

For the function itself

01.19.06.0001.02

$$\sinh(z) \propto z + \frac{z^3}{6} + \frac{z^5}{120} + \ldots \;/;\; (z \to 0)$$

01.19.06.0033.01

$$\sinh(z) \propto z + \frac{z^3}{6} + \frac{z^5}{120} + O\left(z^7\right)$$

01.19.06.0002.01

$$\sinh(z) == \sum_{k=0}^{\infty} \frac{z^{2k+1}}{(2k+1)!}$$

01.19.06.0003.01

$$\sinh(z) == z\, {}_0F_1\left(;\frac{3}{2};\frac{z^2}{4}\right)$$

01.19.06.0004.02

$$\sinh(z) \propto z + O\left(z^3\right)$$

01.19.06.0034.01

$$\sinh(z) == F_\infty(z) \;/;\; \left(\left(F_n(z) == z\sum_{k=0}^{n} \frac{z^{2k}}{(2k+1)!} == \sinh(z) - \frac{z^{2n+3}}{(2n+3)!}\, {}_1F_2\left(1;n+2,n+\frac{5}{2};\frac{z^2}{4}\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For powers of the function

For the second power

01.19.06.0005.02

$$\sinh^2(z) \propto z^2 + \frac{z^4}{3} + \frac{2z^6}{45} + \ldots \;/;\; (z \to 0)$$

01.19.06.0035.01

$$\sinh^2(z) \propto z^2 + \frac{z^4}{3} + \frac{2z^6}{45} + O\left(z^8\right)$$

01.19.06.0006.01

$$\sinh^2(z) == \sum_{k=1}^{\infty} \frac{2^{2k-1} z^{2k}}{(2k)!}$$

01.19.06.0007.01

$$\sinh^2(z) == z^2\, {}_1F_2\left(1;2,\frac{3}{2};z^2\right)$$

01.19.06.0036.01

$$\sinh^2(z) \propto z^2 + O(z^4)$$

01.19.06.0037.01

$$\sinh^2(z) = F_\infty(z) /; \left(\left(F_m(z) = \sum_{k=1}^{m} \frac{2^{2k-1} z^{2k}}{(2k)!} = \sinh^2(z) - \frac{2^{2m+1} z^{2m+2}}{(2m+2)!} \, {}_1F_2\left(1; m+\frac{3}{2}, m+2; z^2\right)\right) \bigwedge m \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For the third power

01.19.06.0008.02

$$\sinh^3(z) \propto z^3 + \frac{z^5}{2} + \frac{13 z^7}{120} + \ldots /; (z \to 0)$$

01.19.06.0038.01

$$\sinh^3(z) \propto z^3 + \frac{z^5}{2} + \frac{13 z^7}{120} + O(z^9)$$

01.19.06.0009.01

$$\sinh^3(z) = \frac{1}{4} \sum_{k=1}^{\infty} \frac{\left(3^{2k+1} - 3\right) z^{2k+1}}{(2k+1)!}$$

01.19.06.0039.01

$$\sinh^3(z) = \frac{3z}{4} \left({}_0F_1\left(; \frac{3}{2}; \frac{9z^2}{4}\right) - {}_0F_1\left(; \frac{3}{2}; \frac{z^2}{4}\right)\right)$$

01.19.06.0040.01

$$\sinh^3(z) \propto z^3 + O(z^5)$$

01.19.06.0041.01

$$\sinh^3(z) = F_\infty(z) /; \left(\left(F_m(z) = \frac{1}{4} z^3 \sum_{j=0}^{m} \frac{\left(-3 + 3^{2j+3}\right) z^{2j}}{(2j+3)!} = \right.\right.$$

$$\left.\left. \sinh^3(z) - \frac{3 z^{2m+5}}{4\,\Gamma(2m+6)} \left(9^{m+2} \, {}_1F_2\left(1; m+3, m+\frac{7}{2}; \frac{9z^2}{4}\right) - {}_1F_2\left(1; m+3, m+\frac{7}{2}; \frac{z^2}{4}\right)\right)\right) \bigwedge m \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For symbolical integer power

01.19.06.0042.01

$$\sinh^n(z) \propto z^n \left(1 + \left(\frac{2^{1-n}}{(n+2)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{n+2}\right) z^2 + \left(\frac{2^{1-n}}{(n+4)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{n+4}\right) z^4 + \ldots\right) /; (z \to 0) \bigwedge n \in \mathbb{N}^+$$

01.19.06.0043.01

$$\sinh^n(z) \propto z^n \left(1 + \left(\frac{2^{1-n}}{(n+2)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{n+2}\right) z^2 + \left(\frac{2^{1-n}}{(n+4)!} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{k} (n-2k)^{n+4}\right) z^4 + O(z^6)\right) /; n \in \mathbb{N}^+$$

01.19.06.0044.01

$$\sinh^n(z) = 2^{1-n} z^n \sum_{j=0}^{\infty} \left(\frac{1}{(2j+n)!} \sum_{k=0}^{\lfloor \frac{n-1}{2} \rfloor} (-1)^k \binom{n}{k} (n-2k)^{2j+n} \right) z^{2j} \;/;\; n \in \mathbb{N}^+$$

01.19.06.0045.01

$$\sinh^n(z) = \frac{2^{1-n} z^n}{n!} \sum_{k=0}^{\lfloor \frac{n-1}{2} \rfloor} (-1)^k \binom{n}{k} (n-2k)^n \, {}_1F_2\left(1; \frac{n+1}{2}, \frac{n}{2}+1; \frac{(n-2k)^2 z^2}{4}\right) \;/;\; n \in \mathbb{N}^+$$

01.19.06.0046.01

$$\sinh^n(z) \propto z^n \left(1 + O\left(z^2\right)\right) \;/;\; n \in \mathbb{N}^+$$

01.19.06.0047.01

$$\sinh^n(z) = F_\infty(z) \;/;$$
$$\left(\left(F_m(z) = 2^{1-n} z^n \sum_{j=0}^{m} \left(\frac{1}{(2j+n)!} \sum_{k=0}^{\lfloor \frac{n-1}{2} \rfloor} (-1)^k \binom{n}{k} (n-2k)^{2j+n} \right) z^{2j} = 2^{1-n} z^n \sum_{k=0}^{\lfloor \frac{n-1}{2} \rfloor} (-1)^k \binom{n}{k} (n-2k)^n \left(\frac{1}{n!} \, {}_1F_2\left(1; \frac{n}{2}+\frac{1}{2}, \frac{n}{2}+1; \frac{(n-2k)^2 z^2}{4}\right) - \frac{\left((n-2k)^2 z^2\right)^{m+1}}{\Gamma(2m+n+3)} \, {}_1F_2\left(1; \frac{n+3}{2}+m, m+\frac{n}{2}+2; \frac{(n-2k)^2 z^2}{4}\right)\right)\right) \bigwedge m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+\right)$$

Summed form of the truncated series expansion.

Expansions at $z = \frac{\pi i}{2}$

For the function itself

01.19.06.0010.02

$$\sinh(z) \propto i + \frac{i}{2}\left(z - \frac{i\pi}{2}\right)^2 + \frac{i}{24}\left(z - \frac{i\pi}{2}\right)^4 + \frac{i}{720}\left(z - \frac{i\pi}{2}\right)^6 + \ldots \;/;\; \left(z \to \frac{i\pi}{2}\right)$$

01.19.06.0048.01

$$\sinh(z) \propto i + \frac{i}{2}\left(z - \frac{i\pi}{2}\right)^2 + \frac{i}{24}\left(z - \frac{i\pi}{2}\right)^4 + \frac{i}{720}\left(z - \frac{i\pi}{2}\right)^6 + O\left(\left(z - \frac{i\pi}{2}\right)^8\right)$$

01.19.06.0011.01

$$\sinh(z) = i \sum_{k=0}^{\infty} \frac{1}{(2k)!} \left(z - \frac{i\pi}{2}\right)^{2k}$$

01.19.06.0012.01

$$\sinh(z) = i \, {}_0F_1\left(; \frac{1}{2}; \frac{1}{4}\left(z - \frac{i\pi}{2}\right)^2\right)$$

01.19.06.0013.02

$$\sinh(z) \propto i + O\left(\left(z - \frac{i\pi}{2}\right)^2\right)$$

01.19.06.0049.01

$$\sinh(z) = F_\infty(z) /; \left(\left(F_n(z) = i \sum_{k=0}^{n} \frac{1}{(2k)!} \left(z - \frac{\pi i}{2}\right)^{2k} = \sinh(z) - \frac{i\sqrt{\pi}}{2^{2n+2}} \left(z - \frac{\pi i}{2}\right)^{2+2n} {}_1\tilde{F}_2\left(1; n + \frac{3}{2}, n + 2; \frac{1}{4}\left(z - \frac{\pi i}{2}\right)^2\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For powers of the function

For the second power

01.19.06.0014.02

$$\sinh^2(z) \propto -1 - \left(z - \frac{i\pi}{2}\right)^2 - \frac{1}{3}\left(z - \frac{i\pi}{2}\right)^4 - \frac{2}{45}\left(z - \frac{i\pi}{2}\right)^6 - \ldots /; \left(z \to \frac{i\pi}{2}\right)$$

01.19.06.0050.01

$$\sinh^2(z) \propto -1 - \left(z - \frac{i\pi}{2}\right)^2 - \frac{1}{3}\left(z - \frac{i\pi}{2}\right)^4 - \frac{2}{45}\left(z - \frac{i\pi}{2}\right)^6 + O\left(\left(z - \frac{i\pi}{2}\right)^8\right)$$

01.19.06.0015.01

$$\sinh^2(z) = -1 - \sum_{k=1}^{\infty} \frac{2^{2k-1}}{(2k)!} \left(z - \frac{i\pi}{2}\right)^{2k}$$

01.19.06.0016.01

$$\sinh^2(z) = -\frac{1}{2}\, {}_0F_1\left(; \frac{1}{2}; \left(z - \frac{i\pi}{2}\right)^2\right) - \frac{1}{2}$$

01.19.06.0051.01

$$\sinh^2(z) \propto -1 + O\left(\left(z - \frac{i\pi}{2}\right)^2\right)$$

01.19.06.0052.01

$$\sinh^2(z) = F_\infty(z) /; \left(\left(F_m(z) = -1 - \sum_{k=1}^{m} \frac{2^{2k-1}}{(2k)!} \left(z - \frac{\pi i}{2}\right)^{2k} = \sinh^2(z) + \frac{\sqrt{\pi}}{2} \left(z - \frac{\pi i}{2}\right)^{2+2m} {}_1\tilde{F}_2\left(1; m + \frac{3}{2}, m + 2; \left(z - \frac{\pi i}{2}\right)^2\right)\right) \bigwedge m \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

For the third power

01.19.06.0017.02

$$\sinh^3(z) \propto -i - \frac{3i}{2}\left(z - \frac{i\pi}{2}\right)^2 - \frac{7i}{8}\left(z - \frac{i\pi}{2}\right)^4 - \frac{61i}{240}\left(z - \frac{i\pi}{2}\right)^6 - \ldots /; \left(z \to \frac{i\pi}{2}\right)$$

01.19.06.0053.01

$$\sinh^3(z) \propto -i - \frac{3i}{2}\left(z - \frac{i\pi}{2}\right)^2 - \frac{7i}{8}\left(z - \frac{i\pi}{2}\right)^4 - \frac{61i}{240}\left(z - \frac{i\pi}{2}\right)^6 + O\left(\left(z - \frac{i\pi}{2}\right)^8\right)$$

01.19.06.0018.01

$$\sinh^3(z) = -\frac{i}{4}\sum_{k=0}^{\infty}\frac{(3+3^{2k})}{(2k)!}\left(z-\frac{i\pi}{2}\right)^{2k}$$

01.19.06.0054.01

$$\sinh^3(z) = -\frac{3i}{4}\,{}_0F_1\!\left(;\frac{1}{2};\frac{1}{4}\left(z-\frac{i\pi}{2}\right)^2\right)-\frac{i}{4}\,{}_0F_1\!\left(;\frac{1}{2};\frac{9}{4}\left(z-\frac{i\pi}{2}\right)^2\right)$$

01.19.06.0055.01

$$\sinh^3(z) \propto -i + O\left(\left(z-\frac{i\pi}{2}\right)^2\right)$$

01.19.06.0056.01

$$\sinh^3(z) = F_\infty(z) \;/;\; \left(\left(F_m(z) = -\frac{i}{4}\sum_{k=0}^{m}\frac{(3+3^{2k})}{(2k)!}\left(z-\frac{\pi i}{2}\right)^{2k} = \sinh^3(z) + i\,2^{-4-2m}\sqrt{\pi}\left(z-\frac{\pi i}{2}\right)^{2+2m}\left(3\,{}_1\tilde{F}_2\!\left(1;m+\frac{3}{2},m+2;\frac{1}{4}\left(z-\frac{\pi i}{2}\right)^2\right)+3^{2m+2}\,{}_1\tilde{F}_2\!\left(1;m+\frac{3}{2},m+2;\frac{1}{4}\left(z-\frac{\pi i}{2}\right)^2\right)\right)\right)\bigwedge m\in\mathbb{N}\right)$$

Summed form of the truncated series expansion.

For symbolical integer power

01.19.06.0057.01

$$\sinh^n(z) \propto i^n\left(1-\frac{1}{2^{n+2}}\left((1+(-1)^n)\binom{n}{\lfloor\frac{n}{2}\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor\right)^2-2^{n+1}n\right)\left(z-\frac{\pi i}{2}\right)^2+\frac{1}{3\,2^{n+4}}\left(2^{n+1}n(3n-2)-(1+(-1)^n)\binom{n}{\lfloor\frac{n}{2}\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor\right)^4\right)\left(z-\frac{\pi i}{2}\right)^4+\ldots\right)/;\left(z\to\frac{\pi i}{2}\right)\bigwedge n\in\mathbb{N}^+$$

01.19.06.0058.01

$$\sinh^n(z) \propto i^n\left(1-\frac{1}{2^{n+2}}\left((1+(-1)^n)\binom{n}{\lfloor\frac{n}{2}\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor\right)^2-2^{n+1}n\right)\left(z-\frac{\pi i}{2}\right)^2+\frac{1}{3\,2^{n+4}}\left(2^{n+1}n(3n-2)-(1+(-1)^n)\binom{n}{\lfloor\frac{n}{2}\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor\right)^4\right)\left(z-\frac{\pi i}{2}\right)^4+O\left(\left(z-\frac{\pi i}{2}\right)^6\right)\right)/;n\in\mathbb{N}^+$$

01.19.06.0059.01

$$\sinh^n(z) = i^n\left(1+2^{1-n}\sum_{j=1}^{\infty}\left(\frac{1}{(2j)!}\sum_{k=0}^{\lfloor\frac{n-1}{2}\rfloor}\binom{n}{k}(n-2k)^{2j}\right)\left(z-\frac{\pi i}{2}\right)^{2j}\right)/;n\in\mathbb{N}^+$$

01.19.06.0060.01

$$\sinh^n(z) = i^n\left(2^{-n}\binom{n}{\frac{n}{2}}(1-n\bmod 2)+2^{1-n}\sum_{k=0}^{\lfloor\frac{n-1}{2}\rfloor}\binom{n}{k}\,{}_0F_1\!\left(;\frac{1}{2};\frac{(n-2k)^2}{4}\left(z-\frac{\pi i}{2}\right)^2\right)\right)/;n\in\mathbb{N}^+$$

01.19.06.0061.01

$$\sinh^n(z) \propto i^n + O\left(\left(z-\frac{\pi i}{2}\right)^2\right)/;n\in\mathbb{N}^+$$

01.19.06.0062.01

$$\sinh^n(z) == F_\infty(z) /; \left(\left(F_m(z) == i^n \left(1 + 2^{1-n} \sum_{j=1}^{m} \frac{1}{(2j)!} \left((-1)^j \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{k} (n-2k)^{2j}\right) \left(z - \frac{\pi i}{2}\right)^{2j}\right) == \sinh^n(z) - \frac{i^n \sqrt{\pi}}{2^{n+2m+1}} \left(z - \frac{\pi i}{2}\right)^{2+2m} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{k} (n-2k)^{2m+2} \, {}_1\tilde{F}_2\left(1; m + \frac{3}{2}, m+2; \frac{(n-2k)^2}{4} \left(z - \frac{\pi i}{2}\right)^2\right)\right) \bigwedge m \in \mathbb{N} \bigwedge n \in \mathbb{N}^+\right)$$

Summed form of the truncated series expansion.

q-series

01.19.06.0019.01

$$\sinh(z) == \frac{1}{2}\left(q - \frac{1}{q}\right) /; q == e^{\pi z}$$

Exponential Fourier series

01.19.06.0020.01

$$\sinh(a x) == -\frac{2 \sinh(a \pi)}{\pi} \sum_{k=1}^{\infty} \frac{(-1)^k k \sin(k x)}{k^2 + a^2} /; i a \notin \mathbb{Z} \bigwedge -\pi < x < \pi$$

Asymptotic series expansions

01.19.06.0021.01

$$\sinh(z) \propto \sinh(z) /; (|z| \to \infty)$$

01.19.06.0022.01

$$\sinh(z) \propto \frac{e^z}{2} /; \left(z \to e^{i \phi} \infty\right) \bigwedge -\frac{\pi}{2} < \phi < \frac{\pi}{2}$$

01.19.06.0023.01

$$\sinh(z) \propto -\frac{e^{-z}}{2} /; \left(z \to e^{i \phi} \infty\right) \bigwedge -\pi < \phi < -\frac{\pi}{2} \bigvee \frac{\pi}{2} < \phi \leq \pi$$

01.19.06.0063.01

$$\sinh(z) \propto \begin{cases} -\frac{e^{-z}}{2} & -\pi < \arg(z) < -\frac{\pi}{2} \bigvee \frac{\pi}{2} < \arg(z) \leq \pi \\ \frac{e^z}{2} & -\frac{\pi}{2} < \arg(z) < \frac{\pi}{2} \\ \sinh(z) & \text{True} \end{cases} /; (|z| \to \infty)$$

Other series representations

01.19.06.0025.01

$$\sinh(z) == 2 \sum_{k=0}^{\infty} I_{2k+1}(z)$$

01.19.06.0026.01

$$\log\left(\frac{\sinh(z)}{z}\right) == \sum_{k=1}^{\infty} \frac{2^{2k-1} B_{2k} z^{2k}}{k (2k)!} /; 1.780467 < |z| \leq \pi$$

Residue representations

01.19.06.0024.01

$$\sinh(z) = \frac{\sqrt{\pi}}{2}\, z \sum_{j=0}^{\infty} \operatorname{res}_s\!\left(\frac{\left(-\frac{z^2}{4}\right)^{-s}}{\Gamma\!\left(\frac{3}{2}-s\right)}\,\Gamma(s)\right)(-j)$$

Integral representations

On the real axis

Of the direct function

01.19.07.0001.01

$$\sinh(z) = z \int_0^1 \cosh(z\,t)\,dt$$

Contour integral representations

01.19.07.0002.01

$$\sinh(z) = \frac{\sqrt{\pi}\,z}{2}\,\frac{1}{2\,\pi\,i}\int_{\gamma-i\,\infty}^{\gamma+i\,\infty} e^{s+\frac{z^2}{4s}}\, s^{-\frac{3}{2}}\,ds \;/;\; \gamma > 0$$

01.19.07.0003.01

$$\sinh(z) = \frac{\sqrt{\pi}\,z}{4\,i}\int_{\mathcal{L}} \frac{\Gamma(s)}{\Gamma\!\left(s+\frac{1}{2}\right)\Gamma\!\left(\frac{1}{2}-s\right)\Gamma\!\left(\frac{3}{2}-s\right)}\left(\frac{z^2}{4}\right)^{-s} ds$$

Product representations

01.19.08.0001.01

$$\sinh(z) = z \prod_{k=1}^{\infty}\left(1+\frac{z^2}{\pi^2\,k^2}\right)$$

01.19.08.0002.01

$$\sinh(z) = z \prod_{\substack{k=-\infty \\ k\neq 0}}^{\infty}\left(1-\frac{i\,z}{\pi\,k}\right) e^{\frac{i\,z}{\pi\,k}}$$

01.19.08.0003.01

$$\sinh(z) = z \prod_{k=1}^{\infty}\cosh\!\left(2^{-k}\,z\right) \;/;\; |z| < 1$$

01.19.08.0004.01

$$\sinh(z) = z \prod_{k=1}^{\infty}\left(1+\frac{4}{3}\sinh^2\!\left(\frac{z}{3^k}\right)\right)$$

Limit representations

01.19.09.0001.01

$$\sinh(z) == -\frac{i\sqrt{\pi}}{2}\lim_{n\to\infty}\frac{(-1)^n}{4^n\, n!} H_{2n+1}\left(\frac{i z}{2\sqrt{n}}\right)$$

01.19.09.0002.01

$$\sinh(z) == -i\lim_{z\to\infty}\frac{(-1)^n \pi^{2n+1}}{4\,(2n)!} E_{2n}\left(\frac{i z}{\pi}\right)$$

01.19.09.0003.01

$$\sinh(z) == -i\lim_{a\to\infty}\operatorname{Se}\left(a,\, q,\, \frac{i z}{\sqrt{a}}\right) /;\ q \in \mathbb{R}$$

01.19.09.0004.01

$$\sinh(z) == i\lim_{a\to\infty}\frac{1}{\sqrt{a}}\operatorname{Ce}'\left(a,\, q,\, \frac{i z}{\sqrt{a}}\right) /;\ q \in \mathbb{R}$$

Differential equations

Ordinary linear differential equations and wronskians

For the direct function itself

01.19.13.0001.01

$$w''(z) - w(z) == 0 /;\ w(z) == \sinh(z) \bigwedge w(0) == 0 \bigwedge w'(0) == 1$$

01.19.13.0002.01

$$w''(z) - w(z) == 0 /;\ w(z) == c_1 \cosh(z) + c_2 \sinh(z)$$

01.19.13.0003.01

$$W_z(\cosh(z), \sinh(z)) == 1$$

01.19.13.0004.01

$$w''(z) - a\, w(z) + b == 0 /;\ w(z) == \frac{b}{a} + c_1 \cosh\left(\sqrt{a}\, z\right) + c_2 \sinh\left(\sqrt{a}\, z\right)$$

01.19.13.0005.01

$$W_z\left(\cosh\left(\sqrt{a}\, z\right), \sinh\left(\sqrt{a}\, z\right)\right) == \sqrt{a}$$

01.19.13.0008.01

$$w''(z) - \frac{g''(z)}{g'(z)} w'(z) - g'(z)^2\, w(z) = 0 /;\ w(z) = c_1 \cosh(g(z)) + c_2 \sinh(g(z))$$

01.19.13.0009.01

$$W_z(\cosh(g(z)), \sinh(g(z))) == g'(z)$$

01.19.13.0010.01

$$w''(z) - \left(\frac{2\, h'(z)}{h(z)} + \frac{g''(z)}{g'(z)}\right) w'(z) + \left(-g'(z)^2 + \frac{2\, h'(z)^2}{h(z)^2} + \frac{h'(z)\, g''(z)}{h(z)\, g'(z)} - \frac{h''(z)}{h(z)}\right) w(z) = 0 /;$$
$$w(z) = c_1\, h(z) \cosh(g(z)) + c_2\, h(z) \sinh(g(z))$$

01.19.13.0011.01

$$W_z(h(z) \cosh(g(z)), h(z) \sinh(g(z))) == h(z)^2\, g'(z)$$

01.19.13.0012.01

$$z^2 w''(z) - (r+2s-1) z w'(z) + \left(s(r+s) - a^2 r^2 z^{2r}\right) w(z) = 0 /; w(z) = c_1 z^s \cosh(a z^r) + c_2 z^s \sinh(a z^r)$$

01.19.13.0013.01

$$W_z(z^s \cosh(a z^r), z^s \sinh(a z^r)) = a r z^{r+2s-1}$$

01.19.13.0014.01

$$w''(z) - (\log(r) + 2\log(s)) w'(z) + \left(\log(s)(\log(r) + \log(s)) - a^2 r^{2z} \log^2(r)\right) w(z) = 0 /; w(z) = c_1 s^z \cosh(a r^z) + c_2 s^z \sinh(a r^z)$$

01.19.13.0015.01

$$W_z(s^z \cosh(a r^z), s^z \sinh(a r^z)) = a r^z s^{2z} \log(r)$$

Ordinary nonlinear differential equations

01.19.13.0006.02

$$w'(z) - \sqrt{w(z)^2 + 1} = 0 /; w(z) = \sinh(z) \bigwedge w(0) = 0 \bigwedge |\mathrm{Im}(z)| < \frac{\pi}{2}$$

01.19.13.0007.01

$$w'(z) + \sqrt{a w(z)^2 + b w(z) + c} = 0 /; w(z) = \frac{\sqrt{b^2 - 4ac}}{2a}\left(i \sqrt{c_1} \sinh\left(\sqrt{-a}\, z\right) - \sqrt{1 - c_1} \cosh\left(\sqrt{-a}\, z\right)\right) - \frac{b}{2a}$$

Transformations

Transformations and argument simplifications

Argument involving basic arithmetic operations

01.19.16.0001.01

$$\sinh(-z) = -\sinh(z)$$

01.19.16.0002.01

$$\sinh(a (b z^c)^m) = \frac{(b z^c)^m}{b^m z^{mc}} \sinh(a b^m z^{mc}) /; 2m \in \mathbb{Z}$$

01.19.16.0003.01

$$\sinh\left(\sqrt{z^2}\right) = \frac{\sqrt{z^2}}{z} \sinh(z)$$

Argument involving inverse trigonometric and hyperbolic functions

Involving $\sin^{-1}$

01.19.16.0127.01

$$\sinh\left(\sin^{-1}(z)\right) = -\frac{1}{2}\left(i z + \sqrt{1 - z^2}\right)^{-i}\left(\left(i z + \sqrt{1 - z^2}\right)^{2i} - 1\right)$$

01.19.16.0004.01

$$\sinh\left(i \sin^{-1}(z)\right) = i z$$

01.19.16.0017.01

$$\sinh\left(\frac{i}{2}\sin^{-1}(z)\right) = \frac{i\, z}{\sqrt{2}\,\sqrt{z^2}}\sqrt{1-\sqrt{1-z^2}}$$

01.19.16.0128.01

$$\sinh\left(a\sin^{-1}(z)\right) = -\frac{1}{2}\left(i\,z+\sqrt{1-z^2}\right)^{-i\,a}\left(\left(i\,z+\sqrt{1-z^2}\right)^{2\,i\,a}-1\right)$$

01.19.16.0029.01

$$\sinh\left(i\,n\sin^{-1}(z)\right) = i\,z\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}\left(1-z^2\right)^{\frac{n-1}{2}-k} /;\, n\in\mathbb{N}^+$$

01.19.16.0030.01

$$\sinh\left(i\,n\sin^{-1}(z)\right) = i\,z\,U_{n-1}\left(\sqrt{1-z^2}\right)$$

01.19.16.0057.01

$$\sinh\left(\frac{i\,n}{2}\sin^{-1}(z)\right) = i\,z\left(\sqrt{1-z^2}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n/2-k-1}\left(\frac{1-\sqrt{1-z^2}}{z^2}\right)^k /;\, n\in\mathbb{N}^+$$

01.19.16.0058.01

$$\sinh\left(\frac{i\,n}{2}\sin^{-1}(z)\right) = \frac{i\,z\sqrt{1-\sqrt{1-z^2}}}{\sqrt{2}\,\sqrt{z^2}}\,U_{n-1}\left(\frac{\sqrt{\sqrt{1-z^2}+1}}{\sqrt{2}}\right) /;\, n\in\mathbb{N}^+$$

Involving $\cos^{-1}$

01.19.16.0129.01

$$\sinh\left(\cos^{-1}(z)\right) = \frac{1}{2}e^{-\frac{\pi}{2}}\left(i\,z+\sqrt{1-z^2}\right)^{-i}\left(e^{\pi}\left(i\,z+\sqrt{1-z^2}\right)^{2\,i}-1\right)$$

01.19.16.0005.01

$$\sinh\left(i\cos^{-1}(z)\right) = i\sqrt{1-z^2}$$

01.19.16.0018.01

$$\sinh\left(\frac{i}{2}\cos^{-1}(z)\right) = \frac{i\sqrt{1-z}}{\sqrt{2}}$$

01.19.16.0130.01

$$\sinh\left(a\cos^{-1}(z)\right) = \frac{1}{2}e^{-\frac{1}{2}(a\,\pi)}\left(-1+e^{2\,a\cos^{-1}(z)}\right)\left(i\,z+\sqrt{1-z^2}\right)^{-i\,a}$$

01.19.16.0031.01

$$\sinh\left(i\,n\cos^{-1}(z)\right) = i\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{2\,k+1}\left(1-z^2\right)^{k+\frac{1}{2}}z^{n-2\,k-1} /;\, n\in\mathbb{N}^+$$

01.19.16.0032.01

$$\sinh\left(n\cosh^{-1}(z)\right) = i\sqrt{1-z^2}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}z^{n-2k-1}\;/;\;n\in\mathbb{N}^+$$

01.19.16.0033.01

$$\sinh\left(n\cosh^{-1}(z)\right) = i\sqrt{1-z^2}\;U_{n-1}(z)$$

01.19.16.0059.01

$$\sinh\left(\frac{i\,n}{2}\cos^{-1}(z)\right) = i\sqrt{1-z}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n/2-k-1}(z+1)^{\frac{n-1}{2}-k}\;/;\;n\in\mathbb{N}^+$$

01.19.16.0060.01

$$\sinh\left(\frac{i\,n}{2}\cos^{-1}(z)\right) = \frac{i\sqrt{1-z}}{\sqrt{2}}\,U_{n-1}\left(\frac{\sqrt{z+1}}{\sqrt{2}}\right)\;/;\;n\in\mathbb{N}^+$$

Involving $\tan^{-1}$

01.19.16.0131.01

$$\sinh\left(\tan^{-1}(z)\right) = \frac{1}{2}\left((1-i\,z)^i-(i\,z+1)^i\right)\left(z^2+1\right)^{-\frac{i}{2}}$$

01.19.16.0132.01

$$\sinh\left(\tan^{-1}(x,y)\right) = -\frac{1}{2}\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{-i}\left(\left(\frac{x+i\,y}{\sqrt{x^2+y^2}}\right)^{2i}-1\right)$$

01.19.16.0006.01

$$\sinh\left(i\tan^{-1}(z)\right) = \frac{i\,z}{\sqrt{1+z^2}}$$

01.19.16.0007.01

$$\sinh\left(i\tan^{-1}(x,y)\right) = \frac{i\,y}{\sqrt{x^2+y^2}}$$

01.19.16.0019.01

$$\sinh\left(\frac{i}{2}\tan^{-1}(z)\right) = \frac{i\,z}{\sqrt{2}\sqrt{z^2}}\sqrt{1-\frac{1}{\sqrt{1+z^2}}}$$

01.19.16.0133.01

$$\sinh\left(\frac{1}{2}\,i\tan^{-1}(x,y)\right) = \frac{\frac{x+i\,y}{\sqrt{x^2+y^2}}-1}{2\sqrt{\frac{x+i\,y}{\sqrt{x^2+y^2}}}}$$

01.19.16.0134.01

$$\sinh\left(a\tan^{-1}(z)\right) = \frac{1}{2}\left((1-i\,z)^{i\,a}-(i\,z+1)^{i\,a}\right)\left(z^2+1\right)^{-\frac{1}{2}(i\,a)}$$

01.19.16.0135.01

$$\sinh\left(a \tan^{-1}(x, y)\right) = -\frac{1}{2}\left(\frac{x + i y}{\sqrt{x^2 + y^2}}\right)^{-i a}\left(\left(\frac{x + i y}{\sqrt{x^2 + y^2}}\right)^{2 i a} - 1\right)$$

01.19.16.0034.01

$$\sinh\left(i n \tan^{-1}(z)\right) = i\left(z^2 + 1\right)^{-\frac{n}{2}} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n}{2k+1} z^{2k+1} /; n \in \mathbb{N}^+$$

01.19.16.0035.01

$$\sinh\left(i n \tan^{-1}(z)\right) = \frac{i z}{\sqrt{z^2 + 1}} U_{n-1}\left(\frac{1}{\sqrt{z^2 + 1}}\right) /; n \in \mathbb{N}^+$$

01.19.16.0036.01

$$\sinh\left(i n \tan^{-1}(x, y)\right) = \frac{i x^{n-1} y}{\left(x^2 + y^2\right)^{n/2}} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n-k-1}{k} 2^{n-2k-1} \left(\frac{x^2 + y^2}{x^2}\right)^k /; n \in \mathbb{N}^+$$

01.19.16.0037.01

$$\sinh\left(i n \tan^{-1}(x, y)\right) = \frac{i y}{\sqrt{x^2 + y^2}} U_{n-1}\left(\frac{x}{\sqrt{x^2 + y^2}}\right)$$

01.19.16.0061.01

$$\sinh\left(\frac{i n}{2} \tan^{-1}(z)\right) = \frac{i z}{\sqrt{z^2 + 1}} \left(1 + \frac{1}{\sqrt{z^2 + 1}}\right)^{\frac{n}{2}-1} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n-k-1}{k} 2^{\frac{n}{2}-k-1} \left(\frac{\sqrt{z^2 + 1}}{\sqrt{z^2 + 1} + 1}\right)^k /; n \in \mathbb{N}^+$$

01.19.16.0062.01

$$\sinh\left(\frac{i n}{2} \tan^{-1}(z)\right) = \frac{i z}{\sqrt{2} \sqrt{z^2}} \sqrt{1 - \frac{1}{\sqrt{z^2 + 1}}} \, U_{n-1}\left(\frac{1}{\sqrt{2}} \sqrt{1 + \frac{1}{\sqrt{z^2 + 1}}}\right) /; n \in \mathbb{N}^+$$

Involving $\cot^{-1}$

01.19.16.0136.01

$$\sinh\left(\cot^{-1}(z)\right) = \frac{1}{2}\left(1 + \frac{1}{z^2}\right)^{-\frac{i}{2}} \left(\left(\frac{-i + z}{z}\right)^i - \left(\frac{i + z}{z}\right)^i\right)$$

01.19.16.0137.01

$$\sinh\left(i \cot^{-1}(z)\right) = \frac{i}{\sqrt{1 + \frac{1}{z^2}} \, z}$$

01.19.16.0008.01

$$\sinh\left(i \cot^{-1}(z)\right) = \frac{i \sqrt{-z}}{\sqrt{z} \sqrt{-1 - z^2}}$$

01.19.16.0020.01

$$\sinh\left(\frac{i}{2}\cot^{-1}(z)\right) = \frac{i}{\sqrt{2}}\sqrt{\frac{1}{z^2}}\, z\sqrt{1-\frac{1}{\sqrt{1+\frac{1}{z^2}}}}$$

01.19.16.0138.01

$$\sinh\left(a\cot^{-1}(z)\right) = \frac{1}{2}\left(1+\frac{1}{z^2}\right)^{-\frac{1}{2}(i a)}\left(\left(\frac{-i+z}{z}\right)^{i a}-\left(\frac{i+z}{z}\right)^{i a}\right)$$

01.19.16.0038.01

$$\sinh\left(i\, n\cot^{-1}(z)\right) = i\left(1+\frac{1}{z^2}\right)^{-\frac{n}{2}}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n}{2k+1}z^{-2k-1}\;/;\; n\in\mathbb{N}^+$$

01.19.16.0039.01

$$\sinh\left(i\, n\cot^{-1}(z)\right) = \frac{i\sqrt{-z}}{\sqrt{z}\sqrt{-z^2-1}}\, U_{n-1}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}\right)\;/;\; n\in\mathbb{N}^+$$

01.19.16.0063.01

$$\sinh\left(\frac{i\, n}{2}\cot^{-1}(z)\right) = \frac{i}{z\sqrt{1+\frac{1}{z^2}}}\left(\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(1-\left(\sqrt{1+\frac{1}{z^2}}-1\right)z^2\right)^k\;/;\; n\in\mathbb{N}^+$$

01.19.16.0064.01

$$\sinh\left(\frac{i\, n}{2}\cot^{-1}(z)\right) = \frac{i\, z}{\sqrt{2}}\sqrt{\frac{1}{z^2}}\sqrt{1-\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}}\; U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{-z^2}}{\sqrt{-z^2-1}}+1}\right)\;/;\; n\in\mathbb{N}^+$$

Involving $\csc^{-1}$

01.19.16.0139.01

$$\sinh\left(\csc^{-1}(z)\right) = \frac{1}{2}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i}-\frac{1}{2}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{i}$$

01.19.16.0009.01

$$\sinh\left(i\csc^{-1}(z)\right) = \frac{i}{z}$$

01.19.16.0021.01

$$\sinh\left(\frac{i}{2}\csc^{-1}(z)\right) = \frac{i\, z}{\sqrt{2}}\sqrt{\frac{1}{z^2}}\sqrt{1-\frac{\sqrt{z^2}\sqrt{-1+z^2}}{z^2}}$$

01.19.16.0140.01

$$\sinh\left(a\csc^{-1}(z)\right) = \frac{1}{2}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i a}-\frac{1}{2}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{i a}$$

01.19.16.0040.01

$$\sinh(i\,n\csc^{-1}(z)) = \frac{i}{z}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}\left(1-\frac{1}{z^2}\right)^{\frac{n-1}{2}-k} /;\ n\in\mathbb{N}^+$$

01.19.16.0041.01

$$\sinh(i\,n\csc^{-1}(z)) = \frac{i}{z}U_{n-1}\left(\sqrt{1-\frac{1}{z^2}}\right) /;\ n\in\mathbb{N}^+$$

01.19.16.0065.01

$$\sinh\left(\frac{i\,n}{2}\csc^{-1}(z)\right) = \frac{i}{z}\left(\frac{\sqrt{z^2-1}}{\sqrt{z^2}}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(z^2-\sqrt{z^2}\sqrt{z^2-1}\right)^k /;\ n\in\mathbb{N}^+$$

01.19.16.0066.01

$$\sinh\left(\frac{i\,n}{2}\csc^{-1}(z)\right) = \frac{i\,z}{\sqrt{2}}\sqrt{\frac{1}{z^2}}\sqrt{1-\sqrt{1-\frac{1}{z^2}}}\,U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\sqrt{1-\frac{1}{z^2}}+1}\right) /;\ n\in\mathbb{N}^+$$

Involving $\sec^{-1}$

01.19.16.0141.01

$$\sinh(\sec^{-1}(z)) = \frac{1}{2}e^{\pi/2}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{i} - \frac{1}{2}e^{-\frac{\pi}{2}}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i}$$

01.19.16.0010.01

$$\sinh(i\sec^{-1}(z)) = i\sqrt{1-\frac{1}{z^2}}$$

01.19.16.0022.01

$$\sinh\left(\frac{i}{2}\sec^{-1}(z)\right) = \frac{i\sqrt{z-1}}{\sqrt{2}\sqrt{z}}$$

01.19.16.0142.01

$$\sinh(a\sec^{-1}(z)) = \frac{1}{2}e^{\frac{a\pi}{2}}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{i\,a} - \frac{1}{2}e^{-\frac{1}{2}(a\pi)}\left(\sqrt{1-\frac{1}{z^2}}+\frac{i}{z}\right)^{-i\,a}$$

01.19.16.0042.01

$$\sinh(i\,n\sec^{-1}(z)) = i\sqrt{1-\frac{1}{z^2}}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}z^{2k-n+1} /;\ n\in\mathbb{N}^+$$

01.19.16.0043.01

$$\sinh(i\,n\sec^{-1}(z)) = i\sqrt{1-\frac{1}{z^2}}\,U_{n-1}\left(\frac{1}{z}\right)$$

01.19.16.0067.01

$$\sinh\left(\frac{i\,n}{2}\sec^{-1}(z)\right) = i\left(\frac{z+1}{z}\right)^{\frac{n-1}{2}}\sqrt{\frac{z-1}{z}}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(\frac{z}{z+1}\right)^k /; n \in \mathbb{N}^+$$

01.19.16.0068.01

$$\sinh\left(\frac{i\,n}{2}\sec^{-1}(z)\right) = \frac{i}{\sqrt{2}}\sqrt{\frac{z-1}{z}}\,U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{z+1}{z}}\right) /; n \in \mathbb{N}^+$$

Involving $\sinh^{-1}$

01.19.16.0011.01

$$\sinh(\sinh^{-1}(z)) = z$$

01.19.16.0023.01

$$\sinh\left(\frac{1}{2}\sinh^{-1}(z)\right) = \frac{z}{\sqrt{2}\sqrt{z^2}}\sqrt{\sqrt{z^2+1}-1}$$

01.19.16.0143.01

$$\sinh(i\sinh^{-1}(z)) = \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{i} - \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{-i}$$

01.19.16.0144.01

$$\sinh(a\sinh^{-1}(z)) = \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{a} - \frac{1}{2}\left(z+\sqrt{z^2+1}\right)^{-a}$$

01.19.16.0044.01

$$\sinh(n\sinh^{-1}(z)) = z\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}\left(z^2+1\right)^{\frac{n-1}{2}-k} /; n \in \mathbb{N}^+$$

01.19.16.0045.01

$$\sinh(n\sinh^{-1}(z)) = z\,U_{n-1}\left(\sqrt{1+z^2}\right)$$

01.19.16.0069.01

$$\sinh\left(\frac{n}{2}\sinh^{-1}(z)\right) = z\left(\sqrt{z^2+1}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(\frac{\sqrt{z^2+1}-1}{z^2}\right)^k /; n \in \mathbb{N}^+$$

01.19.16.0070.01

$$\sinh\left(\frac{n}{2}\sinh^{-1}(z)\right) = \frac{z}{\sqrt{2}\sqrt{\sqrt{z^2+1}+1}}\,U_{n-1}\left(\frac{\sqrt{\sqrt{z^2+1}+1}}{\sqrt{2}}\right) /; n \in \mathbb{N}^+$$

Involving $\cosh^{-1}$

01.19.16.0012.01

$$\sinh(\cosh^{-1}(z)) = \sqrt{z-1}\,\sqrt{z+1}$$

01.19.16.0024.01

$$\sinh\left(\frac{1}{2}\cosh^{-1}(z)\right) = \frac{\sqrt{z-1}}{\sqrt{2}}$$

01.19.16.0145.01

$$\sinh\left(i\cosh^{-1}(z)\right) = \frac{1}{2}\left(z+\sqrt{z-1}\sqrt{z+1}\right)^{-i}\left(\left(z+\sqrt{z-1}\sqrt{z+1}\right)^{2i}-1\right)$$

01.19.16.0146.01

$$\sinh\left(a\cosh^{-1}(z)\right) = \frac{1}{2}\left(z+\sqrt{z-1}\sqrt{z+1}\right)^{a}-\frac{1}{2}\left(z+\sqrt{z-1}\sqrt{z+1}\right)^{-a}$$

01.19.16.0046.01

$$\sinh\left(n\cosh^{-1}(z)\right) = \sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}\binom{n}{2k+1}\left(\sqrt{z-1}\sqrt{z+1}\right)^{2k+1} z^{n-2k-1} /; n\in\mathbb{N}^+$$

01.19.16.0047.01

$$\sinh\left(n\cosh^{-1}(z)\right) = \sqrt{z-1}\sqrt{z+1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}z^{n-2k-1} /; n\in\mathbb{N}^+$$

01.19.16.0048.01

$$\sinh\left(n\cosh^{-1}(z)\right) = \sqrt{z-1}\sqrt{z+1}\,U_{n-1}(z)$$

01.19.16.0071.01

$$\sinh\left(\frac{n}{2}\cosh^{-1}(z)\right) = \sqrt{z-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}(z+1)^{\frac{n-1}{2}-k} /; n\in\mathbb{N}^+$$

01.19.16.0072.01

$$\sinh\left(\frac{n}{2}\cosh^{-1}(z)\right) = \frac{\sqrt{z-1}}{\sqrt{2}}\,U_{n-1}\left(\frac{\sqrt{z+1}}{\sqrt{2}}\right) /; n\in\mathbb{N}^+$$

Involving $\tanh^{-1}$

01.19.16.0013.01

$$\sinh\left(\tanh^{-1}(z)\right) = \frac{z}{\sqrt{1-z^2}}$$

01.19.16.0025.01

$$\sinh\left(\frac{1}{2}\tanh^{-1}(z)\right) = \frac{z}{\sqrt{2}\sqrt{z^2}}\sqrt{\frac{1}{\sqrt{1-z^2}}-1}$$

01.19.16.0147.01

$$\sinh\left(i\tanh^{-1}(z)\right) = \frac{1}{2}\left(1-z^2\right)^{-\frac{i}{2}}\left((z+1)^{i}-(1-z)^{i}\right)$$

01.19.16.0148.01

$$\sinh\left(a\tanh^{-1}(z)\right) = \frac{1}{2}\left(1-z^2\right)^{-\frac{a}{2}}\left((z+1)^{a}-(1-z)^{a}\right)$$

01.19.16.0049.01

$$\sinh(n \tanh^{-1}(z)) = (1 - z^2)^{-\frac{n}{2}} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{2k+1} z^{2k+1} /; n \in \mathbb{N}^+$$

01.19.16.0050.01

$$\sinh(n \tanh^{-1}(z)) = \frac{z}{\sqrt{1-z^2}} U_{n-1}\left(\frac{1}{\sqrt{1-z^2}}\right) /; n \in \mathbb{N}^+$$

01.19.16.0073.01

$$\sinh\left(\frac{n}{2} \tanh^{-1}(z)\right) = \frac{z}{\sqrt{1-z^2}} \left(1 + \frac{1}{\sqrt{1-z^2}}\right)^{\frac{n}{2}-1} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n-k-1}{k} 2^{n/2-k-1} \left(\frac{\sqrt{1-z^2}}{\sqrt{1-z^2}+1}\right)^k /; n \in \mathbb{N}^+$$

01.19.16.0074.01

$$\sinh\left(\frac{n}{2} \tanh^{-1}(z)\right) = \frac{z}{\sqrt{2}\sqrt{-z^2}} \sqrt{1 - \frac{1}{\sqrt{1-z^2}}} \, U_{n-1}\left(\frac{1}{\sqrt{2}} \sqrt{1 + \frac{1}{\sqrt{1-z^2}}}\right) /; n \in \mathbb{N}^+$$

Involving $\coth^{-1}$

01.19.16.0014.01

$$\sinh(\coth^{-1}(z)) = \frac{\sqrt{z^2}}{z\sqrt{z^2-1}}$$

01.19.16.0026.01

$$\sinh\left(\frac{1}{2} \coth^{-1}(z)\right) = \frac{z}{\sqrt{2}} \sqrt{\frac{1}{z^2}} \sqrt{\frac{1}{\sqrt{1-\frac{1}{z^2}}} - 1}$$

01.19.16.0149.01

$$\sinh(i \coth^{-1}(z)) = \frac{1}{2}\left(\left(1+\frac{1}{z}\right)^i - \left(1-\frac{1}{z}\right)^i\right)\left(1-\frac{1}{z^2}\right)^{-\frac{i}{2}}$$

01.19.16.0150.01

$$\sinh(a \coth^{-1}(z)) = \frac{1}{2}\left(\left(1+\frac{1}{z}\right)^a - \left(1-\frac{1}{z}\right)^a\right)\left(1-\frac{1}{z^2}\right)^{-\frac{a}{2}}$$

01.19.16.0051.01

$$\sinh(n \coth^{-1}(z)) = \left(1 - \frac{1}{z^2}\right)^{-\frac{n}{2}} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{2k+1} z^{-2k-1} /; n \in \mathbb{N}^+$$

01.19.16.0052.01

$$\sinh(n \coth^{-1}(z)) = \frac{\sqrt{z^2}}{z\sqrt{z^2-1}} U_{n-1}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}\right) /; n \in \mathbb{N}^+$$

01.19.16.0075.01

$$\sinh\left(\frac{n}{2}\coth^{-1}(z)\right) = \frac{1}{z\sqrt{1-\frac{1}{z^2}}}\left(\frac{\sqrt{z^2}}{\sqrt{z^2-1}}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(\left(\sqrt{1-\frac{1}{z^2}}-1\right)z^2+1\right)^k /; n\in\mathbb{N}^+$$

01.19.16.0076.01

$$\sinh\left(\frac{n}{2}\coth^{-1}(z)\right) = -\frac{z}{\sqrt{2}}\sqrt{-\frac{1}{z^2}}\sqrt{1-\frac{\sqrt{z^2}}{\sqrt{z^2-1}}}\,U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{\sqrt{z^2}}{\sqrt{z^2-1}}+1}\right) /; n\in\mathbb{N}^+$$

Involving csch^{-1}

01.19.16.0015.01

$$\sinh\left(\operatorname{csch}^{-1}(z)\right) = \frac{1}{z}$$

01.19.16.0027.01

$$\sinh\left(\frac{1}{2}\operatorname{csch}^{-1}(z)\right) = \frac{z}{\sqrt{2}}\sqrt{\frac{1}{z^2}}\sqrt{\sqrt{1+\frac{1}{z^2}}-1}$$

01.19.16.0151.01

$$\sinh\left(i\operatorname{csch}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{2i}-1\right)\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{-i}$$

01.19.16.0152.01

$$\sinh\left(a\operatorname{csch}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{2a}-1\right)\left(\sqrt{1+\frac{1}{z^2}}+\frac{1}{z}\right)^{-a}$$

01.19.16.0053.01

$$\sinh\left(n\operatorname{csch}^{-1}(z)\right) = \frac{1}{z}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}\left(1+\frac{1}{z^2}\right)^{\frac{n-1}{2}-k} /; n\in\mathbb{N}^+$$

01.19.16.0054.01

$$\sinh\left(n\operatorname{csch}^{-1}(z)\right) = \frac{1}{z}U_{n-1}\left(\sqrt{1+\frac{1}{z^2}}\right) /; n\in\mathbb{N}^+$$

01.19.16.0077.01

$$\sinh\left(\frac{n}{2}\operatorname{csch}^{-1}(z)\right) = \frac{1}{z}\left(\sqrt{1+\frac{1}{z^2}}+1\right)^{\frac{n}{2}-1}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(z^2+\sqrt{-z^2}\sqrt{-z^2-1}\right)^k /; n\in\mathbb{N}^+$$

01.19.16.0078.01

$$\sinh\left(\frac{n}{2}\operatorname{csch}^{-1}(z)\right) = -\frac{z}{\sqrt{2}}\sqrt{-\frac{1}{z^2}}\sqrt{1-\sqrt{1+\frac{1}{z^2}}}\,U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\sqrt{1+\frac{1}{z^2}}+1}\right)\;/;\; n\in\mathbb{N}^+$$

Involving sech^{-1}

01.19.16.0016.01

$$\sinh\left(\operatorname{sech}^{-1}(z)\right) = \frac{1}{z}\sqrt{\frac{1-z}{1+z}}\,(1+z)$$

01.19.16.0028.01

$$\sinh\left(\frac{1}{2}\operatorname{sech}^{-1}(z)\right) = \frac{\sqrt{1-z}}{\sqrt{2}}\sqrt{\frac{1}{z}}$$

01.19.16.0153.01

$$\sinh\left(i\operatorname{sech}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{\frac{1}{z}-1}\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{2i}-1\right)\left(\sqrt{\frac{1}{z}-1}\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{-i}$$

01.19.16.0154.01

$$\sinh\left(a\operatorname{sech}^{-1}(z)\right) = \frac{1}{2}\left(\left(\sqrt{\frac{1}{z}-1}\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{2a}-1\right)\left(\sqrt{\frac{1}{z}-1}\sqrt{1+\frac{1}{z}}+\frac{1}{z}\right)^{-a}$$

01.19.16.0055.01

$$\sinh\left(n\operatorname{sech}^{-1}(z)\right) = \sqrt{\frac{1-z}{1+z}}\,(1+z)\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{n-2k-1}z^{2k-n}\;/;\; n\in\mathbb{N}^+$$

01.19.16.0056.01

$$\sinh\left(n\operatorname{sech}^{-1}(z)\right) = \frac{1}{z}\sqrt{\frac{1-z}{1+z}}\,(1+z)\,U_{n-1}\left(\frac{1}{z}\right)\;/;\; n\in\mathbb{N}^+$$

01.19.16.0079.01

$$\sinh\left(\frac{n}{2}\operatorname{sech}^{-1}(z)\right) = \sqrt{\frac{1-z}{z}}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^k\binom{n-k-1}{k}2^{\frac{n}{2}-k-1}\left(\frac{z+1}{z}\right)^{\frac{n-1}{2}-k}\;/;\; n\in\mathbb{N}^+$$

01.19.16.0080.01

$$\sinh\left(\frac{n}{2}\operatorname{sech}^{-1}(z)\right) = \frac{1}{\sqrt{2}}\sqrt{\frac{1-z}{z}}\,U_{n-1}\left(\frac{1}{\sqrt{2}}\sqrt{\frac{z+1}{z}}\right)\;/;\; n\in\mathbb{N}^+$$

Addition formulas

01.19.16.0081.01

$$\sinh(a+b) = \cosh(b)\sinh(a)+\cosh(a)\sinh(b)$$

01.19.16.0082.01

$$\sinh(a-b) = \cosh(b)\sinh(a)-\cosh(a)\sinh(b)$$

01.19.16.0083.01

$$\sinh(a+b\,i) = i\cosh(a)\sin(b)+\cos(b)\sinh(a)$$

01.19.16.0084.01

$$\sinh(a - i\, b) = \cos(b) \sinh(a) - i \cosh(a) \sin(b)$$

Half-angle formulas

01.19.16.0085.01

$$\sinh\left(\frac{z}{2}\right) = \sqrt{\frac{\cosh(z) - 1}{2}} \;/;\; \operatorname{Re}(z) > 0 \land |\operatorname{Im}(z)| < \pi$$

01.19.16.0086.01

$$\sinh\left(\frac{z}{2}\right) = \frac{\sqrt{z^2}}{z} \sqrt{\frac{\cosh(z) - 1}{2}} \;/;\; |\operatorname{Im}(z)| < \pi$$

01.19.16.0087.01

$$\sinh\left(\frac{z}{2}\right) = \frac{\sqrt{z^2}\, (-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{2\pi} + \frac{1}{2} \right\rfloor}}{z} \sqrt{\frac{\cosh(z) - 1}{2}} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{2\pi} + \frac{1}{2} \right\rfloor + \left\lfloor -\frac{\operatorname{Im}(z)}{2\pi} - \frac{1}{2} \right\rfloor}\right) \theta(\operatorname{Re}(z))\right) /;\; \frac{z - \pi i}{2 \pi i} \notin \mathbb{Z}$$

Multiple arguments

Argument involving numeric multiples of variable

01.19.16.0088.01

$$\sinh(2 z) = 2 \sinh(z) \cosh(z)$$

01.19.16.0089.01

$$\sinh(3 z) = 4 \sinh^3(z) + 3 \sinh(z)$$

01.19.16.0090.01

$$\sinh(3 z) = \sinh^3(z) + 3 \cosh^2(z) \sinh(z)$$

Argument involving symbolic multiples of variable

01.19.16.0091.01

$$\sinh(n z) = \sinh(z) \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^k \binom{n-k-1}{k} 2^{n-2k-1} \cosh^{n-2k-1}(z) \;/;\; n \in \mathbb{N}^+$$

01.19.16.0092.01

$$\sinh(n z) = \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} \binom{n}{2k+1} \sinh^{2k+1}(z) \cosh^{n-2k-1}(z) \;/;\; n \in \mathbb{N}^+$$

01.19.16.0093.01

$$\sinh(n z) = i^{1-n}\, 2^{n-1} \prod_{k=0}^{n-1} \sinh\left(z + \frac{i \pi k}{n}\right) /;\; n \in \mathbb{N}^+$$

01.19.16.0094.01

$$\sinh(n z) = \sinh(z)\, U_{n-1}(\cosh(z))$$

01.19.16.0155.01

$$\sinh(a z) = \frac{1}{2} \left((\cosh(z) + \sinh(z))^a\, e^{-2 i \pi a \left\lfloor \frac{\pi - \operatorname{Im}(z)}{2\pi} \right\rfloor} - (\cosh(z) - \sinh(z))^a\, e^{-2 i \pi a \left\lfloor \frac{\operatorname{Im}(z) + \pi}{2\pi} \right\rfloor} \right)$$

Products, sums, and powers of the direct function

Products of the direct function

01.19.16.0095.01

$$\sinh(a)\sinh(b) \equiv \frac{1}{2}(\cosh(a+b)-\cosh(a-b))$$

01.19.16.0111.01

$$\prod_{k=1}^{n}\cosh(z_k) \equiv 2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}(-1)^{\sum_{j=1}^{n}(2k_j+2)/4}\cosh\left(\sum_{j=1}^{n}k_j z_j\right) /; \frac{n}{2}\in\mathbb{N}^+$$

01.19.16.0112.01

$$\prod_{k=1}^{n}\sinh(z_k) \equiv (-2)^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}(-1)^{\sum_{j=1}^{n}(2k_j+2)/4}\sinh\left(\sum_{j=1}^{n}k_j z_j\right) /; \frac{n+1}{2}\in\mathbb{N}^+$$

Products involving the direct function

01.19.16.0096.01

$$\sinh(a)\cosh(b) \equiv \frac{1}{2}(\sinh(a-b)+\sinh(a+b))$$

Sums of the direct function

01.19.16.0097.01

$$\sinh(a)+\sinh(b) \equiv 2\cosh\left(\frac{a-b}{2}\right)\sinh\left(\frac{a+b}{2}\right)$$

01.19.16.0098.01

$$\sinh(a)-\sinh(b) \equiv 2\cosh\left(\frac{a+b}{2}\right)\sinh\left(\frac{a-b}{2}\right)$$

Sums involving the direct function

Involving other hyperbolic functions

Involving cosh

01.19.16.0113.01

$$\sinh(z)+\cosh(z) \equiv e^z$$

01.19.16.0114.01

$$\sinh(z)-\cosh(z) \equiv -e^{-z}$$

01.19.16.0115.01

$$\sinh(a)+i\cosh(b) \equiv 2\,i\cos\left(\frac{i(a-b)}{2}+\frac{\pi}{4}\right)\cos\left(\frac{i(a+b)}{2}+\frac{\pi}{4}\right)$$

01.19.16.0116.01

$$\sinh(a)-i\cosh(b) \equiv -2\,i\cos\left(\frac{i(a-b)}{2}-\frac{\pi}{4}\right)\cos\left(\frac{i(a+b)}{2}-\frac{\pi}{4}\right)$$

01.19.16.0117.01

$$a\sinh(z)+b\cosh(z)=a\sqrt{1-\frac{b^2}{a^2}}\,\sinh\left(z+\tanh^{-1}\left(\frac{b}{a}\right)\right)$$

Involving trigonometric functions

Involving sin

01.19.16.0118.01

$$\sinh(z)+i\sin(z)=2\cosh\left(\frac{z\,e^{-\frac{1}{4}(i\pi)}}{\sqrt{2}}\right)\sinh\left(\frac{z\,e^{\frac{i\pi}{4}}}{\sqrt{2}}\right)$$

01.19.16.0119.01

$$\sinh(z)-i\sin(z)=2\cosh\left(\frac{z\,e^{\frac{i\pi}{4}}}{\sqrt{2}}\right)\sinh\left(\frac{z\,e^{-\frac{1}{4}(i\pi)}}{\sqrt{2}}\right)$$

01.19.16.0120.01

$$\sinh(a)+i\sin(b)=2\cosh\left(\frac{a-i\,b}{2}\right)\sinh\left(\frac{a+i\,b}{2}\right)$$

01.19.16.0121.01

$$\sinh(a)+i\sin(b)=2\cosh\left(\frac{a+i\,b}{2}\right)\sinh\left(\frac{a-i\,b}{2}\right)$$

Involving cos

01.19.16.0122.01

$$\sinh(z)+i\cos(z)=2\,i\cos\left(\frac{e^{\frac{1}{4}(-i)\pi}\,i\,z}{\sqrt{2}}+\frac{\pi}{4}\right)\cos\left(\frac{e^{\frac{i\pi}{4}}\,i\,z}{\sqrt{2}}+\frac{\pi}{4}\right)$$

01.19.16.0123.01

$$\sinh(z)-i\cos(z)=-2\,i\cos\left(\frac{\pi}{4}-\frac{i\,e^{-\frac{1}{4}(i\pi)}\,z}{\sqrt{2}}\right)\cos\left(\frac{\pi}{4}-\frac{i\,e^{\frac{i\pi}{4}}\,z}{\sqrt{2}}\right)$$

01.19.16.0124.01

$$\sinh(a)+i\cos(b)=2\,i\cosh\left(\frac{a-i\,b}{2}-\frac{i\pi}{4}\right)\cosh\left(\frac{a+i\,b}{2}-\frac{i\pi}{4}\right)$$

01.19.16.0125.01

$$\sinh(a)-i\cos(b)=-2\,i\cosh\left(\frac{a+i\,b}{2}+\frac{i\pi}{4}\right)\cosh\left(\frac{a-i\,b}{2}+\frac{i\pi}{4}\right)$$

Powers of the direct function

01.19.16.0099.01

$$\sinh^2(z)=\frac{1}{2}(\cosh(2\,z)-1)$$

01.19.16.0100.01

$$\sinh^3(z) = \frac{1}{4}(\sinh(3z) - 3\sinh(z))$$

01.19.16.0101.01

$$\sinh^{2n}(z) = (-1)^n 2^{-2n}\binom{2n}{n} + 2^{1-2n}\sum_{k=0}^{n-1}(-1)^k\binom{2n}{k}\cosh(2(n-k)z) /; n \in \mathbb{N}^+$$

01.19.16.0126.01

$$\sinh^{2n}(z) = 2^{1-2n}\sum_{k=0}^{n-1}(-1)^k\binom{2n}{k}(\cosh(2(n-k)z) - 1) /; n \in \mathbb{N}^+$$

01.19.16.0102.01

$$\sinh^{2n-1}(z) = 2^{2-2n}\sum_{k=0}^{n}(-1)^k\binom{2n-1}{k}\sinh((2n-2k-1)z) /; n \in \mathbb{N}^+$$

01.19.16.0103.01

$$\sinh^n(z) = i^n 2^{-n}\binom{n}{\frac{n}{2}}(1 - n \bmod 2) - i^n 2^{1-n}\sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor}(-1)^{k-1}\binom{n}{k}\cosh\left((n-2k)z - \frac{\pi i n}{2}\right) /; n \in \mathbb{N}^+$$

Powers involving the direct function

01.19.16.0104.01

$$(\cosh(z) + \sinh(z))^n = \cosh(nz) + \sinh(nz) /; n \in \mathbb{N}^+$$

01.19.16.0105.01

$$(\cosh(z) + \sinh(z))^n = e^{nz} /; n \in \mathbb{N}^+$$

01.19.16.0106.01

$$(\cosh(z) - \sinh(z))^n = \cosh(nz) - \sinh(nz) /; n \in \mathbb{N}^+$$

01.19.16.0107.01

$$(\cosh(z) - \sinh(z))^n = e^{-nz} /; n \in \mathbb{N}^+$$

Sums of powers involving the direct function

01.19.16.0108.01

$$\sinh^2(a) - \sinh^2(b) = \sinh(a-b)\sinh(a+b)$$

01.19.16.0109.01

$$\sinh^2(a) + \cosh^2(b) = \cosh(a-b)\cosh(a+b)$$

Related transformations

01.19.16.0110.01

$$\sinh\left(a\sinh^{-1}(z)\right) = \frac{\sqrt{z^2}}{z}\sinh\left(\frac{1}{2}a\cosh^{-1}\left(1+2z^2\right)\right)$$

Identities

Functional identities

Univariate functional identities

01.19.17.0001.01

$$\sinh^2(2z) = 4\left(\sinh^2(z) + 1\right)\sinh^2(z)$$

Biivariate functional identities

01.19.17.0002.01

$$\sinh^4(z_1 + z_2) - 2\left(2\sinh^2(z_2)\sinh^2(z_1) + \sinh^2(z_1) + \sinh^2(z_2)\right)\sinh^2(z_1 + z_2) + \left(\sinh^2(z_1) - \sinh^2(z_2)\right)^2 = 0$$

01.19.17.0003.01

$$|g(x + i\,y)| = |g(x) + g(i\,y)| \;/;\; g(z) = c\sinh(d\,z) \land d \in \mathbb{R} \land x \in \mathbb{R} \land y \in \mathbb{R}$$

01.19.17.0004.01

$$g(x + y)\,g(x - y) = g(x)^2 - g(y)^2 \;/;\; g(z) = \sinh(c\,z) \land x \in \mathbb{R} \land y \in \mathbb{R}$$

Complex characteristics

Real part

01.19.19.0001.01

$$\operatorname{Re}(\sinh(x + i\,y)) = \cos(y)\sinh(x)$$

Imaginary part

01.19.19.0002.01

$$\operatorname{Im}(\sinh(x + i\,y)) = \cosh(x)\sin(y)$$

Absolute value

01.19.19.0003.01

$$|\sinh(x + i\,y)| = \sqrt{\frac{\cosh(2x) - \cos(2y)}{2}}$$

01.19.19.0004.01

$$|\sinh(x + i\,y)| = \sqrt{\cosh^2(x)\sin^2(y) + \cos^2(y)\sinh^2(x)}$$

Argument

01.19.19.0005.01

$$\arg(\sinh(x + i\,y)) = \tan^{-1}(\coth(x)\tan(y)) + \frac{\pi}{2}\operatorname{sgn}\left(\operatorname{sgn}(\cosh(x)\sin(y)) + \frac{1}{2}\right)(1 - \operatorname{sgn}(\cos(y)\sinh(x)))$$

01.19.19.0006.01

$$\arg(\sinh(x + i\,y)) = \tan^{-1}(\cos(y)\sinh(x),\ \cosh(x)\sin(y))$$

Conjugate value

01.19.19.0007.01

$$\overline{\sinh(x + i\,y)} = \cos(y)\sinh(x) - i\cosh(x)\sin(y)$$

Differentiation

Low-order differentiation

01.19.20.0001.01

$$\frac{\partial \sinh(z)}{\partial z} = \cosh(z)$$

01.19.20.0002.01

$$\frac{\partial^2 \sinh(z)}{\partial z^2} = \sinh(z)$$

Symbolic differentiation

01.19.20.0003.02

$$\frac{\partial^n \sinh(z)}{\partial z^n} = (-i)^n \sinh\left(z + \frac{i \pi n}{2}\right) /; n \in \mathbb{N}$$

01.19.20.0004.01

$$\frac{\partial^n f(\sinh(z))}{\partial z^n} = (-1)^n \sum_{m=1}^{n} \frac{1}{m!} \sum_{j=0}^{m-1} \binom{m}{j} \sum_{l=0}^{m-j} (-1)^{j-l}\, 2^{j-m} \sinh^j(z)\, (j + 2l - m)^n\, e^{-(j+2l-m)z} \binom{m-j}{l} f^{(m)}(\sinh(z)) /; n \in \mathbb{N}^+$$

01.19.20.0005.02

$$\frac{\partial^n f(\sinh(z))}{\partial z^n} = \sum_{m=0}^{n} \frac{f^{(m)}(\sinh(z))}{m!} \left(\frac{\partial^n (\sinh(y) - \sinh(z))^m}{\partial y^n} /. \{y \to z\} \right) /; n \in \mathbb{N}^+$$

01.19.20.0007.02

$$\frac{\partial^n \sinh(a z + b)}{\partial z^n} = (-i a)^n \sinh\left(a z + b + \frac{i n \pi}{2}\right) /; n \in \mathbb{N}$$

01.19.20.0011.01

$$\frac{\partial^n \sinh^m(z)}{\partial z^n} = 2^{-m} \sum_{k=0}^{m} (-1)^{k+m} \binom{m}{k} (2k - m)^n\, e^{(2k-m)z} /; m \in \mathbb{N} \land n \in \mathbb{N}^+$$

01.19.20.0012.01

$$\frac{\partial^n \sinh^m(z)}{\partial z^n} = 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (m - 2k)^n \left(e^{(m-2k)z} + (-1)^{m+n} e^{-(m-2k)z} \right) /; m \in \mathbb{N} \land n \in \mathbb{N}^+$$

01.19.20.0008.02

$$\frac{\partial^n \sinh^m(z)}{\partial z^n} = -i^m\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k-1} \binom{m}{k} (-i (m - 2k))^n \cosh\left(\frac{1}{2} i \pi (n - m) + (m - 2k) z\right) /; m \in \mathbb{N} \land n \in \mathbb{N}^+$$

01.19.20.0013.01

$$\frac{\partial^n \sinh^m(z)}{\partial z^n} = 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (m - 2k)^n \left(\left(1 + (-1)^{m+n}\right) \cosh((m - 2k) z) + \left(1 - (-1)^{m+n}\right) \sinh((m - 2k) z) \right) /; m \in \mathbb{N} \land n \in \mathbb{N}^+$$

01.19.20.0014.01

$$\frac{\partial^n \sinh^m(z)}{\partial z^n} = 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (m - 2k)^n \left(\left(1 - (-1)^{m+n}\right) \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor - k} \binom{m-2k}{2j+1} \sinh^{2j+1}(z) \cosh^{-2j-2k+m-1}(z) + \left(1 + (-1)^{m+n}\right) \sum_{j=0}^{\left\lfloor \frac{m}{2} \right\rfloor - k} \binom{m-2k}{2j} \sinh^{2j}(z) \cosh^{-2j-2k+m}(z) \right) /; m \in \mathbb{N} \land n \in \mathbb{N}^+$$

Fractional integro-differentiation

01.19.20.0006.01

$$\frac{\partial^\alpha \sinh(z)}{\partial z^\alpha} = 2^{\alpha-1} \sqrt{\pi}\; z^{1-\alpha}\, {}_1\tilde{F}_2\left(1;\, 1-\frac{\alpha}{2},\, \frac{3}{2}-\frac{\alpha}{2};\, \frac{z^2}{4}\right)$$

01.19.20.0009.01

$$\frac{\partial^\alpha \sinh(a\,z+b)}{\partial z^\alpha} = 2^{\alpha-1} \sqrt{\pi}\; z^{-\alpha} \left(a\,z \cosh(b)\, {}_1\tilde{F}_2\left(1;\, 1-\frac{\alpha}{2},\, \frac{3}{2}-\frac{\alpha}{2};\, \frac{a^2 z^2}{4}\right) + 2\, {}_1\tilde{F}_2\left(1;\, \frac{1}{2}-\frac{\alpha}{2},\, 1-\frac{\alpha}{2};\, \frac{a^2 z^2}{4}\right) \sinh(b)\right)$$

01.19.20.0010.01

$$\frac{\partial^\alpha \sinh^n(z)}{\partial z^\alpha} = \frac{2^{-n}\, i^n\, (1 - n \bmod 2)\, z^{-\alpha}}{\Gamma(1-\alpha)} \binom{n}{\frac{n}{2}} - 2^{\alpha-n}\, i^n \sqrt{\pi}\; z^{-\alpha} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^{k-1} \binom{n}{k} \left(2 \cos\left(\frac{n\,\pi}{2}\right) {}_1\tilde{F}_2\left(1;\, \frac{1}{2}-\frac{\alpha}{2},\, 1-\frac{\alpha}{2};\, \frac{1}{4}(n-2\,k)^2 z^2\right) - i\,(n-2\,k)\, z\, {}_1\tilde{F}_2\left(1;\, 1-\frac{\alpha}{2},\, \frac{3}{2}-\frac{\alpha}{2};\, \frac{1}{4}(n-2\,k)^2 z^2\right) \sin\left(\frac{n\,\pi}{2}\right)\right) /;\, n \in \mathbb{N}^+$$

Integration

Indefinite integration

Involving only one direct function

01.19.21.0020.01

$$\int \sinh(b + a\,z)\, dz = \frac{\cosh(b + a\,z)}{a}$$

01.19.21.0021.01

$$\int \sinh(a\,z)\, dz = \frac{\cosh(a\,z)}{a}$$

01.19.21.0022.01

$$\int \sinh(z)\, dz = \cosh(z)$$

Involving one direct function and elementary functions

Involving power function

Involving power

Power arguments

01.19.21.0023.01

$$\int \sinh(a\,z^r)\, dz = \frac{z\left(-a^2 z^{2\,r}\right)^{-1/r} \left((-a\,z^r)^{1/r}\, \Gamma\left(\frac{1}{r},\, a\,z^r\right) - (a\,z^r)^{1/r}\, \Gamma\left(\frac{1}{r},\, -a\,z^r\right)\right)}{2\,r}$$

01.19.21.0024.01

$$\int \sinh(a z^2)\, dz = \frac{\sqrt{\pi}\left(\operatorname{erfi}(\sqrt{a}\, z) - \operatorname{erf}(\sqrt{a}\, z)\right)}{4\sqrt{a}}$$

01.19.21.0025.01

$$\int \sinh(a\sqrt{z})\, dz = \frac{2 a\sqrt{z}\cosh(a\sqrt{z}) - 2\sinh(a\sqrt{z})}{a^2}$$

01.19.21.0026.01

$$\int \sinh(a (z^r)^p)\, dz = \frac{z\left((a (z^r)^p)^{-\frac{1}{p r}}\, \Gamma\left(\frac{1}{p r}, a (z^r)^p\right) - (-a (z^r)^p)^{-\frac{1}{p r}}\, \Gamma\left(\frac{1}{p r}, -a (z^r)^p\right)\right)}{2 p r}$$

01.19.21.0027.01

$$\int \sinh\left(a (z^r)^{1/r}\right) dz = \frac{z (z^r)^{-1/r} \cosh\left(a (z^r)^{1/r}\right)}{a}$$

01.19.21.0028.01

$$\int \sinh\left(a\sqrt{z^2}\right) dz = \frac{\sqrt{z^2}\, \cosh\left(a\sqrt{z^2}\right)}{a z}$$

Involving $z^{\alpha-1}$and arguments $a z$

01.19.21.0029.01

$$\int z^{\alpha-1} \sinh(a z)\, dz = \frac{1}{2} z^{\alpha} \left((a z)^{-\alpha}\, \Gamma(\alpha, a z) - (-a z)^{-\alpha}\, \Gamma(\alpha, -a z)\right)$$

01.19.21.0030.01

$$\int z^{\alpha-1} \sinh(z)\, dz = \frac{1}{2} \left(\Gamma(\alpha, z) - (-z)^{-\alpha} z^{\alpha}\, \Gamma(\alpha, -z)\right)$$

01.19.21.0031.01

$$\int z^n \sinh(a z)\, dz = \frac{1}{2} a^{-n-1} \left((-1)^n\, \Gamma(n+1, -a z) + \Gamma(n+1, a z)\right) /; n \in \mathbb{Z}$$

01.19.21.0032.01

$$\int z^n \sinh(a z)\, dz = \frac{1}{2} a^{-n-1} \left(\frac{\operatorname{Ei}(a z) + (-1)^n \operatorname{Ei}(-a z)}{(-n-1)!} + (-1)^n e^{a z} \left(\sum_{k=0}^{n} \frac{(-a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-a z)^k}{(n+1)_{k-n}}\right) + e^{-a z} \left(\sum_{k=0}^{n} \frac{(a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(a z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0033.01

$$\int z \sinh(a z)\, dz = \frac{a z \cosh(a z) - \sinh(a z)}{a^2}$$

01.19.21.0034.01

$$\int z^2 \sinh(a z)\, dz = \frac{\left(a^2 z^2 + 2\right) \cosh(a z) - 2 a z \sinh(a z)}{a^3}$$

01.19.21.0035.01

$$\int z^3 \sinh(a\,z)\,dz = \frac{a\,z\left(a^2 z^2+6\right)\cosh(a\,z)-3\left(a^2 z^2+2\right)\sinh(a\,z)}{a^4}$$

01.19.21.0036.01

$$\int z^4 \sinh(a\,z)\,dz = \frac{\left(a^4 z^4+12\,a^2 z^2+24\right)\cosh(a\,z)-4\,a\,z\left(a^2 z^2+6\right)\sinh(a\,z)}{a^5}$$

01.19.21.0037.01

$$\int z^5 \sinh(a\,z)\,dz = \frac{a\,z\left(a^4 z^4+20\,a^2 z^2+120\right)\cosh(a\,z)-5\left(a^4 z^4+12\,a^2 z^2+24\right)\sinh(a\,z)}{a^6}$$

01.19.21.0038.01

$$\int z^6 \sinh(a\,z)\,dz = \frac{\left(a^6 z^6+30\,a^4 z^4+360\,a^2 z^2+720\right)\cosh(a\,z)-6\,a\,z\left(a^4 z^4+20\,a^2 z^2+120\right)\sinh(a\,z)}{a^7}$$

01.19.21.0039.01

$$\int z^7 \sinh(a\,z)\,dz = \frac{1}{a^8}\left(a\,z\left(a^6 z^6+42\,a^4 z^4+840\,a^2 z^2+5040\right)\cosh(a\,z)-7\left(a^6 z^6+30\,a^4 z^4+360\,a^2 z^2+720\right)\sinh(a\,z)\right)$$

01.19.21.0040.01

$$\int z^8 \sinh(a\,z)\,dz = \frac{1}{a^9}\left(\left(a^8 z^8+56\,a^6 z^6+1680\,a^4 z^4+20\,160\,a^2 z^2+40\,320\right)\cosh(a\,z)-8\,a\,z\left(a^6 z^6+42\,a^4 z^4+840\,a^2 z^2+5040\right)\sinh(a\,z)\right)$$

01.19.21.0041.01

$$\int \frac{\sinh(a\,z)}{z}\,dz = \mathrm{Shi}(a\,z)$$

01.19.21.0042.01

$$\int \frac{\sinh(a\,z)}{z^2}\,dz = a\,\mathrm{Chi}(a\,z)-\frac{\sinh(a\,z)}{z}$$

01.19.21.0043.01

$$\int \frac{\sinh(a\,z)}{z^3}\,dz = -\frac{-a^2\,\mathrm{Shi}(a\,z)\,z^2+a\cosh(a\,z)\,z+\sinh(a\,z)}{2\,z^2}$$

01.19.21.0044.01

$$\int \frac{\sinh(a\,z)}{z^4}\,dz = -\frac{-a^3\,\mathrm{Chi}(a\,z)\,z^3+a\cosh(a\,z)\,z+\left(a^2 z^2+2\right)\sinh(a\,z)}{6\,z^3}$$

01.19.21.0045.01

$$\int \frac{\sinh(a\,z)}{z^5}\,dz = -\frac{-a^4\,\mathrm{Shi}(a\,z)\,z^4+a\left(a^2 z^2+2\right)\cosh(a\,z)\,z+\left(a^2 z^2+6\right)\sinh(a\,z)}{24\,z^4}$$

01.19.21.0046.01

$$\int z^{n+\frac{1}{2}} \sinh(a\,z)\,dz = \frac{a^{-n-1}\sqrt{z}\left((-1)^n\sqrt{a\,z}\;\Gamma\!\left(n+\frac{3}{2},\,-a\,z\right)+\sqrt{-a\,z}\;\Gamma\!\left(n+\frac{3}{2},\,a\,z\right)\right)}{2\sqrt{-a^2 z^2}}\;/;\;n\in\mathbb{Z}$$

01.19.21.0047.01

$$\int z^{n+\frac{1}{2}} \sinh(a z) \, dz = \frac{(-1)^n a^{-n-1} \sqrt{z}}{2 \sqrt{-a^2 z^2}} \left(\left(\sqrt{a z} \operatorname{erfc}\left(\sqrt{-a z}\right) + (-1)^n \sqrt{-a z} \operatorname{erfc}\left(\sqrt{a z}\right) \right) \Gamma\left(n + \frac{3}{2}\right) + e^{a z} \sqrt{a z} \left(\sum_{k=0}^{n} \frac{(-a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) + (-1)^n \sqrt{-a z} \, e^{-a z} \left(\sum_{k=0}^{n} \frac{(a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(a z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z}$$

01.19.21.0048.01

$$\int \sqrt{z} \sinh(a z) \, dz = \frac{\sqrt{z} \cosh(a z)}{a} - \frac{\sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) + \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) \right)}{4 a^{3/2}}$$

01.19.21.0049.01

$$\int z^{3/2} \sinh(a z) \, dz = \frac{\cosh(a z) z^{3/2}}{a} - \frac{3 \sinh(a z) \sqrt{z}}{2 a^2} + \frac{3 \sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) \right)}{8 a^{5/2}}$$

01.19.21.0050.01

$$\int z^{5/2} \sinh(a z) \, dz = -\frac{5 \sinh(a z) z^{3/2}}{2 a^2} + \frac{\left(4 a^2 z^2 + 15\right) \cosh(a z) \sqrt{z}}{4 a^3} - \frac{15 \sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) + \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) \right)}{16 a^{7/2}}$$

01.19.21.0051.01

$$\int z^{7/2} \sinh(a z) \, dz = \frac{\left(4 a^2 z^2 + 35\right) \cosh(a z) z^{3/2}}{4 a^3} - \frac{7 \left(4 a^2 z^2 + 15\right) \sinh(a z) \sqrt{z}}{8 a^4} + \frac{105 \sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) \right)}{32 a^{9/2}}$$

01.19.21.0052.01

$$\int z^{9/2} \sinh(a z) \, dz = -\frac{9 \left(4 a^2 z^2 + 35\right) \sinh(a z) z^{3/2}}{8 a^4} + \frac{\left(16 a^4 z^4 + 252 a^2 z^2 + 945\right) \cosh(a z) \sqrt{z}}{16 a^5} - \frac{945 \sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) + \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) \right)}{64 a^{11/2}}$$

01.19.21.0053.01

$$\int \frac{\sinh(a z)}{\sqrt{z}} \, dz = \frac{\sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) \right)}{2 \sqrt{a}}$$

01.19.21.0054.01

$$\int \frac{\sinh(a z)}{z^{3/2}} \, dz = \sqrt{a} \sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) + \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) \right) - \frac{2 \sinh(a z)}{\sqrt{z}}$$

01.19.21.0055.01

$$\int \frac{\sinh(a z)}{z^{5/2}} \, dz = \frac{2}{3} \left(\sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) \right) a^{3/2} - \frac{2 \cosh(a z) a}{\sqrt{z}} - \frac{\sinh(a z)}{z^{3/2}} \right)$$

01.19.21.0056.01

$$\int \frac{\sinh(a z)}{z^{7/2}} \, dz = \frac{2}{15} \left(2 \sqrt{\pi} \left(\operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) + \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) \right) a^{5/2} - \frac{2 \cosh(a z) a}{z^{3/2}} - \frac{\left(4 a^2 z^2 + 3\right) \sinh(a z)}{z^{5/2}} \right)$$

01.19.21.0057.01

$$\int \frac{\sinh(a z)}{z^{9/2}} \, dz = \frac{2}{105} \left(4 \sqrt{\pi} \left(\operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) \right) a^{7/2} - \frac{2 \left(4 a^2 z^2 + 3\right) \cosh(a z) a}{z^{5/2}} - \frac{\left(4 a^2 z^2 + 15\right) \sinh(a z)}{z^{7/2}} \right)$$

Involving $z^{\alpha-1}$ and arguments $a z + b$

01.19.21.0058.01

$$\int z^{\alpha-1} \sinh(b + a z)\, dz = \frac{1}{2} e^{-b} z^{\alpha} \left(E_{1-\alpha}(a z) - e^{2 b} E_{1-\alpha}(-a z)\right)$$

01.19.21.0059.01

$$\int z^n \sinh(b + a z)\, dz = \frac{1}{2} a^{-n-1} \left((-1)^n e^b \Gamma(n+1, -a z) + e^{-b} \Gamma(n+1, a z)\right) /; n \in \mathbb{Z}$$

01.19.21.0060.01

$$\int z^n \sinh(b + a z)\, dz = \frac{1}{2} a^{-n-1} \left(\frac{(-1)^n e^{-b} \operatorname{Ei}(-a z) + e^b \operatorname{Ei}(a z)}{(-n-1)!} + (-1)^n e^{b+a z} \left(\sum_{k=0}^{n} \frac{(-a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-a z)^k}{(n+1)_{k-n}}\right) + e^{-b-a z} \left(\sum_{k=0}^{n} \frac{(a z)^k}{(n+1)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(a z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0061.01

$$\int z \sinh(b + a z)\, dz = \frac{a z \cosh(b + a z) - \sinh(b + a z)}{a^2}$$

01.19.21.0062.01

$$\int z^2 \sinh(b + a z)\, dz = \frac{\left(a^2 z^2 + 2\right) \cosh(b + a z) - 2 a z \sinh(b + a z)}{a^3}$$

01.19.21.0063.01

$$\int z^3 \sinh(b + a z)\, dz = \frac{a z \left(a^2 z^2 + 6\right) \cosh(b + a z) - 3 \left(a^2 z^2 + 2\right) \sinh(b + a z)}{a^4}$$

01.19.21.0064.01

$$\int z^4 \sinh(b + a z)\, dz = \frac{\left(a^4 z^4 + 12 a^2 z^2 + 24\right) \cosh(b + a z) - 4 a z \left(a^2 z^2 + 6\right) \sinh(b + a z)}{a^5}$$

01.19.21.0065.01

$$\int z^5 \sinh(b + a z)\, dz = \frac{a z \left(a^4 z^4 + 20 a^2 z^2 + 120\right) \cosh(b + a z) - 5 \left(a^4 z^4 + 12 a^2 z^2 + 24\right) \sinh(b + a z)}{a^6}$$

01.19.21.0066.01

$$\int \frac{\sinh(b + a z)}{z}\, dz = \operatorname{Chi}(a z) \sinh(b) + \cosh(b) \operatorname{Shi}(a z)$$

01.19.21.0067.01

$$\int \frac{\sinh(b + a z)}{z^2}\, dz = a \cosh(b) \operatorname{Chi}(a z) + a \sinh(b) \operatorname{Shi}(a z) - \frac{\sinh(b + a z)}{z}$$

01.19.21.0068.01

$$\int \frac{\sinh(b + a z)}{z^3}\, dz = \frac{a^2 \operatorname{Chi}(a z) \sinh(b) z^2 + a^2 \cosh(b) \operatorname{Shi}(a z) z^2 - a \cosh(b + a z) z - \sinh(b + a z)}{2 z^2}$$

01.19.21.0069.01

$$\int \frac{\sinh(b + a z)}{z^4}\, dz = \frac{1}{6 z^3} \left(a^3 \cosh(b) \operatorname{Chi}(a z) z^3 + a^3 \sinh(b) \operatorname{Shi}(a z) z^3 - a^2 \sinh(b + a z) z^2 - a \cosh(b + a z) z - 2 \sinh(b + a z)\right)$$

01.19.21.0070.01

$$\int \frac{\sinh(b+a z)}{z^5}\, dz = -\frac{1}{24 z^4} \left(-a^4 \operatorname{Chi}(a z) \sinh(b) z^4 - a^4 \cosh(b) \operatorname{Shi}(a z) z^4 + a^3 \cosh(b+a z) z^3 + a^2 \sinh(b+a z) z^2 + 2 a \cosh(b+a z) z + 6 \sinh(b+a z)\right)$$

01.19.21.0071.01

$$\int z^{n+\frac{1}{2}} \sinh(b+a z)\, dz = \frac{a^{-n-1} \sqrt{z} \left((-1)^n e^b \sqrt{a z}\, \Gamma\left(n+\frac{3}{2}, -a z\right) + e^{-b} \sqrt{-a z}\, \Gamma\left(n+\frac{3}{2}, a z\right)\right)}{2 \sqrt{-a^2 z^2}} \;/;\; n \in \mathbb{Z}$$

01.19.21.0072.01

$$\int z^{n+\frac{1}{2}} \sinh(b+a z)\, dz = \frac{(-1)^n a^{-n-1} e^{-b} \sqrt{z}}{2 \sqrt{-a^2 z^2}} \left(\left(e^{2 b} \sqrt{a z}\, \operatorname{erfc}\left(\sqrt{-a z}\right) + (-1)^n \sqrt{-a z}\, \operatorname{erfc}\left(\sqrt{a z}\right)\right) \Gamma\left(n+\frac{3}{2}\right) + e^{2 b+a z} \sqrt{a z} \left(\sum_{k=0}^{n} \frac{(-a z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(-a z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right) + (-1)^n \sqrt{-a z}\, e^{-a z} \left(\sum_{k=0}^{n} \frac{(a z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(a z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right) \;/;\; n \in \mathbb{Z}$$

01.19.21.0073.01

$$\int \sqrt{z} \sinh(b+a z)\, dz = \frac{1}{4 a^{3/2}} \left(4 \sqrt{a} \sqrt{z} \cosh(b+a z) + \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) (\sinh(b) - \cosh(b)) - \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) + \sinh(b))\right)$$

01.19.21.0074.01

$$\int z^{3/2} \sinh(b+a z)\, dz = \frac{1}{8 a^{5/2}} \left(3 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) (\sinh(b) - \cosh(b)) + 3 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) + \sinh(b)) + 4 \sqrt{a} \sqrt{z}\, (2 a z \cosh(b+a z) - 3 \sinh(b+a z))\right)$$

01.19.21.0075.01

$$\int z^{5/2} \sinh(b+a z)\, dz = \frac{1}{16 a^{7/2}} \left(-15 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) - \sinh(b)) - 15 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) + \sinh(b)) + 4 \sqrt{a} \sqrt{z} \left(\left(4 a^2 z^2 + 15\right) \cosh(b+a z) - 10 a z \sinh(b+a z)\right)\right)$$

01.19.21.0076.01

$$\int z^{7/2} \sinh(b+a z)\, dz = \frac{1}{32 a^{9/2}} \left(-105 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) - \sinh(b)) + 105 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) + \sinh(b)) + 4 \sqrt{a} \sqrt{z} \left(2 a z \left(4 a^2 z^2 + 35\right) \cosh(b+a z) - 7 \left(4 a^2 z^2 + 15\right) \sinh(b+a z)\right)\right)$$

01.19.21.0077.01

$$\int z^{9/2} \sinh(b+a z)\, dz = \frac{1}{64 a^{11/2}} \left(-945 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) - \sinh(b)) - 945 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) (\cosh(b) + \sinh(b)) + 4 \sqrt{a} \sqrt{z} \left(\left(16 a^4 z^4 + 252 a^2 z^2 + 945\right) \cosh(b+a z) - 18 a z \left(4 a^2 z^2 + 35\right) \sinh(b+a z)\right)\right)$$

01.19.21.0078.01

$$\int \frac{\sinh(b+a z)}{\sqrt{z}}\, dz = \frac{\sqrt{\pi} \left(e^b \operatorname{erfi}\left(\sqrt{a} \sqrt{z}\right) - e^{-b} \operatorname{erf}\left(\sqrt{a} \sqrt{z}\right)\right)}{2 \sqrt{a}}$$

01.19.21.0079.01

$$\int \frac{\sinh(b+a\,z)}{z^{3/2}}\,dz = \frac{1}{\sqrt{z}}\left(\sqrt{a}\,\sqrt{\pi}\,\sqrt{z}\,\operatorname{erf}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)-\sinh(b)) + \sqrt{a}\,\sqrt{\pi}\,\sqrt{z}\,\operatorname{erfi}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)+\sinh(b)) - 2\sinh(b+a\,z)\right)$$

01.19.21.0080.01

$$\int \frac{\sinh(b+a\,z)}{z^{5/2}}\,dz = -\frac{1}{3\,z^{3/2}}\left(2\left(a^{3/2}\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)-\sinh(b))\,z^{3/2} - a^{3/2}\sqrt{\pi}\,\operatorname{erfi}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)+\sinh(b))\,z^{3/2} + 2\,a\cosh(b+a\,z)\,z + \sinh(b+a\,z)\right)\right)$$

01.19.21.0081.01

$$\int \frac{\sinh(b+a\,z)}{z^{7/2}}\,dz = \frac{1}{15\,z^{5/2}}\left(4\,a^{5/2}\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)-\sinh(b))\,z^{5/2} + 4\,a^{5/2}\sqrt{\pi}\,\operatorname{erfi}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)+\sinh(b))\,z^{5/2} - 2\left(2\,a\,z\cosh(b+a\,z) + \left(4\,a^2 z^2+3\right)\sinh(b+a\,z)\right)\right)$$

01.19.21.0082.01

$$\int \frac{\sinh(b+a\,z)}{z^{9/2}}\,dz = -\frac{1}{105\,z^{7/2}}\left(2\left(4\,a^{7/2}\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)-\sinh(b))\,z^{7/2} - 4\,a^{7/2}\sqrt{\pi}\,\operatorname{erfi}\left(\sqrt{a}\,\sqrt{z}\right)(\cosh(b)+\sinh(b))\,z^{7/2} + 8\,a^3\cosh(b+a\,z)\,z^3 + 4\,a^2\sinh(b+a\,z)\,z^2 + 6\,a\cosh(b+a\,z)\,z + 15\sinh(b+a\,z)\right)\right)$$

Involving $z^{\alpha-1}$ and arguments $a\ z^r$

01.19.21.0083.01

$$\int z^{\alpha-1}\sinh(a\,z^r)\,dz = \frac{z^\alpha\left(-a^2 z^{2r}\right)^{-\frac{\alpha}{r}}\left((-a\,z^r)^{\alpha/r}\,\Gamma\left(\frac{\alpha}{r},\,a\,z^r\right) - (a\,z^r)^{\alpha/r}\,\Gamma\left(\frac{\alpha}{r},\,-a\,z^r\right)\right)}{2\,r}$$

01.19.21.0084.01

$$\int \frac{\sinh(a\,z^r)}{z}\,dz = \frac{\operatorname{Shi}(a\,z^r)}{r}$$

01.19.21.0085.01

$$\int z^{2n}\sinh\left(a\,z^2\right)dz = \frac{1}{4}\,z\left(\frac{a^{-n}}{\sqrt{a\,z^2}}\left(\operatorname{erfc}\left(\sqrt{a\,z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{-a\,z^2}\sum_{k=0}^{n-1}\frac{\left(a\,z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{-a\,z^2}\sum_{k=n}^{-1}\frac{\left(a\,z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right) - \frac{1}{\sqrt{-a\,z^2}}\left((-a)^{-n}\left(\operatorname{erfc}\left(\sqrt{-a\,z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{a\,z^2}\sum_{k=0}^{n-1}\frac{\left(-a\,z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}} - e^{a\,z^2}\sum_{k=n}^{-1}\frac{\left(-a\,z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right)\right)\ /;\ n\in\mathbb{Z}$$

01.19.21.0086.01

$$\int z^{2n-1}\sinh(a z^2)\,dz = \frac{1}{4}\left(a^{-n}\left(\frac{(-1)^{n-1}\,\text{Ei}(-a z^2)}{(-n)!} + e^{-a z^2}\sum_{k=0}^{n-1}\frac{(a z^2)^k}{(n)_{k-n+1}} - e^{-a z^2}\sum_{k=n}^{-1}\frac{(a z^2)^k}{(n)_{k-n+1}}\right) - (-a)^{-n}\left(\frac{(-1)^{n-1}\,\text{Ei}(a z^2)}{(-n)!} + e^{a z^2}\sum_{k=0}^{n-1}\frac{(-a z^2)^k}{(n)_{k-n+1}} - e^{a z^2}\sum_{k=n}^{-1}\frac{(-a z^2)^k}{(n)_{k-n+1}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0087.01

$$\int z\sinh(a z^2)\,dz = \frac{\cosh(a z^2)}{2a}$$

01.19.21.0088.01

$$\int z^2\sinh(a z^2)\,dz = \frac{z\cosh(a z^2)}{2a} - \frac{\sqrt{\pi}\left(\text{erf}(\sqrt{a}\,z) + \text{erfi}(\sqrt{a}\,z)\right)}{8a^{3/2}}$$

01.19.21.0089.01

$$\int z^3\sinh(a z^2)\,dz = \frac{a z^2\cosh(a z^2) - \sinh(a z^2)}{2a^2}$$

01.19.21.0090.01

$$\int z^4\sinh(a z^2)\,dz = \frac{\cosh(a z^2) z^3}{2a} - \frac{3\sinh(a z^2) z}{4a^2} + \frac{3\sqrt{\pi}\left(\text{erfi}(\sqrt{a}\,z) - \text{erf}(\sqrt{a}\,z)\right)}{16a^{5/2}}$$

01.19.21.0091.01

$$\int z^5\sinh(a z^2)\,dz = \frac{(a^2 z^4 + 2)\cosh(a z^2) - 2a z^2\sinh(a z^2)}{2a^3}$$

01.19.21.0092.01

$$\int \frac{\sinh(a z^2)}{z}\,dz = \frac{1}{2}\,\text{Shi}(a z^2)$$

01.19.21.0093.01

$$\int \frac{\sinh(a z^2)}{z^2}\,dz = \frac{1}{2}\sqrt{a}\,\sqrt{\pi}\left(\text{erf}(\sqrt{a}\,z) + \text{erfi}(\sqrt{a}\,z)\right) - \frac{\sinh(a z^2)}{z}$$

01.19.21.0094.01

$$\int \frac{\sinh(a z^2)}{z^3}\,dz = \frac{1}{2}\left(a\,\text{Chi}(a z^2) - \frac{\sinh(a z^2)}{z^2}\right)$$

01.19.21.0095.01

$$\int \frac{\sinh(a z^2)}{z^4}\,dz = \frac{1}{3}\left(\sqrt{\pi}\left(\text{erfi}(\sqrt{a}\,z) - \text{erf}(\sqrt{a}\,z)\right)a^{3/2} - \frac{2\cosh(a z^2)\,a}{z} - \frac{\sinh(a z^2)}{z^3}\right)$$

01.19.21.0096.01

$$\int \frac{\sinh(a z^2)}{z^5}\,dz = -\frac{-a^2\,\text{Shi}(a z^2) z^4 + a\cosh(a z^2) z^2 + \sinh(a z^2)}{4z^4}$$

01.19.21.0097.01

$$\int z^n \sinh\left(a\sqrt{z}\right) dz = a^{-2(n+1)} \left(-\frac{\text{Ei}\left(-a\sqrt{z}\right)}{(-2n-2)!} - e^{a\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left(-a\sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} + e^{a\sqrt{z}} \sum_{k=2n+2}^{-1} \frac{\left(-a\sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} + e^{-a\sqrt{z}} \sum_{k=0}^{2n+1} \frac{\left(a\sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} - e^{-a\sqrt{z}} \sum_{k=2n+2}^{-1} \frac{\left(a\sqrt{z}\right)^k}{(2n+2)_{k-2n-1}} + \frac{\text{Ei}\left(a\sqrt{z}\right)}{(-2n-2)!}\right) /; n \in \mathbb{Z}$$

01.19.21.0098.01

$$\int z \sinh\left(a\sqrt{z}\right) dz = \frac{2\left(a\sqrt{z}\left(z a^2+6\right)\cosh\left(a\sqrt{z}\right) - 3\left(z a^2+2\right)\sinh\left(a\sqrt{z}\right)\right)}{a^4}$$

01.19.21.0099.01

$$\int z^2 \sinh\left(a\sqrt{z}\right) dz = \frac{2\left(a\sqrt{z}\left(z^2 a^4+20 z a^2+120\right)\cosh\left(a\sqrt{z}\right) - 5\left(z^2 a^4+12 z a^2+24\right)\sinh\left(a\sqrt{z}\right)\right)}{a^6}$$

01.19.21.0100.01

$$\int z^3 \sinh\left(a\sqrt{z}\right) dz = \frac{1}{a^8}\left(2\left(a\sqrt{z}\left(z^3 a^6+42 z^2 a^4+840 z a^2+5040\right)\cosh\left(a\sqrt{z}\right) - 7\left(z^3 a^6+30 z^2 a^4+360 z a^2+720\right)\sinh\left(a\sqrt{z}\right)\right)\right)$$

01.19.21.0101.01

$$\int z^4 \sinh\left(a\sqrt{z}\right) dz = \frac{1}{a^{10}}\left(2\left(a\sqrt{z}\left(z^4 a^8+72 z^3 a^6+3024 z^2 a^4+60\,480 z a^2+362\,880\right)\cosh\left(a\sqrt{z}\right) - 9\left(z^4 a^8+56 z^3 a^6+1680 z^2 a^4+20\,160 z a^2+40\,320\right)\sinh\left(a\sqrt{z}\right)\right)\right)$$

01.19.21.0102.01

$$\int z^5 \sinh\left(a\sqrt{z}\right) dz = \frac{1}{a^{12}}\left(2\left(a\sqrt{z}\left(z^5 a^{10}+110 z^4 a^8+7920 z^3 a^6+332\,640 z^2 a^4+6\,652\,800 z a^2+39\,916\,800\right)\cosh\left(a\sqrt{z}\right) - 11\left(z^5 a^{10}+90 z^4 a^8+5040 z^3 a^6+151\,200 z^2 a^4+1\,814\,400 z a^2+3\,628\,800\right)\sinh\left(a\sqrt{z}\right)\right)\right)$$

01.19.21.0103.01

$$\int \frac{\sinh\left(a\sqrt{z}\right)}{z} dz = 2\,\text{Shi}\left(a\sqrt{z}\right)$$

01.19.21.0104.01

$$\int \frac{\sinh\left(a\sqrt{z}\right)}{z^2} dz = -\frac{-z\,\text{Shi}\left(a\sqrt{z}\right) a^2 + \sqrt{z}\cosh\left(a\sqrt{z}\right) a + \sinh\left(a\sqrt{z}\right)}{z}$$

01.19.21.0105.01

$$\int \frac{\sinh\left(a\sqrt{z}\right)}{z^3} dz = -\frac{-z^2\,\text{Shi}\left(a\sqrt{z}\right) a^4 + \sqrt{z}\left(z a^2+2\right)\cosh\left(a\sqrt{z}\right) a + \left(z a^2+6\right)\sinh\left(a\sqrt{z}\right)}{12 z^2}$$

01.19.21.0106.01

$$\int \frac{\sinh\left(a\sqrt{z}\right)}{z^4}\,dz = -\frac{1}{360\,z^3}\left(-z^3\,\mathrm{Shi}\left(a\sqrt{z}\right)a^6+\sqrt{z}\left(z^2 a^4+2 z a^2+24\right)\cosh\left(a\sqrt{z}\right)a+\left(z^2 a^4+6 z a^2+120\right)\sinh\left(a\sqrt{z}\right)\right)$$

01.19.21.0107.01

$$\int \frac{\sinh\left(a\sqrt{z}\right)}{z^5}\,dz = -\frac{1}{20\,160\,z^4}\left(-z^4\,\mathrm{Shi}\left(a\sqrt{z}\right)a^8+\sqrt{z}\left(z^3 a^6+2 z^2 a^4+24 z a^2+720\right)\cosh\left(a\sqrt{z}\right)a+\left(z^3 a^6+6 z^2 a^4+120 z a^2+5040\right)\sinh\left(a\sqrt{z}\right)\right)$$

Involving $z^{\alpha-1}$and arguments $a\ z^r+b$

01.19.21.0108.01

$$\int z^{\alpha-1}\sinh(a z^r+b)\,dz = \frac{z^\alpha\left(e^{-b}(a z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, a z^r\right)-e^b(-a z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -a z^r\right)\right)}{2r}$$

01.19.21.0109.01

$$\int \frac{\sinh(a z^r+b)}{z}\,dz = \frac{\mathrm{Chi}(a z^r)\sinh(b)+\cosh(b)\,\mathrm{Shi}(a z^r)}{r}$$

01.19.21.0110.01

$$\int z^n\sinh\left(a z^2+b\right)dz = \frac{1}{4}z^{n+1}\left(e^{-b}\left(a z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, a z^2\right)-e^b\left(-a z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -a z^2\right)\right)/;\ n\in\mathbb{Z}$$

01.19.21.0111.01

$$\int z^{2n}\sinh\left(a z^2+b\right)dz = \frac{1}{4}z\left(\frac{1}{\sqrt{a z^2}}\left(a^{-n}e^{-b}\left(\mathrm{erfc}\left(\sqrt{a z^2}\right)\Gamma\left(n+\frac{1}{2}\right)+e^{-a z^2}\sum_{k=0}^{n-1}\frac{\left(a z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}-e^{-a z^2}\sum_{k=n}^{-1}\frac{\left(a z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right)-\frac{1}{\sqrt{-a z^2}}\left((-a)^{-n}e^b\left(\mathrm{erfc}\left(\sqrt{-a z^2}\right)\Gamma\left(n+\frac{1}{2}\right)+e^{a z^2}\sum_{k=0}^{n-1}\frac{\left(-a z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}-e^{a z^2}\sum_{k=n}^{-1}\frac{\left(-a z^2\right)^{k+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{k-n+1}}\right)\right)\right)/;\ n\in\mathbb{Z}$$

01.19.21.0112.01

$$\int z^{2n-1}\sinh\left(a z^2+b\right)dz = \frac{1}{4}\left(a^{-n}e^{-b}\left(\frac{(-1)^{n-1}\,\mathrm{Ei}\left(-a z^2\right)}{(-n)!}+e^{-a z^2}\sum_{k=0}^{n-1}\frac{\left(a z^2\right)^k}{(n)_{k-n+1}}-e^{-a z^2}\sum_{k=n}^{-1}\frac{\left(a z^2\right)^k}{(n)_{k-n+1}}\right)-(-a)^{-n}e^b\left(\frac{(-1)^{n-1}\,\mathrm{Ei}\left(a z^2\right)}{(-n)!}+e^{a z^2}\sum_{k=0}^{n-1}\frac{\left(-a z^2\right)^k}{(n)_{k-n+1}}-e^{a z^2}\sum_{k=n}^{-1}\frac{\left(-a z^2\right)^k}{(n)_{k-n+1}}\right)\right)/;\ n\in\mathbb{Z}$$

01.19.21.0113.01

$$\int z\sinh\left(a z^2+b\right)dz = \frac{\cosh\left(a z^2+b\right)}{2a}$$

01.19.21.0114.01

$$\int z^2\sinh\left(a z^2+b\right)dz = \frac{1}{8a^{3/2}}\left(4\sqrt{a}\ z\cosh\left(a z^2+b\right)+\sqrt{\pi}\ \mathrm{erf}\left(\sqrt{a}\ z\right)(\sinh(b)-\cosh(b))-\sqrt{\pi}\ \mathrm{erfi}\left(\sqrt{a}\ z\right)(\cosh(b)+\sinh(b))\right)$$

01.19.21.0115.01

$$\int z^3 \sinh\left(a z^2 + b\right) dz = \frac{a z^2 \cosh\left(a z^2 + b\right) - \sinh\left(a z^2 + b\right)}{2 a^2}$$

01.19.21.0116.01

$$\int z^4 \sinh\left(a z^2 + b\right) dz = \frac{1}{16 a^{5/2}} \left(3 \sqrt{\pi} \operatorname{erf}\left(\sqrt{a} z\right) (\sinh(b) - \cosh(b)) + 3 \sqrt{\pi} \operatorname{erfi}\left(\sqrt{a} z\right) (\cosh(b) + \sinh(b)) + 4 \sqrt{a} z \left(2 a z^2 \cosh\left(a z^2 + b\right) - 3 \sinh\left(a z^2 + b\right)\right)\right)$$

01.19.21.0117.01

$$\int z^5 \sinh\left(a z^2 + b\right) dz = \frac{\left(a^2 z^4 + 2\right) \cosh\left(a z^2 + b\right) - 2 a z^2 \sinh\left(a z^2 + b\right)}{2 a^3}$$

01.19.21.0118.01

$$\int \frac{\sinh\left(a z^2 + b\right)}{z} dz = \frac{1}{2} \left(\operatorname{Chi}\left(a z^2\right) \sinh(b) + \cosh(b) \operatorname{Shi}\left(a z^2\right)\right)$$

01.19.21.0119.01

$$\int \frac{\sinh\left(a z^2 + b\right)}{z^2} dz = \frac{1}{2 z} \left(\sqrt{a} \sqrt{\pi} z \operatorname{erf}\left(\sqrt{a} z\right) (\cosh(b) - \sinh(b)) + \sqrt{a} \sqrt{\pi} z \operatorname{erfi}\left(\sqrt{a} z\right) (\cosh(b) + \sinh(b)) - 2 \sinh\left(a z^2 + b\right)\right)$$

01.19.21.0120.01

$$\int \frac{\sinh\left(a z^2 + b\right)}{z^3} dz = \frac{1}{2} \left(a \cosh(b) \operatorname{Chi}\left(a z^2\right) + a \sinh(b) \operatorname{Shi}\left(a z^2\right) - \frac{\sinh\left(a z^2 + b\right)}{z^2}\right)$$

01.19.21.0121.01

$$\int \frac{\sinh\left(a z^2 + b\right)}{z^4} dz = \frac{1}{3 z^3} \left(\sqrt{\pi} z^3 \operatorname{erf}\left(\sqrt{a} z\right) (\sinh(b) - \cosh(b)) a^{3/2} + \sqrt{\pi} z^3 \operatorname{erfi}\left(\sqrt{a} z\right) (\cosh(b) + \sinh(b)) a^{3/2} - 2 z^2 \cosh\left(a z^2 + b\right) a - \sinh\left(a z^2 + b\right)\right)$$

01.19.21.0122.01

$$\int \frac{\sinh\left(a z^2 + b\right)}{z^5} dz = \frac{a^2 \operatorname{Chi}\left(a z^2\right) \sinh(b) z^4 + a^2 \cosh(b) \operatorname{Shi}\left(a z^2\right) z^4 - a \cosh\left(a z^2 + b\right) z^2 - \sinh\left(a z^2 + b\right)}{4 z^4}$$

01.19.21.0123.01

$$\int z^{\alpha-1} \sinh\left(\sqrt{z}\, a + b\right) dz = z^\alpha \left(e^{-b} \left(a \sqrt{z}\right)^{-2\alpha} \Gamma\left(2\alpha, a \sqrt{z}\right) - e^b \left(-a \sqrt{z}\right)^{-2\alpha} \Gamma\left(2\alpha, -a \sqrt{z}\right)\right)$$

01.19.21.0124.01

$$\int z^n \sinh\left(\sqrt{z}\, a + b\right) dz = z^{n+1} \left(e^{-b} \left(a \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), a \sqrt{z}\right) - e^b \left(-a \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), -a \sqrt{z}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0125.01

$$\int z^n \sinh\left(\sqrt{z}\, a+b\right) dz = a^{-2(n+1)}\left(e^{-b}\left(-\frac{\operatorname{Ei}\left(-a\sqrt{z}\right)}{(-2(n+1))!}+e^{-a\sqrt{z}}\sum_{k=0}^{2(n+1)-1}\frac{\left(a\sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}}-e^{-a\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left(a\sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}}\right)- e^{b}\left(-\frac{\operatorname{Ei}\left(a\sqrt{z}\right)}{(-2(n+1))!}+e^{a\sqrt{z}}\sum_{k=0}^{2(n+1)-1}\frac{\left(-a\sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}}-e^{a\sqrt{z}}\sum_{k=2(n+1)}^{-1}\frac{\left(-a\sqrt{z}\right)^k}{(2(n+1))_{k-2(n+1)+1}}\right)\right)/;\, n\in\mathbb{Z}$$

01.19.21.0126.01

$$\int z \sinh\left(\sqrt{z}\, a+b\right) dz = \frac{2\left(a\sqrt{z}\left(z a^2+6\right)\cosh\left(\sqrt{z}\, a+b\right)-3\left(z a^2+2\right)\sinh\left(\sqrt{z}\, a+b\right)\right)}{a^4}$$

01.19.21.0127.01

$$\int z^2 \sinh\left(\sqrt{z}\, a+b\right) dz = \frac{2\left(a\sqrt{z}\left(z^2 a^4+20 z a^2+120\right)\cosh\left(\sqrt{z}\, a+b\right)-5\left(z^2 a^4+12 z a^2+24\right)\sinh\left(\sqrt{z}\, a+b\right)\right)}{a^6}$$

01.19.21.0128.01

$$\int z^3 \sinh\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^8}\left(2\left(a\sqrt{z}\left(z^3 a^6+42 z^2 a^4+840 z a^2+5040\right)\cosh\left(\sqrt{z}\, a+b\right)-7\left(z^3 a^6+30 z^2 a^4+360 z a^2+720\right)\sinh\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.19.21.0129.01

$$\int z^4 \sinh\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^{10}}\left(2\left(a\sqrt{z}\left(z^4 a^8+72 z^3 a^6+3024 z^2 a^4+60\,480 z a^2+362\,880\right)\cosh\left(\sqrt{z}\, a+b\right)- 9\left(z^4 a^8+56 z^3 a^6+1680 z^2 a^4+20\,160 z a^2+40\,320\right)\sinh\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.19.21.0130.01

$$\int z^5 \sinh\left(\sqrt{z}\, a+b\right) dz = \frac{1}{a^{12}}\left(2\left(a\sqrt{z}\left(z^5 a^{10}+110 z^4 a^8+7920 z^3 a^6+332\,640 z^2 a^4+6\,652\,800 z a^2+39\,916\,800\right)\cosh\left(\sqrt{z}\, a+b\right)- 11\left(z^5 a^{10}+90 z^4 a^8+5040 z^3 a^6+151\,200 z^2 a^4+1\,814\,400 z a^2+3\,628\,800\right)\sinh\left(\sqrt{z}\, a+b\right)\right)\right)$$

01.19.21.0131.01

$$\int \frac{\sinh\left(\sqrt{z}\, a+b\right)}{z} dz = 2\left(\operatorname{Chi}\left(a\sqrt{z}\right)\sinh(b)+\cosh(b)\operatorname{Shi}\left(a\sqrt{z}\right)\right)$$

01.19.21.0132.01

$$\int \frac{\sinh\left(\sqrt{z}\, a+b\right)}{z^2} dz = \operatorname{Chi}\left(a\sqrt{z}\right)\sinh(b)\, a^2+\cosh(b)\operatorname{Shi}\left(a\sqrt{z}\right) a^2-\frac{\cosh\left(\sqrt{z}\, a+b\right) a}{\sqrt{z}}-\frac{\sinh\left(\sqrt{z}\, a+b\right)}{z}$$

01.19.21.0133.01

$$\int \frac{\sinh\left(\sqrt{z}\, a+b\right)}{z^3}\, dz = -\frac{1}{12 z^2}\left(a^3 \cosh\left(\sqrt{z}\, a+b\right) z^{3/2} - a^4 \operatorname{Chi}\left(a\sqrt{z}\right)\sinh(b)\, z^2 - a^4 \cosh(b)\operatorname{Shi}\left(a\sqrt{z}\right) z^2 + a^2 \sinh\left(\sqrt{z}\, a+b\right) z + 2 a \cosh\left(\sqrt{z}\, a+b\right)\sqrt{z} + 6 \sinh\left(\sqrt{z}\, a+b\right)\right)$$

01.19.21.0134.01

$$\int \frac{\sinh\left(\sqrt{z}\, a+b\right)}{z^4}\, dz = -\frac{1}{360 z^3}\left(2 a^3 \cosh\left(\sqrt{z}\, a+b\right) z^{3/2} + a^5 \cosh\left(\sqrt{z}\, a+b\right) z^{5/2} - a^6 \operatorname{Chi}\left(a\sqrt{z}\right)\sinh(b)\, z^3 - a^6 \cosh(b)\operatorname{Shi}\left(a\sqrt{z}\right) z^3 + a^4 \sinh\left(\sqrt{z}\, a+b\right) z^2 + 6 a^2 \sinh\left(\sqrt{z}\, a+b\right) z + 24 a \cosh\left(\sqrt{z}\, a+b\right)\sqrt{z} + 120 \sinh\left(\sqrt{z}\, a+b\right)\right)$$

01.19.21.0135.01

$$\int \frac{\sinh\left(\sqrt{z}\, a+b\right)}{z^5}\, dz = -\frac{1}{20\,160 z^4}\left(24 a^3 \cosh\left(\sqrt{z}\, a+b\right) z^{3/2} + 2 a^5 \cosh\left(\sqrt{z}\, a+b\right) z^{5/2} + a^7 \cosh\left(\sqrt{z}\, a+b\right) z^{7/2} - a^8 \operatorname{Chi}\left(a\sqrt{z}\right)\sinh(b)\, z^4 - a^8 \cosh(b)\operatorname{Shi}\left(a\sqrt{z}\right) z^4 + a^6 \sinh\left(\sqrt{z}\, a+b\right) z^3 + 6 a^4 \sinh\left(\sqrt{z}\, a+b\right) z^2 + 120 a^2 \sinh\left(\sqrt{z}\, a+b\right) z + 720 a \cosh\left(\sqrt{z}\, a+b\right)\sqrt{z} + 5040 \sinh\left(\sqrt{z}\, a+b\right)\right)$$

Involving rational functions

Involving $(a z+b)^{-n}$

01.19.21.0136.01

$$\int \frac{\sinh(c z)}{b+a z}\, dz = \frac{1}{a}\left(\cosh\left(\frac{b c}{a}\right)\operatorname{Shi}\left(c\left(\frac{b}{a}+z\right)\right) - \operatorname{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\sinh\left(\frac{b c}{a}\right)\right)$$

01.19.21.0137.01

$$\int \frac{\sinh(c z)}{(b+a z)^2}\, dz = \frac{1}{a^2}\left(c \cosh\left(\frac{b c}{a}\right)\operatorname{Chi}\left(c\left(\frac{b}{a}+z\right)\right) - c \sinh\left(\frac{b c}{a}\right)\operatorname{Shi}\left(c\left(\frac{b}{a}+z\right)\right) - \frac{a \sinh(c z)}{b+a z}\right)$$

01.19.21.0138.01

$$\int \frac{\sinh(c z)}{(b+a z)^3}\, dz = -\frac{1}{2 a^3}\left(\operatorname{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\sinh\left(\frac{b c}{a}\right) c^2 - \cosh\left(\frac{b c}{a}\right)\operatorname{Shi}\left(c\left(\frac{b}{a}+z\right)\right) c^2 + \frac{a\,(c\,(b+a z)\cosh(c z) + a \sinh(c z))}{(b+a z)^2}\right)$$

01.19.21.0139.01

$$\int \frac{\sinh(c z)}{(b+a z)^4}\, dz = -\frac{1}{6 a^4}\left(-\left(\cosh\left(\frac{b c}{a}\right)\operatorname{Chi}\left(c\left(\frac{b}{a}+z\right)\right) - \sinh\left(\frac{b c}{a}\right)\operatorname{Shi}\left(c\left(\frac{b}{a}+z\right)\right)\right) c^3 + \frac{a^2 \cosh(c z)\, c}{(b+a z)^2} + \frac{a\left(\left(c^2 z^2+2\right) a^2 + 2 b c^2 z a + b^2 c^2\right)\sinh(c z)}{(b+a z)^3}\right)$$

01.19.21.0140.01

$$\int \frac{\sinh(c z)}{(b+a z)^5}\, dz = -\frac{1}{24 a^5}\left(\left(\text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\sinh\left(\frac{b c}{a}\right)-\cosh\left(\frac{b c}{a}\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)\right)c^4+\frac{a\left(\left(c^2 z^2+2\right)a^2+2 b c^2 z a+b^2 c^2\right)\cosh(c z)\, c}{(b+a z)^3}+\frac{a^2\left(\left(c^2 z^2+6\right)a^2+2 b c^2 z a+b^2 c^2\right)\sinh(c z)}{(b+a z)^4}\right)$$

01.19.21.0141.01

$$\int \frac{\sinh(c z)}{(b+a z)^6}\, dz = -\frac{1}{120 a^6}\left(-\left(\cosh\left(\frac{b c}{a}\right)\text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)-\sinh\left(\frac{b c}{a}\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)\right)c^5+\frac{a^2\left(\left(c^2 z^2+6\right)a^2+2 b c^2 z a+b^2 c^2\right)\cosh(c z)\, c}{(b+a z)^4}+\frac{1}{(b+a z)^5}\left(a\left(\left(c^4 z^4+2 c^2 z^2+24\right)a^4+4 b c^2 z\left(c^2 z^2+1\right)a^3+2 b^2 c^2\left(3 c^2 z^2+1\right)a^2+4 b^3 c^4 z a+b^4 c^4\right)\sinh(c z)\right)\right)$$

01.19.21.0142.01

$$\int \frac{z \sinh(c z)}{b+a z}\, dz = \frac{a\cosh(c z)+b c\, \text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\sinh\left(\frac{b c}{a}\right)-b c\cosh\left(\frac{b c}{a}\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)}{a^2 c}$$

01.19.21.0143.01

$$\int \frac{z^2 \sinh(c z)}{b+a z}\, dz = \frac{1}{a^3 c^2}\left(-b^2\, \text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\sinh\left(\frac{b c}{a}\right)c^2+b^2\cosh\left(\frac{b c}{a}\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)c^2+a\left(-c\,(b-a z)\cosh(c z)-a\sinh(c z)\right)\right)$$

01.19.21.0144.01

$$\int \frac{z \sinh(c z)}{(b+a z)^2}\, dz = \frac{1}{a^3 (b+a z)}\left(-(b+a z)\,\text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\left(b c\cosh\left(\frac{b c}{a}\right)+a\sinh\left(\frac{b c}{a}\right)\right)+a b\sinh(c z)+(b+a z)\left(a\cosh\left(\frac{b c}{a}\right)+b c\sinh\left(\frac{b c}{a}\right)\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.19.21.0145.01

$$\int \frac{z^2 \sinh(c z)}{(b+a z)^2}\, dz = \frac{1}{a^4 c\,(b+a z)}\left(b c\,(b+a z)\,\text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\left(b c\cosh\left(\frac{b c}{a}\right)+2 a\sinh\left(\frac{b c}{a}\right)\right)+a\left(a\,(b+a z)\cosh(c z)-b^2 c\sinh(c z)\right)-b c\,(b+a z)\left(2 a\cosh\left(\frac{b c}{a}\right)+b c\sinh\left(\frac{b c}{a}\right)\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)\right)$$

01.19.21.0146.01

$$\int \frac{z^3 \sinh(c z)}{(b+a z)^2}\, dz = \frac{1}{a^5 c^2 (b+a z)}\left(-b^2 (b+a z)\,\text{Chi}\left(c\left(\frac{b}{a}+z\right)\right)\left(b c\cosh\left(\frac{b c}{a}\right)+3 a\sinh\left(\frac{b c}{a}\right)\right)c^2+b^2 (b+a z)\left(3 a\cosh\left(\frac{b c}{a}\right)+b c\sinh\left(\frac{b c}{a}\right)\right)\text{Shi}\left(c\left(\frac{b}{a}+z\right)\right)c^2+a\left(a c\left(-2 b^2-a z b+a^2 z^2\right)\cosh(c z)-\left(z a^3+b a^2-b^3 c^2\right)\sinh(c z)\right)\right)$$

01.19.21.0147.01

$$\int \frac{z^4 \sinh(c z)}{(b + a z)^2} \, dz = \frac{1}{a^6 c^3 (b + a z)} \left(b^3 (b + a z) \operatorname{Chi}\left(c \left(\frac{b}{a} + z\right)\right) \left(b c \cosh\left(\frac{b c}{a}\right) + 4 a \sinh\left(\frac{b c}{a}\right)\right) c^3 - b^3 (b + a z) \left(4 a \cosh\left(\frac{b c}{a}\right) + b c \sinh\left(\frac{b c}{a}\right)\right) \operatorname{Shi}\left(c \left(\frac{b}{a} + z\right)\right) c^3 + a \left(a (b + a z) \left(\left(c^2 z^2 + 2\right) a^2 - 2 b c^2 z a + 3 b^2 c^2\right) \cosh(c z) - c \left(2 z^2 a^4 - 2 b^2 a^2 + b^4 c^2\right) \sinh(c z)\right) \right)$$

Involving $\left(a z^2 + b\right)^{-n}$

01.19.21.0148.01

$$\int \frac{\sinh(c z)}{a z^2 + b} \, dz = \frac{1}{2 \sqrt{a} \sqrt{b}} \left(\operatorname{Ci}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right) \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) + \operatorname{Ci}\left(i c z - \frac{\sqrt{b} c}{\sqrt{a}}\right) \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) - \cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \left(\operatorname{Si}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right) + \operatorname{Si}\left(\frac{\sqrt{b} c}{\sqrt{a}} - i c z\right)\right) \right)$$

01.19.21.0149.01

$$\int \frac{z \sinh(c z)}{a z^2 + b} \, dz = -\frac{i}{2 a} \left(-\operatorname{Ci}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right) \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) + \operatorname{Ci}\left(i c z - \frac{\sqrt{b} c}{\sqrt{a}}\right) \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) + \cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \left(\operatorname{Si}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right) + \operatorname{Si}\left(i c z - \frac{\sqrt{b} c}{\sqrt{a}}\right)\right) \right)$$

01.19.21.0150.01

$$\int \frac{\sinh(c z)}{\left(a z^2 + b\right)^2} \, dz = \frac{1}{4 b^{3/2}} \left(\frac{\operatorname{Ci}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right) \left(\sqrt{a} \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) - \sqrt{b} c \cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right)\right)}{a} + \frac{\operatorname{Ci}\left(i c z - \frac{\sqrt{b} c}{\sqrt{a}}\right) \left(\sqrt{a} \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) - \sqrt{b} c \cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right)\right)}{a} + \frac{2 \sqrt{b} z \sinh(c z)}{a z^2 + b} + \frac{\cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \operatorname{Si}\left(i c z - \frac{\sqrt{b} c}{\sqrt{a}}\right)}{\sqrt{a}} - \frac{\cos\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \operatorname{Si}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right)}{\sqrt{a}} - \frac{\sqrt{b} c \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \operatorname{Si}\left(i z c + \frac{\sqrt{b} c}{\sqrt{a}}\right)}{a} - \frac{\sqrt{b} c \sin\left(\frac{\sqrt{b} c}{\sqrt{a}}\right) \operatorname{Si}\left(\frac{\sqrt{b} c}{\sqrt{a}} - i c z\right)}{a} \right)$$

01.19.21.0151.01

$$\int \frac{z\sinh(c\,z)}{a\,z^2+b}\,dz = -\frac{i}{2\,a}\left(-\mathrm{Ci}\left(i\,z\,c+\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)+\mathrm{Ci}\left(i\,c\,z-\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)+\cos\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\left(\mathrm{Si}\left(i\,z\,c+\frac{\sqrt{b}\,c}{\sqrt{a}}\right)+\mathrm{Si}\left(i\,c\,z-\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\right)\right)$$

01.19.21.0152.01

$$\int \frac{\sinh(c\,z)}{\left(a\,z^2+b\right)^2}\,dz = \frac{1}{4\,b^{3/2}}\left(\frac{\mathrm{Ci}\left(i\,z\,c+\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\left(\sqrt{a}\,\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)-\sqrt{b}\,c\cos\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\right)}{a}+\frac{\mathrm{Ci}\left(i\,c\,z-\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\left(\sqrt{a}\,\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)-\sqrt{b}\,c\cos\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\right)}{a}+\frac{2\sqrt{b}\,z\sinh(c\,z)}{a\,z^2+b}+\frac{\cos\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(i\,c\,z-\frac{\sqrt{b}\,c}{\sqrt{a}}\right)}{\sqrt{a}}-\frac{\cos\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(i\,z\,c+\frac{\sqrt{b}\,c}{\sqrt{a}}\right)}{\sqrt{a}}-\frac{\sqrt{b}\,c\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(i\,z\,c+\frac{\sqrt{b}\,c}{\sqrt{a}}\right)}{a}-\frac{\sqrt{b}\,c\sin\left(\frac{\sqrt{b}\,c}{\sqrt{a}}\right)\mathrm{Si}\left(\frac{\sqrt{b}\,c}{\sqrt{a}}-i\,c\,z\right)}{a}\right)$$

Involving $\left(a\,z^2+b\,z+c\right)^{-n}$

01.19.21.0153.01

$$\int \frac{\sinh(d\,z)}{a\,z^2+b\,z+c}\,dz = -\frac{1}{\sqrt{b^2-4\,a\,c}}\left(\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)+\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)$$

01.19.21.0154.01

$$\int \frac{z\sinh(d\,z)}{a\,z^2+b\,z+c}\,dz = -\frac{1}{2\,a\sqrt{b^2-4\,a\,c}}\left(\left(\sqrt{b^2-4\,a\,c}-b\right)\left(\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)+\left(b+\sqrt{b^2-4\,a\,c}\right)\left(\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)\right)$$

01.19.21.0155.01

$$\int \frac{\sinh(d\,z)}{\left(a\,z^2+b\,z+c\right)^2}\,dz = \frac{1}{\left(b^2-4\,a\,c\right)^{3/2}}\left(\frac{1}{c+z\,(b+a\,z)}\left((c+z\,(b+a\,z))\left(\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\left(\sqrt{b^2-4\,a\,c}\;d\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+2\,a\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)+\mathrm{Ci}\left(\frac{i\,d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\left(\sqrt{b^2-4\,a\,c}\;d\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-2\,a\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\right)-\sqrt{b^2-4\,a\,c}\;(b+2\,a\,z)\sinh(d\,z)\right)-\left(2\,a\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+\sqrt{b^2-4\,a\,c}\;d\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)+\left(2\,a\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\sqrt{b^2-4\,a\,c}\;d\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\mathrm{Shi}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)$$

01.19.21.0156.01

$$\int \frac{z\sinh(d\,z)}{\left(a\,z^2+b\,z+c\right)^2}\,dz = -\frac{1}{2}\left(\frac{1}{a\left(b^2-4\,a\,c\right)^{3/2}}\left(\operatorname{Ci}\left(\frac{i\,d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\left(\left(-b^2+\sqrt{b^2-4\,a\,c}\;b+4\,a\,c\right)d\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+2\,a\,b\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\right)+\frac{1}{a\left(b^2-4\,a\,c\right)^{3/2}}\left(\operatorname{Ci}\left(\frac{i\,d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\left(\left(b^2+\sqrt{b^2-4\,a\,c}\;b-4\,a\,c\right)d\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-2\,a\,b\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\right)-\frac{1}{a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(2\,a\,b\cosh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)+\left(-b^2+\sqrt{b^2-4\,a\,c}\;b+4\,a\,c\right)d\sinh\left(\frac{\left(b-\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Shi}\left(\frac{d\left(b+2\,a\,z-\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)+\frac{1}{a\left(b^2-4\,a\,c\right)^{3/2}}\left(\left(2\,a\,b\cosh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)-\left(b^2+\sqrt{b^2-4\,a\,c}\;b-4\,a\,c\right)d\sinh\left(\frac{\left(b+\sqrt{b^2-4\,a\,c}\right)d}{2\,a}\right)\right)\operatorname{Shi}\left(\frac{d\left(b+2\,a\,z+\sqrt{b^2-4\,a\,c}\right)}{2\,a}\right)\right)-\frac{2\,(2\,c+b\,z)\sinh(d\,z)}{\left(b^2-4\,a\,c\right)(c+z\,(b+a\,z))}\right)$$

Involving algebraic functions

Involving $(a\,z+b)^{\beta}$

01.19.21.0157.01

$$\int (b+a z)^{\beta} \sinh(d+c z)\, dz = \frac{(b+a z)^{\beta}}{2 c} \left(-\frac{c^2 (b+a z)^2}{a^2}\right)^{-\beta} \left(\Gamma\left(\beta+1, -\frac{c (b+a z)}{a}\right) \left(\cosh\left(\frac{b c}{a}\right) - \sinh\left(\frac{b c}{a}\right)\right) (\cosh(d)+\sinh(d)) \left(\frac{c (b+a z)}{a}\right)^{\beta} + \left(-\frac{c (b+a z)}{a}\right)^{\beta} \Gamma\left(\beta+1, \frac{c (b+a z)}{a}\right) \left(\cosh\left(\frac{b c}{a} - d\right) + \sinh\left(\frac{b c}{a} - d\right)\right)\right)$$

01.19.21.0158.01

$$\int (b+a z)^{\beta} \sinh(c z)\, dz = \frac{(b+a z)^{\beta}}{2 c} \left(-\frac{c^2 (b+a z)^2}{a^2}\right)^{-\beta} \left(\Gamma\left(\beta+1, -\frac{c (b+a z)}{a}\right) \left(\cosh\left(\frac{b c}{a}\right) - \sinh\left(\frac{b c}{a}\right)\right) \left(\frac{c (b+a z)}{a}\right)^{\beta} + \left(-\frac{c (b+a z)}{a}\right)^{\beta} \Gamma\left(\beta+1, \frac{c (b+a z)}{a}\right) \left(\cosh\left(\frac{b c}{a}\right) + \sinh\left(\frac{b c}{a}\right)\right)\right)$$

01.19.21.0159.01

$$\int (b+a z)^{3/2} \sinh(c z)\, dz = \frac{1}{4 c^2 \sqrt{\frac{i c}{a}}} \left(-i\, 3 a \sqrt{2\pi} \cosh\left(\frac{b c}{a}\right) S\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) - 3 a \sqrt{2\pi}\, C\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) \sinh\left(\frac{b c}{a}\right) + 2 \sqrt{\frac{i c}{a}} \sqrt{b+a z}\, (2 c (b+a z) \cosh(c z) - 3 a \sinh(c z))\right)$$

01.19.21.0160.01

$$\int \sqrt{b+a z} \sinh(c z)\, dz = \frac{1}{2 c \sqrt{\frac{i c}{a}}} \left(2 \sqrt{\frac{i c}{a}} \sqrt{b+a z} \cosh(c z) - \sqrt{2\pi} \cosh\left(\frac{b c}{a}\right) C\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) - i \sqrt{2\pi}\, S\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) \sinh\left(\frac{b c}{a}\right)\right)$$

01.19.21.0161.01

$$\int \frac{\sinh(c z)}{\sqrt{b+a z}}\, dz = -\frac{\sqrt{\pi} \left(\operatorname{erfi}\left(\frac{\sqrt{c} \sqrt{b+a z}}{\sqrt{a}}\right) \left(\sinh\left(\frac{b c}{a}\right) - \cosh\left(\frac{b c}{a}\right)\right) + \operatorname{erf}\left(\frac{\sqrt{c} \sqrt{b+a z}}{\sqrt{a}}\right) \left(\cosh\left(\frac{b c}{a}\right) + \sinh\left(\frac{b c}{a}\right)\right)\right)}{2 \sqrt{a} \sqrt{c}}$$

01.19.21.0162.01

$$\int \frac{\sinh(c z)}{(b+a z)^{3/2}}\, dz = \frac{1}{a} \left(-i\, 2 \sqrt{\frac{i c}{a}} \sqrt{2\pi} \cosh\left(\frac{b c}{a}\right) C\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) + 2 \sqrt{\frac{i c}{a}} \sqrt{2\pi}\, S\left(\sqrt{\frac{i c}{a}} \sqrt{\frac{2}{\pi}} \sqrt{b+a z}\right) \sinh\left(\frac{b c}{a}\right) - \frac{2 \sinh(c z)}{\sqrt{b+a z}}\right)$$

Involving exponential function

Involving exp

Involving $a^{b z} \sinh(c z)$

01.19.21.0163.01

$$\int a^{b z} \sinh(c z)\, dz = \frac{a^{b z} (c \cosh(c z) - b \log(a) \sinh(c z))}{c^2 - b^2 \log^2(a)}$$

01.19.21.0164.01

$$\int e^{b z} \sinh(c z)\, dz = \frac{e^{b z} (b \sinh(c z) - c \cosh(c z))}{(b - c)(b + c)}$$

01.19.21.0165.01

$$\int e^{c z} \sinh(c z)\, dz = \frac{e^{2 c z} - 2 c z}{4 c}$$

01.19.21.0166.01

$$\int e^{-c z} \sinh(c z)\, dz = \frac{2 c z + e^{-2 c z}}{4 c}$$

Involving $a^{b z+e} \sinh(c z)$

01.19.21.0167.01

$$\int a^{b z+e} \sinh(c z)\, dz = \frac{a^{b z+e} (c \cosh(c z) - b \log(a) \sinh(c z))}{c^2 - b^2 \log^2(a)}$$

01.19.21.0168.01

$$\int e^{b z+e} \sinh(c z)\, dz = \frac{e^{b z+e} (b \sinh(c z) - c \cosh(c z))}{(b - c)(b + c)}$$

01.19.21.0169.01

$$\int e^{e+c z} \sinh(c z)\, dz = \frac{e^e \left(e^{2 c z} - 2 c z\right)}{4 c}$$

01.19.21.0170.01

$$\int e^{e-c z} \sinh(c z)\, dz = \frac{e^{e-2 c z} \left(2 c e^{2 c z} z + 1\right)}{4 c}$$

Involving $a^{b z} \sinh(c z + d)$

01.19.21.0171.01

$$\int a^{b z} \sinh(d + c z)\, dz = \frac{a^{b z} (c \cosh(d + c z) - b \log(a) \sinh(d + c z))}{c^2 - b^2 \log^2(a)}$$

01.19.21.0172.01

$$\int e^{b z} \sinh(d + c z)\, dz = \frac{e^{b z} (b \sinh(d + c z) - c \cosh(d + c z))}{(b - c)(b + c)}$$

01.19.21.0173.01

$$\int e^{c z} \sinh(d + c z)\, dz = \frac{\left(e^{2 c z} - 2 c z\right) \cosh(d) + \left(2 c z + e^{2 c z}\right) \sinh(d)}{4 c}$$

01.19.21.0174.01

$$\int e^{-c z}\sinh(d+c z)\,dz = \frac{\left(2 c z + e^{-2 c z}\right)\cosh(d) + \left(2 c z - e^{-2 c z}\right)\sinh(d)}{4 c}$$

Involving $a^{b z+e}\sinh(c z+d)$

01.19.21.0175.01

$$\int a^{b z+e}\sinh(d+c z)\,dz = \frac{a^{b z+e}\,(c\cosh(d+c z) - b\log(a)\sinh(d+c z))}{c^2 - b^2\log^2(a)}$$

01.19.21.0176.01

$$\int e^{b z+e}\sinh(d+c z)\,dz = \frac{e^{b z+e}\,(b\sinh(d+c z) - c\cosh(d+c z))}{(b-c)\,(b+c)}$$

01.19.21.0177.01

$$\int e^{e+c z}\sinh(d+c z)\,dz = \frac{e^{e}\left(\left(e^{2 c z} - 2 c z\right)\cosh(d) + \left(2 c z + e^{2 c z}\right)\sinh(d)\right)}{4 c}$$

01.19.21.0178.01

$$\int e^{e-c z}\sinh(d+c z)\,dz = \frac{e^{e-2 c z}\left(\left(2 c\, e^{2 c z} z + 1\right)\cosh(d) + \left(2 c\, e^{2 c z} z - 1\right)\sinh(d)\right)}{4 c}$$

Involving $a^{b z^r}\sinh^{\nu}(c z)$

01.19.21.0179.01

$$\int a^{b z^2}\sinh(c z)\,dz = \frac{\sqrt{\pi}}{4\sqrt{b}\,\log^{\frac{1}{2}}(a)}\, e^{-\frac{c^2}{4 b\log(a)}}\left(\operatorname{erfi}\left(\frac{c + 2 b z\log(a)}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right) + \operatorname{erfi}\left(\frac{c - 2 b z\log(a)}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right)\right)$$

01.19.21.0180.01

$$\int e^{b z^2}\sinh(c z)\,dz = \frac{\sqrt{\pi}}{4\sqrt{b}}\, e^{-\frac{c^2}{4 b}}\left(\operatorname{erfi}\left(\frac{c + 2 b z}{2\sqrt{b}}\right) + \operatorname{erfi}\left(\frac{c - 2 b z}{2\sqrt{b}}\right)\right)$$

01.19.21.0181.01

$$\int a^{b\sqrt{z}}\sinh(c z)\,dz = \frac{a^{b\sqrt{z}}\cosh(c z)}{c} - \frac{b\sqrt{\pi}\,\log(a)}{4 c^{3/2}}\, e^{-\frac{b^2\log^2(a)}{4 c}}\left(e^{\frac{b^2\log^2(a)}{2 c}}\operatorname{erf}\left(\frac{2 c\sqrt{z} - b\log(a)}{2\sqrt{c}}\right) + \operatorname{erfi}\left(\frac{2\sqrt{z}\, c + b\log(a)}{2\sqrt{c}}\right)\right)$$

01.19.21.0182.01

$$\int e^{b\sqrt{z}}\sinh(c z)\,dz = \frac{e^{b\sqrt{z}}\cosh(c z)}{c} - \frac{b\sqrt{\pi}}{4 c^{3/2}}\, e^{-\frac{b^2}{4 c}}\left(e^{\frac{b^2}{2 c}}\operatorname{erf}\left(\frac{2 c\sqrt{z} - b}{2\sqrt{c}}\right) + \operatorname{erfi}\left(\frac{2\sqrt{z}\, c + b}{2\sqrt{c}}\right)\right)$$

Involving $a^{b z^r+e}\sinh(c z)$

01.19.21.0183.01

$$\int a^{b z^2+e}\sinh(c z)\,dz = \frac{a^{e}\, e^{-\frac{c^2}{4 b\log(a)}}\sqrt{\pi}\left(\operatorname{erfi}\left(\frac{c+2 b z\log(a)}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right) - \operatorname{erfi}\left(\frac{2 b z\log(a)-c}{2\sqrt{b}\,\log^{\frac{1}{2}}(a)}\right)\right)}{4\sqrt{b}\,\log^{\frac{1}{2}}(a)}$$

01.19.21.0184.01

$$\int e^{b z^2+e} \sinh(c z)\, dz = \frac{e^{e-\frac{c^2}{4 b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{c+2 b z}{2 \sqrt{b}}\right)+\operatorname{erfi}\left(\frac{c-2 b z}{2 \sqrt{b}}\right)\right)}{4 \sqrt{b}}$$

01.19.21.0185.01

$$\int a^{\sqrt{z}\, b+e} \sinh(c z)\, dz = \frac{1}{2} a^e \left(\frac{e^{-c z} a^{b \sqrt{z}}}{c}+\frac{e^{c z} a^{b \sqrt{z}}}{c}+\frac{1}{2} b \left(\frac{\operatorname{erf}\left(\frac{-2 \sqrt{z}\, c-b \log(a)}{2 \sqrt{-c}}\right)}{(-c)^{3/2}}-\frac{e^{\frac{b^2 \log^2(a)}{2 c}} \operatorname{erf}\left(\frac{2 c \sqrt{z}-b \log(a)}{2 \sqrt{c}}\right)}{c^{3/2}}\right) e^{-\frac{b^2 \log^2(a)}{4 c}} \sqrt{\pi} \log(a)\right)$$

01.19.21.0186.01

$$\int e^{\sqrt{z}\, b+e} \sinh(c z)\, dz = \frac{e^e \left(2 c\, e^{b \sqrt{z}-c z} \left(1+e^{2 c z}\right)-b \sqrt{-c}\, e^{-\frac{b^2}{4 c}} \sqrt{\pi} \operatorname{erf}\left(\frac{b+2 c \sqrt{z}}{2 \sqrt{-c}}\right)+b \sqrt{c}\, e^{\frac{b^2}{4 c}} \sqrt{\pi} \operatorname{erf}\left(\frac{b-2 c \sqrt{z}}{2 \sqrt{c}}\right)\right)}{4 c^2}$$

Involving $a^{b z^r+d z} \sinh(c z)$

01.19.21.0187.01

$$\int a^{b z^2+d z} \sinh(c z)\, dz = \frac{\sqrt{\pi}}{4 \sqrt{b} \log^{\frac{1}{2}}(a)} a^{-\frac{d^2}{4 b}} e^{-\frac{c (c+2 d \log(a))}{4 b \log(a)}} \left(\operatorname{erfi}\left(\frac{c+(d+2 b z) \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)}\right)-e^{\frac{c d}{b}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-c}{2 \sqrt{b} \log^{\frac{1}{2}}(a)}\right)\right)$$

01.19.21.0188.01

$$\int e^{b z^2+d z} \sinh(c z)\, dz = \frac{\sqrt{\pi}}{4 \sqrt{b}} e^{-\frac{(c+d)^2}{4 b}} \left(\operatorname{erfi}\left(\frac{c+d+2 b z}{2 \sqrt{b}}\right)+e^{\frac{c d}{b}} \operatorname{erfi}\left(\frac{c-d-2 b z}{2 \sqrt{b}}\right)\right)$$

01.19.21.0189.01

$$\int a^{\sqrt{z}\, b+d z} \sinh(c z)\, dz = \frac{1}{2} \left(-\frac{e^{c z} a^{\sqrt{z}\, b+d z}}{-c-d \log(a)}+\frac{e^{-c z} a^{\sqrt{z}\, b+d z}}{c-d \log(a)}+ b \sqrt{\pi} \log(a) \left(\frac{e^{\frac{b^2 \log^2(a)}{4 (-c-d \log(a))}} \operatorname{erf}\left(\frac{-2 \sqrt{z}\, c-b \log(a)-2 d \sqrt{z} \log(a)}{2 \sqrt{-c-d \log(a)}}\right)}{2 (-c-d \log(a))^{3/2}}-\frac{e^{\frac{b^2 \log^2(a)}{4 (c-d \log(a))}} \operatorname{erf}\left(\frac{2 \sqrt{z}\, c-b \log(a)-2 d \sqrt{z} \log(a)}{2 \sqrt{c-d \log(a)}}\right)}{2 (c-d \log(a))^{3/2}}\right)\right)$$

01.19.21.0190.01

$$\int e^{\sqrt{z}\, b+d z} \sinh(c z)\, dz = \frac{1}{2} \left(\frac{b \sqrt{\pi}\, e^{\frac{b^2}{4 (-c-d)}} \operatorname{erf}\left(\frac{-2 \sqrt{z}\, c-b-2 d \sqrt{z}}{2 \sqrt{-c-d}}\right)}{2 (-c-d)^{3/2}}-\frac{b \sqrt{\pi}\, e^{\frac{b^2}{4 (c-d)}} \operatorname{erf}\left(\frac{2 \sqrt{z}\, c-b-2 d \sqrt{z}}{2 \sqrt{c-d}}\right)}{2 (c-d)^{3/2}}+\frac{e^{b \sqrt{z}-(c-d) z}}{c-d}-\frac{e^{b \sqrt{z}-(-c-d) z}}{-c-d}\right)$$

Involving $a^{b z^r + d z + e} \sinh(c z)$

01.19.21.0191.01

$$\int a^{b z^2 + d z + e} \sinh(c z)\, dz = \frac{\sqrt{\pi}}{4 \sqrt{b} \log^{\frac{1}{2}}(a)} a^{e - \frac{d^2}{4 b}} e^{-\frac{c (c + 2 d \log(a))}{4 b \log(a)}} \left(\operatorname{erfi}\left(\frac{c + (d + 2 b z) \log(a)}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) - e^{\frac{c d}{b}} \operatorname{erfi}\left(\frac{(d + 2 b z) \log(a) - c}{2 \sqrt{b} \log^{\frac{1}{2}}(a)} \right) \right)$$

01.19.21.0192.01

$$\int e^{b z^2 + d z + e} \sinh(c z)\, dz = \frac{\sqrt{\pi}}{4 \sqrt{b}} e^{-\frac{c^2 + 2 d c + d^2 - 4 b e}{4 b}} \left(\operatorname{erfi}\left(\frac{c + d + 2 b z}{2 \sqrt{b}} \right) - e^{\frac{c d}{b}} \operatorname{erfi}\left(\frac{-c + d + 2 b z}{2 \sqrt{b}} \right) \right)$$

01.19.21.0193.01

$$\int a^{\sqrt{z}\, b + d z + e} \sinh(c z)\, dz = \frac{1}{2} a^e \left(-\frac{e^{c z} a^{\sqrt{z}\, b + d z}}{-c - d \log(a)} + \frac{e^{-c z} a^{\sqrt{z}\, b + d z}}{c - d \log(a)} + b \sqrt{\pi} \log(a) \left(\frac{e^{\frac{b^2 \log^2(a)}{4 (-c - d \log(a))}} \operatorname{erf}\left(\frac{-2 \sqrt{z}\, c - b \log(a) - 2 d \sqrt{z} \log(a)}{2 \sqrt{-c - d \log(a)}} \right)}{2 (-c - d \log(a))^{3/2}} - \frac{e^{\frac{b^2 \log^2(a)}{4 (c - d \log(a))}} \operatorname{erf}\left(\frac{2 \sqrt{z}\, c - b \log(a) - 2 d \sqrt{z} \log(a)}{2 \sqrt{c - d \log(a)}} \right)}{2 (c - d \log(a))^{3/2}} \right) \right)$$

01.19.21.0194.01

$$\int e^{\sqrt{z}\, b + d z + e} \sinh(c z)\, dz = \frac{1}{2} e^e \left(\frac{b \sqrt{\pi}\, e^{\frac{b^2}{4 (-c - d)}} \operatorname{erf}\left(\frac{-2 \sqrt{z}\, c - b - 2 d \sqrt{z}}{2 \sqrt{-c - d}} \right)}{2 (-c - d)^{3/2}} - \frac{b \sqrt{\pi}\, e^{\frac{b^2}{4 (c - d)}} \operatorname{erf}\left(\frac{2 \sqrt{z}\, c - b - 2 d \sqrt{z}}{2 \sqrt{c - d}} \right)}{2 (c - d)^{3/2}} + \frac{e^{b \sqrt{z} - (c - d) z}}{c - d} - \frac{e^{b \sqrt{z} - (-c - d) z}}{-c - d} \right)$$

Involving $a^{b z^r} \sinh(f z + g)$

01.19.21.0195.01

$$\int a^{b z^2} \sinh(g + f z)\, dz = \frac{1}{4 \sqrt{b \log(a)}} \left(a^{-\frac{f^2}{2 b \log^2(a)}} e^{\frac{f^2}{4 b \log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{2 b z \log(a) - f}{2 \sqrt{b \log(a)}} \right) (\sinh(g) - \cosh(g)) + \operatorname{erfi}\left(\frac{f + 2 b z \log(a)}{2 \sqrt{b \log(a)}} \right) (\cosh(g) + \sinh(g)) \right) \right)$$

01.19.21.0196.01

$$\int e^{b z^2} \sinh(g + f z)\, dz = \frac{e^{-\frac{f^2}{4 b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{2 b z - f}{2 \sqrt{b}} \right) (\sinh(g) - \cosh(g)) + \operatorname{erfi}\left(\frac{f + 2 b z}{2 \sqrt{b}} \right) (\cosh(g) + \sinh(g)) \right)}{4 \sqrt{b}}$$

01.19.21.0197.01

$$\int a^{\sqrt{z}\, b} \sinh(g + f z)\, dz = \frac{1}{4} e^{-g} \left(\frac{2 e^{-f z} \left(1 + e^{2 (g + f z)}\right) a^{b \sqrt{z}}}{f} + \frac{b\, e^{\frac{b^2 \log^2(a)}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b \log(a) - 2 f \sqrt{z}}{2 \sqrt{-f}}\right) \log(a)}{(-f)^{3/2}} - \frac{b\, e^{2 g - \frac{b^2 \log^2(a)}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{2 \sqrt{z}\, f + b \log(a)}{2 \sqrt{f}}\right) \log(a)}{f^{3/2}} \right)$$

01.19.21.0198.01

$$\int e^{\sqrt{z}\, b} \sinh(g + f z)\, dz = \frac{1}{4} e^{-g} \left(\frac{2 e^{b \sqrt{z} - f z} \left(1 + e^{2 (g + f z)}\right)}{f} + \frac{b\, e^{\frac{b^2}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b - 2 f \sqrt{z}}{2 \sqrt{-f}}\right)}{(-f)^{3/2}} - \frac{b\, e^{2 g - \frac{b^2}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b + 2 f \sqrt{z}}{2 \sqrt{f}}\right)}{f^{3/2}} \right)$$

Involving $a^{b z^r + e} \sinh(f z + g)$

01.19.21.0199.01

$$\int a^{b z^2 + e} \sinh(g + f z)\, dz = \frac{1}{4 \sqrt{b \log(a)}} \left(a^{e - \frac{f^2}{2 b \log^2(a)}}\, e^{\frac{f^2}{4 b \log(a)}} \sqrt{\pi} \left(\text{erfi}\left(\frac{2 b z \log(a) - f}{2 \sqrt{b \log(a)}}\right) (\sinh(g) - \cosh(g)) + \text{erfi}\left(\frac{f + 2 b z \log(a)}{2 \sqrt{b \log(a)}}\right) (\cosh(g) + \sinh(g)) \right) \right)$$

01.19.21.0200.01

$$\int e^{b z^2 + e} \sinh(g + f z)\, dz = \frac{e^{e - \frac{f^2}{4 b}} \sqrt{\pi} \left(\text{erfi}\left(\frac{2 b z - f}{2 \sqrt{b}}\right) (\sinh(g) - \cosh(g)) + \text{erfi}\left(\frac{f + 2 b z}{2 \sqrt{b}}\right) (\cosh(g) + \sinh(g)) \right)}{4 \sqrt{b}}$$

01.19.21.0201.01

$$\int a^{\sqrt{z}\, b + e} \sinh(g + f z)\, dz = \frac{1}{4} a^e e^{-g} \left(\frac{2 e^{-f z} \left(1 + e^{2 (g + f z)}\right) a^{b \sqrt{z}}}{f} + \frac{b\, e^{\frac{b^2 \log^2(a)}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b \log(a) - 2 f \sqrt{z}}{2 \sqrt{-f}}\right) \log(a)}{(-f)^{3/2}} - \frac{b\, e^{2 g - \frac{b^2 \log^2(a)}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{2 \sqrt{z}\, f + b \log(a)}{2 \sqrt{f}}\right) \log(a)}{f^{3/2}} \right)$$

01.19.21.0202.01

$$\int e^{\sqrt{z}\, b + e} \sinh(g + f z)\, dz = \frac{1}{4} e^{e - g} \left(\frac{2 e^{b \sqrt{z} - f z} \left(1 + e^{2 (g + f z)}\right)}{f} + \frac{b\, e^{\frac{b^2}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b - 2 f \sqrt{z}}{2 \sqrt{-f}}\right)}{(-f)^{3/2}} - \frac{b\, e^{2 g - \frac{b^2}{4 f}} \sqrt{\pi}\, \text{erfi}\left(\frac{b + 2 f \sqrt{z}}{2 \sqrt{f}}\right)}{f^{3/2}} \right)$$

Involving $a^{b z^r + d z} \sinh(f z + g)$

01.19.21.0203.01

$$\int a^{b z^2+d z} \sinh(g+f z)\, dz = \frac{1}{4\sqrt{b \log(a)}} \left(a^{-\frac{2 f^2+2 d \log(a) f+d^2 \log^2(a)}{4 b \log^2(a)}} e^{\frac{f^2}{4 b \log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{f+(d+2 b z)\log(a)}{2\sqrt{b \log(a)}}\right)(\cosh(g)+\sinh(g)) - e^{\frac{d f}{b}} \operatorname{erfi}\left(\frac{(d+2 b z)\log(a)-f}{2\sqrt{b\log(a)}}\right)(\cosh(g)-\sinh(g)) \right)\right)$$

01.19.21.0204.01

$$\int e^{b z^2+d z} \sinh(g+f z)\, dz = \frac{1}{4\sqrt{b}} \left(e^{-\frac{d^2+2 f d+f^2}{4 b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{d+f+2 b z}{2\sqrt{b}}\right)(\cosh(g)+\sinh(g)) - e^{\frac{d f}{b}} \operatorname{erfi}\left(\frac{d-f+2 b z}{2\sqrt{b}}\right)(\cosh(g)-\sinh(g)) \right)\right)$$

01.19.21.0205.01

$$\int a^{\sqrt{z}\, b+d z} \sinh(g+f z)\, dz = \frac{1}{4} e^{-g} \left(2 e^{-f z} \left(\frac{1}{f-d\log(a)} + \frac{e^{2(g+f z)}}{f+d\log(a)} \right) a^{\sqrt{z}\, b+d z} + \frac{b\, e^{\frac{b^2 \log^2(a)}{4 f-4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b\log(a)-2\sqrt{z}\,(f-d\log(a))}{2\sqrt{d\log(a)-f}}\right)\log(a)}{(d\log(a)-f)^{3/2}} - \frac{b\, e^{2 g-\frac{b^2\log^2(a)}{4(f+d\log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b\log(a)+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}}\right)\log(a)}{(f+d\log(a))^{3/2}} \right)$$

01.19.21.0206.01

$$\int e^{\sqrt{z}\, b+d z} \sinh(g+f z)\, dz = \frac{1}{4} e^{-g} \left(2 e^{b\sqrt{z}} \left(\frac{e^{2 g+(d+f) z}}{d+f} + \frac{e^{(d-f) z}}{f-d} \right) + \frac{b\, e^{\frac{b^2}{4 f-4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{(d-f)^{3/2}} - \frac{b\, e^{2 g-\frac{b^2}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{(d+f)^{3/2}} \right)$$

Involving $a^{b z^r+d z+e} \sinh(f z+g)$

01.19.21.0207.01

$$\int a^{b z^2+d z+e} \sinh(g+f z)\, dz = \frac{1}{4\sqrt{b \log(a)}} \left(a^{-\frac{2 f^2+2 d \log(a) f+(d^2-4 b e)\log^2(a)}{4 b \log^2(a)}} e^{\frac{f^2}{4 b \log(a)}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{f+(d+2 b z)\log(a)}{2\sqrt{b \log(a)}}\right)(\cosh(g)+\sinh(g)) - e^{\frac{d f}{b}} \operatorname{erfi}\left(\frac{(d+2 b z)\log(a)-f}{2\sqrt{b\log(a)}}\right)(\cosh(g)-\sinh(g)) \right)\right)$$

01.19.21.0208.01

$$\int e^{b z^2+d z+e} \sinh(g+f z)\, dz = \frac{1}{4\sqrt{b}} \left(e^{-\frac{d^2+2 f d+f^2-4 b e}{4 b}} \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{d+f+2 b z}{2\sqrt{b}}\right) (\cosh(g)+\sinh(g)) - e^{\frac{d f}{b}} \operatorname{erfi}\left(\frac{d-f+2 b z}{2\sqrt{b}}\right)(\cosh(g)-\sinh(g)) \right)\right)$$

01.19.21.0209.01

$$\int a^{\sqrt{z}\, b+e+d z} \sinh(g+f z)\, dz = \frac{1}{4} a^e e^{-g} \left(2 e^{-f z} \left(\frac{1}{f-d\log(a)} + \frac{e^{2(g+f z)}}{f+d\log(a)} \right) a^{\sqrt{z}\, b+d z} + \frac{b\, e^{\frac{b^2 \log^2(a)}{4 f-4 d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b\log(a)-2\sqrt{z}\,(f-d\log(a))}{2\sqrt{d\log(a)-f}} \right) \log(a)}{(d\log(a)-f)^{3/2}} - \frac{b\, e^{2 g-\frac{b^2\log^2(a)}{4(f+d\log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b\log(a)+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}} \right)\log(a)}{(f+d\log(a))^{3/2}} \right)$$

01.19.21.0210.01

$$\int e^{\sqrt{z}\, b+e+d z} \sinh(g+f z)\, dz = \frac{1}{4} e^{e-g} \left(2 e^{b\sqrt{z}} \left(\frac{e^{2 g+(d+f) z}}{d+f} + \frac{e^{(d-f) z}}{f-d} \right) + \frac{b\, e^{\frac{b^2}{4 f-4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d-f)\sqrt{z}}{2\sqrt{d-f}} \right)}{(d-f)^{3/2}} - \frac{b\, e^{2 g-\frac{b^2}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(d+f)\sqrt{z}}{2\sqrt{d+f}} \right)}{(d+f)^{3/2}} \right)$$

Involving $a^{b z} \sinh(c z^r)$

01.19.21.0211.01

$$\int a^{b z} \sinh(c z^2)\, dz = \frac{\sqrt{\pi}}{4\sqrt{c}} \left(e^{-\frac{b^2\log^2(a)}{4 c}} \operatorname{erfi}\left(\frac{2 c z+b\log(a)}{2\sqrt{c}} \right) - e^{\frac{b^2\log^2(a)}{4 c}} \operatorname{erf}\left(\frac{2 c z-b\log(a)}{2\sqrt{c}} \right) \right)$$

01.19.21.0212.01

$$\int e^{b z} \sinh(c z^2)\, dz = \frac{\sqrt{\pi}}{4\sqrt{c}} \left(e^{-\frac{b^2}{4 c}} \operatorname{erfi}\left(\frac{b+2 c z}{2\sqrt{c}} \right) - e^{\frac{b^2}{4 c}} \operatorname{erf}\left(\frac{2 c z-b}{2\sqrt{c}} \right) \right)$$

01.19.21.0213.01

$$\int a^{b z} \sinh(c\sqrt{z})\, dz = \frac{\sinh(c\sqrt{z})\, a^{b z}}{b\log(a)} - \frac{c\sqrt{\pi}\; e^{-\frac{c^2}{4 b\log(a)}} \operatorname{erfi}\left(\frac{c+2 b\sqrt{z}\,\log(a)}{2\sqrt{b\log(a)}} \right)}{4(b\log(a))^{3/2}} + \frac{c\sqrt{\pi}\; e^{-\frac{c^2}{4 b\log(a)}} \operatorname{erfi}\left(\frac{c-2 b\sqrt{z}\,\log(a)}{2\sqrt{b\log(a)}} \right)}{4(b\log(a))^{3/2}}$$

01.19.21.0214.01

$$\int e^{b z} \sinh(c\sqrt{z})\, dz = -\frac{c\sqrt{\pi}\; e^{-\frac{c^2}{4 b}} \operatorname{erfi}\left(\frac{c+2 b\sqrt{z}}{2\sqrt{b}} \right)}{4 b^{3/2}} + \frac{c\sqrt{\pi}\; e^{-\frac{c^2}{4 b}} \operatorname{erfi}\left(\frac{c-2 b\sqrt{z}}{2\sqrt{b}} \right)}{4 b^{3/2}} + \frac{e^{b z}\sinh(c\sqrt{z})}{b}$$

Involving $a^{d z+e} \sinh(c z^r)$

01.19.21.0215.01

$$\int a^{e+d z} \sinh(c z^2)\, dz = \frac{1}{4 c}\left(a^e e^{-\frac{d^2 \log^2(a)}{4 c}} \sqrt{\pi}\left(\sqrt{-c}\, e^{\frac{d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{d \log(a) - 2 c z}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{2 c z + d \log(a)}{2 \sqrt{c}}\right)\right)\right)$$

01.19.21.0216.01

$$\int e^{e+d z} \sinh(c z^2)\, dz = \frac{e^{e-\frac{d^2}{4 c}} \sqrt{\pi}\left(\sqrt{-c}\, e^{\frac{d^2}{2 c}} \operatorname{erfi}\left(\frac{d-2 c z}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d+2 c z}{2 \sqrt{c}}\right)\right)}{4 c}$$

01.19.21.0217.01

$$\int a^{e+d z} \sinh(c \sqrt{z})\, dz = \frac{1}{4 (d \log(a))^{3/2}}\left(a^e e^{-\frac{c^2}{4 d \log(a)} - c \sqrt{z}}\right.$$

$$\left.\left(2 e^{\frac{c^2}{4 d \log(a)}} \left(-1 + e^{2 c \sqrt{z}}\right) \sqrt{d \log(a)}\, a^{d z} - c\, e^{c \sqrt{z}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z} \log(a) - c}{2 \sqrt{d \log(a)}}\right) - c\, e^{c \sqrt{z}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2 d \sqrt{z} \log(a)}{2 \sqrt{d \log(a)}}\right)\right)\right)$$

01.19.21.0218.01

$$\int e^{e+d z} \sinh(c \sqrt{z})\, dz = \frac{e^{e-\frac{c^2}{4 d}}\left(2 \sqrt{d}\, e^{\frac{\left(c-2 d \sqrt{z}\right)^2}{4 d}} \left(-1 + e^{2 c \sqrt{z}}\right) - c \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 d \sqrt{z}}{2 \sqrt{d}}\right) + c \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c-2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)}{4 d^{3/2}}$$

Involving $a^{b z^r} \sinh(c z^r)$

01.19.21.0219.01

$$\int a^{b z^r} \sinh(c z^r)\, dz = -\frac{1}{2 r}\left(z\left(\Gamma\left(\frac{1}{r}, -z^r (c + b \log(a))\right)(-z^r (c + b \log(a)))^{-1/r} - \Gamma\left(\frac{1}{r}, z^r (c - b \log(a))\right)(z^r (c - b \log(a)))^{-1/r}\right)\right)$$

01.19.21.0220.01

$$\int e^{b z^r} \sinh(c z^r)\, dz = -\frac{z\left((-(b + c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -(b + c) z^r\right) - ((c - b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c - b) z^r\right)\right)}{2 r}$$

01.19.21.0221.01

$$\int a^{b z^2} \sinh(c z^2)\, dz = \frac{1}{4\left(c^2 - b^2 \log^2(a)\right)}$$

$$\left(\sqrt{\pi}\left(\operatorname{erfi}\left(\frac{b z \log(a) - c z}{\sqrt{b \log(a) - c}}\right) \sqrt{b \log(a) - c}\, (c + b \log(a)) + \operatorname{erfi}\left(z \sqrt{c + b \log(a)}\right) \sqrt{c + b \log(a)}\, (c - b \log(a))\right)\right)$$

01.19.21.0222.01

$$\int e^{b z^2} \sinh(c z^2)\, dz = \frac{1}{4 (b - c) (b + c)}\left(\sqrt{\pi}\left((b - c) \sqrt{b + c}\, \operatorname{erfi}\left(\sqrt{b + c}\, z\right) - \sqrt{b - c}\, (b + c) \operatorname{erfi}\left(\sqrt{b - c}\, z\right)\right)\right)$$

01.19.21.0223.01

$$\int a^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(c^2 - b^2 \log^2(a)\right)^2} \left(2\, a^{\sqrt{z}\, b} \left(c \cosh\left(\sqrt{z}\, c\right) \left(\sqrt{z}\, c^2 - b^2 \sqrt{z} \log^2(a) + 2\, b \log(a)\right) - \left(-b^3 \sqrt{z} \log^3(a) + b^2 \log^2(a) + b\, c^2 \sqrt{z} \log(a) + c^2\right) \sinh\left(\sqrt{z}\, c\right)\right)\right)$$

01.19.21.0224.01

$$\int e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2 - c^2\right)^2} \left(2\, e^{\sqrt{z}\, b} \left(\left(\sqrt{z}\, c^3 + 2\, b\, c - b^2 \sqrt{z}\, c\right) \cosh\left(\sqrt{z}\, c\right) + \left(\sqrt{z}\, b^3 - b^2 - c^2 \sqrt{z}\, b - c^2\right) \sinh\left(\sqrt{z}\, c\right)\right)\right)$$

Involving $a^{b z^r + e} \sinh\left(c z^r\right)$

01.19.21.0225.01

$$\int a^{b z^r + e} \sinh(c\, z^r)\, dz = -\frac{1}{2\, r} \left(a^e\, z \left(\Gamma\left(\frac{1}{r}, -z^r \left(c + b \log(a)\right)\right) \left(-z^r \left(c + b \log(a)\right)\right)^{-1/r} - \Gamma\left(\frac{1}{r}, z^r \left(c - b \log(a)\right)\right) \left(z^r \left(c - b \log(a)\right)\right)^{-1/r}\right)\right)$$

01.19.21.0226.01

$$\int e^{b z^r + e} \sinh(c\, z^r)\, dz = -\frac{e^e\, z \left(\left(-(b + c)\, z^r\right)^{-1/r} \Gamma\left(\frac{1}{r}, -(b + c)\, z^r\right) - \left((c - b)\, z^r\right)^{-1/r} \Gamma\left(\frac{1}{r}, (c - b)\, z^r\right)\right)}{2\, r}$$

01.19.21.0227.01

$$\int a^{b z^2 + e} \sinh\left(c\, z^2\right) dz = \frac{1}{4 \left(c^2 - b^2 \log^2(a)\right)} \left(a^e \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{b\, z \log(a) - c\, z}{\sqrt{b \log(a) - c}}\right) \sqrt{b \log(a) - c}\, \left(c + b \log(a)\right) + \operatorname{erfi}\left(z \sqrt{c + b \log(a)}\right) \sqrt{c + b \log(a)}\, \left(c - b \log(a)\right)\right)\right)$$

01.19.21.0228.01

$$\int e^{b z^2 + e} \sinh\left(c\, z^2\right) dz = \frac{1}{4\, (b - c)\, (b + c)} \left(e^e \sqrt{\pi} \left((b - c) \sqrt{b + c}\, \operatorname{erfi}\left(\sqrt{b + c}\, z\right) - \sqrt{b - c}\, (b + c) \operatorname{erfi}\left(\sqrt{b - c}\, z\right)\right)\right)$$

01.19.21.0229.01

$$\int a^{\sqrt{z}\, b + e} \sinh\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(c^2 - b^2 \log^2(a)\right)^2} \left(2\, a^{\sqrt{z}\, b + e} \left(c \cosh\left(\sqrt{z}\, c\right) \left(\sqrt{z}\, c^2 - b^2 \sqrt{z} \log^2(a) + 2\, b \log(a)\right) - \left(-b^3 \sqrt{z} \log^3(a) + b^2 \log^2(a) + b\, c^2 \sqrt{z} \log(a) + c^2\right) \sinh\left(\sqrt{z}\, c\right)\right)\right)$$

01.19.21.0230.01

$$\int e^{\sqrt{z}\, b + e} \sinh\left(\sqrt{z}\, c\right) dz = \frac{1}{\left(b^2 - c^2\right)^2} \left(2\, e^{\sqrt{z}\, b + e} \left(\left(\sqrt{z}\, c^3 + 2\, b\, c - b^2 \sqrt{z}\, c\right) \cosh\left(\sqrt{z}\, c\right) + \left(\sqrt{z}\, b^3 - b^2 - c^2 \sqrt{z}\, b - c^2\right) \sinh\left(\sqrt{z}\, c\right)\right)\right)$$

Involving $a^{b z^r + d z} \sinh\left(c z^r\right)$

01.19.21.0231.01

$$\int a^{b z^2+d z} \sinh\left(c z^2\right) dz = \frac{1}{4\left(c^2-b^2 \log^2(a)\right)} \left(a^{\frac{b d^2 \log^2(a)}{2 c^2-2 b^2 \log^2(a)}} \sqrt{\pi} \left(e^{\frac{d^2 \log^2(a)}{4 c+4 b \log(a)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-2 c z}{2 \sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\, (c+b \log(a)) + e^{\frac{d^2 \log^2(a)}{4 b \log(a)-4 c}} \operatorname{erfi}\left(\frac{2 c z+(d+2 b z) \log(a)}{2 \sqrt{c+b \log(a)}}\right) (c-b \log(a)) \sqrt{c+b \log(a)}\right)\right)$$

01.19.21.0232.01

$$\int e^{b z^2+d z} \sinh\left(c z^2\right) dz = \frac{e^{\frac{d^2}{4 c-4 b}} \sqrt{\pi} \left((b-c) \sqrt{b+c}\, e^{\frac{c d^2}{2 b^2-2 c^2}} \operatorname{erfi}\left(\frac{d+2 (b+c) z}{2 \sqrt{b+c}}\right) - \sqrt{b-c}\, (b+c) \operatorname{erfi}\left(\frac{d+2 (b-c) z}{2 \sqrt{b-c}}\right)\right)}{4 (b-c) (b+c)}$$

01.19.21.0233.01

$$\int a^{\sqrt{z}\, b+d z} \sinh\left(c \sqrt{z}\right) dz = \frac{1}{4 (d \log(a))^{3/2}} \left(a^{-\frac{b^2}{4 d}} e^{-\frac{c \left(c+2 \left(b+2 d \sqrt{z}\right) \log(a)\right)}{4 d \log(a)}} \left(2 e^{\frac{c (c+2 b \log(a))}{4 d \log(a)}} \left(-1+e^{2 c \sqrt{z}}\right) \sqrt{d \log(a)}\, a^{\frac{\left(b+2 d \sqrt{z}\right)^2}{4 d}} - e^{c \sqrt{z}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c+b \log(a)) - e^{c \left(\frac{b}{d}+\sqrt{z}\right)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\left(b+2 d \sqrt{z}\right) \log(a)-c}{2 \sqrt{d \log(a)}}\right) (c-b \log(a))\right)\right)$$

01.19.21.0234.01

$$\int e^{\sqrt{z}\, b+d z} \sinh\left(c \sqrt{z}\right) dz = \frac{1}{4 d^{3/2}} \left(e^{-\frac{b^2+2 c b+c^2}{4 d}} \left(2 \sqrt{d}\, e^{\frac{b^2+2 \left(c+2 d \sqrt{z}\right) b+\left(c-2 d \sqrt{z}\right)^2}{4 d}} \left(-1+e^{2 c \sqrt{z}}\right) + (b-c)\, e^{\frac{b c}{d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c+2 d \sqrt{z}}{2 \sqrt{d}}\right) - (b+c) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving $a^{b z^r+d z+e} \sinh\left(c z^r\right)$

01.19.21.0235.01

$$\int a^{b z^2+d z+e} \sinh\left(c z^2\right) dz = \frac{1}{4\left(c^2-b^2 \log^2(a)\right)} \left(a^{\frac{b d^2 \log^2(a)}{2 c^2-2 b^2 \log^2(a)}+e} \sqrt{\pi} \left(e^{\frac{d^2 \log^2(a)}{4 c+4 b \log(a)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-2 c z}{2 \sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\, (c+b \log(a)) + e^{\frac{d^2 \log^2(a)}{4 b \log(a)-4 c}} \operatorname{erfi}\left(\frac{2 c z+(d+2 b z) \log(a)}{2 \sqrt{c+b \log(a)}}\right) (c-b \log(a)) \sqrt{c+b \log(a)}\right)\right)$$

01.19.21.0236.01

$$\int e^{b z^2+d z+e} \sinh(c z^2) \, dz = \frac{e^{\frac{d^2-4 b e+4 c e}{4 c-4 b}} \sqrt{\pi} \left((b-c) \sqrt{b+c} \, e^{\frac{c d^2}{2 b^2-2 c^2}} \operatorname{erfi}\left(\frac{d+2 (b+c) z}{2 \sqrt{b+c}}\right) - \sqrt{b-c} \, (b+c) \operatorname{erfi}\left(\frac{d+2 (b-c) z}{2 \sqrt{b-c}}\right)\right)}{4 (b-c) (b+c)}$$

01.19.21.0237.01

$$\int a^{\sqrt{z} \, b+e+d z} \sinh(c \sqrt{z}) \, dz = \frac{1}{4 (d \log(a))^{3/2}} \left(a^{e-\frac{b^2}{4 d}} e^{-\frac{c \left(c+2 \left(b+2 d \sqrt{z}\right) \log(a)\right)}{4 d \log(a)}} \left(2 e^{\frac{c (c+2 b \log(a))}{4 d \log(a)}} \left(-1+e^{2 c \sqrt{z}}\right) \sqrt{d \log(a)} \, a^{\frac{\left(b+2 d \sqrt{z}\right)^2}{4 d}} - e^{c \sqrt{z}} \sqrt{\pi} \right.\right.$$
$$\left.\left. \operatorname{erfi}\left(\frac{c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c+b \log(a)) - e^{c \left(\frac{b}{d}+\sqrt{z}\right)} \sqrt{\pi} \operatorname{erfi}\left(\frac{\left(b+2 d \sqrt{z}\right) \log(a) - c}{2 \sqrt{d \log(a)}}\right) (c - b \log(a))\right)\right)$$

01.19.21.0238.01

$$\int e^{\sqrt{z} \, b+e+d z} \sinh(c \sqrt{z}) \, dz = \frac{1}{4 d^{3/2}} \left(e^{-\frac{b^2+2 c b+c^2-4 d e}{4 d}} \left(2 \sqrt{d} \, e^{\frac{b^2+2 \left(c+2 d \sqrt{z}\right) b+\left(c-2 d \sqrt{z}\right)^2}{4 d}} \left(-1+e^{2 c \sqrt{z}}\right) + (b-c) \, e^{\frac{b c}{d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-c+2 d \sqrt{z}}{2 \sqrt{d}}\right) - \right.\right.$$
$$\left.\left. (b+c) \sqrt{\pi} \operatorname{erfi}\left(\frac{b+c+2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving $a^{d z} \sinh(c z^r + g)$

01.19.21.0239.01

$$\int a^{d z} \sinh(c z^2 + g) \, dz = \frac{1}{4 c} \left(e^{-\frac{d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c} \, e^{\frac{d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{d \log(a) - 2 c z}{2 \sqrt{-c}}\right) (\cosh(g) - \sinh(g)) + \sqrt{c} \operatorname{erfi}\left(\frac{2 c z + d \log(a)}{2 \sqrt{c}}\right) (\cosh(g) + \sinh(g))\right)\right)$$

01.19.21.0240.01

$$\int e^{d z} \sinh(c z^2 + g) \, dz = \frac{e^{-\frac{d^2}{4 c}} \sqrt{\pi} \left(\sqrt{-c} \, e^{\frac{d^2}{2 c}} \operatorname{erfi}\left(\frac{d-2 c z}{2 \sqrt{-c}}\right) (\cosh(g) - \sinh(g)) + \sqrt{c} \operatorname{erfi}\left(\frac{d+2 c z}{2 \sqrt{c}}\right) (\cosh(g) + \sinh(g))\right)}{4 c}$$

01.19.21.0241.01

$$\int a^{d z} \sinh(\sqrt{z} \, c + g) \, dz = \frac{1}{4 (d \log(a))^{3/2}} \left(e^{-\frac{c^2}{4 d \log(a)} - \sqrt{z} \, c - g} \left(2 e^{\frac{c^2}{4 d \log(a)}} \left(-1 + e^{2 \left(\sqrt{z} \, c + g\right)}\right) \sqrt{d \log(a)} \, a^{d z} - c \, e^{c \sqrt{z}} \sqrt{\pi} \operatorname{erfi}\left(\frac{2 d \sqrt{z} \log(a) - c}{2 \sqrt{d \log(a)}}\right) - \right.\right.$$
$$\left.\left. c \, e^{\sqrt{z} \, c+2 g} \sqrt{\pi} \operatorname{erfi}\left(\frac{c + 2 d \sqrt{z} \log(a)}{2 \sqrt{d \log(a)}}\right)\right)\right)$$

01.19.21.0242.01

$$\int e^{d z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 d^{3/2}} \left(e^{-\frac{c^2}{4 d}-g} \left(2 \sqrt{d}\, e^{\frac{\left(c-2 d \sqrt{z}\right)^2}{4 d}} \left(-1+e^{2\left(\sqrt{z}\, c+g\right)}\right) - c\, e^{2 g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 d \sqrt{z}}{2 \sqrt{d}}\right) + c \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c-2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving $a^{d z+e} \sinh\left(c z^r+g\right)$

01.19.21.0243.01

$$\int a^{e+d z} \sinh\left(c z^2+g\right) dz = \frac{1}{4 c} \left(a^e\, e^{-\frac{d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{d \log(a)-2 c z}{2 \sqrt{-c}}\right) (\cosh(g)-\sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{2 c z+d \log(a)}{2 \sqrt{c}}\right) (\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0244.01

$$\int e^{e+d z} \sinh\left(c z^2+g\right) dz = \frac{e^{e-\frac{d^2}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2}{2 c}} \operatorname{erfi}\left(\frac{d-2 c z}{2 \sqrt{-c}}\right) (\cosh(g)-\sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d+2 c z}{2 \sqrt{c}}\right) (\cosh(g)+\sinh(g))\right)}{4 c}$$

01.19.21.0245.01

$$\int a^{e+d z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 (d \log(a))^{3/2}} \left(a^e\, e^{-\frac{c^2}{4 d \log(a)}-\sqrt{z}\, c-g} \left(2\, e^{\frac{c^2}{4 d \log(a)}} \left(-1+e^{2\left(\sqrt{z}\, c+g\right)}\right) \sqrt{d \log(a)}\, a^{d z} - c\, e^{c \sqrt{z}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 d \sqrt{z}\, \log(a)-c}{2 \sqrt{d \log(a)}}\right) - c\, e^{\sqrt{z}\, c+2 g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 d \sqrt{z}\, \log(a)}{2 \sqrt{d \log(a)}}\right)\right)\right)$$

01.19.21.0246.01

$$\int e^{e+d z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 d^{3/2}} \left(e^{-\frac{c^2}{4 d}+e-g} \left(2 \sqrt{d}\, e^{\frac{\left(c-2 d \sqrt{z}\right)^2}{4 d}} \left(-1+e^{2\left(\sqrt{z}\, c+g\right)}\right) - c\, e^{2 g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 d \sqrt{z}}{2 \sqrt{d}}\right) + c \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c-2 d \sqrt{z}}{2 \sqrt{d}}\right)\right)\right)$$

Involving $a^{b z^r} \sinh\left(c z^r+g\right)$

01.19.21.0247.01

$$\int a^{b z^r} \sinh(c z^r+g)\, dz = -\frac{1}{2 r} \left(e^{-g} z \left(e^{2 g}\, \Gamma\left(\frac{1}{r}, -z^r (c+b \log(a))\right) (-z^r (c+b \log(a)))^{-1/r} - \Gamma\left(\frac{1}{r}, z^r (c-b \log(a))\right) (z^r (c-b \log(a)))^{-1/r}\right)\right)$$

01.19.21.0248.01

$$\int e^{b z^r} \sinh(c z^r+g)\, dz = -\frac{e^{-g} z \left(e^{2 g} (-(b+c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -(b+c) z^r\right) - ((c-b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c-b) z^r\right)\right)}{2 r}$$

01.19.21.0249.01

$$\int a^{b z^2} \sinh\left(c z^2+g\right) dz = \frac{1}{4\left(c^2-b^2 \log^2(a)\right)} \left(\sqrt{\pi} \left(\operatorname{erfi}\left(\frac{b z \log(a)-c z}{\sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\ (c+b \log(a)) (\cosh(g)-\sinh(g)) + \operatorname{erfi}\left(z \sqrt{c+b \log(a)}\right) \sqrt{c+b \log(a)}\ (c-b \log(a)) (\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0250.01

$$\int e^{b z^2} \sinh\left(c z^2+g\right) dz = \frac{1}{4 (b-c)(b+c)} \left(\sqrt{\pi} \left((b-c) \sqrt{b+c}\ \operatorname{erfi}\left(\sqrt{b+c}\ z\right) (\cosh(g)+\sinh(g)) - \sqrt{b-c}\ (b+c) \operatorname{erfi}\left(\sqrt{b-c}\ z\right) (\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0251.01

$$\int a^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(c^2-b^2 \log^2(a)\right)^2} \left(2 a^{\sqrt{z}\, b} \left(c \cosh\left(\sqrt{z}\, c+g\right) \left(\sqrt{z}\, c^2-b^2 \sqrt{z} \log^2(a)+2 b \log(a)\right) - \left(-b^3 \sqrt{z} \log^3(a)+b^2 \log^2(a)+b c^2 \sqrt{z} \log(a)+c^2\right) \sinh\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.19.21.0252.01

$$\int e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2-c^2\right)^2} \left(2 e^{\sqrt{z}\, b} \left(\left(\sqrt{z}\, c^3+2 b c-b^2 \sqrt{z}\, c\right) \cosh\left(\sqrt{z}\, c+g\right) + \left(\sqrt{z}\, b^3-b^2-c^2 \sqrt{z}\, b-c^2\right) \sinh\left(\sqrt{z}\, c+g\right)\right)\right)$$

Involving $a^{b z^r+e} \sinh\left(c z^r+g\right)$

01.19.21.0253.01

$$\int a^{b z^r+e} \sinh(c z^r+g)\, dz = -\frac{1}{2 r} \left(a^e e^{-g} z \left(e^{2 g}\, \Gamma\left(\frac{1}{r}, -z^r (c+b \log(a))\right) (-z^r (c+b \log(a)))^{-1/r} - \Gamma\left(\frac{1}{r}, z^r (c-b \log(a))\right) (z^r (c-b \log(a)))^{-1/r}\right)\right)$$

01.19.21.0254.01

$$\int e^{b z^r+e} \sinh(c z^r+g)\, dz = -\frac{e^{e-g} z \left(e^{2 g} (-(b+c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -(b+c) z^r\right) - ((c-b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c-b) z^r\right)\right)}{2 r}$$

01.19.21.0255.01

$$\int a^{b z^2+e} \sinh\left(c z^2+g\right) dz = \frac{1}{4\left(c^2-b^2 \log^2(a)\right)} \left(a^e \sqrt{\pi} \left(\operatorname{erfi}\left(\frac{b z \log(a)-c z}{\sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\ (c+b \log(a)) (\cosh(g)-\sinh(g)) + \operatorname{erfi}\left(z \sqrt{c+b \log(a)}\right) \sqrt{c+b \log(a)}\ (c-b \log(a)) (\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0256.01

$$\int e^{b z^2+e} \sinh\left(c z^2+g\right) dz = \frac{1}{4 (b-c) (b+c)} \left(e^e \sqrt{\pi} \left((b-c) \sqrt{b+c}\, \operatorname{erfi}\left(\sqrt{b+c}\, z\right) (\cosh(g)+\sinh(g)) - \sqrt{b-c}\, (b+c) \operatorname{erfi}\left(\sqrt{b-c}\, z\right) (\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0257.01

$$\int a^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(c^2-b^2 \log^2(a)\right)^2} \left(2 a^{\sqrt{z}\, b+e} \left(c \cosh\left(\sqrt{z}\, c+g\right) \left(\sqrt{z}\, c^2-b^2 \sqrt{z}\, \log^2(a)+2 b \log(a)\right) - \left(-b^3 \sqrt{z}\, \log^3(a)+b^2 \log^2(a)+b c^2 \sqrt{z}\, \log(a)+c^2\right) \sinh\left(\sqrt{z}\, c+g\right)\right)\right)$$

01.19.21.0258.01

$$\int e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{\left(b^2-c^2\right)^2} \left(2 e^{\sqrt{z}\, b+e} \left(\left(\sqrt{z}\, c^3+2 b c-b^2 \sqrt{z}\, c\right) \cosh\left(\sqrt{z}\, c+g\right) + \left(\sqrt{z}\, b^3-b^2-c^2 \sqrt{z}\, b-c^2\right) \sinh\left(\sqrt{z}\, c+g\right)\right)\right)$$

Involving $a^{b z^r+d z} \sinh\left(c z^r+g\right)$

01.19.21.0259.01

$$\int a^{b z^2+d z} \sinh\left(c z^2+g\right) dz = \frac{1}{4 \left(c^2-b^2 \log^2(a)\right)} \left(a^{\frac{b d^2 \log^2(a)}{2 c^2-2 b^2 \log^2(a)}} \sqrt{\pi} \left(e^{\frac{d^2 \log^2(a)}{4 c+4 b \log(a)}} \operatorname{erfi}\left(\frac{(d+2 b z) \log(a)-2 c z}{2 \sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\, (c+b \log(a)) (\cosh(g)-\sinh(g)) + e^{\frac{d^2 \log^2(a)}{4 b \log(a)-4 c}} \operatorname{erfi}\left(\frac{2 c z+(d+2 b z) \log(a)}{2 \sqrt{c+b \log(a)}}\right) \sqrt{c+b \log(a)}\, (c-b \log(a)) (\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0260.01

$$\int e^{b z^2+d z} \sinh\left(c z^2+g\right) dz = \frac{1}{4 (b-c) (b+c)} \left(e^{\frac{2 b d^2+c d^2}{-4 b^2+4 c^2}} \sqrt{\pi} \left((b-c) \sqrt{b+c}\, e^{\frac{(b+2 c) d^2}{4 (b-c) (b+c)}} \operatorname{erfi}\left(\frac{d+2 (b+c) z}{2 \sqrt{b+c}}\right) (\cosh(g)+\sinh(g)) - \sqrt{b-c}\, (b+c) e^{\frac{b d^2}{4 b^2-4 c^2}} \operatorname{erfi}\left(\frac{d+2 (b-c) z}{2 \sqrt{b-c}}\right) (\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0261.01

$$\int a^{\sqrt{z}\, b+d z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4 (d \log(a))^{3/2}} \left(a^{-\frac{b^2}{4 d}} e^{-\frac{c^2+2 \left(b c+2 d \left(\sqrt{z}\, c+g\right)\right) \log(a)}{4 d \log(a)}} \left(2 e^{\frac{c (c+2 b \log(a))}{4 d \log(a)}} \left(-1+e^{2 \left(\sqrt{z}\, c+g\right)}\right) \sqrt{d \log(a)}\, a^{\frac{\left(b+2 d \sqrt{z}\right)^2}{4 d}} - e^{\sqrt{z}\, c+2 g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+\left(b+2 d \sqrt{z}\right) \log(a)}{2 \sqrt{d \log(a)}}\right) (c+b \log(a)) - e^{c \left(\frac{b}{d}+\sqrt{z}\right)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\left(b+2 d \sqrt{z}\right) \log(a)-c}{2 \sqrt{d \log(a)}}\right) (c-b \log(a))\right)\right)$$

01.19.21.0262.01

$$\int e^{\sqrt{z}\, b+d\, z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4\, d^{3/2}} \left(e^{-\frac{b^2+2\, c\, b+c^2+4\, d\, g}{4\, d}} \left(2\sqrt{d}\; e^{\frac{b^2+2\left(c+2\, d\sqrt{z}\right) b+\left(c-2\, d\sqrt{z}\right)^2}{4\, d}} \left(-1+e^{2\left(\sqrt{z}\, c+g\right)}\right) + (b-c)\, e^{\frac{b\, c}{d}} \sqrt{\pi}\; \mathrm{erfi}\left(\frac{b-c+2\, d\sqrt{z}}{2\sqrt{d}}\right) - (b+c)\, e^{2\, g} \sqrt{\pi}\; \mathrm{erfi}\left(\frac{b+c+2\, d\sqrt{z}}{2\sqrt{d}}\right)\right)\right)$$

Involving $a^{b\, z^r+d\, z+e} \sinh\left(c\, z^r+g\right)$

01.19.21.0263.01

$$\int a^{b\, z^2+d\, z+e} \sinh\left(c\, z^2+g\right) dz = \frac{1}{4\left(c^2-b^2 \log^2(a)\right)} \left(a^{\frac{b\, d^2 \log^2(a)}{2\, c^2-2\, b^2 \log^2(a)}+e} \sqrt{\pi} \left(e^{\frac{d^2 \log^2(a)}{4\, c+4\, b \log(a)}}\, \mathrm{erfi}\left(\frac{(d+2\, b\, z) \log(a)-2\, c\, z}{2\sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\; (c+b \log(a)) (\cosh(g)-\sinh(g)) + e^{\frac{d^2 \log^2(a)}{4\, b \log(a)-4\, c}}\, \mathrm{erfi}\left(\frac{2\, c\, z+(d+2\, b\, z) \log(a)}{2\sqrt{c+b \log(a)}}\right) \sqrt{c+b \log(a)}\; (c-b \log(a)) (\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0264.01

$$\int e^{b\, z^2+d\, z+e} \sinh\left(c\, z^2+g\right) dz = \frac{1}{4\, (b-c)\, (b+c)} \left(e^{\frac{-4\, e\, b^2+2\, d^2\, b+c\left(d^2+4\, c\, e\right)}{4\, c^2-4\, b^2}} \sqrt{\pi} \left((b-c) \sqrt{b+c}\; e^{\frac{(b+2\, c)\, d^2}{4\, (b-c)\, (b+c)}}\, \mathrm{erfi}\left(\frac{d+2\, (b+c)\, z}{2\sqrt{b+c}}\right) (\cosh(g)+\sinh(g)) - \sqrt{b-c}\; (b+c)\, e^{\frac{b\, d^2}{4\, b^2-4\, c^2}}\, \mathrm{erfi}\left(\frac{d+2\, (b-c)\, z}{2\sqrt{b-c}}\right) (\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0265.01

$$\int a^{\sqrt{z}\, b+e+d\, z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4\, (d \log(a))^{3/2}} \left(a^{e-\frac{b^2}{4\, d}}\, e^{-\frac{c^2+2\left(b\, c+2\, d\left(\sqrt{z}\, c+g\right)\right) \log(a)}{4\, d \log(a)}} \left(2\, e^{\frac{c\, (c+2\, b \log(a))}{4\, d \log(a)}} \left(-1+e^{2\left(\sqrt{z}\, c+g\right)}\right) \sqrt{d \log(a)}\; a^{\frac{\left(b+2\, d\sqrt{z}\right)^2}{4\, d}} - e^{\sqrt{z}\, c+2\, g} \sqrt{\pi}\; \mathrm{erfi}\left(\frac{c+\left(b+2\, d\sqrt{z}\right) \log(a)}{2\sqrt{d \log(a)}}\right) (c+b \log(a)) - e^{c\left(\frac{b}{d}+\sqrt{z}\right)} \sqrt{\pi}\; \mathrm{erfi}\left(\frac{\left(b+2\, d\sqrt{z}\right) \log(a)-c}{2\sqrt{d \log(a)}}\right) (c-b \log(a))\right)\right)$$

01.19.21.0266.01

$$\int e^{\sqrt{z}\, b+e+d\,z} \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{1}{4\, d^{3/2}} \left(e^{-\frac{b^2+2\,c\,b+c^2-4\,d\,e+4\,d\,g}{4\,d}} \left(2\sqrt{d}\, e^{\frac{b^2+2\left(c+2\,d\sqrt{z}\right)b+\left(c-2\,d\sqrt{z}\right)^2}{4\,d}} \left(-1+e^{2\left(\sqrt{z}\,c+g\right)}\right) + (b-c)\, e^{\frac{b\,c}{d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c+2\,d\sqrt{z}}{2\sqrt{d}}\right) - (b+c)\, e^{2\,g} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2\,d\sqrt{z}}{2\sqrt{d}}\right)\right)\right)$$

Involving rational functions of exp

Involving $\left(a+b\, e^{d\,z}\right)^{-n} \sinh(c\,z+e)$

01.19.21.0267.01

$$\int \frac{\sinh(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\, dz = \frac{1}{2\,c}\left(a^{-n}\left(e^{c\,z}\, {}_2F_1\left(\frac{c}{d}, n; \frac{c+d}{d}; -\frac{b\,e^{d\,z}}{a}\right) + e^{-c\,z}\, {}_2F_1\left(-\frac{c}{d}, n; \frac{d-c}{d}; -\frac{b\,e^{d\,z}}{a}\right)\right)\right) /; n \in \mathbb{N}^+$$

01.19.21.0268.01

$$\int \frac{\sinh(e+c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\, dz = \frac{a^{-n}}{2\,c}\left(e^{e+c\,z}\, {}_2F_1\left(\frac{c}{d}, n; \frac{c+d}{d}; -\frac{b\,e^{d\,z}}{a}\right) + e^{-e-c\,z}\, {}_2F_1\left(-\frac{c}{d}, n; \frac{d-c}{d}; -\frac{b\,e^{d\,z}}{a}\right)\right) /; n \in \mathbb{N}^+$$

Involving $e^{p\,z}\left(a+b\, e^{d\,z}\right)^{-n} \sinh(c\,z+e)$

01.19.21.0269.01

$$\int \frac{e^{p\,z}\sinh(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\, dz = \frac{a^{-n}}{2\,(c-p)\,(c+p)} \left(e^{(c+p)\,z}\,(c-p)\, {}_2F_1\left(\frac{c+p}{d}, n; \frac{c+d+p}{d}; -\frac{b\,e^{d\,z}}{a}\right) + e^{(p-c)\,z}\,(c+p)\, {}_2F_1\left(\frac{p-c}{d}, n; \frac{-c+d+p}{d}; -\frac{b\,e^{d\,z}}{a}\right)\right) /; n \in \mathbb{N}^+$$

01.19.21.0270.01

$$\int \frac{e^{p\,z}\sinh(e+c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\, dz = \frac{a^{-n}}{2\,(c-p)\,(c+p)} \left(e^{e+(c+p)\,z}\,(c-p)\, {}_2F_1\left(\frac{c+p}{d}, n; \frac{c+d+p}{d}; -\frac{b\,e^{d\,z}}{a}\right) + e^{(p-c)\,z-e}\,(c+p)\, {}_2F_1\left(\frac{p-c}{d}, n; \frac{-c+d+p}{d}; -\frac{b\,e^{d\,z}}{a}\right)\right) /; n \in \mathbb{N}^+$$

Involving algebraic functions of exp

Involving $\left(a+b\, e^{d\,z}\right)^{\beta} \sinh(c\ + ez)$

01.19.21.0271.01

$$\int \left(a+b\,e^{d\,z}\right)^{\beta}\sinh(c\,z)\,dz = \frac{e^{-c\,z}\left(a+b\,e^{d\,z}\right)^{\beta}}{2\,c}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\left(e^{2\,c\,z}\,{}_2F_1\!\left(\frac{c}{d},-\beta;\frac{c+d}{d};-\frac{b\,e^{d\,z}}{a}\right)+{}_2F_1\!\left(-\frac{c}{d},-\beta;1-\frac{c}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)$$

01.19.21.0272.01

$$\int \left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e+c\,z)\,dz = \frac{e^{-e-c\,z}\left(a+b\,e^{d\,z}\right)^{\beta}}{2\,c}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\left(e^{2\,(e+c\,z)}\,{}_2F_1\!\left(\frac{c}{d},-\beta;\frac{c+d}{d};-\frac{b\,e^{d\,z}}{a}\right)+{}_2F_1\!\left(-\frac{c}{d},-\beta;1-\frac{c}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)$$

Involving $e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(c\,z+e)$

01.19.21.0273.01

$$\int e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(c\,z)\,dz = \frac{\left(a+b\,e^{d\,z}\right)^{\beta}}{2\,(c-p)\,(c+p)}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\left(e^{(p-c)\,z}\,(c+p)\,{}_2F_1\!\left(\frac{p-c}{d},-\beta;\frac{-c+d+p}{d};-\frac{b\,e^{d\,z}}{a}\right)+e^{(c+p)\,z}\,(c-p)\,{}_2F_1\!\left(\frac{c+p}{d},-\beta;\frac{c+d+p}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)$$

01.19.21.0274.01

$$\int e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e+c\,z)\,dz = \frac{\left(a+b\,e^{d\,z}\right)^{\beta}}{2\,(c-p)\,(c+p)}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\left(e^{(p-c)\,z-e}\,(c+p)\,{}_2F_1\!\left(\frac{p-c}{d},-\beta;\frac{-c+d+p}{d};-\frac{b\,e^{d\,z}}{a}\right)+e^{e+(c+p)\,z}\,(c-p)\,{}_2F_1\!\left(\frac{c+p}{d},-\beta;\frac{c+d+p}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)$$

Involving exponential function and a power function

Involving exp and power

Involving $z^{\alpha-1}\,e^{b\,z}\sinh(c\,z)$

01.19.21.0275.01

$$\int z^{\alpha-1}\,e^{b\,z}\sinh(c\,z)\,dz = \frac{1}{2}\,z^{\alpha}\left(E_{1-\alpha}((c-b)\,z)-E_{1-\alpha}(-(c+b)\,z)\right)$$

01.19.21.0276.01

$$\int z^{\alpha-1}\,e^{b\,z}\sinh(c\,z)\,dz = \frac{1}{2}\,z^{\alpha}\left(((c-b)\,z)^{-\alpha}\,\Gamma(\alpha,(c-b)\,z)-(-(c+b)\,z)^{-\alpha}\,\Gamma(\alpha,-(c+b)\,z)\right)$$

01.19.21.0277.01

$$\int z^{\alpha-1}\,e^{c\,z}\sinh(c\,z)\,dz = -\frac{z^{\alpha}\left(2^{-\alpha}\,\alpha\,\Gamma(\alpha,-2\,c\,z)\,(-c\,z)^{-\alpha}+1\right)}{2\,\alpha}$$

01.19.21.0278.01

$$\int z^{\alpha-1}\,e^{-c\,z}\sinh(c\,z)\,dz = \frac{1}{2}\,z^{\alpha}\left(2^{-\alpha}\,\Gamma(\alpha,2\,c\,z)\,(c\,z)^{-\alpha}+\frac{1}{\alpha}\right)$$

01.19.21.0279.01

$$\int z^n e^{b z} \sinh(c z)\, dz = \frac{1}{2}\left((c-b)^{-n-1}\left(\frac{(-1)^{-n}\operatorname{Ei}((b-c) z)}{(-n-1)!} + e^{(b-c) z}\sum_{k=0}^{n}\frac{((c-b) z)^k}{(n+1)_{k-n}} - e^{(b-c) z}\sum_{k=n+1}^{-1}\frac{((c-b) z)^k}{(n+1)_{k-n}}\right) - (-b-c)^{-n-1}\left(\frac{(-1)^{-n}\operatorname{Ei}((b+c) z)}{(-n-1)!} + e^{(b+c) z}\sum_{k=0}^{n}\frac{((-b-c) z)^k}{(n+1)_{k-n}} - e^{(b+c) z}\sum_{k=n+1}^{-1}\frac{((-b-c) z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0280.01

$$\int z^n e^{b z} \sinh(c z)\, dz = \frac{1}{2} n!\left(-e^{(c+b) z}\left(\sum_{k=0}^{n}\frac{(-(c+b) z)^k}{k!}\right)(-c-b)^{-n-1} + (c-b)^{-n-1} e^{(b-c) z}\sum_{k=0}^{n}\frac{((c-b) z)^k}{k!}\right) /; n \in \mathbb{N}$$

01.19.21.0281.01

$$\int z e^{b z} \sinh(c z)\, dz = \frac{e^{b z}\left(c\left(z c^2 + 2 b - b^2 z\right)\cosh(c z) - \left(-z b^3 + b^2 + c^2 (b z + 1)\right)\sinh(c z)\right)}{(c-b)^2 (c+b)^2}$$

01.19.21.0282.01

$$\int z e^{c z} \sinh(c z)\, dz = \frac{e^{2 c z}(2 c z - 1) - 2 c^2 z^2}{8 c^2}$$

01.19.21.0283.01

$$\int z e^{-c z} \sinh(c z)\, dz = \frac{1}{8}\left(2 z^2 + \frac{e^{-2 c z}(2 c z + 1)}{c^2}\right)$$

01.19.21.0284.01

$$\int z^2 e^{b z} \sinh(c z)\, dz = \frac{1}{(c-b)^3 (c+b)^3}\left(e^{b z}\left(c\left(z^2 c^4 + \left(-2 b^2 z^2 + 4 b z + 2\right) c^2 + b^2\left(b^2 z^2 - 4 b z + 6\right)\right)\cosh(c z) - \left(z (b z + 2) c^4 + \left(6 b - 2 b^3 z^2\right) c^2 + b^3\left(b^2 z^2 - 2 b z + 2\right)\right)\sinh(c z)\right)\right)$$

01.19.21.0285.01

$$\int z^2 e^{c z} \sinh(c z)\, dz = \frac{e^{2 c z}\left(6 c^2 z^2 - 6 c z + 3\right) - 4 c^3 z^3}{24 c^3}$$

01.19.21.0286.01

$$\int z^2 e^{-c z} \sinh(c z)\, dz = \frac{e^{-2 c z}\left(4 c^3 e^{2 c z} z^3 + 6 c^2 z^2 + 6 c z + 3\right)}{24 c^3}$$

01.19.21.0287.01

$$\int z^3 e^{b z} \sinh(c z)\, dz = \frac{1}{(b-c)^4 (b+c)^4}\left(e^{b z}\left(c\left(-z^3 b^6 + 6 z^2 b^5 + 3 z\left(c^2 z^2 - 6\right) b^4 - 12\left(c^2 z^2 - 2\right) b^3 - 3 c^2 z\left(c^2 z^2 - 4\right) b^2 + 6 c^2\left(c^2 z^2 + 4\right) b + c^4 z\left(c^2 z^2 + 6\right)\right)\cosh(c z) + \left(z^3 b^7 - 3 z^2 b^6 + \left(6 z - 3 c^2 z^3\right) b^5 + 3\left(c^2 z^2 - 2\right) b^4 + 3 c^2 z\left(c^2 z^2 + 4\right) b^3 + 3 c^2\left(c^2 z^2 - 12\right) b^2 - c^4 z\left(c^2 z^2 + 18\right) b - 3 c^4\left(c^2 z^2 + 2\right)\right)\sinh(c z)\right)\right)$$

01.19.21.0288.01

$$\int z^4 e^{b z} \sinh(c z) \, dz = \frac{1}{(b-c)^5 (b+c)^5} \Big(e^{b z} \Big(\big(z^4 b^9 - 4 z^3 b^8 - 4 z^2 (c^2 z^2 - 3) b^7 + 8 z (c^2 z^2 - 3) b^6 + 6 (c^4 z^4 + 2 c^2 z^2 + 4) b^5 - 120 c^2 z b^4 - 4 c^2 (c^4 z^4 + 15 c^2 z^2 - 60) b^3 - 8 c^4 z (c^2 z^2 - 15) b^2 + c^4 (c^4 z^4 + 36 c^2 z^2 + 120) b + 4 c^6 z (c^2 z^2 + 6)\big) \sinh(c z) - c \big(z^4 b^8 - 8 z^3 b^7 - 4 z^2 (c^2 z^2 - 9) b^6 + 24 z (c^2 z^2 - 4) b^5 + 6 (c^4 z^4 - 10 c^2 z^2 + 20) b^4 - 24 c^4 z^3 b^3 - 4 c^2 (c^4 z^4 - 3 c^2 z^2 - 60) b^2 + 8 c^4 z (c^2 z^2 + 12) b + c^4 (c^4 z^4 + 12 c^2 z^2 + 24)\big) \cosh(c z)\Big)\Big)$$

01.19.21.0289.01

$$\int z^5 e^{b z} \sinh(c z) \, dz = \frac{1}{(b-c)^6 (b+c)^6} \Big(e^{b z} \Big(c \big(-z^5 b^{10} + 10 z^4 b^9 + 5 z^3 (c^2 z^2 - 12) b^8 - 40 z^2 (c^2 z^2 - 6) b^7 - 10 z (c^4 z^4 - 16 c^2 z^2 + 60) b^6 + 60 (c^4 z^4 - 4 c^2 z^2 + 12) b^5 + 10 c^2 z (c^4 z^4 - 12 c^2 z^2 - 60) b^4 - 40 c^2 (c^4 z^4 + 6 c^2 z^2 - 60) b^3 - 5 c^4 z (c^4 z^4 - 216) b^2 + 10 c^4 (c^4 z^4 + 24 c^2 z^2 + 72) b + c^6 z (c^4 z^4 + 20 c^2 z^2 + 120)\big) \cosh(c z) + \big(z^5 b^{11} - 5 z^4 b^{10} - 5 z^3 (c^2 z^2 - 4) b^9 + 15 z^2 (c^2 z^2 - 4) b^8 + 10 z (c^4 z^4 + 12) b^7 - 10 (c^4 z^4 + 24 c^2 z^2 + 12) b^6 - 10 c^2 z (c^4 z^4 + 12 c^2 z^2 - 108) b^5 - 10 c^2 (c^4 z^4 - 60 c^2 z^2 + 180) b^4 + 5 c^4 z (c^4 z^4 + 32 c^2 z^2 - 120) b^3 + 15 c^4 (c^4 z^4 - 16 c^2 z^2 - 120) b^2 - c^6 z (c^4 z^4 + 60 c^2 z^2 + 600) b - 5 c^6 (c^4 z^4 + 12 c^2 z^2 + 24)\big) \sinh(c z)\Big)\Big)$$

01.19.21.0290.01

$$\int z^{-n} e^{b z} \sinh(c z) \, dz = \frac{1}{2 (c-b) (c+b) (n-1)!} e^{-(c+b) z} \Bigg(-(c-b) (-c-b)^n e^{2 (c+b) z} (n-1)! \sum_{k=1}^{n-1} \frac{(-c-b)^{k-n} z^{k-n}}{(1-n)_k} + (-1)^n e^{(c+b) z} \left((-c-b)^n (c-b) \operatorname{Ei}((c+b) z) + (c-b)^n (c+b) \operatorname{Ei}((b-c) z)\right) - (c-b)^n (c+b) e^{2 b z} (n-1)! \sum_{k=1}^{n-1} \frac{(c-b)^{k-n} z^{k-n}}{(1-n)_k}\Bigg) /; n \in \mathbb{N}^+$$

01.19.21.0291.01

$$\int \frac{e^{b z} \sinh(c z)}{z} \, dz = \frac{1}{2} (\operatorname{Ei}((c+b) z) - \operatorname{Ei}((b-c) z))$$

01.19.21.0292.01

$$\int \frac{e^{c z} \sinh(c z)}{z} \, dz = \frac{1}{2} (\operatorname{Ei}(2 c z) - \log(z))$$

01.19.21.0293.01

$$\int \frac{e^{-c z} \sinh(c z)}{z} \, dz = \frac{1}{2} (\log(z) - \operatorname{Ei}(-2 c z))$$

01.19.21.0294.01

$$\int \frac{e^{b z} \sinh(c z)}{z^2} \, dz = \frac{(c-b) z \operatorname{Ei}((b-c) z) + e^{(b-c) z} - e^{(c+b) z} + (c+b) z \operatorname{Ei}((c+b) z)}{2 z}$$

01.19.21.0295.01

$$\int \frac{e^{c z} \sinh(c z)}{z^2} \, dz = \frac{2 c z \operatorname{Ei}(2 c z) - e^{2 c z} + 1}{2 z}$$

01.19.21.0296.01

$$\int \frac{e^{-c z} \sinh(c z)}{z^2} \, dz = -\frac{-2 c z \operatorname{Ei}(-2 c z) - e^{-2 c z} + 1}{2 z}$$

01.19.21.0297.01

$$\int \frac{e^{b z} \sinh(c z)}{z^3} \, dz = \frac{-(b-c)^2 \operatorname{Ei}((b-c) z) z^2 + (b+c)^2 \operatorname{Ei}((b+c) z) z^2 + e^{(b-c) z} \left(b z - c z - e^{2 c z} (b z + c z + 1) + 1\right)}{4 z^2}$$

01.19.21.0298.01

$$\int \frac{e^{b z} \sinh(c z)}{z^4} \, dz = \frac{1}{12 z^3} \Big(-(b-c)^3 \operatorname{Ei}((b-c) z) z^3 + (b+c)^3 \operatorname{Ei}((b+c) z) z^3 + e^{(b-c) z} \left(b^2 z^2 + c^2 z^2 - c z + b\left(z - 2 c z^2\right) - e^{2 c z} \left(b^2 z^2 + c^2 z^2 + c z + b (2 c z + 1) z + 2\right) + 2\right)\Big)$$

01.19.21.0299.01

$$\int \frac{e^{b z} \sinh(c z)}{z^5} \, dz = \frac{1}{48 z^4} \Big(-(b-c)^4 \operatorname{Ei}((b-c) z) z^4 + (b+c)^4 \operatorname{Ei}((b+c) z) z^4 + e^{(b-c) z} \Big(b^3 z^3 - c^3 z^3 + c^2 z^2 - 2 c z + b\left(3 c^2 z^2 - 2 c z + 2\right) z + b^2 \left(z^2 - 3 c z^3\right) - e^{2 c z} \left(b^3 z^3 + c^3 z^3 + c^2 z^2 + b^2 (3 c z + 1) z^2 + 2 c z + b\left(3 c^2 z^2 + 2 c z + 2\right) z + 6\right) + 6\Big)\Big)$$

01.19.21.0300.01

$$\int z^{n+\frac{1}{2}} e^{b z} \sinh(c z) \, dz = \frac{1}{2} z^{n+\frac{3}{2}} \left(((c-b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(c-b) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(b-c) z} \sum_{k=0}^{n} \frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(b-c) z} \sum_{k=n+1}^{-1} \frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) - ((-c-b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-c-b) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(c+b) z} \sum_{k=0}^{n} \frac{((-c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(c+b) z} \sum_{k=n+1}^{-1} \frac{((-c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z}$$

01.19.21.0301.01

$$\int \sqrt{z} \, e^{b z} \sinh(c z) \, dz = \left(z^{3/2} \left(\frac{\sqrt{\pi} \operatorname{erf}\left(\sqrt{(c-b) z}\right) (-(b+c) z)^{3/2}}{z} + 4 e^{b z} \sqrt{(c-b) z} \, (c \cosh(c z) - b \sinh(c z)) \sqrt{-(b+c) z} + \sqrt{\pi} \left(\frac{((c-b) z)^{3/2}}{z} + (b+c) \sqrt{-(b+c) z} \right) + (b-c) \sqrt{\pi} \sqrt{(c-b) z} \operatorname{erf}\left(\sqrt{-(b+c) z}\right) \right) \right) \Big/ \left(4 (b-c) \sqrt{(c-b) z} \, (-(b+c) z)^{3/2} \right)$$

01.19.21.0302.01

$$\int z^{3/2} e^{b z} \sinh(c z) \, dz = \frac{1}{8} z^{5/2} \left(\frac{2 e^{(b+c) z} (2 (b+c) z - 3)}{(b+c)^2 z^2} + 3 \sqrt{\pi} \left(\frac{\sqrt{(c-b) z}}{(c-b)^3 z^3} - \frac{1}{(-(b+c) z)^{5/2}} \right) + \frac{3 \sqrt{\pi} \operatorname{erf}\left(\sqrt{-(b+c) z}\right)}{(-(b+c) z)^{5/2}} - \frac{2 e^{(b-c) z} (2 b z - 2 c z - 3)}{(b-c)^2 z^2} - \frac{3 \sqrt{\pi} \operatorname{erf}\left(\sqrt{(c-b) z}\right)}{((c-b) z)^{5/2}} \right)$$

01.19.21.0303.01

$$\int z^{5/2} e^{b z} \sinh(c z)\, dz = \frac{1}{16} z^{7/2} \left(-\frac{8 e^{(b-c) z} b^2}{(b-c)^3 z} + \frac{8 e^{(b+c) z} b^2}{(b+c)^3 z} + \frac{16 c\, e^{(b-c) z} b}{(b-c)^3 z} + \frac{16 c\, e^{(b+c) z} b}{(b+c)^3 z} + \frac{20 e^{(b-c) z} b}{(b-c)^3 z^2} - \frac{20 e^{(b+c) z} b}{(b+c)^3 z^2} + \frac{15 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{-(b+c) z}\right)}{(-(b+c) z)^{7/2}} + \frac{8 c^2 e^{(b-c) z}}{(c-b)^3 z} + \frac{8 c^2 e^{(b+c) z}}{(b+c)^3 z} + \frac{20 c\, e^{(b-c) z}}{(c-b)^3 z^2} - \frac{20 c\, e^{(b+c) z}}{(b+c)^3 z^2} + \frac{30 e^{(b+c) z}}{(b+c)^3 z^3} - \frac{15 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{(c-b) z}\right)}{((c-b) z)^{7/2}} + \frac{15 \sqrt{\pi}}{((c-b) z)^{7/2}} - \frac{15 \sqrt{\pi}}{(-(b+c) z)^{7/2}} + \frac{30 e^{(b-c) z}}{(c z - b z)^3} \right)$$

01.19.21.0304.01

$$\int z^{7/2} e^{b z} \sinh(c z)\, dz = \frac{1}{32} z^{9/2} \left(-\frac{16 e^{(b-c) z} b^3}{(b-c)^4 z} + \frac{16 e^{(b+c) z} b^3}{(b+c)^4 z} + \frac{48 c\, e^{(b-c) z} b^2}{(b-c)^4 z} + \frac{48 c\, e^{(b+c) z} b^2}{(b+c)^4 z} + \frac{56 e^{(b-c) z} b^2}{(b-c)^4 z^2} - \frac{56 e^{(b+c) z} b^2}{(b+c)^4 z^2} - \frac{48 c^2 e^{(b-c) z} b}{(b-c)^4 z} + \frac{48 c^2 e^{(b+c) z} b}{(b+c)^4 z} - \frac{112 c\, e^{(b-c) z} b}{(b-c)^4 z^2} - \frac{112 c\, e^{(b+c) z} b}{(b+c)^4 z^2} - \frac{140 e^{(b-c) z} b}{(b-c)^4 z^3} + \frac{140 e^{(b+c) z} b}{(b+c)^4 z^3} + \frac{105 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{-(b+c) z}\right)}{(-(b+c) z)^{9/2}} + \frac{16 c^3 e^{(b-c) z}}{(b-c)^4 z} + \frac{16 c^3 e^{(b+c) z}}{(b+c)^4 z} + \frac{56 c^2 e^{(b-c) z}}{(b-c)^4 z^2} - \frac{56 c^2 e^{(b+c) z}}{(b+c)^4 z^2} + \frac{140 c\, e^{(b-c) z}}{(b-c)^4 z^3} + \frac{140 c\, e^{(b+c) z}}{(b+c)^4 z^3} - \frac{210 e^{(b+c) z}}{(b+c)^4 z^4} - \frac{105 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{(c-b) z}\right)}{((c-b) z)^{9/2}} + \frac{105 \sqrt{\pi}}{((c-b) z)^{9/2}} - \frac{105 \sqrt{\pi}}{(-(b+c) z)^{9/2}} + \frac{210 e^{(b-c) z}}{(c z - b z)^4} \right)$$

01.19.21.0305.01

$$\int z^{9/2} e^{b z} \sinh(c z)\, dz = \frac{1}{2} z^{11/2} \left(\frac{1}{((c-b) z)^{11/2}} \left(e^{(b-c) z} ((c-b) z)^{9/2} + \frac{9}{2} \left(e^{(b-c) z} ((c-b) z)^{7/2} + \frac{7}{16} e^{-c z} \left(2 e^{b z} \sqrt{(c-b) z} \left(4 b^2 z^2 + 4 c^2 z^2 + 10 c z - 2 b (4 c z + 5) z + 15\right) - 15 e^{c z} \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{(c-b) z}\right) + 15 e^{c z} \sqrt{\pi} \right)\right)\right) - \frac{1}{(-(b+c) z)^{11/2}} \left(e^{(b+c) z} (-(b+c) z)^{9/2} + \frac{9}{2} \left(e^{(b+c) z} (-(b+c) z)^{7/2} + \frac{7}{16} \left(2 e^{(b+c) z} \sqrt{-(b+c) z} \left(4 b^2 z^2 + 4 c^2 z^2 - 10 c z + 2 b (4 c z - 5) z + 15\right) - 15 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{-(b+c) z}\right) + 15 \sqrt{\pi} \right)\right)\right)\right)$$

01.19.21.0306.01

$$\int \frac{e^{b z} \sinh(c z)}{\sqrt{z}}\, dz = -\frac{\sqrt{\pi} \left(\sqrt{b-c}\, (b+c) \operatorname{erfi}\left(\sqrt{b-c}\, \sqrt{z}\right) + (c-b) \sqrt{b+c}\, \operatorname{erfi}\left(\sqrt{b+c}\, \sqrt{z}\right) \right)}{2 (b-c)(b+c)}$$

01.19.21.0307.01

$$\int \frac{e^{b z} \sinh(c z)}{z^{3/2}}\, dz = \frac{1}{\sqrt{z}} \left(\sqrt{\pi} \sqrt{(c-b) z}\, \operatorname{erf}\left(\sqrt{(c-b) z}\right) + e^{(b-c) z} - e^{(b+c) z} - \sqrt{\pi} \sqrt{-(b+c) z}\, \operatorname{erf}\left(\sqrt{-(b+c) z}\right) - \sqrt{\pi} \sqrt{(c-b) z} + \sqrt{\pi} \sqrt{-(b+c) z} \right)$$

01.19.21.0308.01

$$\int \frac{e^{bz}\sinh(cz)}{z^{5/2}}\,dz = \frac{1}{3z^{3/2}}\left(e^{(b-c)z}\left(2bz-2cz-e^{2cz}(2bz+2cz+1)+1\right)+2\sqrt{\pi}\left(\operatorname{erf}\left(\sqrt{-(b+c)z}\right)(-(b+c)z)^{3/2}+bz\sqrt{-(b+c)z}+cz\sqrt{-(b+c)z}+(b-c)z\sqrt{(c-b)z}\operatorname{erf}\left(\sqrt{(c-b)z}\right)-bz\sqrt{(c-b)z}+cz\sqrt{(c-b)z}\right)\right)$$

01.19.21.0309.01

$$\int \frac{e^{bz}\sinh(cz)}{z^{7/2}}\,dz = \frac{1}{15z^{5/2}}\left(4\sqrt{\pi}\left(\sqrt{-(b+c)z}\,b^2+2c\sqrt{(c-b)z}\,b+2c\sqrt{-(b+c)z}\,b+(b-c)^2\sqrt{(c-b)z}\operatorname{erf}\left(\sqrt{(c-b)z}\right)-(b+c)^2\sqrt{-(b+c)z}\operatorname{erf}\left(\sqrt{-(b+c)z}\right)-c^2\sqrt{(c-b)z}-b^2\sqrt{(c-b)z}+c^2\sqrt{-(b+c)z}\right)z^2+e^{(b-c)z}\left(4b^2z^2+4c^2z^2-2cz+2b(1-4cz)z-e^{2cz}\left(4b^2z^2+4c^2z^2+2cz+2b(4cz+1)z+3\right)+3\right)\right)$$

01.19.21.0310.01

$$\int \frac{e^{bz}\sinh(cz)}{z^{9/2}}\,dz = \frac{1}{105z^{7/2}}\left(8\sqrt{\pi}\operatorname{erf}\left(\sqrt{(-b-c)z}\right)((-b-c)z)^{7/2}-8\sqrt{\pi}((-b-c)z)^{7/2}+8\sqrt{\pi}((c-b)z)^{7/2}+15e^{(b-c)z}-15e^{(b+c)z}+8(b-c)^3e^{(b-c)z}z^3-8(b+c)^3e^{(b+c)z}z^3+4(b-c)^2e^{(b-c)z}z^2-4(b+c)^2e^{(b+c)z}z^2+6(b-c)e^{(b-c)z}z-6(b+c)e^{(b+c)z}z-8\sqrt{\pi}((c-b)z)^{7/2}\operatorname{erf}\left(\sqrt{(c-b)z}\right)\right)$$

Involving $z^{\alpha-1}e^{bz+e}\sinh(cz)$

01.19.21.0311.01

$$\int z^{\alpha-1}e^{e+bz}\sinh(cz)\,dz = \frac{1}{2}e^e z^\alpha\left(E_{1-\alpha}((c-b)z)-E_{1-\alpha}(-(c+b)z)\right)$$

01.19.21.0312.01

$$\int z^{\alpha-1}e^{e+bz}\sinh(cz)\,dz = -\frac{1}{2}e^e z^\alpha\left(((-b-c)z)^{-\alpha}\,\Gamma(\alpha,(-b-c)z)-((c-b)z)^{-\alpha}\,\Gamma(\alpha,(c-b)z)\right)$$

01.19.21.0313.01

$$\int z^{\alpha-1}e^{e+cz}\sinh(cz)\,dz = -\frac{e^e z^\alpha\left(2^{-\alpha}\alpha\,\Gamma(\alpha,-2cz)(-cz)^{-\alpha}+1\right)}{2\alpha}$$

01.19.21.0314.01

$$\int z^{\alpha-1}e^{e-cz}\sinh(cz)\,dz = \frac{1}{2}e^e z^\alpha\left(2^{-\alpha}\,\Gamma(\alpha,2cz)(cz)^{-\alpha}+\frac{1}{\alpha}\right)$$

01.19.21.0315.01

$$\int z^n e^{e+bz}\sinh(cz)\,dz = \frac{1}{2}e^e\left((c-b)^{-n-1}\left(\frac{(-1)^{-n}\operatorname{Ei}((b-c)z)}{(-n-1)!}+e^{(b-c)z}\sum_{k=0}^{n}\frac{((c-b)z)^k}{(n+1)_{k-n}}-e^{(b-c)z}\sum_{k=n+1}^{-1}\frac{((c-b)z)^k}{(n+1)_{k-n}}\right)-(-c-b)^{-n-1}\left(\frac{(-1)^{-n}\operatorname{Ei}((c+b)z)}{(-n-1)!}+e^{(c+b)z}\sum_{k=0}^{n}\frac{((-c-b)z)^k}{(n+1)_{k-n}}-e^{(c+b)z}\sum_{k=n+1}^{-1}\frac{((-c-b)z)^k}{(n+1)_{k-n}}\right)\right)/;\ n\in\mathbb{Z}$$

01.19.21.0316.01

$$\int z^n e^{e+bz}\sinh(cz)\,dz = -\frac{1}{2}e^e\,n!\left((-b-c)^{-n-1}e^{(b+c)z}\sum_{k=0}^{n}\frac{((-b-c)z)^k}{k!}-(c-b)^{-n-1}e^{(b-c)z}\sum_{k=0}^{n}\frac{((c-b)z)^k}{k!}\right)/;\ n\in\mathbb{N}$$

01.19.21.0317.01

$$\int z\,e^{e+bz}\sinh(cz)\,dz = \frac{e^{e+bz}\left(\left(zc^3+2bc-b^2zc\right)\cosh(cz)+\left(zb^3-b^2-c^2zb-c^2\right)\sinh(cz)\right)}{(b-c)^2(b+c)^2}$$

01.19.21.0318.01

$$\int z\,e^{e+cz}\sinh(cz)\,dz = -\frac{e^e\left(2c^2z^2+e^{2cz}(1-2cz)\right)}{8c^2}$$

01.19.21.0319.01

$$\int z\,e^{e-cz}\sinh(cz)\,dz = \frac{e^{e-2cz}\left(2c^2e^{2cz}z^2+2cz+1\right)}{8c^2}$$

01.19.21.0320.01

$$\int z^2 e^{e+bz}\sinh(cz)\,dz = \frac{1}{(b-c)^3(b+c)^3}\left(e^{e+bz}\left(\left(z^2b^5-2zb^4+\left(2-2c^2z^2\right)b^3+c^2\left(c^2z^2+6\right)b+2c^4z\right)\sinh(cz)-c\left(z^2b^4-4zb^3+\left(6-2c^2z^2\right)b^2+4c^2zb+c^2\left(c^2z^2+2\right)\right)\cosh(cz)\right)\right)$$

01.19.21.0321.01

$$\int z^2 e^{e+cz}\sinh(cz)\,dz = \frac{e^e\left(e^{2cz}\left(6c^2z^2-6cz+3\right)-4c^3z^3\right)}{24c^3}$$

01.19.21.0322.01

$$\int z^2 e^{e-cz}\sinh(cz)\,dz = \frac{e^{e-2cz}\left(4c^3e^{2cz}z^3+6c^2z^2+6cz+3\right)}{24c^3}$$

01.19.21.0323.01

$$\int z^3 e^{e+bz}\sinh(cz)\,dz = \frac{1}{(b-c)^4(b+c)^4}\left(e^{e+bz}\left(c\left(-z^3b^6+6z^2b^5+3z\left(c^2z^2-6\right)b^4-12\left(c^2z^2-2\right)b^3-3c^2z\left(c^2z^2-4\right)b^2+6c^2\left(c^2z^2+4\right)b+c^4z\left(c^2z^2+6\right)\right)\cosh(cz)+\left(z^3b^7-3z^2b^6+\left(6z-3c^2z^3\right)b^5+3\left(c^2z^2-2\right)b^4+3c^2z\left(c^2z^2+4\right)b^3+3c^2\left(c^2z^2-12\right)b^2-c^4z\left(c^2z^2+18\right)b-3c^4\left(c^2z^2+2\right)\right)\sinh(cz)\right)\right)$$

01.19.21.0324.01

$$\int z^4 e^{e+b z} \sinh(c z) \, dz = \frac{1}{(b-c)^5 (b+c)^5} \left(e^{e+b z} \left(\left(z^4 b^9 - 4 z^3 b^8 - 4 z^2 \left(c^2 z^2 - 3\right) b^7 + 8 z \left(c^2 z^2 - 3\right) b^6 + 6 \left(c^4 z^4 + 2 c^2 z^2 + 4\right) b^5 - 120 c^2 z b^4 - 4 c^2 \left(c^4 z^4 + 15 c^2 z^2 - 60\right) b^3 - 8 c^4 z \left(c^2 z^2 - 15\right) b^2 + c^4 \left(c^4 z^4 + 36 c^2 z^2 + 120\right) b + 4 c^6 z \left(c^2 z^2 + 6\right)\right) \sinh(c z) - c \left(z^4 b^8 - 8 z^3 b^7 - 4 z^2 \left(c^2 z^2 - 9\right) b^6 + 24 z \left(c^2 z^2 - 4\right) b^5 + 6 \left(c^4 z^4 - 10 c^2 z^2 + 20\right) b^4 - 24 c^4 z^3 b^3 - 4 c^2 \left(c^4 z^4 - 3 c^2 z^2 - 60\right) b^2 + 8 c^4 z \left(c^2 z^2 + 12\right) b + c^4 \left(c^4 z^4 + 12 c^2 z^2 + 24\right)\right) \cosh(c z)\right)\right)$$

01.19.21.0325.01

$$\int z^5 e^{e+b z} \sinh(c z) \, dz = \frac{1}{(b-c)^6 (b+c)^6} \left(e^{e+b z} \left(c \left(-z^5 b^{10} + 10 z^4 b^9 + 5 z^3 \left(c^2 z^2 - 12\right) b^8 - 40 z^2 \left(c^2 z^2 - 6\right) b^7 - 10 z \left(c^4 z^4 - 16 c^2 z^2 + 60\right) b^6 + 60 \left(c^4 z^4 - 4 c^2 z^2 + 12\right) b^5 + 10 c^2 z \left(c^4 z^4 - 12 c^2 z^2 - 60\right) b^4 - 40 c^2 \left(c^4 z^4 + 6 c^2 z^2 - 60\right) b^3 - 5 c^4 z \left(c^4 z^4 - 216\right) b^2 + 10 c^4 \left(c^4 z^4 + 24 c^2 z^2 + 72\right) b + c^6 z \left(c^4 z^4 + 20 c^2 z^2 + 120\right)\right) \cosh(c z) + \left(z^5 b^{11} - 5 z^4 b^{10} - 5 z^3 \left(c^2 z^2 - 4\right) b^9 + 15 z^2 \left(c^2 z^2 - 4\right) b^8 + 10 z \left(c^4 z^4 + 12\right) b^7 - 10 \left(c^4 z^4 + 24 c^2 z^2 + 12\right) b^6 - 10 c^2 z \left(c^4 z^4 + 12 c^2 z^2 - 108\right) b^5 - 10 c^2 \left(c^4 z^4 - 60 c^2 z^2 + 180\right) b^4 + 5 c^4 z \left(c^4 z^4 + 32 c^2 z^2 - 120\right) b^3 + 15 c^4 \left(c^4 z^4 - 16 c^2 z^2 - 120\right) b^2 - c^6 z \left(c^4 z^4 + 60 c^2 z^2 + 600\right) b - 5 c^6 \left(c^4 z^4 + 12 c^2 z^2 + 24\right)\right) \sinh(c z)\right)\right)$$

01.19.21.0326.01

$$\int z^{-n} e^{e+b z} \sinh(c z) \, dz = \frac{1}{2 \left(b^2 - c^2\right) (n-1)!} \left(e^{e+(c-b) z} \left(-(b-c) e^{2 b z} (n-1)! \left(\sum_{k=1}^{n-1} \frac{(-b-c)^{k-n} z^{k-n}}{(1-n)_k}\right) (-b-c)^n - (c-b)^n e^{2 (b-c) z} (n-1)! \left(\sum_{k=1}^{n-1} \frac{(c-b)^{k-n} z^{k-n}}{(1-n)_k}\right) (-b-c) + (-1)^n e^{(b-c) z} ((b-c) \operatorname{Ei}((b+c) z) (-b-c)^n + (c-b)^n \operatorname{Ei}((b-c) z) (-b-c))\right)\right) /; n \in \mathbb{N}^+$$

01.19.21.0327.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z} \, dz = \frac{1}{2} e^e (\operatorname{Ei}((b+c) z) - \operatorname{Ei}((b-c) z))$$

01.19.21.0328.01

$$\int \frac{1}{z} \left(e^{e+c z} \sinh(c z)\right) dz = \frac{1}{2} e^e (\operatorname{Ei}(2 c z) - \log(z))$$

01.19.21.0329.01

$$\int \frac{1}{z} (e^{e-c z} \sinh(c z)) \, dz = \frac{1}{2} e^e (\log(z) - \operatorname{Ei}(-2 c z))$$

01.19.21.0330.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z^2} \, dz = \frac{1}{2 z} \left(e^e \left((c-b) z \operatorname{Ei}((b-c) z) + e^{(b-c) z} - e^{(b+c) z} + (b+c) z \operatorname{Ei}((b+c) z)\right)\right)$$

01.19.21.0331.01

$$\int \frac{e^{e+c z} \sinh(c z)}{z^2} \, dz = \frac{e^e \left(2 c z \operatorname{Ei}(2 c z) - e^{2 c z} + 1\right)}{2 z}$$

01.19.21.0332.01

$$\int \frac{e^{e-c z}\sinh(c z)}{z^2}\,dz = \frac{e^e\left(2 c z \operatorname{Ei}(-2 c z)+e^{-2 c z}-1\right)}{2 z}$$

01.19.21.0333.01

$$\int \frac{e^{e+b z}\sinh(c z)}{z^3}\,dz = \frac{1}{4 z^2}\left(e^e\left(-(b-c)^2 \operatorname{Ei}((b-c) z) z^2+(b+c)^2 \operatorname{Ei}((b+c) z) z^2+e^{(b-c) z}\left(b z-c z-e^{2 c z}(b z+c z+1)+1\right)\right)\right)$$

01.19.21.0334.01

$$\int \frac{e^{e+b z}\sinh(c z)}{z^4}\,dz = \frac{1}{12} e^e\left(-\operatorname{Ei}((b-c) z)(b-c)^3+\frac{e^{(b-c) z}\left(b^2 z^2+c^2 z^2-c z+b\left(z-2 c z^2\right)+2\right)}{z^3}+(b+c)^3 \operatorname{Ei}((b+c) z)-\frac{e^{(b+c) z}\left((b+c)^2 z^2+(b+c) z+2\right)}{z^3}\right)$$

01.19.21.0335.01

$$\int \frac{e^{e+b z}\sinh(c z)}{z^5}\,dz = \frac{1}{48} e^e\left(-\operatorname{Ei}((b-c) z)(b-c)^4+\frac{e^{(b-c) z}\left((b-c)^3 z^3+(b-c)^2 z^2+2(b-c) z+6\right)}{z^4}+(b+c)^4 \operatorname{Ei}((b+c) z)-\frac{e^{(b+c) z}\left((b+c)^3 z^3+(b+c)^2 z^2+2(b+c) z+6\right)}{z^4}\right)$$

01.19.21.0336.01

$$\int z^{n+\frac{1}{2}} e^{e+b z}\sinh(c z)\,dz = \frac{1}{2} e^e z^{n+\frac{3}{2}}\left(((c-b) z)^{-n-\frac{3}{2}}\left(\operatorname{erfc}\left(\sqrt{(c-b) z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(b-c) z}\sum_{k=0}^{n}\frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(b-c) z}\sum_{k=n+1}^{-1}\frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)-((-c-b) z)^{-n-\frac{3}{2}}\left(\operatorname{erfc}\left(\sqrt{(-c-b) z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{(c+b) z}\sum_{k=0}^{n}\frac{((-c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}-e^{(c+b) z}\sum_{k=n+1}^{-1}\frac{((-c-b) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right)\;/;\; n\in\mathbb{Z}$$

01.19.21.0337.01

$$\int \sqrt{z}\, e^{e+b z}\sinh(c z)\,dz = \frac{1}{2} e^e z^{3/2}\left(\frac{e^{(b-c) z}\sqrt{(c-b) z}-\frac{1}{2}\sqrt{\pi}\left(\operatorname{erf}\left(\sqrt{(c-b) z}\right)-1\right)}{((c-b) z)^{3/2}}+\frac{\frac{1}{2}\sqrt{\pi}\left(\operatorname{erf}\left(\sqrt{-(b+c) z}\right)-1\right)-e^{(b+c) z}\sqrt{-(b+c) z}}{(-(b+c) z)^{3/2}}\right)$$

01.19.21.0338.01

$$\int z^{3/2} e^{e+b z}\sinh(c z)\,dz = \frac{1}{8} e^e z^{5/2}\left(\frac{-2 e^{(b-c) z}\sqrt{(c-b) z}\,(2 b z-2 c z-3)-3\sqrt{\pi}\operatorname{erf}\left(\sqrt{(c-b) z}\right)+3\sqrt{\pi}}{(b-c)^2 z^2\sqrt{(c-b) z}}+\frac{2 e^{(b+c) z}\sqrt{-(b+c) z}\,(2 b z+2 c z-3)+3\sqrt{\pi}\operatorname{erf}\left(\sqrt{-(b+c) z}\right)-3\sqrt{\pi}}{(-(b+c) z)^{5/2}}\right)$$

01.19.21.0339.01

$$\int z^{5/2} e^{e+b z} \sinh(c z) \, dz = \frac{1}{2} e^e z^{7/2} \left(\frac{1}{((c-b) z)^{7/2}} \left(e^{(b-c) z} ((c-b) z)^{5/2} - \frac{5}{8} \left(2 e^{(b-c) z} \sqrt{(c-b) z} \, (2 b z - 2 c z - 3) + 3 \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{(c-b) z} \right) - 3 \sqrt{\pi} \right) \right) + \frac{1}{(-(b+c) z)^{7/2}} \left(\frac{5}{8} \left(2 e^{(b+c) z} \sqrt{-(b+c) z} \, (2 b z + 2 c z - 3) + 3 \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{-(b+c) z} \right) - 3 \sqrt{\pi} \right) - e^{(b+c) z} (-(b+c) z)^{5/2} \right) \right)$$

01.19.21.0340.01

$$\int z^{7/2} e^{e+b z} \sinh(c z) \, dz = \frac{1}{2} e^e z^{9/2} \left(\frac{1}{((c-b) z)^{9/2}} \left(e^{(b-c) z} ((c-b) z)^{7/2} + \frac{7}{16} e^{-c z} \left(2 e^{b z} \sqrt{(c-b) z} \left(4 b^2 z^2 + 4 c^2 z^2 + 10 c z - 2 b (4 c z + 5) z + 15 \right) - 15 e^{c z} \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{(c-b) z} \right) + 15 e^{c z} \sqrt{\pi} \right) \right) - \frac{1}{(-(b+c) z)^{9/2}} \left(e^{(b+c) z} (-(b+c) z)^{7/2} + \frac{7}{16} \left(2 e^{(b+c) z} \sqrt{-(b+c) z} \left(4 b^2 z^2 + 4 c^2 z^2 - 10 c z + 2 b (4 c z - 5) z + 15 \right) - 15 \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{-(b+c) z} \right) + 15 \sqrt{\pi} \right) \right) \right)$$

01.19.21.0341.01

$$\int z^{9/2} e^{e+b z} \sinh(c z) \, dz = \frac{1}{2} e^e z^{11/2} \left(\frac{1}{((c-b) z)^{11/2}} \left(e^{(b-c) z} ((c-b) z)^{9/2} + \frac{9}{2} \left(e^{(b-c) z} ((c-b) z)^{7/2} + \frac{7}{16} e^{-c z} \left(2 e^{b z} \sqrt{(c-b) z} \left(4 b^2 z^2 + 4 c^2 z^2 + 10 c z - 2 b (4 c z + 5) z + 15 \right) - 15 e^{c z} \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{(c-b) z} \right) + 15 e^{c z} \sqrt{\pi} \right) \right) \right) - \frac{1}{(-(b+c) z)^{11/2}} \left(e^{(b+c) z} (-(b+c) z)^{9/2} + \frac{9}{2} \left(e^{(b+c) z} (-(b+c) z)^{7/2} + \frac{7}{16} \left(2 e^{(b+c) z} \sqrt{-(b+c) z} \left(4 b^2 z^2 + 4 c^2 z^2 - 10 c z + 2 b (4 c z - 5) z + 15 \right) - 15 \sqrt{\pi} \, \operatorname{erf}\left(\sqrt{-(b+c) z} \right) + 15 \sqrt{\pi} \right) \right) \right) \right)$$

01.19.21.0342.01

$$\int \frac{e^{e+b z} \sinh(c z)}{\sqrt{z}} \, dz = -\frac{e^e \sqrt{\pi} \left(\sqrt{b-c} \, (b+c) \operatorname{erfi}\left(\sqrt{b-c} \, \sqrt{z} \right) + (c-b) \sqrt{b+c} \, \operatorname{erfi}\left(\sqrt{b+c} \, \sqrt{z} \right) \right)}{2 (b-c) (b+c)}$$

01.19.21.0343.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z^{3/2}} \, dz = \frac{1}{\sqrt{z}} \left(e^e \left(\sqrt{\pi} \, \sqrt{(c-b) z} \, \operatorname{erf}\left(\sqrt{(c-b) z} \right) + e^{(b-c) z} - e^{(b+c) z} - \sqrt{\pi} \, \sqrt{-(b+c) z} \, \operatorname{erf}\left(\sqrt{-(b+c) z} \right) - \sqrt{\pi} \, \sqrt{(c-b) z} + \sqrt{\pi} \, \sqrt{-(b+c) z} \right) \right)$$

01.19.21.0344.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z^{5/2}} \, dz = \frac{1}{3 z^{3/2}} \left(e^e \left(-2 \sqrt{\pi} \operatorname{erf}\left(\sqrt{(c-b) z}\right) ((c-b) z)^{3/2} + 2 \sqrt{\pi} ((c-b) z)^{3/2} - 2 \sqrt{\pi} (-(b+c) z)^{3/2} + e^{(b-c) z} - e^{(b+c) z} + 2 (b-c) e^{(b-c) z} z - 2 (b+c) e^{(b+c) z} z + 2 \sqrt{\pi} (-(b+c) z)^{3/2} \operatorname{erf}\left(\sqrt{-(b+c) z}\right)\right)\right)$$

01.19.21.0345.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z^{7/2}} \, dz = \frac{1}{15 z^{5/2}} \left(e^e \left(4 \sqrt{\pi} \operatorname{erf}\left(\sqrt{(c-b) z}\right) ((c-b) z)^{5/2} - 4 \sqrt{\pi} ((c-b) z)^{5/2} + 4 \sqrt{\pi} (-(b+c) z)^{5/2} + 3 e^{(b-c) z} - 3 e^{(b+c) z} + 4 (b-c)^2 e^{(b-c) z} z^2 - 4 (b+c)^2 e^{(b+c) z} z^2 + 2 (b-c) e^{(b-c) z} z - 2 (b+c) e^{(b+c) z} z - 4 \sqrt{\pi} (-(b+c) z)^{5/2} \operatorname{erf}\left(\sqrt{-(b+c) z}\right)\right)\right)$$

01.19.21.0346.01

$$\int \frac{e^{e+b z} \sinh(c z)}{z^{9/2}} \, dz = -\frac{1}{105 z^{7/2}} \left(e^e \left(8 \sqrt{\pi} \operatorname{erf}\left(\sqrt{(c-b) z}\right) ((c-b) z)^{7/2} - 8 \sqrt{\pi} ((c-b) z)^{7/2} + 8 \sqrt{\pi} (-(b+c) z)^{7/2} - 15 e^{(b-c) z} + 15 e^{(b+c) z} + 8 (c-b)^3 e^{(b-c) z} z^3 + 8 (b+c)^3 e^{(b+c) z} z^3 - 4 (b-c)^2 e^{(b-c) z} z^2 + 4 (b+c)^2 e^{(b+c) z} z^2 - 6 (b-c) e^{(b-c) z} z + 6 (b+c) e^{(b+c) z} z - 8 \sqrt{\pi} (-(b+c) z)^{7/2} \operatorname{erf}\left(\sqrt{-(b+c) z}\right)\right)\right)$$

Involving $z^{\alpha-1} e^{b z} \sinh(c z + d)$

01.19.21.0347.01

$$\int z^{\alpha-1} e^{b z} \sinh(d + c z) \, dz = \frac{1}{2} e^d z^\alpha \left(e^{-2 d} E_{1-\alpha}((c-b) z) - E_{1-\alpha}((-b-c) z)\right)$$

01.19.21.0348.01

$$\int z^n e^{b z} \sinh(d + c z) \, dz = \frac{1}{2} e^d \left(e^{-2 d} (c-b)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((b-c) z)}{(-n-1)!} + e^{(b-c) z} \sum_{k=0}^{n} \frac{((c-b) z)^k}{(n+1)_{k-n}} - e^{(b-c) z} \sum_{k=n+1}^{-1} \frac{((c-b) z)^k}{(n+1)_{k-n}}\right) - (-b-c)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((b+c) z)}{(-n-1)!} + e^{(b+c) z} \sum_{k=0}^{n} \frac{((-b-c) z)^k}{(n+1)_{k-n}} - e^{(b+c) z} \sum_{k=n+1}^{-1} \frac{((-b-c) z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0349.01

$$\int z^{n+\frac{1}{2}} e^{b z} \sinh(d + c z) \, dz = \frac{1}{2} e^d z^{n+\frac{3}{2}} \left(e^{-2 d} ((c-b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(c-b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(b-c) z} \sum_{k=0}^{n} \frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(b-c) z} \sum_{k=n+1}^{-1} \frac{((c-b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right) - ((-b-c) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-b-c) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(b+c) z} \sum_{k=0}^{n} \frac{((-b-c) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(b+c) z} \sum_{k=n+1}^{-1} \frac{((-b-c) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0350.01

$$\int z\, e^{b z} \sinh(d + c z)\, dz = \frac{e^{b z} \left(\left(z c^3 + 2 b c - b^2 z c\right) \cosh(d + c z) + \left(z b^3 - b^2 - c^2 z b - c^2\right) \sinh(d + c z)\right)}{(b - c)^2 (b + c)^2}$$

Involving $z^{\alpha-1} e^{b z+e} \sinh(c z + d)$

01.19.21.0351.01

$$\int z^{\alpha-1} e^{e+b z} \sinh(d + c z)\, dz = \frac{1}{2} e^{e-d} z^{\alpha} \left(E_{1-\alpha}((c - b) z) - e^{2 d} E_{1-\alpha}(-(c + b) z)\right)$$

01.19.21.0352.01

$$\int z^n e^{e+b z} \sinh(d + c z)\, dz = \frac{1}{2} e^{e-d} z^{n+1} \left(E_{-n}((c - b) z) - e^{2 d} E_{-n}(-(c + b) z)\right) /; n \in \mathbb{Z}$$

01.19.21.0353.01

$$\int z^n e^{e+b z} \sinh(d + c z)\, dz = \frac{1}{2} e^{d+e} \left(e^{-2 d} (c - b)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((b - c) z)}{(-n - 1)!} + e^{(b-c) z} \sum_{k=0}^{n} \frac{((c - b) z)^k}{(n + 1)_{k-n}} - e^{(b-c) z} \sum_{k=n+1}^{-1} \frac{((c - b) z)^k}{(n + 1)_{k-n}}\right) - (-c - b)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((c + b) z)}{(-n - 1)!} + e^{(c+b) z} \sum_{k=0}^{n} \frac{((-c - b) z)^k}{(n + 1)_{k-n}} - e^{(c+b) z} \sum_{k=n+1}^{-1} \frac{((-c - b) z)^k}{(n + 1)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0354.01

$$\int z^{n+\frac{1}{2}} e^{e+b z} \sinh(d + c z)\, dz = \frac{1}{2} e^{d+e} z^{n+\frac{3}{2}} \left(e^{-2 d} E_{-n-\frac{1}{2}}((c - b) z) - E_{-n-\frac{1}{2}}(-(c + b) z)\right) /; n \in \mathbb{Z}$$

01.19.21.0355.01

$$\int z^{n+\frac{1}{2}} e^{e+b z} \sinh(d + c z)\, dz = \frac{1}{2} e^{d+e} z^{n+\frac{3}{2}} \left(e^{-2 d} ((c - b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(c - b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(b-c) z} \sum_{k=0}^{n} \frac{((c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(b-c) z} \sum_{k=n+1}^{-1} \frac{((c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right) - ((-c - b) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-c - b) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(c+b) z} \sum_{k=0}^{n} \frac{((-c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(c+b) z} \sum_{k=n+1}^{-1} \frac{((-c - b) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}}\right)\right) /; n \in \mathbb{Z}$$

01.19.21.0356.01

$$\int z\, e^{e+b z} \sinh(d + c z)\, dz = \frac{e^{e+b z} \left(c \left(z c^2 + 2 b - b^2 z\right) \cosh(d + c z) - \left(-z b^3 + b^2 + c^2 (b z + 1)\right) \sinh(d + c z)\right)}{(c - b)^2 (c + b)^2}$$

Involving $z^n e^{b z^r} \sinh(c z)$

01.19.21.0357.01

$$\int z^n e^{b z^2} \sinh(c z)\, dz = -\frac{1}{4} b^{-n-1} e^{-\frac{c^2}{4 b}} \left(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (c + 2 b z)^{q+1} \left(-\frac{(c + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q + 1}{2}, -\frac{(c + 2 b z)^2}{4 b}\right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (2 b z - c)^{q+1} \left(-\frac{(2 b z - c)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q + 1}{2}, -\frac{(2 b z - c)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0358.01

$$\int z^n e^{\sqrt{z}\, b} \sinh(c\, z)\, dz = 2^{-2n-2} c^{-2n-2} \left(e^{-\frac{b^2}{4c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2c\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2c\sqrt{z}\right)^2}{4c}\right) + 2\sqrt{-\frac{\left(b+2c\sqrt{z}\right)^2}{c}}\; c\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2c\sqrt{z}\right)^2}{4c}\right)\right) - e^{\frac{b^2}{4c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2c\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(b-2c\sqrt{z}\right)^2}{c}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2c\sqrt{z}\right)^2}{4c}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \sinh(c\, z)$

01.19.21.0359.01

$$\int z^n e^{b z^2 + e} \sinh(c\, z)\, dz = -\frac{1}{4} b^{-n-1} e^{e-\frac{c^2}{4b}} \left(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (c + 2bz)^{q+1} \left(-\frac{(c+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+2bz)^2}{4b}\right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (2bz - c)^{q+1} \left(-\frac{(2bz-c)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2bz-c)^2}{4b}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0360.01

$$\int z^n\, e^{\sqrt{z}\, b+e} \sinh(c\, z)\, dz = 2^{-2n-2}\, c^{-2n-2} \left(e^{e-\frac{b^2}{4c}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b+2c\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2c\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2c\sqrt{z}\right)^2}{4c}\right) + 2\sqrt{-\frac{\left(b+2c\sqrt{z}\right)^2}{c}}\; c\, \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2c\sqrt{z}\right)^2}{4c}\right) \right) - e^{\frac{b^2}{4c}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b-2c\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2c\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), \frac{\left(b-2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(b-2c\sqrt{z}\right)^2}{c}}\; \Gamma\!\left(\frac{1}{2}(h+k+2), \frac{\left(b-2c\sqrt{z}\right)^2}{4c}\right) \right) \right) /;\, n \in \mathbb{N}$$

Involving $z^n\, e^{b z^r + d z} \sinh(c\, z)$

01.19.21.0361.01

$$\int z^n\, e^{b z^2+d z} \sinh(c\, z)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(c+d)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-c-d)^{n-q} (c+d+2bz)^{q+1} \left(-\frac{(c+d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(c+d+2bz)^2}{4b}\right) - e^{-\frac{(d-c)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (c-d)^{n-q} (-c+d+2bz)^{q+1} \left(-\frac{(-c+d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(-c+d+2bz)^2}{4b}\right) \right) /;\, n \in \mathbb{N}$$

01.19.21.0362.01

$$\int z^n e^{\sqrt{z}\, b+d\, z} \sinh(c\, z)\, dz = 2^{-2n-2}\left((c+d)^{-2n-2}\, e^{-\frac{b^2}{4(c+d)}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b+2(c+d)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(b\left(b+2(c+d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right) + 2\sqrt{-\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}}\,(c+d)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)\right) - (d-c)^{-2n-2}\, e^{-\frac{b^2}{4(d-c)}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b+2(d-c)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(b\left(b+2(d-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right) + 2\sqrt{-\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}}\,(d-c)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sinh(c\, z)$

01.19.21.0363.01

$$\int z^n e^{b z^2+d z+e} \sinh(c\, z)\, dz = -\frac{1}{4} b^{-n-1} e^e \left(e^{-\frac{(c+d)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-c-d)^{n-q} (c+d+2bz)^{q+1} \left(-\frac{(c+d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+d+2bz)^2}{4b}\right) - e^{-\frac{(d-c)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (c-d)^{n-q} (-c+d+2bz)^{q+1} \left(-\frac{(-c+d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-c+d+2bz)^2}{4b}\right)\right) /;\, n \in \mathbb{N}$$

01.19.21.0364.01

$$\int z^n e^{\sqrt{z}\, b+e+d\, z} \sinh(c\, z)\, dz = 2^{-2n-2}\Bigg((c+d)^{-2n-2} e^{e-\frac{b^2}{4(c+d)}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k b^{-h-k+2n}\left(b+2(c+d)\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2(c+d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)+ 2\sqrt{-\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{c+d}}\,(c+d)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(c+d)\sqrt{z}\right)^2}{4(c+d)}\right)\Bigg)- (d-c)^{-2n-2} e^{e-\frac{b^2}{4(d-c)}} \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k b^{-h-k+2n}\left(b+2(d-c)\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2(d-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)+ 2\sqrt{-\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{d-c}}\,(d-c)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-c)\sqrt{z}\right)^2}{4(d-c)}\right)\Bigg)\Bigg) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r} \sinh(f z + g)$

01.19.21.0365.01

$$\int z^n e^{b z^2} \sinh(g + f z)\, dz = -\frac{1}{4} b^{-n-1}\left(e^{-\frac{f^2}{4b}+g} \sum_{q=0}^{n} 2^{q-n}(-f)^{n-q}(f+2bz)^{q+1}\left(-\frac{(f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(f+2bz)^2}{4b}\right)- e^{-\frac{f^2}{4b}-g} \sum_{q=0}^{n} 2^{q-n} f^{n-q}(2bz-f)^{q+1}\left(-\frac{(2bz-f)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(2bz-f)^2}{4b}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0366.01

$$\int z^n e^{\sqrt{z}\, b} \sinh(g + f z)\, dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{b^2}{4f}+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 f \sqrt{z}\right)^{h+k} \left(-\frac{\left(b + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(b + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) - e^{\frac{b^2}{4f}-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2 f \sqrt{z}\right)^{h+k} \left(\frac{\left(b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(b - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \sinh(f z + g)$

01.19.21.0367.01

$$\int z^n e^{b z^2+e} \sinh(g + f z)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{f^2}{4b}+e+g} \sum_{q=0}^{n} 2^{q-n} (-f)^{n-q} (f + 2 b z)^{q+1} \left(-\frac{(f + 2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + 2 b z)^2}{4 b}\right) - e^{-\frac{f^2}{4b}+e-g} \sum_{q=0}^{n} 2^{q-n} f^{n-q} (2 b z - f)^{q+1} \left(-\frac{(2 b z - f)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 b z - f)^2}{4 b}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0368.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh(g+f z)\, dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{b^2}{4f}+e+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2f\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(b+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2f\sqrt{z}\right)^2}{4f}\right) \right) - e^{\frac{b^2}{4f}+e-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2f\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2f\sqrt{z}\right)^2}{4f}\right) \right) \right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \sinh(f z + g)$

01.19.21.0369.01

$$\int z^n e^{b z^2 + d z} \sinh(g+f z)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(d+f)^2}{4b}+g} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q} (d+f+2bz)^{q+1} \left(-\frac{(d+f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2bz)^2}{4b}\right) - e^{-\frac{(d-f)^2}{4b}-g} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2bz)^{q+1} \left(-\frac{(d-f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2bz)^2}{4b}\right) \right) /;\, n \in \mathbb{N}$$

01.19.21.0370.01

$$\int z^n e^{\sqrt{z}\, b+d z} \sinh(g+f z)\, dz = 2^{-2n-2} \left(e^{-\frac{b^2}{4(d+f)}+g} (d+f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2(d+f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}}\, (d+f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{b^2}{4(d-f)}-g} (d-f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2(d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right) + 2\sqrt{-\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}}\, (d-f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sinh(f z + g)$

01.19.21.0371.01

$$\int z^n e^{b z^2+d z+e} \sinh(g+f z)\, dz = -\frac{1}{4} b^{-n-1} \left(e^{-\frac{(d+f)^2}{4b}+e+g} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q} (d+f+2bz)^{q+1} \left(-\frac{(d+f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2bz)^2}{4b}\right) - e^{-\frac{(d-f)^2}{4b}+e-g} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2bz)^{q+1} \left(-\frac{(d-f+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2bz)^2}{4b}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0372.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh(g+f z)\, dz = 2^{-2n-2} \Bigg(e^{-\frac{b^2}{4(d+f)}+e+g} (d+f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b\left(b+2(d+f)\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{d+f}}\, (d+f)\, \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\Bigg) - e^{-\frac{b^2}{4(d-f)}+e-g} (d-f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(b\left(b+2(d-f)\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right) + 2\sqrt{-\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{d-f}}\, (d-f)\, \Gamma\!\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z} \sinh(c z^r)$

01.19.21.0373.01

$$\int z^n e^{b z} \sinh(c z^2)\, dz = \frac{1}{4} \Bigg(\frac{1}{\sqrt{-c}} \left(e^{\frac{b^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-b)^{n-q} (b-2cz)^{q+1} \left(\frac{(b-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, \frac{(b-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}} \left(e^{-\frac{b^2}{4c}} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-b)^{n-q} (b+2cz)^{q+1} \left(-\frac{(b+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2}, -\frac{(b+2cz)^2}{4c}\right)\right)\Bigg) /;\, n \in \mathbb{N}$$

01.19.21.0374.01

$$\int z^n e^{b z} \sinh\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} b^{-2n-2} e^{-\frac{c^2}{4b}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c+2b\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c+2b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2b\sqrt{z}\right)^2}{4b}\right) + 2\sqrt{-\frac{\left(c+2b\sqrt{z}\right)^2}{b}}\, b\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2b\sqrt{z}\right)^2}{4b}\right)\right) - \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2b\sqrt{z}-c\right)^{h+k} \left(-\frac{\left(2b\sqrt{z}-c\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2b\sqrt{-\frac{\left(2b\sqrt{z}-c\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2b\sqrt{z}-c\right)^2}{4b}\right) - c\left(2b\sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2b\sqrt{z}-c\right)^2}{4b}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{d z+e} \sinh(c z^r)$

01.19.21.0375.01

$$\int z^n e^{e+d z} \sinh\left(c z^2\right) dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{d^2}{4c}+e} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-d)^{n-q} (d-2cz)^{q+1} \left(\frac{(d-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}}\left(e^{-\frac{d^2}{4c}+e} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-d)^{n-q} (d+2cz)^{q+1} \left(-\frac{(d+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2cz)^2}{4c}\right)\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0376.01

$$\int z^n e^{e+d z} \sinh\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} d^{-2n-2} e^{-\frac{c^2}{4d}+e} \left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k c^{-h-k+2n} \left(c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right) - \sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2d\sqrt{z}-c\right)^{h+k} \left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right) - c\left(2d\sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r} \sinh(c z^r)$

01.19.21.0377.01

$$\int z^{\alpha-1} e^{b z^r} \sinh(c z^r)\, dz = \frac{z^\alpha \left(((c-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-b) z^r\right) - ((-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c) z^r\right)\right)}{2r}$$

01.19.21.0378.01

$$\int z^n e^{b z^2} \sinh\left(c z^2\right) dz = \frac{1}{4} z^{n+1} \left(-\Gamma\left(\frac{n+1}{2}, (-b-c) z^2\right)\left((-b-c) z^2\right)^{\frac{1}{2}(-n-1)} + \left((c-b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.0379.01

$$\int z^n e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c\right) dz = (c-b)^{-2(n+1)} \Gamma\left(2(n+1), (c-b)\sqrt{z}\right) - (b+c)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c)\sqrt{z}\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sinh(c z^r)$

01.19.21.0380.01

$$\int z^{\alpha-1} e^{b z^r+e} \sinh(c z^r)\, dz = \frac{z^\alpha e^e \left(((c-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-b) z^r\right) - ((-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c) z^r\right)\right)}{2r}$$

01.19.21.0381.01

$$\int z^n e^{b z^2+e} \sinh\left(c z^2\right) dz = \frac{1}{4} z^{n+1} e^e \left(-\Gamma\left(\frac{n+1}{2}, (-b-c) z^2\right)\left((-b-c) z^2\right)^{\frac{1}{2}(-n-1)} + \left((c-b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.0382.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c\right) dz = e^e (c-b)^{-2(n+1)} \Gamma\left(2(n+1), (c-b)\sqrt{z}\right) - e^e (b+c)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c)\sqrt{z}\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \sinh(c z^r)$

01.19.21.0383.01

$$\int z^n e^{b z^2 + d z} \sinh(c z^2) dz = \frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{d^2}{4(b-c)}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-c)z)^{q+1} \left(-\frac{(d+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{d^2}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+2cz)^{q+1} \left(-\frac{(d+2bz+2cz)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+2cz)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0384.01

$$\int z^n e^{\sqrt{z}\, b+d\,z} \sinh\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{(b+c)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c)\left(b+c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{(b-c)^2}{4d}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sinh(c z^r)$

01.19.21.0385.01

$$\int z^n e^{b z^2 + d z + e} \sinh\left(c z^2\right) dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{d^2}{4(b-c)}+e} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-c)z)^{q+1} \left(-\frac{(d+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{d^2}{4(b+c)}+e} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+2cz)^{q+1} \left(-\frac{(d+2bz+2cz)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+2cz)^2}{4(b+c)}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0386.01

$$\int z^n e^{\sqrt{z}\, b+e+d\, z} \sinh\left(\sqrt{z}\, c\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{(b+c)^2}{4d}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+c)^{-h-k+2n} \left(b+c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c)\left(b+c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{(b-c)^2}{4d}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b-c)^{-h-k+2n} \left(b-c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{d z} \sinh\left(c z^r + g\right)$

01.19.21.0387.01

$$\int z^n e^{d z} \sinh\left(c z^2 + g\right) dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}} \left(e^{\frac{d^2}{4c}-g} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-d)^{n-q} (d-2cz)^{q+1} \left(\frac{(d-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}} \left(e^{-\frac{d^2}{4c}+g} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-d)^{n-q} (d+2cz)^{q+1} \left(-\frac{(d+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2cz)^2}{4c}\right)\right)\right) /;\, n \in \mathbb{N}$$

01.19.21.0388.01

$$\int z^n e^{d z} \sinh\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{c^2}{4d}+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{c^2}{4d}-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2d\sqrt{z}-c\right)^{h+k} \left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right) - c\left(2d\sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{d z+e} \sinh\left(c z^r + g\right)$

01.19.21.0389.01

$$\int z^n e^{e+d z} \sinh\left(c z^2+g\right) dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{d^2}{4c}+e-g} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-d)^{n-q} (d-2cz)^{q+1} \left(\frac{(d-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}}\left(e^{-\frac{d^2}{4c}+e+g} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-d)^{n-q} (d+2cz)^{q+1} \left(-\frac{(d+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2cz)^2}{4c}\right)\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0390.01

$$\int z^n e^{e+d z} \sinh\left(\sqrt{z}\; c+g\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{c^2}{4d}+e+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{c^2}{4d}+e-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2d\sqrt{z}-c\right)^{h+k} \left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right) - c\left(2d\sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r} \sinh\left(c z^r + g\right)$

01.19.21.0391.01

$$\int z^{\alpha-1} e^{b z^r} \sinh(c z^r + g)\, dz = \frac{z^\alpha \left(e^{-g} ((c-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-b) z^r\right) - e^g ((-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c) z^r\right)\right)}{2r}$$

01.19.21.0392.01

$$\int z^n e^{b z^2} \sinh\left(c z^2 + g\right) dz = \frac{1}{4} z^{n+1} \left(-e^g \Gamma\left(\frac{n+1}{2}, (-b-c) z^2\right) \left((-b-c) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-g} \left((c-b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.0393.01

$$\int z^n e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\; c + g\right) dz = e^{-g} (c-b)^{-2(n+1)} \Gamma\left(2(n+1), (c-b)\sqrt{z}\right) - e^g (b+c)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c)\sqrt{z}\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sinh\left(c z^r + g\right)$

01.19.21.0394.01

$$\int z^{\alpha-1} e^{b z^r + e} \sinh(c z^r + g)\, dz = \frac{z^\alpha \left(e^{e-g} ((c-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-b) z^r\right) - e^{e+g} ((-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c) z^r\right)\right)}{2r}$$

01.19.21.0395.01

$$\int z^n e^{b z^2+e} \sinh(c z^2+g)\, dz = \frac{1}{4} z^{n+1} \left(-e^{e+g}\, \Gamma\left(\frac{n+1}{2}, (-b-c) z^2\right) \left((-b-c) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e-g} \left((c-b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.0396.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh(\sqrt{z}\, c+g)\, dz = e^{e-g} (c-b)^{-2(n+1)}\, \Gamma\left(2(n+1), (c-b)\sqrt{z}\right) - e^{e+g} (b+c)^{-2(n+1)}\, \Gamma\left(2(n+1), (-b-c)\sqrt{z}\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z} \sinh(c z^r+g)$

01.19.21.0397.01

$$\int z^n e^{b z^2+d z} \sinh(c z^2+g)\, dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{d^2}{4(b-c)}-g} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-c)z)^{q+1} \left(-\frac{(d+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{d^2}{4(b+c)}+g} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+2cz)^{q+1} \left(-\frac{(d+2bz+2cz)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+2cz)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0398.01

$$\int z^n e^{\sqrt{z}\, b+d\,z} \sinh\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{(b+c)^2}{4d}+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c)\left(b+c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right) \right) - e^{-\frac{(b-c)^2}{4d}-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sinh\left(c z^r + g\right)$

01.19.21.0399.01

$$\int z^n e^{b z^2 + d z + e} \sinh\left(c z^2 + g\right) dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{d^2}{4(b-c)}+e-g} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b-c)z)^{q+1} \left(-\frac{(d+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{d^2}{4(b+c)}+e+g} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz+2cz)^{q+1} \left(-\frac{(d+2bz+2cz)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz+2cz)^2}{4(b+c)}\right) \right) /; n \in \mathbb{N}$$

01.19.21.0400.01

$$\int z^n e^{\sqrt{z}\, b+e+d\,z} \sinh\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-2} d^{-2n-2} \left(e^{-\frac{(b+c)^2}{4d}+e+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c)\left(b+c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+c+2d\sqrt{z}\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2d\sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{(b-c)^2}{4d}+e-g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c)\left(b-c+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c+2d\sqrt{z}\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving exponential and algebraic functions

Involving exp and algebraic functions

Involving $(a\,z+b)^\beta\, d^z \sinh(c\,z+e)$

01.19.21.0401.01

$$\int (b+a\,z)^\beta\, d^z \sinh(e+c\,z)\, dz = \frac{d^{-\frac{b}{a}}\, e^{-\frac{b\,c}{a}-e} (b+a\,z)^{\beta+1} \left(e^{\frac{2\,b\,c}{a}} E_{-\beta}\left(\frac{(b+a\,z)(c-\log(d))}{a}\right) - e^{2\,e} E_{-\beta}\left(-\frac{(b+a\,z)(c+\log(d))}{a}\right)\right)}{2\,a}$$

01.19.21.0402.01

$$\int (b+a\,z)^\beta\, e^{p\,z} \sinh(e+c\,z)\, dz = \frac{e^{-e-\frac{b(c+p)}{a}} (b+a\,z)^{\beta+1} \left(e^{\frac{2\,b\,c}{a}} E_{-\beta}\left(\frac{(c-p)(b+a\,z)}{a}\right) - e^{2\,e} E_{-\beta}\left(-\frac{(c+p)(b+a\,z)}{a}\right)\right)}{2\,a}$$

01.19.21.0403.01

$$\int (b+a\,z)^{\beta}\,d^{z}\sinh(c\,z)\,dz = \frac{d^{-\frac{b}{a}}\,e^{-\frac{b\,c}{a}}\,(b+a\,z)^{\beta+1}\left(e^{\frac{2\,b\,c}{a}}\,E_{-\beta}\left(\frac{(b+a\,z)\,(c-\log(d))}{a}\right)-E_{-\beta}\left(-\frac{(b+a\,z)\,(c+\log(d))}{a}\right)\right)}{2\,a}$$

01.19.21.0404.01

$$\int (b+a\,z)^{\beta}\,e^{p\,z}\sinh(c\,z)\,dz = \frac{e^{-\frac{b\,(c+p)}{a}}\,(b+a\,z)^{\beta+1}\left(e^{\frac{2\,b\,c}{a}}\,E_{-\beta}\left(\frac{(c-p)\,(b+a\,z)}{a}\right)-E_{-\beta}\left(-\frac{(c+p)\,(b+a\,z)}{a}\right)\right)}{2\,a}$$

01.19.21.0405.01

$$\int \frac{e^{p\,z}\sinh(c\,z)}{\sqrt{b+a\,z}}\,dz = \frac{1}{2\left(c^2-p^2\right)\sqrt{b+a\,z}}\left(e^{-\frac{b\,(c+p)}{a}}\sqrt{\pi}\left(\sqrt{\frac{(c-p)\,(b+a\,z)}{a}}\;e^{\frac{2\,b\,c}{a}}\,(c+p)\,\mathrm{erfc}\left(\sqrt{\frac{(c-p)\,(b+a\,z)}{a}}\right)+\sqrt{-\frac{(c+p)\,(b+a\,z)}{a}}\;(c-p)\,\mathrm{erfc}\left(\sqrt{-\frac{(c+p)\,(b+a\,z)}{a}}\right)\right)\right)$$

Arguments involving polynomials

Involving $a\,z^2+b\,z+c$

01.19.21.0406.01

$$\int \sinh\left(a\,z^2+b\,z+c\right)dz = \frac{\sqrt{\pi}}{4\sqrt{a}}\,e^{-\frac{b^2}{4\,a}-c}\left(e^{2\,c}\,\mathrm{erfi}\left(\frac{b+2\,a\,z}{2\sqrt{a}}\right)-e^{\frac{b^2}{2\,a}}\,\mathrm{erf}\left(\frac{b+2\,a\,z}{2\sqrt{a}}\right)\right)$$

Involving $a\,z^2+b\,z$

01.19.21.0407.01

$$\int \sinh\left(a\,z^2+b\,z\right)dz = \frac{\sqrt{\pi}}{4\sqrt{a}}\,e^{-\frac{b^2}{4\,a}}\left(\mathrm{erfi}\left(\frac{b+2\,a\,z}{2\sqrt{a}}\right)-e^{\frac{b^2}{2\,a}}\,\mathrm{erf}\left(\frac{b+2\,a\,z}{2\sqrt{a}}\right)\right)$$

Involving $a\,z^2+c$

01.19.21.0408.01

$$\int \sinh\left(a\,z^2+c\right)dz = \frac{\sqrt{\pi}}{4\sqrt{a}}\,e^{-c}\left(e^{2\,c}\,\mathrm{erfi}\left(\sqrt{a}\;z\right)-\mathrm{erf}\left(\sqrt{a}\;z\right)\right)$$

Arguments involving rational functions

Involving $a\,z^2+\frac{b}{z^2}$

01.19.21.0409.01

$$\int \sinh\left(a z^2 + \frac{b}{z^2}\right) dz = -\frac{1}{8}\sqrt{\pi}\left(\frac{e^{-2\sqrt{-a}\sqrt{-b}}\left(-e^{4\sqrt{-a}\sqrt{-b}}\left(\operatorname{erf}\left(\sqrt{-a}\,z + \frac{\sqrt{-b}}{z}\right)-1\right) + \operatorname{erf}\left(\frac{\sqrt{-b}}{z} - \sqrt{-a}\,z\right)-1\right)}{\sqrt{-a}} + \frac{e^{-2\sqrt{a}\sqrt{b}}\left(e^{4\sqrt{a}\sqrt{b}}\left(\operatorname{erf}\left(\sqrt{a}\,z + \frac{\sqrt{b}}{z}\right)-1\right) - \operatorname{erf}\left(\frac{\sqrt{b}}{z} - \sqrt{a}\,z\right)+1\right)}{\sqrt{a}}\right)$$

Involving $a z^2 + \frac{b}{z^2} + c$

01.19.21.0410.01

$$\int \sinh\left(a z^2 + c + \frac{b}{z^2}\right) dz = -\frac{1}{8} e^c \sqrt{\pi}\left(\frac{e^{-2\sqrt{-a}\sqrt{-b}}\left(-e^{4\sqrt{-a}\sqrt{-b}}\left(\operatorname{erf}\left(\sqrt{-a}\,z + \frac{\sqrt{-b}}{z}\right)-1\right) + \operatorname{erf}\left(\frac{\sqrt{-b}}{z} - \sqrt{-a}\,z\right)-1\right)}{\sqrt{-a}} + \frac{e^{-2\left(c+\sqrt{a}\sqrt{b}\right)}\left(e^{4\sqrt{a}\sqrt{b}}\left(\operatorname{erf}\left(\sqrt{a}\,z + \frac{\sqrt{b}}{z}\right)-1\right) - \operatorname{erf}\left(\frac{\sqrt{b}}{z} - \sqrt{a}\,z\right)+1\right)}{\sqrt{a}}\right)$$

Arguments involving algebraic functions

Involving $a z + b\sqrt{z} + c$

01.19.21.0411.01

$$\int \sinh\left(a z + \sqrt{z}\,b + c\right) dz = \frac{e^{-c}}{4 a^{3/2}}\left(2\sqrt{a}\, e^{-a z - b\sqrt{z}}\left(1 + e^{2\left(\sqrt{z}\,b + c + a z\right)}\right) + b\, e^{\frac{b^2}{4a}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{2\sqrt{z}\,a + b}{2\sqrt{a}}\right) - b\, e^{2c - \frac{b^2}{4a}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\sqrt{z}\,a + b}{2\sqrt{a}}\right)\right)$$

Involving $a z + b\sqrt{z}$

01.19.21.0412.01

$$\int \sinh\left(\sqrt{z}\,b + a z\right) dz = \frac{1}{4 a^{3/2}}\left(2\sqrt{a}\, e^{-a z - b\sqrt{z}}\left(1 + e^{2\sqrt{z}\,b + 2 a z}\right) + b\, e^{\frac{b^2}{4a}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{2\sqrt{z}\,a + b}{2\sqrt{a}}\right) - b\, e^{-\frac{b^2}{4a}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\sqrt{z}\,a + b}{2\sqrt{a}}\right)\right)$$

Involving $a z^r + c$

01.19.21.0413.01

$$\int \sinh(a z^r + c)\, dz = -\frac{1}{2 r}\left(e^c z (-a z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -a z^r\right) - e^{-c} z (a z^r)^{-1/r} \Gamma\left(\frac{1}{r}, a z^r\right)\right)$$

01.19.21.0414.01

$$\int \sinh\left(a z^2 + c\right) dz = \frac{\sqrt{\pi}\, e^{-c} \left(e^{2 c} \operatorname{erfi}\left(\sqrt{a}\, z\right) - \operatorname{erf}\left(\sqrt{a}\, z\right)\right)}{4 \sqrt{a}}$$

01.19.21.0415.01

$$\int \sinh\left(\sqrt{z}\, a + c\right) dz = \frac{e^{-\sqrt{z}\, a - c} \left(\sqrt{z}\, a + e^{2\left(\sqrt{z}\, a + c\right)} \left(a \sqrt{z} - 1\right) + 1\right)}{a^2}$$

Arguments involving exponential functions

01.19.21.0416.01

$$\int \sinh(a^z)\, dz = \frac{\operatorname{Shi}(a^z)}{\log(a)}$$

01.19.21.0417.01

$$\int \sinh(e^z)\, dz = \operatorname{Shi}(e^z)$$

Arguments involving trigonometric functions

Involving tan

01.19.21.0418.01

$$\int \sinh(\tan(z))\, dz = \frac{1}{2} (\operatorname{Chi}(i - \tan(z)) \sin(1) + \operatorname{Chi}(i + \tan(z)) \sin(1) + i \cos(1) (\operatorname{Shi}(i - \tan(z)) + \operatorname{Shi}(i + \tan(z))))$$

01.19.21.0419.01

$$\int \sinh(a \tan(z))\, dz = \frac{1}{2} (\operatorname{Chi}(-a (-i + \tan(z))) \sin(a) + \operatorname{Chi}(a (i + \tan(z))) \sin(a) + i \cos(a) (\operatorname{Shi}(a (i + \tan(z))) + \operatorname{Shi}(i a - a \tan(z))))$$

Involving cot

01.19.21.0420.01

$$\int \sinh(\cot(z))\, dz = \frac{1}{2} (-\operatorname{Chi}(i - \cot(z)) \sin(1) - \operatorname{Chi}(i + \cot(z)) \sin(1) - i \cos(1) (\operatorname{Shi}(i - \cot(z)) + \operatorname{Shi}(i + \cot(z))))$$

01.19.21.0421.01

$$\int \sinh(a \cot(z))\, dz = \frac{1}{2} (-\operatorname{Chi}(-a (-i + \cot(z))) \sin(a) - \operatorname{Chi}(a (i + \cot(z))) \sin(a) - i \cos(a) (\operatorname{Shi}(a (i + \cot(z))) + \operatorname{Shi}(i a - a \cot(z))))$$

Arguments involving hyperbolic functions

Involving tanh

01.19.21.0422.01

$$\int \sinh(\tanh(z))\,dz = -\frac{1}{4e}\left(\left(-1+e^2\right)\text{Chi}(1-\tanh(z))+\left(-1+e^2\right)\text{Chi}(\tanh(z)+1)-\left(1+e^2\right)(\text{Shi}(1-\tanh(z))+\text{Shi}(\tanh(z)+1))\right)$$

01.19.21.0423.01

$$\int \sinh(a\tanh(z))\,dz = \frac{1}{2}(-\text{Chi}(\tanh(z)\,a+a)\sinh(a)-\text{Chi}(a-a\tanh(z))\sinh(a)+\cosh(a)(\text{Shi}(\tanh(z)\,a+a)+\text{Shi}(a-a\tanh(z))))$$

Involving coth

01.19.21.0424.01

$$\int \sinh(\coth(z))\,dz = -\frac{1}{4e}\left(\left(-1+e^2\right)\text{Chi}(1-\coth(z))+\left(-1+e^2\right)\text{Chi}(\coth(z)+1)-\left(1+e^2\right)(\text{Shi}(1-\coth(z))+\text{Shi}(\coth(z)+1))\right)$$

01.19.21.0425.01

$$\int \sinh(a\coth(z))\,dz = \frac{1}{2}(-\text{Chi}(\coth(z)\,a+a)\sinh(a)-\text{Chi}(a-a\coth(z))\sinh(a)+\cosh(a)(\text{Shi}(\coth(z)\,a+a)+\text{Shi}(a-a\coth(z))))$$

Arguments involving inverse trigonometric functions

Involving $\sin^{-1}$

01.19.21.0426.01

$$\int \sinh\left(\sin^{-1}(z)\right)dz = \frac{1}{2}\left(\sqrt{1-z^2}\,\cosh\left(\sin^{-1}(z)\right)+z\sinh\left(\sin^{-1}(z)\right)\right)$$

01.19.21.0427.01

$$\int \sinh\left(a\sin^{-1}(z)\right)dz = \frac{a\sqrt{1-z^2}\,\cosh\left(a\sin^{-1}(z)\right)+z\sinh\left(a\sin^{-1}(z)\right)}{a^2+1}$$

Involving $\cos^{-1}$

01.19.21.0428.01

$$\int \sinh\left(\cos^{-1}(z)\right)dz = \frac{1}{2}\left(z\sinh\left(\cos^{-1}(z)\right)-\sqrt{1-z^2}\,\cosh\left(\cos^{-1}(z)\right)\right)$$

01.19.21.0429.01

$$\int \sinh\left(a\cos^{-1}(z)\right)dz = \frac{z\sinh\left(a\cos^{-1}(z)\right)-a\sqrt{1-z^2}\,\cosh\left(a\cos^{-1}(z)\right)}{a^2+1}$$

Involving $\tan^{-1}$

01.19.21.0430.01

$$\int \sinh\left(\tan^{-1}(z)\right) dz = \frac{1}{10}\left(5\, e^{-\tan^{-1}(z)}\, i\, {}_2F_1\left(\frac{i}{2}, 1; 1+\frac{i}{2}; -e^{2 i \tan^{-1}(z)}\right) - 5\, e^{\tan^{-1}(z)}\, i\, {}_2F_1\left(-\frac{i}{2}, 1; 1-\frac{i}{2}; -e^{2 i \tan^{-1}(z)}\right) + e^{(-1+2 i) \tan^{-1}(z)} (2-i)\, {}_2F_1\left(1+\frac{i}{2}, 1; 2+\frac{i}{2}; -e^{2 i \tan^{-1}(z)}\right) + e^{(1+2 i) \tan^{-1}(z)} (2+i)\, {}_2F_1\left(1-\frac{i}{2}, 1; 2-\frac{i}{2}; -e^{2 i \tan^{-1}(z)}\right)\right) + z \sinh\left(\tan^{-1}(z)\right)$$

01.19.21.0431.01

$$\int \sinh\left(a \tan^{-1}(z)\right) dz = \frac{1}{2\left(a^2+4\right)}\left(e^{-a \tan^{-1}(z)}\left((a+2 i)\left((a-2 i)\left(\left(-1+e^{2 a \tan^{-1}(z)}\right) z + i\, {}_2F_1\left(\frac{i a}{2}, 1; 1+\frac{i a}{2}; -e^{2 i \tan^{-1}(z)}\right) - i\, e^{2 a \tan^{-1}(z)}\, {}_2F_1\left(-\frac{1}{2}(i a), 1; 1-\frac{i a}{2}; -e^{2 i \tan^{-1}(z)}\right)\right) - i\, a\, e^{2 i \tan^{-1}(z)}\, {}_2F_1\left(1+\frac{i a}{2}, 1; 2+\frac{i a}{2}; -e^{2 i \tan^{-1}(z)}\right)\right) + a (2 + i a)\, e^{2 (a+i) \tan^{-1}(z)}\, {}_2F_1\left(1-\frac{i a}{2}, 1; 2-\frac{i a}{2}; -e^{2 i \tan^{-1}(z)}\right)\right)\right)$$

Involving $\cot^{-1}$

01.19.21.0432.01

$$\int \sinh\left(\cot^{-1}(z)\right) dz = \frac{1}{10}\left(-5\, i\, e^{-\cot^{-1}(z)}\, {}_2F_1\left(\frac{i}{2}, 1; 1+\frac{i}{2}; e^{2 i \cot^{-1}(z)}\right) + 5\, e^{\cot^{-1}(z)}\, i\, {}_2F_1\left(-\frac{i}{2}, 1; 1-\frac{i}{2}; e^{2 i \cot^{-1}(z)}\right) + e^{(-1+2 i) \cot^{-1}(z)} (2-i)\, {}_2F_1\left(1+\frac{i}{2}, 1; 2+\frac{i}{2}; e^{2 i \cot^{-1}(z)}\right) + e^{(1+2 i) \cot^{-1}(z)} (2+i)\, {}_2F_1\left(1-\frac{i}{2}, 1; 2-\frac{i}{2}; e^{2 i \cot^{-1}(z)}\right)\right) + z \sinh\left(\cot^{-1}(z)\right)$$

01.19.21.0433.01

$$\int \sinh\left(a \cot^{-1}(z)\right) dz = \frac{1}{2\left(a^2+4\right)}\left(i\, e^{-a \cot^{-1}(z)}\left((a+2 i)\left((a-2 i)\left(-i\left(-1+e^{2 a \cot^{-1}(z)}\right) z - {}_2F_1\left(\frac{i a}{2}, 1; 1+\frac{i a}{2}; e^{2 i \cot^{-1}(z)}\right) + e^{2 a \cot^{-1}(z)}\, {}_2F_1\left(-\frac{1}{2}(i a), 1; 1-\frac{i a}{2}; e^{2 i \cot^{-1}(z)}\right)\right) - a\, e^{2 i \cot^{-1}(z)}\, {}_2F_1\left(1+\frac{i a}{2}, 1; 2+\frac{i a}{2}; e^{2 i \cot^{-1}(z)}\right)\right) + a (a - 2 i)\, e^{2 (a+i) \cot^{-1}(z)}\, {}_2F_1\left(1-\frac{i a}{2}, 1; 2-\frac{i a}{2}; e^{2 i \cot^{-1}(z)}\right)\right)\right)$$

Involving $\csc^{-1}$

01.19.21.0434.01

$$\int \sinh\left(\csc^{-1}(z)\right) dz = \left(\frac{1}{2}-\frac{i}{2}\right) e^{(-1+i) \csc^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}+\frac{i}{2}, 1; \frac{3}{2}+\frac{i}{2}; e^{2 i \csc^{-1}(z)}\right) + \left(\frac{1}{2}+\frac{i}{2}\right) e^{(1+i) \csc^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}-\frac{i}{2}, 1; \frac{3}{2}-\frac{i}{2}; e^{2 i \csc^{-1}(z)}\right) + z \sinh\left(\csc^{-1}(z)\right)$$

01.19.21.0435.01

$$\int \sinh\left(a \csc^{-1}(z)\right) dz = \frac{1}{a^2+1}\left(e^{-a\csc^{-1}(z)}\left(a\,(1+i\,a)\,e^{(2a+i)\csc^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}-\frac{i\,a}{2},1;\frac{3}{2}-\frac{i\,a}{2};e^{2i\csc^{-1}(z)}\right)+\right.\right.$$
$$\left.\left.(a+i)\left((a-i)\,e^{a\csc^{-1}(z)}\,z\sinh\left(a\csc^{-1}(z)\right)-i\,a\,e^{i\csc^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}+\frac{i\,a}{2},1;\frac{3}{2}+\frac{i\,a}{2};e^{2i\csc^{-1}(z)}\right)\right)\right)\right)$$

Involving $\sec^{-1}$

01.19.21.0436.01

$$\int \sinh\left(\sec^{-1}(z)\right) dz = \left(\frac{1}{2}+\frac{i}{2}\right) e^{(-1+i)\sec^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}+\frac{i}{2},1;\frac{3}{2}+\frac{i}{2};-e^{2i\sec^{-1}(z)}\right)+$$
$$\left(-\frac{1}{2}+\frac{i}{2}\right) e^{(1+i)\sec^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}-\frac{i}{2},1;\frac{3}{2}-\frac{i}{2};-e^{2i\sec^{-1}(z)}\right)+z\sinh\left(\sec^{-1}(z)\right)$$

01.19.21.0437.01

$$\int \sinh\left(a \sec^{-1}(z)\right) dz =$$
$$\frac{1}{a^2+1}\left(e^{-a\sec^{-1}(z)}\left((a+i)\left(a\,e^{i\sec^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}+\frac{i\,a}{2},1;\frac{3}{2}+\frac{i\,a}{2};-e^{2i\sec^{-1}(z)}\right)+(a-i)\,e^{a\sec^{-1}(z)}\,z\sinh\left(a\sec^{-1}(z)\right)\right)-\right.\right.$$
$$\left.\left.a\,(a-i)\,e^{(2a+i)\sec^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}-\frac{i\,a}{2},1;\frac{3}{2}-\frac{i\,a}{2};-e^{2i\sec^{-1}(z)}\right)\right)\right)$$

Arguments involving inverse hyperbolic functions

Involving $\sinh^{-1}$

01.19.21.0438.01

$$\int \sinh\left(\sinh^{-1}(z)\right) dz = \frac{z^2}{2}$$

01.19.21.0439.01

$$\int \sinh\left(a \sinh^{-1}(z)\right) dz = \frac{1}{2}\left(\frac{\cosh\left((a-1)\sinh^{-1}(z)\right)}{a-1}+\frac{\cosh\left((a+1)\sinh^{-1}(z)\right)}{a+1}\right)$$

Involving $\cosh^{-1}$

01.19.21.0440.01

$$\int \sinh\left(\cosh^{-1}(z)\right) dz = \frac{\sqrt{\frac{z-1}{z+1}}\left(\sqrt{z-1}\;z\,(z+1)-\sqrt{z+1}\;\log\left(z+\sqrt{z-1}\;\sqrt{z+1}\right)\right)}{2\sqrt{z-1}}$$

01.19.21.0441.01

$$\int \sinh\left(a \cosh^{-1}(z)\right) dz = \frac{1}{2}\left(\frac{\sinh\left((a+1)\cosh^{-1}(z)\right)}{a+1}+\frac{\sinh\left(\cosh^{-1}(z)-a\cosh^{-1}(z)\right)}{a-1}\right)$$

Involving $\tanh^{-1}$

01.19.21.0442.01

$$\int \sinh\left(\tanh^{-1}(z)\right) dz = -\sqrt{1-z^2}$$

01.19.21.0443.01

$$\int \sinh\left(a \tanh^{-1}(z)\right) dz = \frac{1}{2\,(a^2-4)} \left(e^{-a \tanh^{-1}(z)} \left((a-2)\left((a+2)\left(\left(-1+e^{2 a \tanh^{-1}(z)}\right) z + e^{2 a \tanh^{-1}(z)}\, {}_2F_1\left(\frac{a}{2}, 1; \frac{a}{2}+1; -e^{2 \tanh^{-1}(z)}\right) - {}_2F_1\left(-\frac{a}{2}, 1; 1-\frac{a}{2}; -e^{2 \tanh^{-1}(z)}\right)\right) - a\, e^{2 (a+1) \tanh^{-1}(z)}\, {}_2F_1\left(\frac{a}{2}+1, 1; \frac{a}{2}+2; -e^{2 \tanh^{-1}(z)}\right)\right) + a\,(a+2)\, e^{2 \tanh^{-1}(z)}\, {}_2F_1\left(1-\frac{a}{2}, 1; 2-\frac{a}{2}; -e^{2 \tanh^{-1}(z)}\right)\right)\right)$$

Involving $\coth^{-1}$

01.19.21.0444.01

$$\int \sinh\left(\coth^{-1}(z)\right) dz = \frac{\sqrt{1-\frac{1}{z^2}}\; z \log\left(z+\sqrt{z^2-1}\right)}{\sqrt{z^2-1}}$$

01.19.21.0445.01

$$\int \sinh\left(a \coth^{-1}(z)\right) dz = \frac{1}{2\,(a^2-4)} \left(e^{-a \coth^{-1}(z)} \left((a-2)\left((a+2)\left(\left(-1+e^{2 a \coth^{-1}(z)}\right) z + e^{2 a \coth^{-1}(z)}\, {}_2F_1\left(\frac{a}{2}, 1; \frac{a}{2}+1; e^{2 \coth^{-1}(z)}\right) - {}_2F_1\left(-\frac{a}{2}, 1; 1-\frac{a}{2}; e^{2 \coth^{-1}(z)}\right)\right) + a\, e^{2 (a+1) \coth^{-1}(z)}\, {}_2F_1\left(\frac{a}{2}+1, 1; \frac{a}{2}+2; e^{2 \coth^{-1}(z)}\right)\right) - a\,(a+2)\, e^{2 \coth^{-1}(z)}\, {}_2F_1\left(1-\frac{a}{2}, 1; 2-\frac{a}{2}; e^{2 \coth^{-1}(z)}\right)\right)\right)$$

Involving csch^{-1}

01.19.21.0446.01

$$\int \sinh\left(\operatorname{csch}^{-1}(z)\right) dz = \log(z)$$

01.19.21.0447.01

$$\int \sinh\left(a \operatorname{csch}^{-1}(z)\right) dz = \frac{1}{a^2-1} \left(e^{-a \operatorname{csch}^{-1}(z)} \left((a-1)\, e^{a \operatorname{csch}^{-1}(z)} \left(a\, e^{(a+1) \operatorname{csch}^{-1}(z)}\, {}_2F_1\left(\frac{a+1}{2}, 1; \frac{a+3}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right) + (a+1)\, z \sinh\left(a \operatorname{csch}^{-1}(z)\right)\right) - a\,(a+1)\, e^{\operatorname{csch}^{-1}(z)}\, {}_2F_1\left(\frac{1}{2}-\frac{a}{2}, 1; \frac{3}{2}-\frac{a}{2}; e^{2 \operatorname{csch}^{-1}(z)}\right)\right)\right)$$

Involving sech^{-1}

01.19.21.0448.01

$$\int \sinh\left(\operatorname{sech}^{-1}(z)\right) dz = \sqrt{\frac{1-z}{1+z}}\; \frac{\left(\sqrt{1-z}\,(z+1) + \log(z)\sqrt{z+1} - \log\left(\sqrt{1-z^2}+1\right)\sqrt{z+1}\right)}{\sqrt{1-z}}$$

01.19.21.0449.01

$$\int \sinh\left(a\,\text{sech}^{-1}(z)\right) dz = \frac{1}{a^2-1}\left(e^{-a\,\text{sech}^{-1}(z)}\left(a\,(a+1)\,e^{\text{sech}^{-1}(z)}\,{}_2F_1\left(\frac{1}{2}-\frac{a}{2},1;\frac{3}{2}-\frac{a}{2};-e^{2\,\text{sech}^{-1}(z)}\right)-\right.\right.$$
$$\left.\left.(a-1)\,e^{a\,\text{sech}^{-1}(z)}\left(a\,e^{(a+1)\,\text{sech}^{-1}(z)}\,{}_2F_1\left(\frac{a+1}{2},1;\frac{a+3}{2};-e^{2\,\text{sech}^{-1}(z)}\right)-(a+1)\,z\sinh\left(a\,\text{sech}^{-1}(z)\right)\right)\right)\right)$$

Arguments involving polynomials or algebraic functions and power factors

Involving power

Involving $z^n \sinh\left(c\,z^r + f\,z\right)$

01.19.21.0450.01

$$\int z^n \sinh\left(c\,z^2+f\,z\right) dz =$$
$$2^{-n-2}\,c^{-n-1}\,e^{-\frac{f^2}{4c}}\,(-f)^n\,(f+2\,c\,z)\left(e^{\frac{f^2}{2c}}\sum_{j=0}^{n}\left(\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\left(-\frac{4\,c\,z}{f}-2\right)^j\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(f+2\,c\,z)^2}{4\,c}\right)-\right.$$
$$\left.\sum_{j=0}^{n}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\left(-\frac{4\,c\,z}{f}-2\right)^j\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)/;\, n\in\mathbb{N}$$

01.19.21.0451.01

$$\int z^n \sinh\left(\sqrt{z}\,c+f\,z\right) dz = 4^{-n-1}\,c^{2n}\,e^{-\frac{c^2}{4f}}\,f^{-2(n+1)}$$
$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}4^j\left(-\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\left(-\frac{2\sqrt{z}\,f}{c}-1\right)^{h+j}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)+\right.\right.$$
$$\left.2\sqrt{-\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}}\,f\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)\right)-$$
$$e^{\frac{c^2}{2f}}\sum_{j=0}^{n}\sum_{h=0}^{j}4^j\left(\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\left(-\frac{2\sqrt{z}\,f}{c}-1\right)^{h+j}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)-\right.$$
$$\left.\left.2\,f\sqrt{\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(c+2\,f\sqrt{z}\right)^2}{4\,f}\right)\right)\right)/;\, n\in\mathbb{N}$$

Involving $z^n \sinh(c z^r + f z + g)$

01.19.21.0452.01

$$\int z^n \sinh(c z^2 + f z + g)\, dz = -2^{-n-2} c^{-n-1} e^{-\frac{f^2}{4c}-g} (-f)^n (f + 2 c z) \left(e^{2g} \sum_{j=0}^{n} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \left(-\frac{4cz}{f} - 2\right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right) - e^{\frac{f^2}{2c}} \sum_{j=0}^{n} \left(\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \left(-\frac{4cz}{f} - 2\right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(f+2cz)^2}{4c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0453.01

$$\int z^n \sinh(\sqrt{z}\, c + g + f z)\, dz = 4^{-n-1} c^{2n} e^{-\frac{c^2}{4f}-g} f^{-2(n+1)} \left(e^{2g} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(-\frac{(c+2f\sqrt{z})^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c} - 1\right)^{h+j} \binom{j}{h} \binom{n}{j} \left(c\,(c+2f\sqrt{z})\, \Gamma\left(\frac{1}{2}(h+j+1), -\frac{(c+2f\sqrt{z})^2}{4f}\right) + 2\sqrt{-\frac{(c+2f\sqrt{z})^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{(c+2f\sqrt{z})^2}{4f}\right)\right) - e^{\frac{c^2}{2f}} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j \left(\frac{(c+2f\sqrt{z})^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c} - 1\right)^{h+j} \binom{j}{h} \binom{n}{j} \left(c\,(c+2f\sqrt{z})\, \Gamma\left(\frac{1}{2}(h+j+1), \frac{(c+2f\sqrt{z})^2}{4f}\right) - 2f\sqrt{\frac{(c+2f\sqrt{z})^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{(c+2f\sqrt{z})^2}{4f}\right)\right)\right) /; n \in \mathbb{N}$$

Arguments involving polynomials or algebraic functions and factors involving exponential functions

Involving exp

Involving $a^{d z} \sinh(c z^r + f z)$

01.19.21.0454.01

$$\int a^{d z} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4 c}\left(a^{-\frac{d f}{2 c}} e^{-\frac{f^2+d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{f^2+d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{-f - 2 c z + d \log(a)}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{f + 2 c z + d \log(a)}{2 \sqrt{c}}\right)\right)\right)$$

01.19.21.0455.01

$$\int e^{d z} \sinh\left(c z^2 + f z\right) dz = \frac{e^{-\frac{d^2+2 f d+f^2}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2+f^2}{2 c}} \operatorname{erfi}\left(\frac{d-f-2 c z}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d+f+2 c z}{2 \sqrt{c}}\right)\right)}{4 c}$$

01.19.21.0456.01

$$\int a^{d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4}\left(2 e^{-f z-c \sqrt{z}} \left(\frac{1}{f - d \log(a)} + \frac{e^{2 \sqrt{z}\, c+2 f z}}{f + d \log(a)}\right) a^{d z} - \frac{c\, e^{\frac{c^2}{4 f-4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c-2 \sqrt{z}\, (f-d \log(a))}{2 \sqrt{d \log(a)-f}}\right)}{(d \log(a) - f)^{3/2}} - \frac{c\, e^{-\frac{c^2}{4 (f+d \log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 \sqrt{z}\, (f+d \log(a))}{2 \sqrt{f+d \log(a)}}\right)}{(f + d \log(a))^{3/2}}\right)$$

01.19.21.0457.01

$$\int e^{d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4}\left(-\frac{c\, e^{\frac{c^2}{4 f-4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 (d-f) \sqrt{z} - c}{2 \sqrt{d-f}}\right)}{(d - f)^{3/2}} + \frac{2 e^{d z-f z-c \sqrt{z}}}{f - d} + \frac{2 e^{\sqrt{z}\, c+(d+f) z}}{d + f} - \frac{c\, e^{-\frac{c^2}{4 (d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2 (d+f) \sqrt{z}}{2 \sqrt{d+f}}\right)}{(d + f)^{3/2}}\right)$$

Involving $a^{d z+e} \sinh\left(c z^r + f z\right)$

01.19.21.0458.01

$$\int a^{e+d z} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4 c}\left(a^{e-\frac{d f}{2 c}} e^{-\frac{f^2+d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{f^2+d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{-f - 2 c z + d \log(a)}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{f + 2 c z + d \log(a)}{2 \sqrt{c}}\right)\right)\right)$$

01.19.21.0459.01

$$\int e^{e+d z} \sinh\left(c z^2 + f z\right) dz = \frac{e^{-\frac{d^2+2 f d+f^2-4 c e}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2+f^2}{2 c}} \operatorname{erfi}\left(\frac{d-f-2 c z}{2 \sqrt{-c}}\right) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d+f+2 c z}{2 \sqrt{c}}\right)\right)}{4 c}$$

01.19.21.0460.01

$$\int a^{e+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} a^e \left(2 e^{-f z - c\sqrt{z}} \left(\frac{1}{f - d\log(a)} + \frac{e^{2\sqrt{z}\, c + 2 f z}}{f + d\log(a)}\right) a^{d z} - \frac{c\, e^{\frac{c^2}{4 f - 4 d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c - 2\sqrt{z}\, (f - d\log(a))}{2\sqrt{d\log(a) - f}}\right)}{(d\log(a) - f)^{3/2}} - \frac{c\, e^{-\frac{c^2}{4(f + d\log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2\sqrt{z}\, (f + d\log(a))}{2\sqrt{f + d\log(a)}}\right)}{(f + d\log(a))^{3/2}}\right)$$

01.19.21.0461.01

$$\int e^{e+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} e^e \left(-\frac{c\, e^{\frac{c^2}{4 f - 4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2(d-f)\sqrt{z} - c}{2\sqrt{d-f}}\right)}{(d-f)^{3/2}} + \frac{2 e^{d z - f z - c\sqrt{z}}}{f - d} + \frac{2 e^{\sqrt{z}\, c + (d+f) z}}{d + f} - \frac{c\, e^{-\frac{c^2}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{(d+f)^{3/2}}\right)$$

Involving $a^{b z^r} \sinh\left(c z^r + f z\right)$

01.19.21.0462.01

$$\int a^{b z^2} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 - b^2 \log^2(a)\right)} \left(a^{\frac{b f^2}{2 c^2 - 2 b^2 \log^2(a)}} \sqrt{\pi} \left(e^{\frac{f^2}{4 c + 4 b\log(a)}} \operatorname{erfi}\left(\frac{-f - 2 c z + 2 b z\log(a)}{2\sqrt{b\log(a) - c}}\right) \sqrt{b\log(a) - c}\, (c + b\log(a)) + e^{\frac{f^2}{4 b\log(a) - 4 c}} \operatorname{erfi}\left(\frac{f + 2 c z + 2 b z\log(a)}{2\sqrt{c + b\log(a)}}\right) (c - b\log(a)) \sqrt{c + b\log(a)}\right)\right)$$

01.19.21.0463.01

$$\int e^{b z^2} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4(b-c)(b+c)} \left(e^{-\frac{(2b+c) f^2}{4\left(b^2 - c^2\right)}} \sqrt{\pi} \left((b-c)\sqrt{b+c}\, e^{\frac{(b+2c) f^2}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{f + 2(b+c) z}{2\sqrt{b+c}}\right) - \sqrt{b-c}\, (b+c)\, e^{\frac{b f^2}{4 b^2 - 4 c^2}} \operatorname{erfi}\left(\frac{-f + 2 b z - 2 c z}{2\sqrt{b-c}}\right)\right)\right)$$

01.19.21.0464.01

$$\int a^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{\cosh\left(\sqrt{z}\, c + f z\right) a^{\sqrt{z}\, b}}{f} + \frac{e^{\frac{c^2 - 2 b\log(a) c + b^2\log^2(a)}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c + b\log(a) - 2 f\sqrt{z}}{2\sqrt{-f}}\right) (b\log(a) - c)}{4(-f)^{3/2}} - \frac{e^{-\frac{c^2 + 2 b\log(a) c + b^2\log^2(a)}{4 f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + b\log(a) + 2 f\sqrt{z}}{2\sqrt{f}}\right) (c + b\log(a))}{4 f^{3/2}}$$

01.19.21.0465.01

$$\int e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{e^{\sqrt{z}\, b} \cosh\left(\sqrt{z}\, c + f\, z\right)}{f} + \frac{(b-c)\, e^{\frac{b^2-2cb+c^2}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c-2f\sqrt{z}}{2\sqrt{-f}}\right)}{4(-f)^{3/2}} - \frac{(b+c)\, e^{-\frac{b^2+2cb+c^2}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2f\sqrt{z}}{2\sqrt{f}}\right)}{4 f^{3/2}}$$

Involving $a^{b z^r + e} \sinh(c z^r + f z)$

01.19.21.0466.01

$$\int a^{b z^2+e} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 - b^2 \log^2(a)\right)} \left(a^{\frac{b f^2}{2c^2-2b^2\log^2(a)}+e} \sqrt{\pi} \left(e^{\frac{f^2}{4c+4b\log(a)}} \operatorname{erfi}\left(\frac{-f - 2cz + 2bz\log(a)}{2\sqrt{b\log(a)-c}}\right) \sqrt{b\log(a)-c}\, (c + b\log(a)) + e^{\frac{f^2}{4b\log(a)-4c}} \operatorname{erfi}\left(\frac{f + 2cz + 2bz\log(a)}{2\sqrt{c+b\log(a)}}\right) (c - b\log(a)) \sqrt{c + b\log(a)}\right)\right)$$

01.19.21.0467.01

$$\int e^{b z^2+e} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4(b-c)(b+c)} \left(e^{-\frac{-4eb^2+2f^2b+c\left(f^2+4ce\right)}{4\left(b^2-c^2\right)}} \sqrt{\pi} \left((b-c)\sqrt{b+c}\; e^{\frac{(b+2c)f^2}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{f + 2(b+c)z}{2\sqrt{b+c}}\right) - \sqrt{b-c}\; (b+c)\, e^{\frac{b f^2}{4b^2-4c^2}} \operatorname{erfi}\left(\frac{-f + 2bz - 2cz}{2\sqrt{b-c}}\right)\right)\right)$$

01.19.21.0468.01

$$\int a^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{\cosh\left(\sqrt{z}\, c + f z\right) a^{\sqrt{z}\, b+e}}{f} + \frac{e^{\frac{c^2-2b\log(a)c+b^2\log^2(a)+4ef\log(a)}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+b\log(a)-2f\sqrt{z}}{2\sqrt{-f}}\right)(b\log(a)-c)}{4(-f)^{3/2}} - \frac{e^{-\frac{c^2+2b\log(a)c+b^2\log^2(a)-4ef\log(a)}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+b\log(a)+2f\sqrt{z}}{2\sqrt{f}}\right)(c + b\log(a))}{4 f^{3/2}}$$

01.19.21.0469.01

$$\int e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{e^{\sqrt{z}\, b+e} \cosh\left(\sqrt{z}\, c + f\, z\right)}{f} + \frac{(b-c)\, e^{\frac{b^2-2cb+c^2+4ef}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c-2f\sqrt{z}}{2\sqrt{-f}}\right)}{4(-f)^{3/2}} - \frac{(b+c)\, e^{-\frac{b^2+2cb+c^2-4ef}{4f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2f\sqrt{z}}{2\sqrt{f}}\right)}{4 f^{3/2}}$$

Involving $a^{b z^r + d z} \sinh(c z^r + f z)$

01.19.21.0470.01

$$\int a^{b z^2+d z} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 - b^2 \log^2(a)\right)} \left(a^{\frac{b d^2 \log^2(a)+b d f \log(a)+f (b f-c d)}{2\left(c^2-b^2 \log^2(a)\right)}} \sqrt{\pi} \left(e^{\frac{f^2+d^2 \log^2(a)}{4 c+4 b \log(a)}} \operatorname{erfi}\left(\frac{-f-2 c z+(d+2 b z) \log(a)}{2 \sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\, (c+b \log(a))\, a^{\frac{b d f \log(a)}{b^2 \log^2(a)-c^2}} + e^{\frac{f^2+d^2 \log^2(a)}{4 b \log(a)-4 c}} \operatorname{erfi}\left(\frac{f+2 c z+(d+2 b z) \log(a)}{2 \sqrt{c+b \log(a)}}\right) \sqrt{c+b \log(a)}\, (c-b \log(a)) \right) \right)$$

01.19.21.0471.01

$$\int e^{b z^2+d z} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4 (b-c) (b+c)} \left(e^{-\frac{c (d-f)^2+2 b\left(d^2+f d+f^2\right)}{4\left(b^2-c^2\right)}} \sqrt{\pi} \left((b-c) \sqrt{b+c}\, e^{\frac{(b+2 c)\left(d^2+f^2\right)}{4 (b-c) (b+c)}} \operatorname{erfi}\left(\frac{d+f+2 (b+c) z}{2 \sqrt{b+c}}\right) - \sqrt{b-c}\, (b+c)\, e^{\frac{b\left(d^2+4 f d+f^2\right)}{4 (b-c) (b+c)}} \operatorname{erfi}\left(\frac{d-f+2 b z-2 c z}{2 \sqrt{b-c}}\right) \right) \right)$$

01.19.21.0472.01

$$\int a^{\sqrt{z}\, b+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} \left(2 e^{-f z-c \sqrt{z}} \left(\frac{1}{f-d \log(a)} + \frac{e^{2 \sqrt{z}\, c+2 f z}}{f+d \log(a)}\right) a^{\sqrt{z}\, b+d z} - \frac{e^{-\frac{(c-b \log(a))^2}{4 d \log(a)-4 f}} \sqrt{\pi} \operatorname{erfi}\left(\frac{-c+b \log(a)-2 \sqrt{z}\, (f-d \log(a))}{2 \sqrt{d \log(a)-f}}\right) (c-b \log(a))}{(d \log(a)-f)^{3/2}} - \frac{e^{-\frac{(c+b \log(a))^2}{4 (f+d \log(a))}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+b \log(a)+2 \sqrt{z}\, (f+d \log(a))}{2 \sqrt{f+d \log(a)}}\right) (c+b \log(a))}{(f+d \log(a))^{3/2}} \right)$$

01.19.21.0473.01

$$\int e^{\sqrt{z}\, b+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} \left(\frac{(b-c)\, e^{-\frac{(b-c)^2}{4 (d-f)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-c+2 (d-f) \sqrt{z}}{2 \sqrt{d-f}}\right)}{(d-f)^{3/2}} - \frac{2 e^{\sqrt{z}\, (b-c)+(d-f) z}}{d-f} + \frac{2 e^{\sqrt{z}\, (b+c)+(d+f) z}}{d+f} - \frac{(b+c)\, e^{-\frac{(b+c)^2}{4 (d+f)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+c+2 (d+f) \sqrt{z}}{2 \sqrt{d+f}}\right)}{(d+f)^{3/2}} \right)$$

Involving $a^{b z^r+d z+e} \sinh\left(c z^r + f z\right)$

01.19.21.0474.01

$$\int a^{b z^2+d z+e} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4\left(c^2 - b^2 \log^2(a)\right)} \left(a^{e-\frac{d f}{2(c+b\log(a))}+\frac{b\left(f^2+d^2\log^2(a)\right)}{2\left(c^2-b^2\log^2(a)\right)}} \sqrt{\pi} \left(e^{\frac{f^2+d^2\log^2(a)}{4c+4b\log(a)}} \operatorname{erfi}\left(\frac{-f-2cz+(d+2bz)\log(a)}{2\sqrt{b\log(a)-c}}\right) \sqrt{b\log(a)-c}\,(c+b\log(a))\, a^{\frac{b d f \log(a)}{b^2\log^2(a)-c^2}} + e^{\frac{f^2+d^2\log^2(a)}{4b\log(a)-4c}} \operatorname{erfi}\left(\frac{f+2cz+(d+2bz)\log(a)}{2\sqrt{c+b\log(a)}}\right) \sqrt{c+b\log(a)}\,(c-b\log(a))\right)\right)$$

01.19.21.0475.01

$$\int e^{b z^2+d z+e} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4(b-c)(b+c)} \left(e^{-\frac{-4eb^2+2\left(d^2+fd+f^2\right)b+c\left(d^2-2fd+f^2+4ce\right)}{4\left(b^2-c^2\right)}} \sqrt{\pi} \left((b-c)\sqrt{b+c}\; e^{\frac{(b+2c)\left(d^2+f^2\right)}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{d+f+2(b+c)z}{2\sqrt{b+c}}\right) - \sqrt{b-c}\,(b+c)\, e^{\frac{b\left(d^2+4fd+f^2\right)}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{d-f+2bz-2cz}{2\sqrt{b-c}}\right)\right)\right)$$

01.19.21.0476.01

$$\int a^{\sqrt{z}\, b+e+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{1}{4} a^e \left(2 a^{\sqrt{z}\, b+d z} e^{-f z-c\sqrt{z}} \left(\frac{1}{f-d\log(a)} + \frac{e^{2\sqrt{z}\, c+2 f z}}{f+d\log(a)}\right) - \frac{a^{-\frac{b c}{2(f+d\log(a))}} e^{-\frac{c^2+b^2\log^2(a)}{4(f+d\log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+b\log(a)+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}}\right)(c+b\log(a))}{(f+d\log(a))^{3/2}}\right) - \frac{a^{\frac{b c}{2d\log(a)-2f}+e} e^{\frac{c^2+b^2\log^2(a)}{4f-4d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+b\log(a)-2\sqrt{z}\,(f-d\log(a))}{2\sqrt{d\log(a)-f}}\right)(c-b\log(a))}{4(d\log(a)-f)^{3/2}}$$

01.19.21.0477.01

$$\int e^{\sqrt{z}\, b+e+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = \frac{(b-c)\, e^{\frac{b^2-2cb+c^2-4de+4ef}{4f-4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c+2(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{4(d-f)^{3/2}} - \frac{e^{\sqrt{z}\,(b-c)+e+(d-f)z}}{2(d-f)} + \frac{e^{\sqrt{z}\,(b+c)+e+(d+f)z}}{2(d+f)} - \frac{(b+c)\, e^{-\frac{b^2+2cb+c^2-4e(d+f)}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{4(d+f)^{3/2}}$$

Involving $a^{d z} \sinh\left(c z^r + f z + g\right)$

01.19.21.0478.01

$$\int a^{d z} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4 c}\left(a^{-\frac{d f}{2 c}} e^{-\frac{f^2+d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{f^2+d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{-f - 2 c z + d \log(a)}{2 \sqrt{-c}}\right)(\cosh(g) - \sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{f + 2 c z + d \log(a)}{2 \sqrt{c}}\right)(\cosh(g) + \sinh(g))\right)\right)$$

01.19.21.0479.01

$$\int e^{d z} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4 c}\left(e^{-\frac{d^2+2 f d+f^2}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2+f^2}{2 c}} \operatorname{erfi}\left(\frac{d - f - 2 c z}{2 \sqrt{-c}}\right)(\cosh(g) - \sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d + f + 2 c z}{2 \sqrt{c}}\right)(\cosh(g) + \sinh(g))\right)\right)$$

01.19.21.0480.01

$$\int a^{d z} \sinh\left(\sqrt{z}\, c + g + f z\right) dz = \frac{1}{4} e^{-g}\left(2 e^{-f z - c \sqrt{z}}\left(\frac{1}{f - d \log(a)} + \frac{e^{2\left(\sqrt{z}\, c + g + f z\right)}}{f + d \log(a)}\right) a^{d z} - \frac{c\, e^{\frac{c^2}{4 f - 4 d \log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c - 2 \sqrt{z}\, (f - d \log(a))}{2 \sqrt{d \log(a) - f}}\right)}{(d \log(a) - f)^{3/2}} - \frac{c\, e^{2 g - \frac{c^2}{4 (f + d \log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2 \sqrt{z}\, (f + d \log(a))}{2 \sqrt{f + d \log(a)}}\right)}{(f + d \log(a))^{3/2}}\right)$$

01.19.21.0481.01

$$\int e^{d z} \sinh\left(\sqrt{z}\, c + g + f z\right) dz = \frac{1}{4} e^{-g}\left(-\frac{c\, e^{\frac{c^2}{4 f - 4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 (d - f) \sqrt{z} - c}{2 \sqrt{d - f}}\right)}{(d - f)^{3/2}} + \frac{2 e^{d z - f z - c \sqrt{z}}}{f - d} + \frac{2 e^{\sqrt{z}\, c + 2 g + (d + f) z}}{d + f} - \frac{c\, e^{2 g - \frac{c^2}{4 (d + f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2 (d + f) \sqrt{z}}{2 \sqrt{d + f}}\right)}{(d + f)^{3/2}}\right)$$

Involving $a^{d z+e} \sinh\left(c z^r + f z + g\right)$

01.19.21.0482.01

$$\int a^{e+d z} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4 c}\left(a^{e - \frac{d f}{2 c}} e^{-\frac{f^2+d^2 \log^2(a)}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{f^2+d^2 \log^2(a)}{2 c}} \operatorname{erfi}\left(\frac{-f - 2 c z + d \log(a)}{2 \sqrt{-c}}\right)(\cosh(g) - \sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{f + 2 c z + d \log(a)}{2 \sqrt{c}}\right)(\cosh(g) + \sinh(g))\right)\right)$$

01.19.21.0483.01

$$\int e^{e+d z} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4 c}\left(e^{-\frac{d^2+2 f d+f^2-4 c e}{4 c}} \sqrt{\pi} \left(\sqrt{-c}\, e^{\frac{d^2+f^2}{2 c}} \operatorname{erfi}\left(\frac{d - f - 2 c z}{2 \sqrt{-c}}\right)(\cosh(g) - \sinh(g)) + \sqrt{c}\, \operatorname{erfi}\left(\frac{d + f + 2 c z}{2 \sqrt{c}}\right)(\cosh(g) + \sinh(g))\right)\right)$$

01.19.21.0484.01

$$\int a^{e+d z} \sinh\left(\sqrt{z}\, c+g+f z\right) dz = \frac{1}{4} a^e e^{-g} \left(2 e^{-f z-c\sqrt{z}} \left(\frac{1}{f-d\log(a)}+\frac{e^{2\left(\sqrt{z}\, c+g+f z\right)}}{f+d\log(a)}\right) a^{d z} - \frac{c\, e^{\frac{c^2}{4 f-4 d\log(a)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c-2\sqrt{z}\,(f-d\log(a))}{2\sqrt{d\log(a)-f}}\right)}{(d\log(a)-f)^{3/2}} - \frac{c\, e^{2 g-\frac{c^2}{4(f+d\log(a))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}}\right)}{(f+d\log(a))^{3/2}}\right)$$

01.19.21.0485.01

$$\int e^{e+d z} \sinh\left(\sqrt{z}\, c+g+f z\right) dz = \frac{1}{4} e^{e-g} \left(-\frac{c\, e^{\frac{c^2}{4 f-4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2(d-f)\sqrt{z}-c}{2\sqrt{d-f}}\right)}{(d-f)^{3/2}} + \frac{2 e^{d z-f z-c\sqrt{z}}}{f-d} + \frac{2 e^{\sqrt{z}\, c+2 g+(d+f) z}}{d+f} - \frac{c\, e^{2 g-\frac{c^2}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{(d+f)^{3/2}}\right)$$

Involving $a^{b z^r} \sinh\left(c z^r + f z + g\right)$

01.19.21.0486.01

$$\int a^{b z^2} \sinh\left(c z^2+f z+g\right) dz = \frac{1}{4\left(c^2-b^2\log^2(a)\right)} \left(a^{\frac{b f^2}{2\left(c^2-b^2\log^2(a)\right)}} \sqrt{\pi} \left(e^{\frac{f^2}{4 c+4 b\log(a)}} \operatorname{erfi}\left(\frac{-f-2 c z+2 b z\log(a)}{2\sqrt{b\log(a)-c}}\right) \sqrt{b\log(a)-c}\, (c+b\log(a))(\cosh(g)-\sinh(g)) + e^{\frac{f^2}{4 b\log(a)-4 c}} \operatorname{erfi}\left(\frac{f+2 c z+2 b z\log(a)}{2\sqrt{c+b\log(a)}}\right) \sqrt{c+b\log(a)}\, (c-b\log(a))(\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0487.01

$$\int e^{b z^2} \sinh\left(c z^2+f z+g\right) dz = \frac{1}{4(b-c)(b+c)} \left(e^{-\frac{2 b f^2+c f^2}{4\left(b^2-c^2\right)}} \sqrt{\pi} \left((b-c)\sqrt{b+c}\, e^{\frac{(b+2 c) f^2}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{f+2(b+c) z}{2\sqrt{b+c}}\right)(\cosh(g)+\sinh(g)) - \sqrt{b-c}\,(b+c)\, e^{\frac{b f^2}{4(b-c)(b+c)}} \operatorname{erfi}\left(\frac{-f+2 b z-2 c z}{2\sqrt{b-c}}\right)(\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0488.01

$$\int a^{b\sqrt{z}}\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{\cosh\left(\sqrt{z}\,c+g+f\,z\right)a^{b\sqrt{z}}}{f}+\frac{e^{\frac{c^2-2\,b\log(a)\,c+b^2\log^2(a)-4\,f\,g}{4\,f}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+b\log(a)-2\,f\sqrt{z}}{2\sqrt{-f}}\right)(b\log(a)-c)}{4\,(-f)^{3/2}}-\frac{e^{-\frac{c^2+2\,b\log(a)\,c+b^2\log^2(a)-4\,f\,g}{4\,f}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{c+b\log(a)+2\,f\sqrt{z}}{2\sqrt{f}}\right)(c+b\log(a))}{4\,f^{3/2}}$$

01.19.21.0489.01

$$\int e^{b\sqrt{z}}\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{e^{b\sqrt{z}}\cosh\left(\sqrt{z}\,c+g+f\,z\right)}{f}+\frac{(b-c)\,e^{\frac{b^2-2\,c\,b+c^2-4\,f\,g}{4\,f}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-c-2\,f\sqrt{z}}{2\sqrt{-f}}\right)}{4\,(-f)^{3/2}}-\frac{(b+c)\,e^{-\frac{b^2+2\,c\,b+c^2-4\,f\,g}{4\,f}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+c+2\,f\sqrt{z}}{2\sqrt{f}}\right)}{4\,f^{3/2}}$$

Involving $a^{b\,z^r+e}\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0490.01

$$\int a^{b\,z^2+e}\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{4\left(c^2-b^2\log^2(a)\right)}\left(a^{\frac{b\,f^2}{2\left(c^2-b^2\log^2(a)\right)}+e}\sqrt{\pi}\left(e^{\frac{f^2}{4\,c+4\,b\log(a)}}\operatorname{erfi}\left(\frac{-f-2\,c\,z+2\,b\,z\log(a)}{2\sqrt{b\log(a)-c}}\right)\sqrt{b\log(a)-c}\,(c+b\log(a))(\cosh(g)-\sinh(g))+e^{\frac{f^2}{4\,b\log(a)-4\,c}}\operatorname{erfi}\left(\frac{f+2\,c\,z+2\,b\,z\log(a)}{2\sqrt{c+b\log(a)}}\right)\sqrt{c+b\log(a)}\,(c-b\log(a))(\cosh(g)+\sinh(g))\right)\right)$$

01.19.21.0491.01

$$\int e^{b\,z^2+e}\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{4\,(b-c)(b+c)}\left(e^{-\frac{-4\,e\,b^2+2\,f^2\,b+c\left(f^2+4\,c\,e\right)}{4\left(b^2-c^2\right)}}\sqrt{\pi}\left((b-c)\sqrt{b+c}\,e^{\frac{(b+2\,c)\,f^2}{4\,(b-c)(b+c)}}\operatorname{erfi}\left(\frac{f+2\,(b+c)\,z}{2\sqrt{b+c}}\right)(\cosh(g)+\sinh(g))-\sqrt{b-c}\,(b+c)\,e^{\frac{b\,f^2}{4\,(b-c)(b+c)}}\operatorname{erfi}\left(\frac{-f+2\,b\,z-2\,c\,z}{2\sqrt{b-c}}\right)(\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0492.01

$$\int a^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = \frac{a^{\sqrt{z}\, b+e} \cosh\left(\sqrt{z}\, c+g+f\, z\right)}{f} + \frac{e^{\frac{c^2-2\, b \log(a)\, c+b^2 \log^2(a)+4\, f\, (e \log(a)-g)}{4\, f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+b \log(a)-2\, f \sqrt{z}}{2 \sqrt{-f}}\right) (b \log(a)-c)}{4\, (-f)^{3/2}} - \frac{e^{-\frac{c^2+2\, b \log(a)\, c+b^2 \log^2(a)-4\, f\, (g+e \log(a))}{4\, f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+b \log(a)+2\, f \sqrt{z}}{2 \sqrt{f}}\right) (c+b \log(a))}{4\, f^{3/2}}$$

01.19.21.0493.01

$$\int e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = \frac{e^{\sqrt{z}\, b+e} \cosh\left(\sqrt{z}\, c+g+f\, z\right)}{f} + \frac{(b-c)\, e^{\frac{b^2-2\, c\, b+c^2+4\, f\, (e-g)}{4\, f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c-2\, f \sqrt{z}}{2 \sqrt{-f}}\right)}{4\, (-f)^{3/2}} - \frac{(b+c)\, e^{-\frac{b^2+2\, c\, b+c^2-4\, f\, (e+g)}{4\, f}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2\, f \sqrt{z}}{2 \sqrt{f}}\right)}{4\, f^{3/2}}$$

Involving $a^{b\, z^r+d\, z} \sinh\left(c\, z^r+f\, z+g\right)$

01.19.21.0494.01

$$\int a^{b\, z^2+d\, z} \sinh\left(c\, z^2+f\, z+g\right) dz = \frac{\sqrt{\pi}}{4\left(c^2-b^2 \log^2(a)\right)}\, a^{-\frac{d\, f}{2\, (c+b \log(a))}+\frac{b\left(f^2+d^2 \log^2(a)\right)}{2\left(c^2-b^2 \log^2(a)\right)}} \left(e^{\frac{f^2+d^2 \log^2(a)}{4\, c+4\, b \log(a)}} \operatorname{erfi}\left(\frac{-f-2\, c\, z+(d+2\, b\, z) \log(a)}{2 \sqrt{b \log(a)-c}}\right) \sqrt{b \log(a)-c}\, (c+b \log(a))\, (\cosh(g)-\sinh(g))\, a^{\frac{b\, d\, f \log(a)}{b^2 \log^2(a)-c^2}} + e^{\frac{f^2+d^2 \log^2(a)}{4\, b \log(a)-4\, c}} \operatorname{erfi}\left(\frac{f+2\, c\, z+(d+2\, b\, z) \log(a)}{2 \sqrt{c+b \log(a)}}\right) \sqrt{c+b \log(a)}\, (c-b \log(a))\, (\cosh(g)+\sinh(g))\right)$$

01.19.21.0495.01

$$\int e^{b\, z^2+d\, z} \sinh\left(c\, z^2+f\, z+g\right) dz = \frac{1}{4\, (b-c)\, (b+c)} \left(e^{-\frac{2\, b\left(d^2+f\, d+f^2\right)+c\left(d^2-2\, f\, d+f^2\right)}{4\left(b^2-c^2\right)}} \sqrt{\pi} \left((b-c) \sqrt{b+c}\, e^{\frac{(b+2\, c)\left(d^2+f^2\right)}{4\, (b-c)\, (b+c)}} \operatorname{erfi}\left(\frac{d+f+2\, (b+c)\, z}{2 \sqrt{b+c}}\right) (\cosh(g)+\sinh(g)) - \sqrt{b-c}\, (b+c)\, e^{\frac{b\left(d^2+4\, f\, d+f^2\right)}{4\, (b-c)\, (b+c)}} \operatorname{erfi}\left(\frac{d-f+2\, b\, z-2\, c\, z}{2 \sqrt{b-c}}\right) (\cosh(g)-\sinh(g))\right)\right)$$

01.19.21.0496.01

$$\int a^{\sqrt{z}\, b+d\, z} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = -\frac{e^{-\sqrt{z}\, c-g-f\, z}\, a^{\sqrt{z}\, b+d\, z}}{2\,(d\log(a)-f)} + \frac{e^{\sqrt{z}\, c+g+f\, z}\, a^{\sqrt{z}\, b+d\, z}}{2\,(f+d\log(a))} + \frac{e^{-\frac{c^2-2\, b\log(a)\, c+b^2\log^2(a)+4\, g\,(d\log(a)-f)}{4\,(d\log(a)-f)}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{-c+b\log(a)+2\sqrt{z}\,(d\log(a)-f)}{2\sqrt{d\log(a)-f}}\right)(b\log(a)-c)}{4\,(d\log(a)-f)^{3/2}} - \frac{e^{-\frac{c^2+2\, b\log(a)\, c+b^2\log^2(a)-4\, g\,(f+d\log(a))}{4\,(f+d\log(a))}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{c+b\log(a)+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}}\right)(c+b\log(a))}{4\,(f+d\log(a))^{3/2}}$$

01.19.21.0497.01

$$\int e^{\sqrt{z}\, b+d\, z} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = \frac{(b-c)\, e^{-\frac{b^2-2\, c\, b+c^2+4\,(d-f)\, g}{4\,(d-f)}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b-c+2\,(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{4\,(d-f)^{3/2}} - \frac{e^{\sqrt{z}\,(b-c)-g+(d-f)\, z}}{2\,(d-f)} + \frac{e^{\sqrt{z}\,(b+c)+g+(d+f)\, z}}{2\,(d+f)} - \frac{(b+c)\, e^{-\frac{b^2+2\, c\, b+c^2-4\,(d+f)\, g}{4\,(d+f)}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+c+2\,(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{4\,(d+f)^{3/2}}$$

Involving $a^{b\, z^r+d\, z+e} \sinh\left(c\, z^r+f\, z+g\right)$

01.19.21.0498.01

$$\int a^{b\, z^2+d\, z+e} \sinh\left(c\, z^2+f\, z+g\right) dz = \frac{\sqrt{\pi}}{4\left(c^2-b^2\log^2(a)\right)}\, a^{e-\frac{d\, f}{2\,(c+b\log(a))}+\frac{b\left(f^2+d^2\log^2(a)\right)}{2\left(c^2-b^2\log^2(a)\right)}} \left(e^{\frac{f^2+d^2\log^2(a)}{4\, c+4\, b\log(a)}}\, \mathrm{erfi}\left(\frac{-f-2\, c\, z+(d+2\, b\, z)\log(a)}{2\sqrt{b\log(a)-c}}\right)\sqrt{b\log(a)-c}\;(c+b\log(a))\,(\cosh(g)-\sinh(g))\, a^{\frac{b\, d\, f\log(a)}{b^2\log^2(a)-c^2}} + e^{\frac{f^2+d^2\log^2(a)}{4\, b\log(a)-4\, c}}\, \mathrm{erfi}\left(\frac{f+2\, c\, z+(d+2\, b\, z)\log(a)}{2\sqrt{c+b\log(a)}}\right)\sqrt{c+b\log(a)}\;(c-b\log(a))\,(\cosh(g)+\sinh(g))\right)$$

01.19.21.0499.01

$$\int e^{b\, z^2+d\, z+e} \sinh\left(c\, z^2+f\, z+g\right) dz = \frac{\sqrt{\pi}}{4\,(b-c)\,(b+c)}\, e^{-\frac{-4\, e\, b^2+2\left(d^2+f\, d+f^2\right) b+c\left(d^2-2\, f\, d+f^2+4\, c\, e\right)}{4\left(b^2-c^2\right)}} \left((b-c)\sqrt{b+c}\; e^{\frac{(b+2\, c)\left(d^2+f^2\right)}{4\,(b-c)\,(b+c)}}\, \mathrm{erfi}\left(\frac{d+f+2\,(b+c)\, z}{2\sqrt{b+c}}\right)(\cosh(g)+\sinh(g)) - \sqrt{b-c}\;(b+c)\, e^{\frac{b\left(d^2+4\, f\, d+f^2\right)}{4\,(b-c)\,(b+c)}}\, \mathrm{erfi}\left(\frac{d-f+2\, b\, z-2\, c\, z}{2\sqrt{b-c}}\right)(\cosh(g)-\sinh(g))\right)$$

01.19.21.0500.01

$$\int a^{\sqrt{z}\, b+d\,z+e}\sinh\left(\sqrt{z}\, c+f\,z+g\right)dz = -\frac{e^{-\sqrt{z}\, c-g-f\,z}\,a^{\sqrt{z}\, b+e+d\,z}}{2\,(d\log(a)-f)}+\frac{e^{\sqrt{z}\, c+g+f\,z}\,a^{\sqrt{z}\, b+e+d\,z}}{2\,(f+d\log(a))}+\frac{\sqrt{\pi}\,(b\log(a)-c)}{4\,(d\log(a)-f)^{3/2}}\,e^{-\frac{c^2-2\,b\log(a)\,c+b^2\log^2(a)-4\,(d\log(a)-f)\,(e\log(a)-g)}{4\,(d\log(a)-f)}}\operatorname{erfi}\left(\frac{-c+b\log(a)+2\sqrt{z}\,(d\log(a)-f)}{2\sqrt{d\log(a)-f}}\right)-\frac{\sqrt{\pi}\,(c+b\log(a))}{4\,(f+d\log(a))^{3/2}}\,e^{-\frac{c^2+2\,b\log(a)\,c+b^2\log^2(a)-4\,(f+d\log(a))\,(g+e\log(a))}{4\,(f+d\log(a))}}\operatorname{erfi}\left(\frac{c+b\log(a)+2\sqrt{z}\,(f+d\log(a))}{2\sqrt{f+d\log(a)}}\right)$$

01.19.21.0501.01

$$\int e^{\sqrt{z}\, b+d\,z+e}\sinh\left(\sqrt{z}\, c+f\,z+g\right)dz = \frac{(b-c)\sqrt{\pi}\;e^{-\frac{b^2-2\,c\,b+c^2-4\,(d-f)\,(e-g)}{4\,(d-f)}}\operatorname{erfi}\left(\frac{b-c+2\,(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{4\,(d-f)^{3/2}}-\frac{e^{\sqrt{z}\,(b-c)+e-g+(d-f)\,z}}{2\,(d-f)}+\frac{e^{\sqrt{z}\,(b+c)+e+g+(d+f)\,z}}{2\,(d+f)}-\frac{(b+c)\sqrt{\pi}\;e^{-\frac{b^2+2\,c\,b+c^2-4\,(d+f)\,(e+g)}{4\,(d+f)}}\operatorname{erfi}\left(\frac{b+c+2\,(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{4\,(d+f)^{3/2}}$$

Arguments involving polynomials or algebraic functions and factors involving exponential function and a power function

Involving exp and power

Involving $z^n\, e^{d\,z}\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0502.01

$$\int z^n\, e^{d\,z}\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{(d-f)^2}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,(-c)^{-n-\frac{1}{2}}\,(f-d)^{n-q}\,(d-f-2\,c\,z)^{q+1}\left(\frac{(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{(d-f-2\,c\,z)^2}{4\,c}\right)\right)-\frac{1}{\sqrt{c}}\left(e^{-\frac{(d+f)^2}{4\,c}}\sum_{q=0}^{n}2^{q-n}\,c^{-n-\frac{1}{2}}\,(-d-f)^{n-q}\,(d+f+2\,c\,z)^{q+1}\left(-\frac{(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{(d+f+2\,c\,z)^2}{4\,c}\right)\right)\right)$$

01.19.21.0503.01

$$\int z^n e^{dz}\sinh\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-2n-2}\left(e^{-\frac{c^2}{4(d+f)}}(d+f)^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,c^{-h-k+2n}\left(c+2(d+f)\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)-$$

$$e^{-\frac{c^2}{4(d-f)}}(d-f)^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-c)^{-h-k+2n}\left(2(d-f)\sqrt{z}-c\right)^{h+k}\left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)-\right.$$

$$\left.\left.c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n e^{d z+e}\sinh\left(c z^r+f z\right)$

01.19.21.0504.01

$$\int z^n e^{e+dz}\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{(d-f)^2}{4c}+e}\sum_{q=0}^{n}2^{q-n}(-c)^{-n-\frac{1}{2}}(f-d)^{n-q}(d-f-2cz)^{q+1}\left(\frac{(d-f-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(d-f-2cz)^2}{4c}\right)\right)-\right.$$

$$\left.\frac{1}{\sqrt{c}}\left(e^{-\frac{(d+f)^2}{4c}+e}\sum_{q=0}^{n}2^{q-n}c^{-n-\frac{1}{2}}(-d-f)^{n-q}(d+f+2cz)^{q+1}\left(-\frac{(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(d+f+2cz)^2}{4c}\right)\right)\right)$$

01.19.21.0505.01

$$\int z^n e^{e+d z} \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-2} \left(e^{-\frac{c^2}{4(d+f)}+e} (d+f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c + 2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c\left(c+2(d+f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\, (d+f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{c^2}{4(d-f)}+e} (d-f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2(d-f)\sqrt{z} - c\right)^{h+k} \left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - c\left(2(d-f)\sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r} \sinh\left(c z^r + f z\right)$

01.19.21.0506.01

$$\int z^n e^{b z^2} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{f^2}{4(b-c)}} \sum_{q=0}^{n} 2^{q-n} f^{n-q} (-f + 2bz - 2cz)^{q+1} \left(-\frac{(-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{f^2}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-f)^{n-q} (f + 2(b+c)z)^{q+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0507.01

$$\int z^n e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{(b+c)^2}{4f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2f\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c)\left(b+c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) \right) - e^{\frac{(b-c)^2}{4f}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c-2f\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c-2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) \right) \right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \sinh\left(c z^r + f z + g\right)$

01.19.21.0508.01

$$\int z^n e^{b z^2 + e} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{f^2}{4(b-c)} + e} \sum_{q=0}^{n} 2^{q-n} f^{n-q} (-f + 2bz - 2cz)^{q+1} \left(-\frac{(-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{f^2}{4(b+c)} + e} \sum_{q=0}^{n} 2^{q-n} (-f)^{n-q} (f + 2(b+c)z)^{q+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right) \right) /;\, n \in \mathbb{N}$$

01.19.21.0509.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{(b+c)^2}{4f}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2f\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c)\left(b+c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right) - e^{\frac{(b-c)^2}{4f}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c-2f\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c-2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z} \sinh\left(c z^r + f z\right)$

01.19.21.0510.01

$$\int z^n e^{b z^2 + d z} \sinh\left(c z^2 + f z\right) dz = \frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2bz-2cz)^{q+1} \left(-\frac{(d-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q} (d+f+2(b+c)z)^{q+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) /;\, n \in \mathbb{N}$$

01.19.21.0511.01

$$\int z^n e^{\sqrt{z}\, b+d\,z} \sinh\left(\sqrt{z}\, c + f\, z\right) dz ==$$

$$2^{-2n-2}\left(e^{-\frac{(b+c)^2}{4(d+f)}} (d+f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+c)^{-h-k+2n} \left(b+c+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\binom{k}{h}\binom{n}{k}\left((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)-$$

$$e^{-\frac{(b-c)^2}{4(d-f)}} (d-f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b-c)^{-h-k+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right) /;\, n\in\mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \sinh\left(c z^r + f z\right)$

01.19.21.0512.01

$$\int z^n e^{b z^2+d z+e} \sinh\left(c z^2 + f z\right) dz ==$$

$$\frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}+e} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2bz-2cz)^{q+1} \left(-\frac{(d-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)}\right.$$

$$\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}+e} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q}$$

$$\left.(d+f+2(b+c)z)^{q+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) /;\, n\in\mathbb{N}$$

01.19.21.0513.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh\left(\sqrt{z}\, c+f z\right) dz = 2^{-2n-2}\left(e^{-\frac{(b+c)^2}{4(d+f)}+e} (d+f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+ 2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{(b-c)^2}{4(d-f)}+e} (d-f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+ 2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{d z} \sinh\left(c z^r + f z + g\right)$

01.19.21.0514.01

$$\int z^n e^{d z} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{(d-f)^2}{4c}-g} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (f-d)^{n-q} (d-f-2cz)^{q+1} \left(\frac{(d-f-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(d-f-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}}\left(e^{-\frac{(d+f)^2}{4c}+g} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-d-f)^{n-q} (d+f+2cz)^{q+1} \left(-\frac{(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2cz)^2}{4c}\right)\right)\right)$$

01.19.21.0515.01

$$\int z^n e^{dz} \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-2} \left(e^{-\frac{c^2}{4(d+f)}+g} (d+f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c + 2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(c\left(c+2(d+f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{c^2}{4(d-f)}-g} (d-f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2(d-f)\sqrt{z} - c\right)^{h+k} \left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{d z+e} \sinh\left(c z^r + f z + g\right)$

01.19.21.0516.01

$$\int z^n e^{e+dz} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4}\left(\frac{1}{\sqrt{-c}}\left(e^{\frac{(d-f)^2}{4c}+e-g} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (f-d)^{n-q} (d-f-2cz)^{q+1} \left(\frac{(d-f-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-f-2cz)^2}{4c}\right)\right) - \frac{1}{\sqrt{c}} \left(e^{-\frac{(d+f)^2}{4c}+e+g} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-d-f)^{n-q} (d+f+2cz)^{q+1} \left(-\frac{(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2cz)^2}{4c}\right)\right)\right)$$

01.19.21.0517.01

$$\int z^n e^{e+d z} \sinh\left(\sqrt{z}\; c+g+f z\right) dz = 2^{-2n-2}\left(e^{-\frac{c^2}{4(d+f)}+e+g} (d+f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{c^2}{4(d-f)}+e-g} (d-f)^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(2(d-f)\sqrt{z}-c\right)^{h+k} \left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\right)\right) /;\, n\in\mathbb{N}$$

Involving $z^n e^{b z^r} \sinh\left(c z^r + f z + g\right)$

01.19.21.0518.01

$$\int z^n e^{b z^2} \sinh\left(c z^2+f z+g\right) dz = \frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{f^2}{4(b-c)}-g} \sum_{q=0}^{n} 2^{q-n} f^{n-q} (-f+2bz-2cz)^{q+1} \left(-\frac{(-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{f^2}{4(b+c)}+g} \sum_{q=0}^{n} 2^{q-n} (-f)^{n-q} (f+2(b+c)z)^{q+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right)\right) /;\, n\in\mathbb{N}$$

01.19.21.0519.01

$$\int z^n e^{\sqrt{z}\, b} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{(b+c)^2}{4f}+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2f\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c)\left(b+c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right) - e^{\frac{(b-c)^2}{4f}-g} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c-2f\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{b z^r + e} \sinh\left(c z^r + f z + g\right)$

01.19.21.0520.01

$$\int z^n e^{b z^2+e} \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{f^2}{4(b-c)}+e-g} \sum_{q=0}^{n} 2^{q-n} f^{n-q} (-f+2bz-2cz)^{q+1} \left(-\frac{(-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{f^2}{4(b+c)}+e+g} \sum_{q=0}^{n} 2^{q-n} (-f)^{n-q} (f+2(b+c)z)^{q+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.0521.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = 2^{-2n-2} f^{-2n-2} \left(e^{-\frac{(b+c)^2}{4f}+e+g} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b+c)^{-h-k+2n} \left(b+c+2 f \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b+c)\left(b+c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right) - e^{\frac{(b-c)^2}{4f}+e-g} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (b-c)^{-h-k+2n} \left(b-c-2f\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\right)\right) /;\ n\in\mathbb{N}$$

Involving $z^n\, e^{b z^r + d z} \sinh\left(c z^r + f z + g\right)$

01.19.21.0522.01

$$\int z^n e^{b z^2+d z} \sinh\left(c z^2+f z+g\right) dz = \frac{1}{4}\left((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}-g} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2 b z-2 c z)^{q+1} \left(-\frac{(d-f+2bz-2cz)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2bz-2cz)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}+g} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q} (d+f+2(b+c)z)^{q+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) /;\ n\in\mathbb{N}$$

01.19.21.0523.01

$$\int z^n e^{\sqrt{z}\, b+d z} \sinh\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-2n-2} \left(e^{-\frac{(b+c)^2}{4(d+f)}+g} (d+f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c)^{-h-k+2n} \left(b+c+2(d+f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c)\left(b+c+2(d+f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right) + 2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\, (d+f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right) - e^{-\frac{(b-c)^2}{4(d-f)}-g} (d-f)^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c)^{-h-k+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c)\left(b-c+2(d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right) + 2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\, (d-f)\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sinh\left(c z^r + f z + g\right)$

01.19.21.0524.01

$$\int z^n e^{b z^2+d z+e} \sinh\left(c z^2+f z+g\right) dz = \frac{1}{4} \left((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}+e-g} \sum_{q=0}^{n} 2^{q-n} (f-d)^{n-q} (d-f+2 b z-2 c z)^{q+1} \left(-\frac{(d-f+2 b z-2 c z)^2}{b-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f+2 b z-2 c z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}+e+g} \sum_{q=0}^{n} 2^{q-n} (-d-f)^{n-q} (d+f+2(b+c) z)^{q+1} \left(-\frac{(d+f+2(b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f+2(b+c) z)^2}{4(b+c)}\right)\right) /;\, n \in \mathbb{N}$$

01.19.21.0525.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-2 n-2} \left(e^{-\frac{(b+c)^2}{4 (d+f)}+e+g} (d+f)^{-2 n-2} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (b+c)^{-h-k+2 n} \left(b+c+2 (d+f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c+2 (d+f) \sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b+c) \left(b+c+2 (d+f) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(b+c+2 (d+f) \sqrt{z}\right)^2}{4 (d+f)}\right) + 2 \sqrt{-\frac{\left(b+c+2 (d+f) \sqrt{z}\right)^2}{d+f}} (d+f) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(b+c+2 (d+f) \sqrt{z}\right)^2}{4 (d+f)}\right)\right) - e^{-\frac{(b-c)^2}{4 (d-f)}+e-g} (d-f)^{-2 n-2} \sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (b-c)^{-h-k+2 n} \left(b-c+2 (d-f) \sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c) \left(b-c+2 (d-f) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right) + 2 \sqrt{-\frac{\left(b-c+2 (d-f) \sqrt{z}\right)^2}{d-f}} (d-f) \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(b-c+2 (d-f) \sqrt{z}\right)^2}{4 (d-f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving trigonometric functions

Involving sin

Involving sin(c z) sinh(a z)

01.19.21.0526.01

$$\int \sin(c z) \sinh(a z)\, dz = \frac{a \cosh(a z) \sin(c z) - c \cos(c z) \sinh(a z)}{a^2 + c^2}$$

01.19.21.0527.01

$$\int \sin(c z) \sinh(c z)\, dz = \frac{\cosh(c z) \sin(c z) - \cos(c z) \sinh(c z)}{2 c}$$

Involving sin(c z + d) sinh(a z)

01.19.21.0528.01

$$\int \sin(d + c z) \sinh(a z) \, dz = \frac{a \cosh(a z) \sin(d + c z) - c \cos(d + c z) \sinh(a z)}{a^2 + c^2}$$

Involving sin(c z) sinh(a z + b)

01.19.21.0529.01

$$\int \sin(c z) \sinh(b + a z) \, dz = \frac{a \cosh(b + a z) \sin(c z) - c \cos(c z) \sinh(b + a z)}{a^2 + c^2}$$

Involving sin(c z + d) sinh(a z + b)

01.19.21.0530.01

$$\int \sin(d + c z) \sinh(b + a z) \, dz = \frac{a \cosh(b + a z) \sin(d + c z) - c \cos(d + c z) \sinh(b + a z)}{a^2 + c^2}$$

Involving $\sin(b z^r) \sinh(c z)$

01.19.21.0531.01

$$\int \sin(b z^2) \sinh(c z) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{S\left(\frac{-i c + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{c^2}{4 b}\right) - \cos\left(\frac{c^2}{4 b}\right) C\left(\frac{-i c + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right)}{\sqrt{b}} - \frac{\cos\left(\frac{c^2}{4 b}\right) C\left(\frac{i c + 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) + S\left(\frac{i c + 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(\frac{c^2}{4 b}\right)}{\sqrt{-b}} \right)$$

01.19.21.0532.01

$$\int \sin\left(b \sqrt{z}\right) \sinh(c z) \, dz = \frac{1}{4} i \left(\frac{1}{(-i c)^{3/2}} \left(b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 c}\right) C\left(\frac{b - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}}\right) - 2 \sqrt{-i c} \sin\left(b \sqrt{z} - i c z\right) + b i \sqrt{2 \pi} S\left(\frac{b - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 c}\right)\right) - \frac{1}{(-i c)^{3/2}} \left(b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 c}\right) C\left(\frac{b + 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}}\right) + 2 \sqrt{-i c} \sin\left(\sqrt{z} b + i c z\right) + b i \sqrt{2 \pi} S\left(\frac{b + 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 c}\right)\right)\right)$$

Involving $\sin(b z^r + e) \sinh(c z)$

01.19.21.0533.01

$$\int \sin(b z^2 + e) \sinh(c z) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{S\left(\frac{-i c + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{c^2}{4 b} + e\right) - \cos\left(\frac{c^2}{4 b} + e\right) C\left(\frac{-i c + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right)}{\sqrt{b}} - \frac{\cos\left(\frac{c^2}{4 b} + e\right) C\left(\frac{i c + 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) + S\left(\frac{i c + 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(\frac{c^2}{4 b} + e\right)}{\sqrt{-b}} \right)$$

01.19.21.0534.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \sinh(c\, z)\, dz = \frac{1}{4} i \left(\frac{1}{(-i\, c)^{3/2}} \left(b \sqrt{2\pi} \cosh\left(\frac{b^2}{4\, c}+i\, e\right) C\left(\frac{b-2\, i\, c \sqrt{z}}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) - 2 \sqrt{-i\, c} \sin\left(\sqrt{z}\, b+e-i\, c\, z\right) + b\, i \sqrt{2\pi}\, S\left(\frac{b-2\, i\, c\sqrt{z}}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}+i\, e\right)\right) - \frac{1}{(-i\, c)^{3/2}} \left(b\sqrt{2\pi} \cosh\left(\frac{b^2}{4\, c}-i\, e\right) C\left(\frac{b+2\, i\, c\sqrt{z}}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) + 2\sqrt{-i\, c} \sin\left(\sqrt{z}\, b+e+i\, c\, z\right) + b\, i\sqrt{2\pi}\, S\left(\frac{b+2\, i\, c\sqrt{z}}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}-i\, e\right)\right)\right)$$

Involving $\sin\left(b\, z^r+d\, z\right) \sinh(c\, z)$

01.19.21.0535.01

$$\int \sin\left(b\, z^2+d\, z\right) \sinh(c\, z)\, dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(d-i\, c)^2}{4\, b}\right) C\left(\frac{d-i\, c+2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) + S\left(\frac{d-i\, c+2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(d-i\, c)^2}{4\, b}\right)}{\sqrt{b}} + \frac{\cos\left(\frac{(d+i\, c)^2}{4\, b}\right) C\left(\frac{d+i\, c+2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - S\left(\frac{d+i\, c+2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(d+i\, c)^2}{4\, b}\right)}{\sqrt{-b}}\right)$$

01.19.21.0536.01

$$\int \sin\left(\sqrt{z}\, b+d\, z\right) \sinh(c\, z)\, dz = \frac{1}{4} i \left(\frac{1}{(d-i\, c)^{3/2}} \left(b\sqrt{2\pi} \cos\left(\frac{b^2}{4\,(d-i\, c)}\right) C\left(\frac{b+2\,(d-i\, c)\sqrt{z}}{\sqrt{d-i\, c}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, S\left(\frac{b+2\,(d-i\, c)\sqrt{z}}{\sqrt{d-i\, c}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,(d-i\, c)}\right) - 2\sqrt{d-i\, c} \sin\left(\sqrt{z}\, b+(d-i\, c)\, z\right)\right) - \frac{1}{(-d-i\, c)^{3/2}} \left(b\sqrt{2\pi} \cos\left(\frac{b^2}{4\,(d+i\, c)}\right) C\left(\frac{b+2\,(d+i\, c)\sqrt{z}}{\sqrt{-d-i\, c}\, \sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b+2\,(d+i\, c)\sqrt{z}}{\sqrt{-d-i\, c}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,(d+i\, c)}\right) + 2\sqrt{-d-i\, c} \sin\left(\sqrt{z}\, b+(d+i\, c)\, z\right)\right)\right)$$

Involving $\sin\left(b\, z^r+d\, z+e\right) \sinh(c\, z)$

01.19.21.0537.01

$$\int \sin\left(b\, z^2+d\, z+e\right) \sinh(c\, z)\, dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(d-i\, c)^2}{4\, b}-e\right) C\left(\frac{d-i\, c+2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) + S\left(\frac{d-i\, c+2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(d-i\, c)^2}{4\, b}-e\right)}{\sqrt{b}} + \frac{\cos\left(\frac{(d+i\, c)^2}{4\, b}-e\right) C\left(\frac{d+i\, c+2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - S\left(\frac{d+i\, c+2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{(d+i\, c)^2}{4\, b}-e\right)}{\sqrt{-b}}\right)$$

01.19.21.0538.01

$$\int \sin\left(\sqrt{z}\, b + e + d\, z\right) \sinh(c\, z)\, dz = \frac{1}{4}\, i \left(\frac{1}{(d - i\, c)^{3/2}} \left(b\, \sqrt{2\pi}\, \cos\left(\frac{b^2}{4\,(d - i\, c)} - e\right) C\left(\frac{b + 2\,(d - i\, c)\sqrt{z}}{\sqrt{d - i\, c}\, \sqrt{2\pi}}\right) + b\, \sqrt{2\pi}\, S\left(\frac{b + 2\,(d - i\, c)\sqrt{z}}{\sqrt{d - i\, c}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,(d - i\, c)} - e\right) - 2\sqrt{d - i\, c}\, \sin\left(\sqrt{z}\, b + e + (d - i\, c)\, z\right)\right) - \frac{1}{(-d - i\, c)^{3/2}} \left(b\, \sqrt{2\pi}\, \cos\left(e - \frac{b^2}{4\,(d + i\, c)}\right) C\left(\frac{b + 2\,(d + i\, c)\sqrt{z}}{\sqrt{-d - i\, c}\, \sqrt{2\pi}}\right) + b\, \sqrt{2\pi}\, S\left(\frac{b + 2\,(d + i\, c)\sqrt{z}}{\sqrt{-d - i\, c}\, \sqrt{2\pi}}\right) \sin\left(e - \frac{b^2}{4\,(d + i\, c)}\right) + 2\sqrt{-d - i\, c}\, \sin\left(\sqrt{z}\, b + e + (d + i\, c)\, z\right)\right)\right)$$

Involving $\sin\left(b\, z^r\right) \sinh(f\, z + g)$

01.19.21.0539.01

$$\int \sin\left(b\, z^2\right) \sinh(g + f\, z)\, dz = -\frac{1}{2}\, i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{f^2}{4 b} + i\, g\right) C\left(\frac{i f + 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) + S\left(\frac{i f + 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4 b} + i\, g\right)}{\sqrt{-b}} + \frac{\cosh\left(\frac{i f^2}{4 b} + g\right) C\left(\frac{-i f + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) + i\, S\left(\frac{-i f + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sinh\left(\frac{i f^2}{4 b} + g\right)}{\sqrt{b}}\right)$$

01.19.21.0540.01

$$\int \sin\left(b \sqrt{z}\right) \sinh(g + f\, z)\, dz = \frac{1}{4}\, i \left(\frac{1}{(-i\, f)^{3/2}} \left(b\, \sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, f} + g\right) C\left(\frac{b - 2\, i\, f \sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right) + b\, i\, \sqrt{2\pi}\, S\left(\frac{b - 2\, i\, f \sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, f} + g\right) + 2\sqrt{-i\, f}\; i \sinh\left(g + f\, z + i\, b \sqrt{z}\right)\right) - \frac{1}{(-i\, f)^{3/2}} \left(b\, \sqrt{2\pi}\, \cos\left(\frac{i\, b^2}{4\, f} + i\, g\right) C\left(\frac{b + 2\, i\, f \sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right) + b\, \sqrt{2\pi}\, S\left(\frac{b + 2\, i\, f \sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right) \sin\left(\frac{i\, b^2}{4\, f} + i\, g\right) + 2\sqrt{-i\, f}\, \sin\left(\sqrt{z}\, b + i\, g + i\, f\, z\right)\right)\right)$$

Involving $\sin\left(b\, z^r + e\right) \sinh(f\, z + g)$

01.19.21.0541.01

$$\int \sin\left(b z^2+e\right) \sinh(g+f z)\,dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{f^2}{4 b}+e+i g\right) C\left(\frac{i f+2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right)+S\left(\frac{i f+2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 b}+e+i g\right)}{\sqrt{-b}}+\frac{\cosh\left(\frac{i f^2}{4 b}+g+i e\right) C\left(\frac{-i f+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right)+i S\left(\frac{-i f+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sinh\left(\frac{i f^2}{4 b}+g+i e\right)}{\sqrt{b}}\right)$$

01.19.21.0542.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \sinh(g+f z)\,dz = \frac{1}{4} i \left(\frac{1}{(-i f)^{3/2}} \left(b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 f}+g+i e\right) C\left(\frac{b-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right)+b i \sqrt{2 \pi}\, S\left(\frac{b-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 f}+g+i e\right)+2 \sqrt{-i f}\, i \sinh\left(g+i e+f z+i b \sqrt{z}\right)\right)-\frac{1}{(-i f)^{3/2}} \left(b \sqrt{2 \pi} \cos\left(\frac{i b^2}{4 f}+e+i g\right) C\left(\frac{b+2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right)+b \sqrt{2 \pi}\, S\left(\frac{b+2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sin\left(\frac{i b^2}{4 f}+e+i g\right)+2 \sqrt{-i f} \sin\left(\sqrt{z}\, b+e+i g+i f z\right)\right)\right)$$

Involving $\sin\left(b z^r+d z\right) \sinh(f z+g)$

01.19.21.0543.01

$$\int \sin\left(b z^2+d z\right) \sinh(g+f z)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{i S\left(\frac{d-i f+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (d-i f)^2}{4 b}-g\right)-\cosh\left(\frac{i (d-i f)^2}{4 b}-g\right) C\left(\frac{d-i f+2 b z}{\sqrt{b} \sqrt{2 \pi}}\right)}{\sqrt{b}}-\frac{\cos\left(i g-\frac{(d+i f)^2}{4 b}\right) C\left(\frac{d+i f+2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right)+S\left(\frac{d+i f+2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(i g-\frac{(d+i f)^2}{4 b}\right)}{\sqrt{-b}}\right)$$

01.19.21.0544.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \sinh(g + f\, z)\, dz = \frac{1}{4} i \left(\frac{1}{(d - i\, f)^{3/2}} \left(b \sqrt{2\pi} \cosh\left(\frac{i\, b^2}{4 (d - i\, f)} - g \right) C\left(\frac{b + 2 (d - i\, f) \sqrt{z}}{\sqrt{d - i\, f} \sqrt{2\pi}} \right) - 2 \sqrt{d - i\, f} \sin\left(\sqrt{z}\, b - i\, g + (d - i\, f)\, z\right) - i\, b \sqrt{2\pi}\, S\left(\frac{b + 2 (d - i\, f) \sqrt{z}}{\sqrt{d - i\, f} \sqrt{2\pi}} \right) \sinh\left(\frac{i\, b^2}{4 (d - i\, f)} - g \right) \right) - \frac{1}{(-d - i\, f)^{3/2}} \left(b \sqrt{2\pi} \cos\left(i\, g - \frac{b^2}{4 (d + i\, f)} \right) C\left(\frac{b + 2 (d + i\, f) \sqrt{z}}{\sqrt{-d - i\, f} \sqrt{2\pi}} \right) + b \sqrt{2\pi}\, S\left(\frac{b + 2 (d + i\, f) \sqrt{z}}{\sqrt{-d - i\, f} \sqrt{2\pi}} \right) \sin\left(i\, g - \frac{b^2}{4 (d + i\, f)} \right) + 2 \sqrt{-d - i\, f} \sin\left(\sqrt{z}\, b + i\, g + (d + i\, f)\, z\right) \right) \right)$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \sinh(f\, z + g)$

01.19.21.0545.01

$$\int \sin\left(b\, z^2 + d\, z + e\right) \sinh(g + f\, z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{i\, S\left(\frac{d - i\, f + 2\, b\, z}{\sqrt{b} \sqrt{2\pi}} \right) \sinh\left(\frac{i (d - i\, f)^2}{4\, b} - g - i\, e \right) - \cosh\left(\frac{i (d - i\, f)^2}{4\, b} - g - i\, e \right) C\left(\frac{d - i\, f + 2\, b\, z}{\sqrt{b} \sqrt{2\pi}} \right)}{\sqrt{b}} - \frac{\cos\left(-\frac{(d + i\, f)^2}{4\, b} + e + i\, g \right) C\left(\frac{d + i\, f + 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}} \right) + S\left(\frac{d + i\, f + 2\, b\, z}{\sqrt{-b} \sqrt{2\pi}} \right) \sin\left(-\frac{(d + i\, f)^2}{4\, b} + e + i\, g \right)}{\sqrt{-b}} \right)$$

01.19.21.0546.01

$$\int \sin\left(\sqrt{z}\, b + e + d\, z\right) \sinh(g + f\, z)\, dz = \frac{1}{4}\, i \left(\frac{1}{(d - i\, f)^{3/2}} \left(b\sqrt{2\pi}\, \cosh\left(\frac{i\, b^2}{4\,(d - i\, f)} - g - i\, e\right) C\left(\frac{b + 2\,(d - i\, f)\sqrt{z}}{\sqrt{d - i\, f}\, \sqrt{2\pi}}\right) - 2\sqrt{d - i\, f}\, \sin\left(\sqrt{z}\, b + e - i\, g + (d - i\, f)\, z\right) - i\, b\sqrt{2\pi}\, S\left(\frac{b + 2\,(d - i\, f)\sqrt{z}}{\sqrt{d - i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{i\, b^2}{4\,(d - i\, f)} - g - i\, e\right)\right) - \frac{1}{(-d - i\, f)^{3/2}} \left(b\sqrt{2\pi}\, \cos\left(-\frac{b^2}{4\,(d + i\, f)} + e + i\, g\right) C\left(\frac{b + 2\,(d + i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}}\right) + b\sqrt{2\pi}\, S\left(\frac{b + 2\,(d + i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}}\right) \sin\left(-\frac{b^2}{4\,(d + i\, f)} + e + i\, g\right) + 2\sqrt{-d - i\, f}\, \sin\left(\sqrt{z}\, b + e + i\, g + (d + i\, f)\, z\right)\right)\right)$$

Involving $\sin(b\, z)\sinh(c\, z^r)$

01.19.21.0547.01

$$\int \sin(b\, z) \sinh\left(c\, z^2\right) dz = -\frac{1}{2}\, i \sqrt{\frac{\pi}{2}} \left(\frac{\cosh\left(\frac{b^2}{4\, c}\right) C\left(\frac{b + 2\, i\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) + i\, S\left(\frac{b + 2\, i\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}\right)}{\sqrt{-i\, c}} + \frac{\cosh\left(\frac{b^2}{4\, c}\right) C\left(\frac{2\, i\, c\, z - b}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) - i\, S\left(\frac{2\, i\, c\, z - b}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}\right)}{\sqrt{i\, c}}\right)$$

01.19.21.0548.01

$$\int \sin(b\, z) \sinh\left(c\sqrt{z}\right) dz = -\frac{1}{4}\, i \left(\frac{1}{(-b)^{3/2}} \left(-i\, c\sqrt{2\pi}\, \cos\left(\frac{c^2}{4\, b}\right) C\left(\frac{i\, c - 2\, b\sqrt{z}}{\sqrt{-b}\, \sqrt{2\pi}}\right) - i\, c\sqrt{2\pi}\, S\left(\frac{i\, c - 2\, b\sqrt{z}}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4\, b}\right) - 2\sqrt{-b}\, \sin\left(-i\, c\sqrt{z} + b\, z\right)\right) + \frac{1}{(-b)^{3/2}} \left(c\, i\sqrt{2\pi}\, \cos\left(\frac{c^2}{4\, b}\right) C\left(\frac{2\sqrt{z}\, b + i\, c}{\sqrt{-b}\, \sqrt{2\pi}}\right) + c\, i\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\, b + i\, c}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4\, b}\right) + 2\sqrt{-b}\, \sin\left(i\, c\sqrt{z} + b\, z\right)\right)\right)$$

Involving $\sin(d\, z + e)\sinh(c\, z^r)$

01.19.21.0549.01

$$\int \sin(e+d\,z)\sinh\left(c\,z^2\right)dz = -\frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cosh\left(\frac{d^2}{4c}+i\,e\right)C\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)-i\,S\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}+i\,e\right)}{\sqrt{i\,c}}+\frac{\cosh\left(\frac{d^2}{4c}-i\,e\right)C\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)+i\,S\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}-i\,e\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.0550.01

$$\int \sin(e+d\,z)\sinh\left(c\sqrt{z}\right)dz = \frac{1}{4}\,i\left(-\frac{1}{(-d)^{3/2}}\left(c\,i\sqrt{2\pi}\cos\left(\frac{c^2}{4d}+e\right)C\left(\frac{2\sqrt{z}\,d+i\,c}{\sqrt{-d}\,\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\,S\left(\frac{2\sqrt{z}\,d+i\,c}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}+e\right)+2\sqrt{-d}\sin\left(e+d\,z+i\,c\sqrt{z}\right)\right)-\frac{1}{(-d)^{3/2}}\left(-i\,c\sqrt{2\pi}\cos\left(\frac{c^2}{4d}+e\right)C\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4d}+e\right)-2\sqrt{-d}\sin\left(e+d\,z-i\,c\sqrt{z}\right)\right)\right)$$

Involving $\sin(a\,z^r)\sinh(c\,z^r)$

01.19.21.0551.01

$$\int \sin(b\,z^r)\sinh(c\,z^r)\,dz = \frac{1}{4r}\left(i\,z\left(\Gamma\left(\frac{1}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-1/r}-((i\,b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-c)\,z^r\right)-((c-i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-i\,b)\,z^r\right)+((c+i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.0552.01

$$\int \sin\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\sqrt{-b-i\,c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{-b-i\,c}}-\frac{C\left(\sqrt{i\,c-b}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0553.01

$$\int \sin\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = i\left(\frac{\cos\left((b+i\,c)\sqrt{z}\right)+(b+i\,c)\sqrt{z}\sin\left((b+i\,c)\sqrt{z}\right)}{(b+i\,c)^2}-\frac{\cos\left((i\,c-b)\sqrt{z}\right)+(i\,c-b)\sqrt{z}\sin\left((i\,c-b)\sqrt{z}\right)}{(i\,c-b)^2}\right)$$

Involving $\sin(a\,z^r+e)\sinh(c\,z^r)$

01.19.21.0554.01

$$\int \sin(b z^r + e) \sinh(c z^r) \, dz = \frac{1}{4r} \left(i z \left(e^{i e} \Gamma\left(\frac{1}{r}, (-c - i b) z^r\right) ((-c - i b) z^r)^{-1/r} - e^{-i e} ((i b - c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - c) z^r\right) - e^{i e} ((c - i b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - i b) z^r\right) + e^{-i e} ((c + i b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c + i b) z^r\right) \right) \right)$$

01.19.21.0555.01

$$\int \sin(b z^2 + e) \sinh(c z^2) \, dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos(e) C\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) + S\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) \sin(e)}{\sqrt{i c - b}} + \frac{-\cos(e) C\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) - S\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) \sin(e)}{\sqrt{-b - i c}} \right)$$

01.19.21.0556.01

$$\int \sin(\sqrt{z} \, b + e) \sinh(c \sqrt{z}) \, dz = -i \left(\frac{-\cos(\sqrt{z} (b + i c) + e) - (b + i c) \sqrt{z} \sin(\sqrt{z} (b + i c) + e)}{(b + i c)^2} + \frac{\cos(e - (i c - b) \sqrt{z}) - (i c - b) \sqrt{z} \sin(e - (i c - b) \sqrt{z})}{(i c - b)^2} \right)$$

Involving $\sin(b z^r + d z) \sinh(c z^r)$

01.19.21.0557.01

$$\int \sin(b z^2 + d z) \sinh(c z^2) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{\cos\left(\frac{d^2}{4 (i c - b)}\right) C\left(\frac{2 (i c - b) z - d}{\sqrt{i c - b} \sqrt{2 \pi}}\right) + S\left(\frac{2 (i c - b) z - d}{\sqrt{i c - b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 (i c - b)}\right)}{\sqrt{i c - b}} - \frac{\cos\left(\frac{d^2}{4 (b + i c)}\right) C\left(\frac{d + 2 (b + i c) z}{\sqrt{-b - i c} \sqrt{2 \pi}}\right) - S\left(\frac{d + 2 (b + i c) z}{\sqrt{-b - i c} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 (b + i c)}\right)}{\sqrt{-b - i c}} \right)$$

01.19.21.0558.01

$$\int \sin(\sqrt{z} \, b + d z) \sinh(c \sqrt{z}) \, dz = -\frac{1}{4} i \left(\frac{1}{(-d)^{3/2}} \left((b + i c) \sqrt{2 \pi} \cos\left(\frac{(b + i c)^2}{4 d}\right) C\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2 \pi}}\right) - (b + i c) \sqrt{2 \pi} \, S\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2 \pi}}\right) \sin\left(\frac{(b + i c)^2}{4 d}\right) + 2 \sqrt{-d} \sin(\sqrt{z} (b + i c) + d z) \right) + \frac{1}{d^{3/2}} \left((i c - b) \sqrt{2 \pi} \cos\left(\frac{(b - i c)^2}{4 d}\right) C\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) - (b - i c) \sqrt{2 \pi} \, S\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) \sin\left(\frac{(b - i c)^2}{4 d}\right) + 2 \sqrt{d} \sin(\sqrt{z} (b - i c) + d z) \right) \right)$$

Involving $\sin(b z^r + d z + e) \sinh(c z^r)$

01.19.21.0559.01

$$\int \sin(b z^2 + d z + e) \sinh(c z^2)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{\cos\left(-\frac{d^2}{4(b+i c)} + e\right) C\left(\frac{d+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) + S\left(\frac{d+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) \sin\left(-\frac{d^2}{4(b+i c)} + e\right)}{\sqrt{-b-i c}} - \frac{\cosh\left(\frac{i d^2}{4(i c-b)} + i e\right) C\left(\frac{2(i c-b) z-d}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) - i S\left(\frac{2(i c-b) z-d}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) \sinh\left(\frac{i d^2}{4(i c-b)} + i e\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0560.01

$$\int \sin\left(\sqrt{z}\, b + e + d z\right) \sinh\left(c \sqrt{z}\right) dz = -\frac{1}{4} i \left(\frac{1}{d^{3/2}} \left((i c - b) \sqrt{2\pi} \cos\left(\frac{(b-i c)^2}{4 d} - e\right) C\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - (b - i c) \sqrt{2\pi}\, S\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{(b-i c)^2}{4 d} - e\right) + 2 \sqrt{d} \sin\left(\sqrt{z}\,(b - i c) + e + d z\right) \right) + \frac{1}{(-d)^{3/2}} \left((b + i c) \sqrt{2\pi} \cosh\left(i e - \frac{i (b + i c)^2}{4 d}\right) C\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) + 2 \sqrt{-d} \sin\left(\sqrt{z}\,(b + i c) + e + d z\right) - i (b + i c) \sqrt{2\pi}\, S\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sinh\left(i e - \frac{i (b + i c)^2}{4 d}\right) \right) \right)$$

Involving $\sin(d z) \sinh(c z^r + g)$

01.19.21.0561.01

$$\int \sin(d z) \sinh(c z^2 + g)\, dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cosh\left(\frac{d^2}{4 c} + g\right) C\left(\frac{2 i c z - d}{\sqrt{i c}\,\sqrt{2\pi}}\right) - i S\left(\frac{2 i c z - d}{\sqrt{i c}\,\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 c} + g\right)}{\sqrt{i c}} + \frac{\cosh\left(\frac{d^2}{4 c} + g\right) C\left(\frac{d + 2 i c z}{\sqrt{-i c}\,\sqrt{2\pi}}\right) + i S\left(\frac{d + 2 i c z}{\sqrt{-i c}\,\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 c} + g\right)}{\sqrt{-i c}} \right)$$

01.19.21.0562.01

$$\int \sin(d z) \sinh\left(\sqrt{z}\, c + g\right) dz = \frac{1}{4} i \left(-\frac{1}{(-d)^{3/2}} \left(c\, i \sqrt{2\pi} \cos\left(\frac{c^2}{4 d} + i g\right) C\left(\frac{2 \sqrt{z}\, d + i c}{\sqrt{-d}\,\sqrt{2\pi}}\right) + c\, i \sqrt{2\pi}\, S\left(\frac{2 \sqrt{z}\, d + i c}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 d} + i g\right) + 2 \sqrt{-d} \sin\left(i g + d z + i c \sqrt{z}\right) \right) - \frac{1}{(-d)^{3/2}} \left(-i c \sqrt{2\pi} \cosh\left(\frac{i c^2}{4 d} + g\right) C\left(\frac{i c - 2 d \sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) - i c \sqrt{2\pi}\, S\left(\frac{i c - 2 d \sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4 d} - i g\right) - 2 \sqrt{-d} \sin\left(-i g + d z - i c \sqrt{z}\right) \right) \right)$$

Involving $\sin(d\,z+e)\sinh\left(c\,z^r+g\right)$

01.19.21.0563.01

$$\int \sin(e+d\,z)\sinh\left(c\,z^2+g\right)dz = -\frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cosh\left(\frac{d^2}{4c}+g+i\,e\right)C\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)-i\,S\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}+g+i\,e\right)}{\sqrt{i\,c}}+\right.$$
$$\left.\frac{\cosh\left(\frac{d^2}{4c}-i\,e+g\right)C\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)+i\,S\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}-i\,e+g\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.0564.01

$$\int \sin(e+d\,z)\sinh\left(\sqrt{z}\;c+g\right)dz =$$
$$\frac{1}{4}\,i\left(-\frac{1}{(-d)^{3/2}}\left(c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,d}+e+i\,g\right)C\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\;S\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e+i\,g\right)+\right.\right.$$
$$\left.2\sqrt{-d}\;\sin\left(e+i\,g+d\,z+i\,c\sqrt{z}\right)\right)-\frac{1}{(-d)^{3/2}}\left(-i\,c\sqrt{2\pi}\;\cosh\left(\frac{i\,c^2}{4\,d}+g+i\,e\right)C\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)-\right.$$
$$\left.\left.i\,c\sqrt{2\pi}\;S\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e-i\,g\right)-2\sqrt{-d}\;\sin\left(e-i\,g+d\,z-i\,c\sqrt{z}\right)\right)\right)$$

Involving $\sin\left(a\,z^r\right)\sinh\left(c\,z^r+g\right)$

01.19.21.0565.01

$$\int \sin(b\,z^r)\sinh(c\,z^r+g)\,dz =$$
$$\frac{1}{4\,r}\left(i\,z\left(e^g\,\Gamma\left(\frac{1}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-1/r}-e^g\,((i\,b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-c)\,z^r\right)-e^{-g}\,((c-i\,b)\,z^r)^{-1/r}\right.\right.$$
$$\left.\left.\Gamma\left(\frac{1}{r},(c-i\,b)\,z^r\right)+e^{-g}\,((c+i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.0566.01

$$\int \sin\left(b\,z^2\right)\sinh\left(c\,z^2+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cosh(g)\,C\left(\sqrt{-b-i\,c}\;\sqrt{\frac{2}{\pi}}\;z\right)+i\,S\left(\sqrt{-b-i\,c}\;\sqrt{\frac{2}{\pi}}\;z\right)\sinh(g)}{\sqrt{-b-i\,c}}-\right.$$
$$\left.\frac{\cosh(g)\,C\left(\sqrt{i\,c-b}\;\sqrt{\frac{2}{\pi}}\;z\right)-i\,S\left(\sqrt{i\,c-b}\;\sqrt{\frac{2}{\pi}}\;z\right)\sinh(g)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0567.01

$$\int \sin\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\;c+g\right)dz = -i\left(\frac{\cos\left(\sqrt{z}\;(i\,c-b)+i\,g\right)+(i\,c-b)\sqrt{z}\;\sin\left(\sqrt{z}\;(i\,c-b)+i\,g\right)}{(i\,c-b)^2}+\frac{-\cos\left(\sqrt{z}\;(b+i\,c)+i\,g\right)-(b+i\,c)\sqrt{z}\;\sin\left(\sqrt{z}\;(b+i\,c)+i\,g\right)}{(b+i\,c)^2}\right)$$

Involving $\sin(a\,z^r+e)\sinh(c\,z^r+g)$

01.19.21.0568.01

$$\int \sin(b\,z^r+e)\sinh(c\,z^r+g)\,dz = \frac{1}{4\,r}\left(i\,z\left(e^{g+i\,e}\,\Gamma\left(\frac{1}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-1/r}-e^{g-i\,e}\,((i\,b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-c)\,z^r\right)-e^{i\,e-g}\,((c-i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-i\,b)\,z^r\right)+e^{-g-i\,e}\,((c+i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.0569.01

$$\int \sin(b\,z^2+e)\sinh(c\,z^2+g)\,dz = -\frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{-\cos(e+i\,g)\,C\left(\sqrt{-b-i\,c}\,\sqrt{\frac{2}{\pi}}\;z\right)-S\left(\sqrt{-b-i\,c}\,\sqrt{\frac{2}{\pi}}\;z\right)\sin(e+i\,g)}{\sqrt{-b-i\,c}}+\frac{\cosh(g+i\,e)\,C\left(\sqrt{i\,c-b}\,\sqrt{\frac{2}{\pi}}\;z\right)-i\,S\left(\sqrt{i\,c-b}\,\sqrt{\frac{2}{\pi}}\;z\right)\sinh(g+i\,e)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0570.01

$$\int \sin\left(\sqrt{z}\;b+e\right)\sinh\left(\sqrt{z}\;c+g\right)dz = -i\left(\frac{-\cos\left(\sqrt{z}\;(b+i\,c)+e+i\,g\right)-(b+i\,c)\sqrt{z}\;\sin\left(\sqrt{z}\;(b+i\,c)+e+i\,g\right)}{(b+i\,c)^2}+\frac{\cos\left(-\sqrt{z}\;(i\,c-b)+e-i\,g\right)-(i\,c-b)\sqrt{z}\;\sin\left(-\sqrt{z}\;(i\,c-b)+e-i\,g\right)}{(i\,c-b)^2}\right)$$

Involving $\sin(b\,z^r+d\,z)\sinh(c\,z^r+g)$

01.19.21.0571.01

$$\int \sin\left(b\,z^2+d\,z\right)\sinh\left(c\,z^2+g\right)dz = \frac{1}{2}\,i\,\sqrt{\frac{\pi}{2}}\left(-\frac{\cos\left(i\,g-\frac{d^2}{4(b+i\,c)}\right)C\left(\frac{d+2(b+i\,c)z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{d+2(b+i\,c)z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)\sin\left(i\,g-\frac{d^2}{4(b+i\,c)}\right)}{\sqrt{-b-i\,c}}-\frac{\cosh\left(\frac{i\,d^2}{4(i\,c-b)}+g\right)C\left(\frac{2(i\,c-b)z-d}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)-i\,S\left(\frac{2(i\,c-b)z-d}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)\sinh\left(\frac{i\,d^2}{4(i\,c-b)}+g\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0572.01

$$\int \sin\left(\sqrt{z}\,b+d\,z\right)\sinh\left(\sqrt{z}\,c+g\right)dz = -\frac{1}{4}\,i\left(\frac{1}{d^{3/2}}\left((i\,c-b)\sqrt{2\pi}\,\cos\left(\frac{(b-i\,c)^2}{4d}+i\,g\right)C\left(\frac{b-i\,c+2d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)-(b-i\,c)\sqrt{2\pi}\,S\left(\frac{b-i\,c+2d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right)\sin\left(\frac{(b-i\,c)^2}{4d}+i\,g\right)+2\sqrt{d}\,\sin\left(\sqrt{z}\,(b-i\,c)-i\,g+d\,z\right)\right)+\frac{1}{(-d)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\,\cosh\left(-\frac{i(b+i\,c)^2}{4d}-g\right)C\left(\frac{b+i\,c+2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)+2\sqrt{-d}\,\sin\left(\sqrt{z}\,(b+i\,c)+i\,g+d\,z\right)-i(b+i\,c)\sqrt{2\pi}\,S\left(\frac{b+i\,c+2d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{i(b+i\,c)^2}{4d}-g\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+g\right)$

01.19.21.0573.01

$$\int \sin\left(b\,z^2+d\,z+e\right)\sinh\left(c\,z^2+g\right)dz = \frac{1}{2}\,i\,\sqrt{\frac{\pi}{2}}\left(-\frac{\cos\left(-\frac{d^2}{4(b+i\,c)}+e+i\,g\right)C\left(\frac{d+2(b+i\,c)z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{d+2(b+i\,c)z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{d^2}{4(b+i\,c)}+e+i\,g\right)}{\sqrt{-b-i\,c}}-\frac{\cosh\left(\frac{i\,d^2}{4(i\,c-b)}+g+i\,e\right)C\left(\frac{2(i\,c-b)z-d}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)-i\,S\left(\frac{2(i\,c-b)z-d}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)\sinh\left(\frac{i\,d^2}{4(i\,c-b)}+g+i\,e\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0574.01

$$\int \sin\left(\sqrt{z}\, b+e+d\,z\right)\sinh\left(\sqrt{z}\, c+g\right)dz = -\frac{1}{4}i\left(\frac{1}{d^{3/2}}\left((i\,c-b)\sqrt{2\pi}\cos\left(\frac{(b-i\,c)^2}{4\,d}-e+i\,g\right)C\left(\frac{b-i\,c+2\,d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)-(b-i\,c)\sqrt{2\pi}\, S\left(\frac{b-i\,c+2\,d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)\sin\left(\frac{(b-i\,c)^2}{4\,d}-e+i\,g\right)+2\sqrt{d}\sin\left(\sqrt{z}\,(b-i\,c)+e-i\,g+d\,z\right)\right)+\frac{1}{(-d)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\cosh\left(-\frac{i\,(b+i\,c)^2}{4\,d}-g+i\,e\right)C\left(\frac{b+i\,c+2\,d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)+2\sqrt{-d}\sin\left(\sqrt{z}\,(b+i\,c)+e+i\,g+d\,z\right)-i\,(b+i\,c)\sqrt{2\pi}\, S\left(\frac{b+i\,c+2\,d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\sinh\left(-\frac{i\,(b+i\,c)^2}{4\,d}-g+i\,e\right)\right)\right)$$

Involving $\sin(d\,z)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0575.01

$$\int \sin(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{2}i\sqrt{\frac{\pi}{2}}\left(\frac{i\,S\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\sqrt{2\pi}}\right)\sinh\left(\frac{(i\,f-d)^2}{4\,c}\right)-\cosh\left(\frac{(i\,f-d)^2}{4\,c}\right)C\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\sqrt{2\pi}}\right)}{\sqrt{i\,c}}-\frac{\cosh\left(\frac{(d+i\,f)^2}{4\,c}\right)C\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\sqrt{2\pi}}\right)+i\,S\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\sqrt{2\pi}}\right)\sinh\left(\frac{(d+i\,f)^2}{4\,c}\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.0576.01

$$\int \sin(d\,z)\sinh\left(\sqrt{z}\, c+f\,z\right)dz = \frac{1}{4}i\left(-\frac{1}{(i\,f-d)^{3/2}}\left(-i\,c\sqrt{2\pi}\cos\left(\frac{c^2}{4\,(i\,f-d)}\right)C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(i\,f-d)}\right)+2\sqrt{i\,f-d}\sin\left(i\,c\sqrt{z}+(i\,f-d)\,z\right)\right)-\frac{1}{(-d-i\,f)^{3/2}}\left(c\,i\sqrt{2\pi}\cos\left(\frac{c^2}{4\,(d+i\,f)}\right)C\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(d+i\,f)}\right)+2\sqrt{-d-i\,f}\sin\left(i\,c\sqrt{z}+(d+i\,f)\,z\right)\right)\right)$$

Involving $\sin(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0577.01

$$\int \sin(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{i\,S\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f-d)^2}{4\,c}+i\,e\right)-\cosh\left(\frac{(i\,f-d)^2}{4\,c}+i\,e\right)C\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)}{\sqrt{i\,c}} - \frac{\cos\left(\frac{i\,(d+i\,f)^2}{4\,c}+e\right)C\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{i\,(d+i\,f)^2}{4\,c}+e\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.0578.01

$$\int \sin(e+d\,z)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{4}\,i\left(-\frac{1}{(i\,f-d)^{3/2}}\left(-i\,c\sqrt{2\,\pi}\,\cos\left(e-\frac{c^2}{4\,(i\,f-d)}\right)C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\,\pi}}\right)-i\,c\sqrt{2\,\pi}\,S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\,\pi}}\right)\sin\left(e-\frac{c^2}{4\,(i\,f-d)}\right)-2\sqrt{i\,f-d}\,\sin\left(e-(i\,f-d)\,z-i\,c\sqrt{z}\right)\right) - \frac{1}{(-d-i\,f)^{3/2}}\left(c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(d+i\,f)}+e\right)C\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,S\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(d+i\,f)}+e\right)+2\sqrt{-d-i\,f}\,\sin\left(e+(d+i\,f)\,z+i\,c\sqrt{z}\right)\right)\right)$$

Involving $\sin\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0579.01

$$\int \sin\left(b\,z^2\right)\sinh\left(c\,z^2+f\,z\right)dz = -\frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{f^2}{4\,(i\,c-b)}\right)C\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\,\pi}}\right)-S\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{f^2}{4\,(i\,c-b)}\right)}{\sqrt{i\,c-b}} + \frac{\cos\left(\frac{f^2}{4\,(-b-i\,c)}\right)C\left(\frac{i\,f+2\,(b+i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\,\pi}}\right)-S\left(\frac{i\,f+2\,(b+i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{f^2}{4\,(-b-i\,c)}\right)}{\sqrt{-b-i\,c}}\right)$$

01.19.21.0580.01

$$\int \sin\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = -\frac{1}{4}\,i\left(\frac{1}{(-i\,f)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\,\cosh\left(\frac{(b+i\,c)^2}{4\,f}\right)C\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)+2\sqrt{-i\,f}\,\sin\left(\sqrt{z}\,(b+i\,c)+i\,f\,z\right)+(i\,b-c)\sqrt{2\pi}\,S\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(b+i\,c)^2}{4\,f}\right)\right)+\frac{1}{(i\,f)^{3/2}}\left((b-i\,c)\sqrt{2\pi}\,\cosh\left(\frac{(i\,c-b)^2}{4\,f}\right)C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)+(i\,c-b)\,i\sqrt{2\pi}\,S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(i\,c-b)^2}{4\,f}\right)-2\,i\sqrt{i\,f}\,\sinh\left(i\,(i\,c-b)\sqrt{z}-f\,z\right)\right)\right)$$

Involving $\sin\left(b\,z^r+e\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0581.01

$$\int \sin\left(b\,z^2+e\right)\sinh\left(c\,z^2+f\,z\right)dz = -\frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(e-\frac{f^2}{4\,(i\,c-b)}\right)C\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)+S\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)\sin\left(e-\frac{f^2}{4\,(i\,c-b)}\right)}{\sqrt{i\,c-b}}+\frac{\cos\left(e-\frac{f^2}{4\,(-b-i\,c)}\right)C\left(\frac{i\,f+2\,(b+i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{i\,f+2\,(b+i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)\sin\left(e-\frac{f^2}{4\,(-b-i\,c)}\right)}{\sqrt{-b-i\,c}}\right)$$

01.19.21.0582.01

$$\int \sin\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = -\frac{1}{4}\,i\left(\frac{1}{(-i\,f)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\,\cos\left(\frac{i\,(b+i\,c)^2}{4\,f}+e\right)C\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)+(b+i\,c)\sqrt{2\pi}\,S\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(b+i\,c)^2}{4\,f}+e\right)+2\sqrt{-i\,f}\,\sin\left(\sqrt{z}\,(b+i\,c)+e+i\,f\,z\right)\right)+\frac{1}{(i\,f)^{3/2}}\left((b-i\,c)\sqrt{2\pi}\,\cosh\left(\frac{(i\,c-b)^2}{4\,f}+i\,e\right)C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)+(i\,c-b)\,i\sqrt{2\pi}\,S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(i\,c-b)^2}{4\,f}+i\,e\right)-2\,i\sqrt{i\,f}\,\sinh\left(-i\,e+i\,(i\,c-b)\sqrt{z}-f\,z\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0583.01

$$\int \sin\left(b z^2 + d z\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{\cos\left(+\frac{(i f-d)^2}{4 (i c-b)}\right) C\left(\frac{-d+i f+2 (i c-b) z}{\sqrt{i c-b} \sqrt{2 \pi}}\right) + S\left(\frac{-d+i f+2 (i c-b) z}{\sqrt{i c-b} \sqrt{2 \pi}}\right) \sin\left(\frac{(i f-d)^2}{4 (i c-b)}\right)}{\sqrt{i c-b}} - \frac{\cos\left(\frac{(d+i f)^2}{4 (b+i c)}\right) C\left(\frac{d+i f+2 (b+i c) z}{\sqrt{-b-i c} \sqrt{2 \pi}}\right) - S\left(\frac{d+i f+2 (b+i c) z}{\sqrt{-b-i c} \sqrt{2 \pi}}\right) \sin\left(\frac{(d+i f)^2}{4 (b+i c)}\right)}{\sqrt{-b-i c}} \right)$$

01.19.21.0584.01

$$\int \sin\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = -\frac{1}{4} i \left(\frac{1}{(i f-d)^{3/2}} \left((b-i c) \sqrt{2 \pi} \cos\left(\frac{(i c-b)^2}{4 (i f-d)}\right) C\left(\frac{-b+i c+2 (i f-d) \sqrt{z}}{\sqrt{i f-d} \sqrt{2 \pi}}\right) - (i c-b) \sqrt{2 \pi}\, S\left(\frac{-b+i c+2 (i f-d) \sqrt{z}}{\sqrt{i f-d} \sqrt{2 \pi}}\right) \sin\left(\frac{(i c-b)^2}{4 (i f-d)}\right) + 2 \sqrt{i f-d} \sin\left(\sqrt{z} (i c-b) + (i f-d) z\right) \right) + \frac{1}{(-d-i f)^{3/2}} \left((b+i c) \sqrt{2 \pi} \cos\left(\frac{(-b-i c)^2}{4 (-d-i f)}\right) C\left(\frac{b+i c+2 (d+i f) \sqrt{z}}{\sqrt{-d-i f} \sqrt{2 \pi}}\right) - (-b-i c) \sqrt{2 \pi}\, S\left(\frac{b+i c+2 (d+i f) \sqrt{z}}{\sqrt{-d-i f} \sqrt{2 \pi}}\right) \sin\left(\frac{(-b-i c)^2}{4 (-d-i f)}\right) + 2 \sqrt{-d-i f} \sin\left(\sqrt{z} (b+i c) + (d+i f) z\right) \right) \right)$$

Involving $\sin\left(b z^r + d z + e\right) \sinh\left(c z^r + f z\right)$

01.19.21.0585.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{\cos\left(e - \frac{(d+i f)^2}{4 (b+i c)}\right) C\left(\frac{d+i f+2 (b+i c) z}{\sqrt{-b-i c} \sqrt{2 \pi}}\right) + S\left(\frac{d+i f+2 (b+i c) z}{\sqrt{-b-i c} \sqrt{2 \pi}}\right) \sin\left(e - \frac{(d+i f)^2}{4 (b+i c)}\right)}{\sqrt{-b-i c}} - \frac{\cosh\left(\frac{i (i f-d)^2}{4 (i c-b)} + i e\right) C\left(\frac{-d+i f+2 (i c-b) z}{\sqrt{i c-b} \sqrt{2 \pi}}\right) - i\, S\left(\frac{-d+i f+2 (i c-b) z}{\sqrt{i c-b} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f-d)^2}{4 (i c-b)} + i e\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0586.01

$$\int \sin\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = -\frac{1}{4} i \left(\frac{1}{(-d - i f)^{3/2}} \left((b + i c) \sqrt{2\pi} \cos\left(\frac{(-b - i c)^2}{4(-d - i f)} + e \right) C\left(\frac{b + i c + 2(d + i f)\sqrt{z}}{\sqrt{-d - i f}\, \sqrt{2\pi}} \right) - (-b - i c)\sqrt{2\pi}\, S\left(\frac{b + i c + 2(d + i f)\sqrt{z}}{\sqrt{-d - i f}\, \sqrt{2\pi}} \right) \sin\left(\frac{(-b - i c)^2}{4(-d - i f)} + e \right) + 2\sqrt{-d - i f}\, \sin\left(\sqrt{z}\,(b + i c) + e + (d + i f) z\right) \right) + \frac{1}{(i f - d)^{3/2}} \left((b - i c)\sqrt{2\pi} \cosh\left(\frac{i (i c - b)^2}{4(i f - d)} + i e \right) C\left(\frac{-b + i c + 2(i f - d)\sqrt{z}}{\sqrt{i f - d}\, \sqrt{2\pi}} \right) - 2\sqrt{i f - d}\, \sin\left(-\sqrt{z}\,(i c - b) + e - (i f - d) z\right) + (i c - b)\, i \sqrt{2\pi}\, S\left(\frac{-b + i c + 2(i f - d)\sqrt{z}}{\sqrt{i f - d}\, \sqrt{2\pi}} \right) \sinh\left(\frac{i (i c - b)^2}{4(i f - d)} + i e \right) \right) \right)$$

Involving $\sin(d\, z) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0587.01

$$\int \sin(d\, z) \sinh\left(c\, z^2 + f\, z + g\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{i\, S\left(\frac{-d + i f + 2 i c z}{\sqrt{i c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(i f - d)^2}{4 c} + g\right) - \cosh\left(\frac{(i f - d)^2}{4 c} + g\right) C\left(\frac{-d + i f + 2 i c z}{\sqrt{i c}\, \sqrt{2\pi}}\right)}{\sqrt{i c}} - \frac{\cos\left(\frac{i (d + i f)^2}{4 c} + i g\right) C\left(\frac{d + i f + 2 i c z}{\sqrt{-i c}\, \sqrt{2\pi}}\right) + S\left(\frac{d + i f + 2 i c z}{\sqrt{-i c}\, \sqrt{2\pi}}\right) \sin\left(\frac{i (d + i f)^2}{4 c} + i g\right)}{\sqrt{-i c}} \right)$$

01.19.21.0588.01

$$\int \sin(d\, z) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{4} i \left(-\frac{1}{(-d - i f)^{3/2}} \left(c\, i \sqrt{2\pi} \cos\left(\frac{c^2}{4(d + i f)} + i g \right) C\left(\frac{2\sqrt{z}\,(d + i f) + i c}{\sqrt{-d - i f}\, \sqrt{2\pi}} \right) + c\, i \sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\,(d + i f) + i c}{\sqrt{-d - i f}\, \sqrt{2\pi}} \right) \sin\left(\frac{c^2}{4(d + i f)} + i g \right) + 2\sqrt{-d - i f}\, \sin\left(i g + i c \sqrt{z} + (d + i f) z\right) \right) - \frac{1}{(i f - d)^{3/2}} \left(-i c \sqrt{2\pi} \cosh\left(\frac{i c^2}{4(i f - d)} - g \right) C\left(\frac{2\sqrt{z}\,(i f - d) + i c}{\sqrt{i f - d}\, \sqrt{2\pi}} \right) + 2\sqrt{i f - d}\, \sin\left(i g + i c \sqrt{z} + (i f - d) z\right) + c\sqrt{2\pi}\, S\left(\frac{2\sqrt{z}\,(i f - d) + i c}{\sqrt{i f - d}\, \sqrt{2\pi}} \right) \sinh\left(\frac{i c^2}{4(i f - d)} - g \right) \right) \right)$$

Involving $\sin(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0589.01

$$\int \sin(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{i\,S\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f-d)^2}{4\,c}+g+i\,e\right)-\cosh\left(\frac{(i\,f-d)^2}{4\,c}+g+i\,e\right)C\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)}{\sqrt{i\,c}}-\frac{\cos\left(\frac{i\,(d+i\,f)^2}{4\,c}+e+i\,g\right)C\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)+S\left(\frac{d+i\,f+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{i\,(d+i\,f)^2}{4\,c}+e+i\,g\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.0590.01

$$\int \sin(e+d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\,i\left(-\frac{1}{(-d-i\,f)^{3/2}}\left(c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(d+i\,f)}+e+i\,g\right)C\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,S\left(\frac{2\sqrt{z}\,(d+i\,f)+i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(d+i\,f)}+e+i\,g\right)+2\sqrt{-d-i\,f}\,\sin\left(e+i\,g+(d+i\,f)\,z+i\,c\sqrt{z}\right)\right)-\frac{1}{(i\,f-d)^{3/2}}\left(-i\,c\sqrt{2\,\pi}\,\cosh\left(\frac{i\,c^2}{4\,(i\,f-d)}-g-i\,e\right)C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\,\pi}}\right)-2\sqrt{i\,f-d}\,\sin\left(e-i\,g-(i\,f-d)\,z-i\,c\sqrt{z}\right)+c\sqrt{2\,\pi}\,S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,c^2}{4\,(i\,f-d)}-g-i\,e\right)\right)\right)$$

Involving $\sin\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0591.01

$$\int \sin\left(b\,z^2\right)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(-\frac{-\cos\left(i\,g-\frac{f^2}{4\,(-b-i\,c)}\right)C\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\,\pi}}\right)-S\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(i\,g-\frac{f^2}{4\,(-b-i\,c)}\right)}{\sqrt{-b-i\,c}}-\frac{\cosh\left(\frac{i\,f^2}{4\,(i\,c-b)}-g\right)C\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\,\pi}}\right)+i\,S\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,f^2}{4\,(i\,c-b)}-g\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0592.01

$$\int \sin\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = -\frac{1}{4}\,i\left(\frac{1}{(-i\,f)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\,\cos\left(\frac{i\,(b+i\,c)^2}{4\,f}+i\,g\right)C\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)+(b+i\,c)\sqrt{2\pi}\,S\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(b+i\,c)^2}{4\,f}+i\,g\right)+2\sqrt{-i\,f}\,\sin\left(\sqrt{z}\,(b+i\,c)+i\,g+i\,f\,z\right)\right)+\frac{1}{(i\,f)^{3/2}}\left((b-i\,c)\sqrt{2\pi}\,\cosh\left(\frac{(i\,c-b)^2}{4\,f}+g\right)C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)+(i\,c-b)\,i\sqrt{2\pi}\,S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(i\,c-b)^2}{4\,f}+g\right)-2\,i\sqrt{i\,f}\,\sinh\left(-g-f\,z+(i\,c-b)\,i\sqrt{z}\right)\right)\right)$$

Involving $\sin\left(b\,z^r+e\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0593.01

$$\int \sin\left(b\,z^2+e\right)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(-\frac{1}{\sqrt{-b-i\,c}}\left(-\cos\left(-\frac{f^2}{4\,(-b-i\,c)}+e+i\,g\right)C\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)-S\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{f^2}{4\,(-b-i\,c)}+e+i\,g\right)\right)-\frac{1}{\sqrt{i\,c-b}}\left(\cosh\left(\frac{i\,f^2}{4\,(i\,c-b)}-g-i\,e\right)C\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)+i\,S\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)\sinh\left(\frac{i\,f^2}{4\,(i\,c-b)}-g-i\,e\right)\right)\right)$$

01.19.21.0594.01

$$\int \sin\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = -\frac{1}{4}\,i\left(\frac{1}{(-i\,f)^{3/2}}\left((b+i\,c)\sqrt{2\pi}\,\cos\left(\frac{i\,(b+i\,c)^2}{4\,f}+e+i\,g\right)C\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)+(b+i\,c)\sqrt{2\pi}\,S\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(b+i\,c)^2}{4\,f}+e+i\,g\right)+2\sqrt{-i\,f}\,\sin\left(\sqrt{z}\,(b+i\,c)+e+i\,g+i\,f\,z\right)\right)+\frac{1}{(i\,f)^{3/2}}\left((b-i\,c)\sqrt{2\pi}\,\cosh\left(\frac{(i\,c-b)^2}{4\,f}+g+i\,e\right)C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)+(i\,c-b)\,i\sqrt{2\pi}\,S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(i\,c-b)^2}{4\,f}+g+i\,e\right)-2\,i\sqrt{i\,f}\,\sinh\left(-g-i\,e-f\,z+(i\,c-b)\,i\sqrt{z}\right)\right)\right)$$

Involving $\sin\left(b\,z^r+d\,z\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0595.01

$$\int \sin(b z^2 + d z)\sinh(c z^2 + f z + g)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{\cos\left(-\frac{(d+i f)^2}{4(b+i c)} + i g\right) C\left(\frac{d+i f+2(b+i c) z}{\sqrt{-b-i c}\sqrt{2\pi}}\right) + S\left(\frac{d+i f+2(b+i c) z}{\sqrt{-b-i c}\sqrt{2\pi}}\right) \sin\left(-\frac{(d+i f)^2}{4(b+i c)} + i g\right)}{\sqrt{-b-i c}} - \frac{1}{\sqrt{i c-b}} \left(\cosh\left(\frac{i(i f-d)^2}{4(i c-b)} + g\right) C\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b}\sqrt{2\pi}}\right) - i S\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b}\sqrt{2\pi}}\right) \sinh\left(\frac{i(i f-d)^2}{4(i c-b)} + g\right)\right)\right)$$

01.19.21.0596.01

$$\int \sin(\sqrt{z}\, b + d z)\sinh(\sqrt{z}\, c + g + f z)\, dz = -\frac{1}{4} i \left(\frac{1}{(-d-i f)^{3/2}} \left((b+i c)\sqrt{2\pi} \cos\left(\frac{(-b-i c)^2}{4(-d-i f)} + i g\right) C\left(\frac{b+i c+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right) - (-b-i c)\sqrt{2\pi}\, S\left(\frac{b+i c+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right) \sin\left(\frac{(-b-i c)^2}{4(-d-i f)} + i g\right) + 2\sqrt{-d-i f}\, \sin\left(i g + (b+i c)\sqrt{z} + (d+i f) z\right)\right) + \frac{1}{(i f-d)^{3/2}} \left((b-i c)\sqrt{2\pi} \cosh\left(\frac{i(i c-b)^2}{4(i f-d)} + g\right) C\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\sqrt{2\pi}}\right) + 2\sqrt{i f-d}\, \sin\left(\sqrt{z}(i c-b) + i g + (i f-d) z\right) + (i c-b) i \sqrt{2\pi}\, S\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\sqrt{2\pi}}\right) \sinh\left(\frac{i(i c-b)^2}{4(i f-d)} + g\right)\right)\right)$$

Involving $\sin(b z^r + d z + e)\sinh(c z^r + f z + g)$

01.19.21.0597.01

$$\int \sin(b z^2 + d z + e)\sinh(c z^2 + f z + g)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(-\frac{1}{\sqrt{-b-i c}} \left(\cos\left(-\frac{(d+i f)^2}{4(b+i c)} + e + i g\right) C\left(\frac{d+i f+2(b+i c) z}{\sqrt{-b-i c}\sqrt{2\pi}}\right) + S\left(\frac{d+i f+2(b+i c) z}{\sqrt{-b-i c}\sqrt{2\pi}}\right) \sin\left(-\frac{(d+i f)^2}{4(b+i c)} + e + i g\right)\right) - \frac{1}{\sqrt{i c-b}} \left(\cosh\left(\frac{i(i f-d)^2}{4(i c-b)} + g + i e\right) C\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b}\sqrt{2\pi}}\right) - i S\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b}\sqrt{2\pi}}\right) \sinh\left(\frac{i(i f-d)^2}{4(i c-b)} + g + i e\right)\right)\right)$$

01.19.21.0598.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{\sqrt[4]{-1}\, e^{-\frac{i\left(d^2+2 i f d-f^2\right)}{4(b+i c)}+i(e+i g)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d+i f+2 b z+2 i c z)}{2\sqrt{b+i c}}\right)}{8\sqrt{b+i c}} + \frac{(-1)^{3/4} e^{\frac{i\left(d^2-2 i f d-f^2\right)}{4(b-i c)}-i(e-i g)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{(-1)^{3/4}(d-i f+2 b z-2 i c z)}{2\sqrt{b-i c}}\right)}{8\sqrt{b-i c}} - \frac{(-1)^{3/4} e^{-\frac{-i d^2+2 f d+f^2 i}{4(b+i c)}-i(e+i g)} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{(-1)^{3/4}(d+i f+2 b z+2 i c z)}{2\sqrt{b+i c}}\right)}{8\sqrt{b+i c}} - \frac{\sqrt[4]{-1}\, e^{i(e-i g)-\frac{i d^2+2 f d-i f^2}{4(b-i c)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d-i f+2 b z-2 i c z)}{2\sqrt{b-i c}}\right)}{8\sqrt{b-i c}}$$

01.19.21.0599.01

$$\int \sin\left(\sqrt{z}\, b + e + d z\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = -\frac{1}{4} i \left(\frac{1}{(-d-i f)^{3/2}} \left((b+i c)\sqrt{2\pi} \cos\left(\frac{(-b-i c)^2}{4(-d-i f)} + e + i g\right) C\left(\frac{b+i c+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\,\sqrt{2\pi}}\right) - (-b-i c)\sqrt{2\pi}\, S\left(\frac{b+i c+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\,\sqrt{2\pi}}\right) \sin\left(\frac{(-b-i c)^2}{4(-d-i f)} + e + i g\right) + 2\sqrt{-d-i f}\, \sin\left(e + i g + (b+i c)\sqrt{z} + (d+i f) z\right)\right) + \frac{1}{(i f-d)^{3/2}} \left((b-i c)\sqrt{2\pi} \cosh\left(\frac{i(i c-b)^2}{4(i f-d)} + g + i e\right) C\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\,\sqrt{2\pi}}\right) - 2\sqrt{i f-d}\, \sin\left(-\sqrt{z}\,(i c-b) + e - i g - (i f-d) z\right) + (i c-b)\, i\sqrt{2\pi}\, S\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\,\sqrt{2\pi}}\right) \sinh\left(\frac{i(i c-b)^2}{4(i f-d)} + g + i e\right)\right)\right)$$

01.19.21.0600.01

$$\int \sin\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + f z + g\right) dz = -\frac{1}{8} i \left(\sqrt{\pi} \left(\frac{1}{\sqrt{i d-f}\,(d+i f)} \left(i(b+i c)\, e^{-\frac{i(b+i c)^2}{4(d+i f)}-g-i e} \left(e^{2 i e} \operatorname{erf}\left(\frac{b+i c+2(d+i f)\sqrt{z}}{2\sqrt{i d-f}}\right) + e^{\frac{i(b+i c)^2}{2(d+i f)}+2 g} \operatorname{erfi}\left(\frac{b+i c+2(d+i f)\sqrt{z}}{2\sqrt{i d-f}}\right)\right)\right) + \frac{1}{(f+i d)^{3/2}} \left((c+i b)\left(-e^{\frac{(c+i b)^2}{4(f+i d)}-g-i e} \operatorname{erf}\left(\frac{c+i b+2(f+i d)\sqrt{z}}{2\sqrt{f+i d}}\right) - e^{-\frac{(c+i b)^2}{4(f+i d)}+g+i e} \operatorname{erfi}\left(\frac{c+i b+2(f+i d)\sqrt{z}}{2\sqrt{f+i d}}\right)\right)\right)\right) + \frac{4\sin\left(\sqrt{z}\, b + e - i g + d z - i f z - i c\sqrt{z}\right)}{d - i f} - \frac{4\sin\left(\sqrt{z}\, b + e + i g + d z + i f z + i c\sqrt{z}\right)}{d + i f}\right)$$

Involving powers of sin

Involving $\sin^{\mu}(c z) \sinh(a z)$

01.19.21.0601.01

$$\int \sin^{\mu}(c z) \sinh(a z)\, dz = \frac{1}{2\left(a^2+c^2 \mu^2\right)} \left(e^{-a z}\left(1-e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left((a - i c \mu)\, {}_2F_1\!\left(\frac{i (a+i c \mu)}{2 c}, -\mu; 1+\frac{i a}{2 c}-\frac{\mu}{2}; e^{2 i c z}\right) + e^{2 a z} (a + i c \mu)\, {}_2F_1\!\left(-\frac{i a + c \mu}{2 c}, -\mu; \frac{1}{2}\left(2-\frac{i a}{c}-\mu\right); e^{2 i c z}\right)\right)\right)$$

01.19.21.0602.01

$$\int \sin^{m}(c z) \sinh(a z)\, dz = \frac{2^{-m} \cosh(a z) (1-m \bmod 2)}{a} \binom{m}{\frac{m}{2}} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{a^2+c^2 (m-2 k)^2} \left((-1)^k e^{-\frac{1}{2} i (2 c z m+\pi m-2 i a z+4 c k z)} \left(a\left(1+e^{2 a z}\right)\left(e^{2 i c m z}+e^{i (\pi m+4 c k z)}\right)+c\left(-1+e^{2 a z}\right)\left(-e^{2 i c m z}+e^{i (\pi m+4 c k z)}\right) i (m-2 k)\right)\binom{m}{k}\right) /; m \in \mathbb{N}^+$$

01.19.21.0603.01

$$\int \sin^{2}(z) \sinh(z)\, dz = \frac{1}{10} (-(\cos(2 z)-5) \cosh(z) - 2 \sin(2 z) \sinh(z))$$

01.19.21.0604.01

$$\int \sin^{3}(z) \sinh(z)\, dz = \frac{1}{40} (3 (\cos(3 z)-5 \cos(z)) \sinh(z) - \cosh(z) (\sin(3 z)-15 \sin(z)))$$

Involving $\sin^{\mu}(c z+d) \sinh(a z)$

01.19.21.0605.01

$$\int \sin^{\mu}(d+c z) \sinh(a z)\, dz = \frac{1}{2\left(a^2+c^2 \mu^2\right)} e^{-a z}\left(1-e^{2 i (d+c z)}\right)^{-\mu} \sin^{\mu}(d+c z) \left(e^{2 a z} (a+i c \mu)\, {}_2F_1\!\left(-\frac{i a+c \mu}{2 c}, -\mu; \frac{1}{2}\left(2-\frac{i a}{c}-\mu\right); e^{2 i (d+c z)}\right) + (a-i c \mu)\, {}_2F_1\!\left(\frac{i (a+i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(2+\frac{i a}{c}-\mu\right); e^{2 i (d+c z)}\right)\right)$$

01.19.21.0606.01

$$\int \sin^{m}(d+c z) \sinh(a z)\, dz = \frac{2^{-m} \cosh(a z) \binom{m}{\frac{m}{2}} (1-m \bmod 2)}{a} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{a^2+c^2 (m-2 k)^2} \left((-1)^k \binom{m}{k} e^{-\frac{1}{2} i (2 c z m+\pi m+2 d (2 k+m)-2 i a z+4 c k z)} \left(a\left(1+e^{2 a z}\right)\left(e^{2 i m (d+c z)}+e^{i (4 d k+4 c z k+m \pi)}\right)+c\left(-1+e^{2 a z}\right)\left(-e^{2 i m (d+c z)}+e^{i (4 d k+4 c z k+m \pi)}\right) i (m-2 k)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^{\mu}(c z) \sinh(a z+b)$

01.19.21.0607.01

$$\int \sin^{\mu}(c z) \sinh(b + a z) \, dz = \frac{1}{2 (a^2 + c^2 \mu^2)} e^{-b-a z} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left(e^{2 (b+a z)} (a + i c \mu) \, {}_2F_1\left(-\frac{i a + c \mu}{2 c}, -\mu; \frac{1}{2}\left(2 - \frac{i a}{c} - \mu\right); e^{2 i c z}\right) + (a - i c \mu) \, {}_2F_1\left(\frac{i (a + i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(2 + \frac{i a}{c} - \mu\right); e^{2 i c z}\right)\right)$$

01.19.21.0608.01

$$\int \sin^{m}(c z) \sinh(b + a z) \, dz = \frac{2^{-m} \cosh(b + a z) \binom{m}{\frac{m}{2}} (1 - m \bmod 2)}{a} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{a^2 + c^2 (m - 2 k)^2} \left((-1)^k \binom{m}{k} e^{-b-\frac{1}{2} i (2 c z m + \pi m - 2 i a z + 4 c k z)} \left(a \left(1 + e^{2 (b+a z)}\right) \left(e^{2 i m c z} + e^{i (\pi m + 4 c k z)}\right) + c \left(-1 + e^{2 (b+a z)}\right) \left(-e^{2 i m c z} + e^{i (\pi m + 4 c k z)}\right) i (m - 2 k)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^{\mu}(c z + d) \sinh(a z + b)$

01.19.21.0609.01

$$\int \sin^{\mu}(d + c z) \sinh(b + a z) \, dz = \frac{1}{2 (a^2 + c^2 \mu^2)} e^{-b-a z} \left(1 - e^{2 i (d+c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \left(e^{2 (b+a z)} (a + i c \mu) \, {}_2F_1\left(-\frac{i a + c \mu}{2 c}, -\mu; \frac{1}{2}\left(2 - \frac{i a}{c} - \mu\right); e^{2 i (d+c z)}\right) + (a - i c \mu) \, {}_2F_1\left(\frac{i (a + i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(2 + \frac{i a}{c} - \mu\right); e^{2 i (d+c z)}\right)\right)$$

01.19.21.0610.01

$$\int \sin^{m}(d + c z) \sinh(b + a z) \, dz = \frac{2^{-m} \cosh(b + a z) (1 - m \bmod 2)}{a} \binom{m}{\frac{m}{2}} + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{a^2 + c^2 (m - 2 k)^2} \left((-1)^k \binom{m}{k} e^{-b-\frac{1}{2} i (2 c z m + \pi m + 2 d (2 k + m) - 2 i a z + 4 c k z)} \left(a \left(1 + e^{2 (b+a z)}\right) \left(e^{2 i m (d+c z)} + e^{i (4 d k + 4 c z k + m \pi)}\right) + c \left(-1 + e^{2 (b+a z)}\right) \left(-e^{2 i m (d+c z)} + e^{i (4 d k + 4 c z k + m \pi)}\right) i (m - 2 k)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^{m}\left(b z^r\right) \sinh(c z)$

01.19.21.0611.01

$$\int \sin^m(b z^2) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{c^2}{4 (2 b s - b m)} + \frac{m \pi}{2} \right) S\left(\frac{-i c + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i c + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{c^2}{4 (2 b s - b m)} + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{m \pi}{2} - \frac{c^2}{4 (b m - 2 b s)} \right) S\left(\frac{-i c + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) + C\left(\frac{-i c + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{c^2}{4 (b m - 2 b s)} - \frac{m \pi}{2} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (m \bmod 2 - 1)}{c} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0612.01

$$\int \sin^m(b \sqrt{z}) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cos\left(-\frac{\pi m}{2} - i c z + (b m - 2 b s) \sqrt{z} \right) - \sqrt{2 \pi} (b m - 2 b s) S\left(\frac{b m - 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \cos\left(\frac{(b m - 2 b s)^2 i}{4 c} + \frac{m \pi}{2} \right) - \sqrt{2 \pi} (2 b s - b m) C\left(\frac{b m - 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \sin\left(\frac{i (b m - 2 b s)^2}{4 c} + \frac{m \pi}{2} \right) \right) + \frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cosh\left(\frac{i \pi m}{2} + c z + i (2 b s - b m) \sqrt{z} \right) - \sqrt{2 \pi} (2 b s - b m) S\left(\frac{-b m + 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \cosh\left(\frac{(2 b s - b m)^2}{4 c} + \frac{i m \pi}{2} \right) - i \sqrt{2 \pi} (b m - 2 b s) C\left(\frac{-b m + 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \sinh\left(\frac{(2 b s - b m)^2}{4 c} + \frac{i m \pi}{2} \right) \right) \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e) \sinh(c z)$

01.19.21.0613.01

$$\int \sin^m\left(b z^2 + e\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{c^2}{4 (2 b s - b m)} + e (2 s - m) + \frac{m \pi}{2} \right) S\left(\frac{-i c + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i c + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{c^2}{4 (2 b s - b m)} + e (2 s - m) + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(-\frac{c^2}{4 (b m - 2 b s)} + e (2 s - m) + \frac{m \pi}{2} \right) S\left(\frac{-i c + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) + C\left(\frac{-i c + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{c^2}{4 (b m - 2 b s)} - e (2 s - m) - \frac{m \pi}{2} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (m \bmod 2 - 1)}{c} /; m \in \mathbb{N}^+$$

01.19.21.0614.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cos\left(e m - \frac{\pi m}{2} - 2 e s - i c z + (b m - 2 b s) \sqrt{z} \right) - \sqrt{2 \pi} (b m - 2 b s) S\left(\frac{b m - 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \cos\left(-\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s - \frac{m \pi}{2} \right) + \sqrt{2 \pi} (2 b s - b m) C\left(\frac{b m - 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \sin\left(-\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s - \frac{m \pi}{2} \right) \right) + \frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cosh\left(-i e m + \frac{i \pi m}{2} + 2 i e s + c z + i (2 b s - b m) \sqrt{z} \right) - \sqrt{2 \pi} (2 b s - b m) S\left(\frac{-b m + 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \cosh\left(\frac{(2 b s - b m)^2}{4 c} - i e m + 2 i e s + \frac{i m \pi}{2} \right) - i \sqrt{2 \pi} (b m - 2 b s) C\left(\frac{-b m + 2 b s - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2 \pi}} \right) \sinh\left(\frac{(2 b s - b m)^2}{4 c} - i e m + 2 i e s + \frac{i m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh(c z)$

01.19.21.0615.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{m \pi}{2} - \frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} \right) S\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{m \pi}{2} - \frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(S\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \cos\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} + \frac{m \pi}{2} \right) - \sin\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} + \frac{m \pi}{2} \right) C\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (m \bmod 2 - 1)}{c} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0616.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\left(-2 \sqrt{-i c - d m + 2 d s} \cos\left(\frac{\pi m}{2} + (-i c - d m + 2 d s) z + (2 b s - b m) \sqrt{z} \right) - \sqrt{2 \pi} (2 b s - b m) S\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c - d m + 2 d s}} \right) \cos\left(\frac{m \pi}{2} - \frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} \right) + \sqrt{2 \pi} (b m - 2 b s) C\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c - d m + 2 d s}} \right) \sin\left(\frac{m \pi}{2} - \frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} \right) \right) \Big/ (-i c - d m + 2 d s)^{3/2} + \left(-2 \sqrt{-i c + d m - 2 d s} \cos\left(-\frac{\pi m}{2} + (-i c + d m - 2 d s) z + (b m - 2 b s) \sqrt{z} \right) - \sqrt{2 \pi} (b m - 2 b s) S\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c + d m - 2 d s}} \right) \cos\left(\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} + \frac{m \pi}{2} \right) - \sqrt{2 \pi} (2 b s - b m) C\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c + d m - 2 d s}} \right) \sin\left(\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} + \frac{m \pi}{2} \right) \right) \Big/ (-i c + d m - 2 d s)^{3/2} \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z + e\right) \sinh(c z)$

01.19.21.0617.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} + e (2 s - m) + \frac{m \pi}{2} \right) S\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sin\left(-\frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} + e (2 s - m) + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(S\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \cos\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} + e (2 s - m) + \frac{m \pi}{2} \right) - \sin\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} + e (2 s - m) + \frac{m \pi}{2} \right) C\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (m \bmod 2 - 1)}{c} /;\, m \in \mathbb{N}^+$$

01.19.21.0618.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\left(\left(-2 \sqrt{-i c - d m + 2 d s} \cos\left(-e m + \frac{\pi m}{2} + 2 e s + (-i c - d m + 2 d s) z + (2 b s - b m) \sqrt{z} \right) - \sqrt{2 \pi} (2 b s - b m) S\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c - d m + 2 d s}} \right) \cos\left(-\frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} - e m + 2 e s + \frac{m \pi}{2} \right) + \sqrt{2 \pi} (b m - 2 b s) C\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c - d m + 2 d s}} \right) \sin\left(-\frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} - e m + 2 e s + \frac{m \pi}{2} \right) \right) \Big/ (-i c - d m + 2 d s)^{3/2} + \left(-2 \sqrt{-i c + d m - 2 d s} \cos\left(e m - \frac{\pi m}{2} - 2 e s + (-i c + d m - 2 d s) z + (b m - 2 b s) \sqrt{z} \right) - \sqrt{2 \pi} (b m - 2 b s) S\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c + d m - 2 d s}} \right) \cos\left(-\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} + e m - 2 e s - \frac{m \pi}{2} \right) + \sqrt{2 \pi} (2 b s - b m) C\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i c + d m - 2 d s}} \right) \sin\left(-\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} + e m - 2 e s - \frac{m \pi}{2} \right) \right) \Big/ (-i c + d m - 2 d s)^{3/2} \right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r\right)\sinh(f z+g)$

01.19.21.0619.01

$$\int \sin^m\left(b z^2\right)\sinh(g+f z)\,dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{\sqrt{2bs-bm}}\left(S\left(\frac{-i f+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)\cosh\left(\frac{i f^2}{4(2bs-bm)}+g+\frac{i m\pi}{2}\right)-i\sinh\left(\frac{i f^2}{4(2bs-bm)}+g+\frac{i m\pi}{2}\right)C\left(\frac{-i f+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)\right)+\frac{1}{\sqrt{bm-2bs}}\left(S\left(\frac{-i f+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)\cosh\left(\frac{i f^2}{4(bm-2bs)}+g-\frac{i m\pi}{2}\right)-i\sinh\left(\frac{i f^2}{4(bm-2bs)}+g-\frac{i m\pi}{2}\right)C\left(\frac{-i f+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)\right)\right)-\frac{\left(-\frac{1}{2}\right)^m\binom{m}{\frac{m}{2}}\cosh(g+f z)(m\bmod 2-1)}{f}\;/;\;m\in\mathbb{N}^+$$

01.19.21.0620.01

$$\int \sin^m\left(\sqrt{z}\,b\right)\sinh(g+f z)\,dz = \frac{\binom{m}{\frac{m}{2}}\cosh(g+f z)(1-m\bmod 2)\left(-\frac{1}{2}\right)^m}{f}+2^{-m-1}\,i\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{(-i f)^{3/2}}\left(-2\sqrt{-i f}\cosh\left(g+f z+i(2bs-bm)\sqrt{z}+\frac{i m\pi}{2}\right)-\sqrt{2\pi}(2bs-bm)S\left(\frac{-bm+2bs-2i f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right)\cosh\left(\frac{(2bs-bm)^2}{4f}+g+\frac{i m\pi}{2}\right)-i\sqrt{2\pi}(bm-2bs)C\left(\frac{-bm+2bs-2i f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right)\sinh\left(\frac{(2bs-bm)^2}{4f}+g+\frac{i m\pi}{2}\right)\right)+\frac{1}{(-i f)^{3/2}}\left(-2\sqrt{-i f}\cosh\left(g+f z+i(bm-2bs)\sqrt{z}-\frac{i m\pi}{2}\right)-\sqrt{2\pi}(bm-2bs)S\left(\frac{bm-2bs-2i f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right)\cosh\left(\frac{(bm-2bs)^2}{4f}+g-\frac{i m\pi}{2}\right)-i\sqrt{2\pi}(2bs-bm)C\left(\frac{bm-2bs-2i f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right)\sinh\left(\frac{(bm-2bs)^2}{4f}+g-\frac{i m\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+e\right)\sinh(f z+g)$

01.19.21.0621.01

$$\int \sin^m\left(b z^2 + e\right) \sinh(g + f z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(S\left(\frac{-i f + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \cosh\left(\frac{i f^2}{4 (2 b s - b m)} + g + e\, i (2 s - m) + \frac{i m \pi}{2} \right) - i \sinh\left(\frac{i f^2}{4 (2 b s - b m)} + g + e\, i (2 s - m) + \frac{i m \pi}{2} \right) C\left(\frac{-i f + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(S\left(\frac{-i f + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \cosh\left(\frac{i f^2}{4 (b m - 2 b s)} + g - i e (2 s - m) - \frac{i m \pi}{2} \right) - i \sinh\left(\frac{i f^2}{4 (b m - 2 b s)} + g - i e (2 s - m) - \frac{i m \pi}{2} \right) C\left(\frac{-i f + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0622.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right) \sinh(g + f z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g + f z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g - i e m + 2 i e s + f z + i (2 b s - b m) \sqrt{z} + \frac{i m \pi}{2} \right) - \sqrt{2\pi} (2 b s - b m) S\left(\frac{-b m + 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \cosh\left(\frac{(2 b s - b m)^2}{4 f} + g - i e m + 2 i e s + \frac{i m \pi}{2} \right) - i \sqrt{2\pi} (b m - 2 b s) C\left(\frac{-b m + 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \sinh\left(\frac{(2 b s - b m)^2}{4 f} + g - i e m + 2 i e s + \frac{i m \pi}{2} \right) \right) + \frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g + i e m - 2 i e s + f z + i (b m - 2 b s) \sqrt{z} - \frac{i m \pi}{2} \right) - \sqrt{2\pi} (b m - 2 b s) S\left(\frac{b m - 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \cosh\left(\frac{(b m - 2 b s)^2}{4 f} + g + i e m - 2 i e s - \frac{i m \pi}{2} \right) - i \sqrt{2\pi} (2 b s - b m) C\left(\frac{b m - 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \sinh\left(\frac{(b m - 2 b s)^2}{4 f} + g + i e m - 2 i e s - \frac{i m \pi}{2} \right) \right) \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh(f z + g)$

01.19.21.0623.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh(g + f z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(-i f - d m + 2 d s)^2}{4 (2 b s - b m)} - i g + \frac{m \pi}{2} \right) S\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sin\left(-\frac{(-i f - d m + 2 d s)^2}{4 (2 b s - b m)} - i g + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(S\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \cosh\left(-\frac{i (-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + g - \frac{i m \pi}{2} \right) - i \sinh\left(-\frac{i (-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + g - \frac{i m \pi}{2} \right) C\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0624.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh(g + f\, z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g + f\, z)\, (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1}\, i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\left(-2 \sqrt{-i\, f - d\, m + 2\, d\, s}\, \cosh\left(g + i\, (-i\, f - d\, m + 2\, d\, s)\, z + i\, (2\, b\, s - b\, m) \sqrt{z} + \frac{i\, m\, \pi}{2}\right) - \sqrt{2\, \pi}\, (2\, b\, s - b\, m)\, S\left(\frac{-b\, m + 2\, b\, s + 2\, (-i\, f - d\, m + 2\, d\, s) \sqrt{z}}{\sqrt{2\, \pi} \sqrt{-i\, f - d\, m + 2\, d\, s}}\right) \cosh\left(-\frac{i\, (2\, b\, s - b\, m)^2}{4\, (-i\, f - d\, m + 2\, d\, s)} + g + \frac{i\, m\, \pi}{2}\right) - i \sqrt{2\, \pi}\, (b\, m - 2\, b\, s)\, C\left(\frac{-b\, m + 2\, b\, s + 2\, (-i\, f - d\, m + 2\, d\, s) \sqrt{z}}{\sqrt{2\, \pi} \sqrt{-i\, f - d\, m + 2\, d\, s}}\right) \sinh\left(-\frac{i\, (2\, b\, s - b\, m)^2}{4\, (-i\, f - d\, m + 2\, d\, s)} + g + \frac{i\, m\, \pi}{2}\right) \right) \Big/ (-i\, f - d\, m + 2\, d\, s)^{3/2} + \left(-2 \sqrt{-i\, f + d\, m - 2\, d\, s}\, \cosh\left(g + i\, (-i\, f + d\, m - 2\, d\, s)\, z + i\, (b\, m - 2\, b\, s) \sqrt{z} - \frac{i\, m\, \pi}{2}\right) - \sqrt{2\, \pi}\, (b\, m - 2\, b\, s)\, S\left(\frac{b\, m - 2\, b\, s + 2\, (-i\, f + d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\, \pi} \sqrt{-i\, f + d\, m - 2\, d\, s}}\right) \cosh\left(-\frac{i\, (b\, m - 2\, b\, s)^2}{4\, (-i\, f + d\, m - 2\, d\, s)} + g - \frac{i\, m\, \pi}{2}\right) - i \sqrt{2\, \pi}\, (2\, b\, s - b\, m)\, C\left(\frac{b\, m - 2\, b\, s + 2\, (-i\, f + d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\, \pi} \sqrt{-i\, f + d\, m - 2\, d\, s}}\right) \sinh\left(-\frac{i\, (b\, m - 2\, b\, s)^2}{4\, (-i\, f + d\, m - 2\, d\, s)} + g - \frac{i\, m\, \pi}{2}\right) \right) \Big/ (-i\, f + d\, m - 2\, d\, s)^{3/2} \right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \sinh(f\, z + g)$

01.19.21.0625.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz ==$$

$$i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(-i f - d m + 2 d s)^2}{4 (2 b s - b m)} - i g + e (2 s - m) + \frac{m \pi}{2} \right) \right.\right.$$
$$S\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right)$$
$$\left.\sin\left(-\frac{(-i f - d m + 2 d s)^2}{4 (2 b s - b m)} - i g + e (2 s - m) + \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}}$$
$$\left(S\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \cosh\left(-\frac{i (-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + g - i e (2 s - m) - \frac{i m \pi}{2} \right) - \right.$$
$$\left.\left.\left. i \sinh\left(-\frac{i (-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + g - i e (2 s - m) - \frac{i m \pi}{2} \right) C\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \right) \right) -$$
$$\frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0626.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh(g + f\, z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g + f\, z)\, (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1}\, i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(\Bigg(\Bigg(-2 \sqrt{-i\, f - d\, m + 2\, d\, s}\, \cosh\left(g - i\, e\, m + 2\, i\, e\, s + i\, (-i\, f - d\, m + 2\, d\, s)\, z + i\, (2\, b\, s - b\, m) \sqrt{z} + \frac{i\, m\, \pi}{2}\right) - \sqrt{2\pi}\, (2\, b\, s - b\, m)\, S\left(\frac{-b\, m + 2\, b\, s + 2\, (-i\, f - d\, m + 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i\, f - d\, m + 2\, d\, s}}\right) \cosh\left(-\frac{i\, (2\, b\, s - b\, m)^2}{4\, (-i\, f - d\, m + 2\, d\, s)} + g - i\, e\, m + 2\, i\, e\, s + \frac{i\, m\, \pi}{2}\right) - i \sqrt{2\pi}\, (b\, m - 2\, b\, s)\, C\left(\frac{-b\, m + 2\, b\, s + 2\, (-i\, f - d\, m + 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i\, f - d\, m + 2\, d\, s}}\right) \sinh\left(-\frac{i\, (2\, b\, s - b\, m)^2}{4\, (-i\, f - d\, m + 2\, d\, s)} + g - i\, e\, m + 2\, i\, e\, s + \frac{i\, m\, \pi}{2}\right)\Bigg) \Bigg/ (-i\, f - d\, m + 2\, d\, s)^{3/2} + \Bigg(-2 \sqrt{-i\, f + d\, m - 2\, d\, s}\, \cosh\left(g + i\, e\, m - 2\, i\, e\, s + i\, (-i\, f + d\, m - 2\, d\, s)\, z + i\, (b\, m - 2\, b\, s) \sqrt{z} - \frac{i\, m\, \pi}{2}\right) - \sqrt{2\pi}\, (b\, m - 2\, b\, s)\, S\left(\frac{b\, m - 2\, b\, s + 2\, (-i\, f + d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i\, f + d\, m - 2\, d\, s}}\right) \cosh\left(-\frac{i\, (b\, m - 2\, b\, s)^2}{4\, (-i\, f + d\, m - 2\, d\, s)} + g + i\, e\, m - 2\, i\, e\, s - \frac{i\, m\, \pi}{2}\right) - i \sqrt{2\pi}\, (2\, b\, s - b\, m)\, C\left(\frac{b\, m - 2\, b\, s + 2\, (-i\, f + d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i\, f + d\, m - 2\, d\, s}}\right) \sinh\left(-\frac{i\, (b\, m - 2\, b\, s)^2}{4\, (-i\, f + d\, m - 2\, d\, s)} + g + i\, e\, m - 2\, i\, e\, s - \frac{i\, m\, \pi}{2}\right)\Bigg) \Bigg/ (-i\, f + d\, m - 2\, d\, s)^{3/2} \Bigg) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m(b\, z) \sinh(c\, z^r)$

01.19.21.0627.01

$$\int \sin^m(b z) \sinh(c z^2) \, dz = i \, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c}} \left(S\left(\frac{2 b k - b m - 2 i c z}{\sqrt{-i c} \sqrt{2 \pi}} \right) \cos\left(\frac{i (2 b k - b m)^2}{4 c} + \frac{m \pi}{2} \right) - \sin\left(\frac{i (2 b k - b m)^2}{4 c} + \frac{m \pi}{2} \right) C\left(\frac{2 b k - b m - 2 i c z}{\sqrt{-i c} \sqrt{2 \pi}} \right) \right) + \frac{1}{\sqrt{i c}} \left(-\cosh\left(\frac{(2 b k - b m)^2}{4 c} + \frac{i m \pi}{2} \right) S\left(\frac{2 b k - b m + 2 i c z}{\sqrt{i c} \sqrt{2 \pi}} \right) - i \, C\left(\frac{2 b k - b m + 2 i c z}{\sqrt{i c} \sqrt{2 \pi}} \right) \sinh\left(\frac{(2 b k - b m)^2}{4 c} + \frac{i m \pi}{2} \right) \right) \right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \, S\left(\frac{c \sqrt{\frac{2}{\pi}} \, z}{\sqrt{i c}} \right) /; m \in \mathbb{N}^+$$

01.19.21.0628.01

$$\int \sin^m(b z) \sinh(c \sqrt{z}) \, dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh(c \sqrt{z}) - \sinh(c \sqrt{z}) \right)}{c^2} + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{(2 b k - b m)^{3/2}} \left(-2 \sqrt{2 b k - b m} \cosh\left(\sqrt{z} \, c + i (2 b k - b m) z - \frac{i m \pi}{2} \right) + c \, i \sqrt{2 \pi} \cos\left(\frac{c^2}{4 (2 b k - b m)} - \frac{m \pi}{2} \right) S\left(\frac{-i c + 2 (2 b k - b m) \sqrt{z}}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) + c \, i \sqrt{2 \pi} \, C\left(\frac{-i c + 2 (2 b k - b m) \sqrt{z}}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{c^2}{4 (2 b k - b m)} - \frac{m \pi}{2} \right) \right) + \frac{1}{(2 b k - b m)^{3/2}} \left(2 \sqrt{2 b k - b m} \cosh\left(\sqrt{z} \, c - i (2 b k - b m) z + \frac{i m \pi}{2} \right) - c \sqrt{2 \pi} \, C\left(\frac{i c + 2 (2 b k - b m) \sqrt{z}}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sinh\left(\frac{i m \pi}{2} - \frac{i c^2}{4 (2 b k - b m)} \right) - c \sqrt{2 \pi} \, S\left(\frac{i c + 2 (2 b k - b m) \sqrt{z}}{\sqrt{2 b k - b m} \sqrt{2 \pi}} \right) \sinh\left(-\frac{i c^2}{4 (2 b k - b m)} - \frac{1}{2} i (1 - m) \pi \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(d z + e) \sinh(c z^r)$

01.19.21.0629.01

$$\int \sin^m(e+d\,z)\sinh(c\,z^2)\,dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\Bigg(\frac{1}{\sqrt{-i\,c}}\Bigg(\cos\Big(-\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}+e\,(2\,k-m)-\frac{m\,\pi}{2}\Big)S\Big(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\Big)+ C\Big(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\Big)\sin\Big(-\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}+e\,(2\,k-m)-\frac{m\,\pi}{2}\Big)\Bigg)+ \frac{1}{\sqrt{i\,c}}\Bigg(-\cosh\Big(\frac{(2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\Big)S\Big(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\Big)-i\,C\Big(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\Big) \sinh\Big(\frac{(2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\Big)\Bigg)\Bigg)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0630.01

$$\int \sin^m(e+d\,z)\sinh(c\sqrt{z})\,dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(c\sqrt{z}\,\cosh(c\sqrt{z})-\sinh(c\sqrt{z})\right)}{c^2}+ 2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\Bigg(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\Bigg(-2\sqrt{2\,d\,k-d\,m}\,\cosh\Big(\sqrt{z}\,c+2\,i\,e\,k-i\,e\,m+i\,(2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\Big)+ c\,i\sqrt{2\,\pi}\,\cos\Big(\frac{c^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{m\,\pi}{2}\Big)S\Big(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\Big)+ c\,i\sqrt{2\,\pi}\,C\Big(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\Big)\sin\Big(\frac{c^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{m\,\pi}{2}\Big)\Bigg)+ \frac{1}{(2\,d\,k-d\,m)^{3/2}}\Bigg(2\sqrt{2\,d\,k-d\,m}\,\cosh\Big(\sqrt{z}\,c-2\,i\,e\,k+i\,e\,m-i\,(2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\Big)- c\sqrt{2\,\pi}\,C\Big(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\Big)\sinh\Big(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}-2\,i\,e\,k+i\,e\,m+\frac{i\,m\,\pi}{2}\Big)- c\sqrt{2\,\pi}\,S\Big(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\Big)\sinh\Big(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}-2\,i\,e\,k+i\,e\,m-\frac{1}{2}\,i\,(1-m)\,\pi\Big)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(a\,z^r)\sinh(c\,z^r)$

01.19.21.0631.01

$$\int \sin^m(b z^r) \sinh(c z^r)\, dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left((c z^r)^{-1/r} \Gamma\left(\frac{1}{r}, c z^r\right) - (-c z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right) ((-c - 2 i b k + i b m) z^r)^{-1/r} + (-1)^{m+1} ((c - 2 i b k + i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + ((-c + 2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - ((c + 2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0632.01

$$\int \sin^m(b z^2) \sinh(c z^2)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\left(S\left(\sqrt{-i c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) \cos\left(\frac{m \pi}{2}\right) - \sin\left(\frac{m \pi}{2}\right) C\left(\sqrt{-i c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right)\right) \Big/ \left(\sqrt{-i c + 2 b k - b m}\right) + \frac{\sin\left(\frac{m\pi}{2}\right) C\left(\sqrt{i c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{i c + 2 b k - b m} \sqrt{\frac{2}{\pi}}\, z\right) \cos\left(\frac{m\pi}{2}\right)}{\sqrt{i c + 2 b k - b m}}\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) /; m \in \mathbb{N}^+$$

01.19.21.0633.01

$$\int \sin^m\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(c \sqrt{z}\right) - \sinh\left(c \sqrt{z}\right)\right)}{c^2} - i\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(i c + b (2 k - m))^2} \left(\sin\left(\sqrt{z}\, (i c + b (2 k - m)) + \frac{m \pi}{2}\right) - (i c + b (2 k - m)) \sqrt{z} \cos\left(\sqrt{z}\, (i c + b (2 k - m)) + \frac{m \pi}{2}\right)\right) + \frac{1}{(-i c + b (2 k - m))^2} \left((-i c + b (2 k - m)) \sqrt{z} \cosh\left(i \sqrt{z}\, (-i c + b (2 k - m)) + \frac{i m \pi}{2}\right) + i \sinh\left(i \sqrt{z}\, (-i c + b (2 k - m)) + \frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(a z^r + e) \sinh(c z^r)$

01.19.21.0634.01

$$\int \sin^m(b z^r + e)\sinh(c z^r)\, dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left((c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, c z^r\right) - (-c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{i^{-m}\, 2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big((-1)^m e^{2 i e k - i e m}\,\Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-1/r} + (-1)^{m+1} e^{2 i e k - i e m}\,((c - 2 i b k + i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + e^{i e m - 2 i e k}\,((-c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{i e m - 2 i e k}\,((c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\Big) /;\, m \in \mathbb{N}^+$$

01.19.21.0635.01

$$\int \sin^m\left(b z^2 + e\right)\sinh\left(c z^2\right) dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(e (2 k - m) - \frac{m \pi}{2}\right) S\left(\sqrt{-i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right) + C\left(\sqrt{-i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right) \sin\left(e (2 k - m) - \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i m \pi}{2} - i e (2 k - m)\right) S\left(\sqrt{i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right) - i\, C\left(\sqrt{i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right) \sinh\left(\frac{i m \pi}{2} - i e (2 k - m)\right)\right)\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) /;\, m \in \mathbb{N}^+$$

01.19.21.0636.01

$$\int \sin^m\left(\sqrt{z}\, b + e\right)\sinh\left(c \sqrt{z}\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z}\, \cosh\left(c \sqrt{z}\right) - \sinh\left(c \sqrt{z}\right)\right)}{c^2} - i\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(i c + b (2 k - m))^2} \left(-(i c + b (2 k - m)) \sqrt{z}\, \cos\left(-\sqrt{z}\, (i c + b (2 k - m)) + e (m - 2 k) - \frac{m \pi}{2}\right) - \sin\left(-\sqrt{z}\, (i c + b (2 k - m)) + e (m - 2 k) - \frac{m \pi}{2}\right)\right) + \frac{1}{(-i c + b (2 k - m))^2} \left((-i c + b (2 k - m)) \sqrt{z}\, \cosh\left(i \sqrt{z}\, (-i c + b (2 k - m)) - i e (m - 2 k) + \frac{i m \pi}{2}\right) + i \sinh\left(i \sqrt{z}\, (-i c + b (2 k - m)) - i e (m - 2 k) + \frac{i m \pi}{2}\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right)\sinh\left(c z^r\right)$

01.19.21.0637.01

$$\int \sin^m(b z^2 + d z) \sinh(c z^2)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(S\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) \cos\left(\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + \frac{m \pi}{2} \right) - \sin\left(\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + \frac{m \pi}{2} \right) C\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) \right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + \frac{i m \pi}{2} \right) S\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) - i\, C\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) \sinh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + \frac{i m \pi}{2} \right) \right) \right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}} \right) /; m \in \mathbb{N}^+$$

01.19.21.0638.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \sinh\left(c \sqrt{z}\right) dz = \frac{(-1)^m 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(c \sqrt{z}\right) - \sinh\left(c \sqrt{z}\right) \right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(2 d s - d m)^{3/2}} \left(2 \sqrt{2 d s - d m} \cosh\left(\frac{i \pi m}{2} + i (2 d s - d m) z + i (-i c - b m + 2 b s) \sqrt{z} \right) + \sqrt{2 \pi} (-i c - b m + 2 b s) \cosh\left(\frac{i m \pi}{2} - \frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)} \right) S\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d s - d m}} \right) + i \sqrt{2 \pi} (i c + b m - 2 b s)\, C\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d s - d m}} \right) \sinh\left(\frac{i m \pi}{2} - \frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)} \right) \right) + \frac{1}{(d m - 2 d s)^{3/2}} \left(2 \sqrt{d m - 2 d s} \cosh\left(-\frac{1}{2} i \pi m + i (d m - 2 d s) z + i (-i c + b m - 2 b s) \sqrt{z} \right) + \sqrt{2 \pi} (-i c + b m - 2 b s) \cosh\left(\frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} + \frac{i m \pi}{2} \right) S\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d m - 2 d s}} \right) - i \sqrt{2 \pi} (i c - b m + 2 b s)\, C\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d m - 2 d s}} \right) \sinh\left(\frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} + \frac{i m \pi}{2} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\sinh(c z^r)$

01.19.21.0639.01

$$\int \sin^m(b z^2 + d z + e)\sinh(c z^2)\,dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4(-i c + 2 b k - b m)} + e(2k - m) - \frac{m \pi}{2} \right) S\left(\frac{2 d k - d m + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\, \sqrt{2\pi}} \right) + C\left(\frac{2 d k - d m + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\, \sqrt{2\pi}} \right) \sin\left(-\frac{(2 d k - d m)^2}{4(-i c + 2 b k - b m)} + e(2k - m) - \frac{m \pi}{2} \right) \right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i(2 d k - d m)^2}{4(i c + 2 b k - b m)} - i e(2k - m) + \frac{i m \pi}{2} \right) S\left(\frac{2 d k - d m + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\, \sqrt{2\pi}} \right) - i\, C\left(\frac{2 d k - d m + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\, \sqrt{2\pi}} \right) \sinh\left(\frac{i(2 d k - d m)^2}{4(i c + 2 b k - b m)} - i e(2k - m) + \frac{i m \pi}{2} \right) \right) \right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}} \right) /;\ m \in \mathbb{N}^+$$

01.19.21.0640.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(c\sqrt{z}\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c\sqrt{z}\, \cosh\left(c\sqrt{z}\right) - \sinh\left(c\sqrt{z}\right)\right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s}$$

$$\Bigg(\frac{1}{(2\,d\,s - d\,m)^{3/2}} \Bigg(2\sqrt{2\,d\,s - d\,m}\, \cosh\left(-i\,e\,m + \frac{i\,\pi\,m}{2} + 2\,i\,e\,s + i\,(2\,d\,s - d\,m)\,z + i\,(-i\,c - b\,m + 2\,b\,s)\sqrt{z}\right) +$$

$$\sqrt{2\pi}\, (-i\,c - b\,m + 2\,b\,s) \cosh\left(-\frac{i\,(-i\,c - b\,m + 2\,b\,s)^2}{4\,(2\,d\,s - d\,m)} - i\,e\,m + 2\,i\,e\,s + \frac{i\,m\,\pi}{2}\right)$$

$$S\left(\frac{-i\,c - b\,m + 2\,b\,s + 2\,(2\,d\,s - d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,s - d\,m}}\right) + i\sqrt{2\pi}\, (i\,c + b\,m - 2\,b\,s)$$

$$C\left(\frac{-i\,c - b\,m + 2\,b\,s + 2\,(2\,d\,s - d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,s - d\,m}}\right) \sinh\left(-\frac{i\,(-i\,c - b\,m + 2\,b\,s)^2}{4\,(2\,d\,s - d\,m)} - i\,e\,m + 2\,i\,e\,s + \frac{i\,m\,\pi}{2}\right)\Bigg) +$$

$$\frac{1}{(d\,m - 2\,d\,s)^{3/2}} \Bigg(2\sqrt{d\,m - 2\,d\,s}\, \cosh\left(i\,e\,m - \frac{i\,\pi\,m}{2} - 2\,i\,e\,s + i\,(d\,m - 2\,d\,s)\,z + i\,(-i\,c + b\,m - 2\,b\,s)\sqrt{z}\right) +$$

$$\sqrt{2\pi}\, (-i\,c + b\,m - 2\,b\,s) \cosh\left(-\frac{i\,(-i\,c + b\,m - 2\,b\,s)^2}{4\,(d\,m - 2\,d\,s)} + i\,e\,m - 2\,i\,e\,s - \frac{i\,m\,\pi}{2}\right)$$

$$S\left(\frac{-i\,c + b\,m - 2\,b\,s + 2\,(d\,m - 2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m - 2\,d\,s}}\right) +$$

$$i\sqrt{2\pi}\, (i\,c - b\,m + 2\,b\,s)\, C\left(\frac{-i\,c + b\,m - 2\,b\,s + 2\,(d\,m - 2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m - 2\,d\,s}}\right)$$

$$\sinh\left(-\frac{i\,(-i\,c + b\,m - 2\,b\,s)^2}{4\,(d\,m - 2\,d\,s)} + i\,e\,m - 2\,i\,e\,s - \frac{i\,m\,\pi}{2}\right)\Bigg)\Bigg) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m(d\,z)\sinh\left(c\,z^r + g\right)$

01.19.21.0641.01

$$\int \sin^m(d\,z)\sinh\left(c\,z^2+g\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(S\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\cos\left(\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}+i\,g+\frac{m\,\pi}{2}\right)-\sin\left(\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}+i\,g+\frac{m\,\pi}{2}\right)C\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\right)+\frac{1}{\sqrt{i\,c}}\left(-\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+\frac{i\,m\,\pi}{2}\right)S\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)-i\,C\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+\frac{i\,m\,\pi}{2}\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh(g)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)-i\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\sinh(g)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0642.01

$$\int \sin^m(d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(c\sqrt{z}\cosh\left(\sqrt{z}\,c+g\right)-\sinh\left(\sqrt{z}\,c+g\right)\right)}{c^2}+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(-2\sqrt{2\,d\,k-d\,m}\cosh\left(\sqrt{z}\,c+g+i\,(2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\pi}\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\,C\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g-\frac{m\,\pi}{2}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\cosh\left(\sqrt{z}\,c+g-i\,(2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\right)-c\sqrt{2\pi}\,C\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g+\frac{i\,m\,\pi}{2}\right)-c\sqrt{2\pi}\,S\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g-\frac{1}{2}\,i\,(1-m)\,\pi\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh\left(c\,z^r+g\right)$

01.19.21.0643.01

$$\int \sin^m(e+d\,z)\sinh\left(c\,z^2+g\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cos\left(-\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}-i\,g+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)S\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)+C\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{i\,(2\,d\,k-d\,m)^2}{4\,c}-i\,g+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)\right)+\frac{1}{\sqrt{i\,c}}\left(-\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)S\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh(g)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)-i\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\sinh(g)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0644.01

$$\int \sin^m(e+d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(c\sqrt{z}\,\cosh\left(\sqrt{z}\,c+g\right)-\sinh\left(\sqrt{z}\,c+g\right)\right)}{c^2}+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(-2\sqrt{2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g+2\,i\,e\,k-i\,e\,m+i\,(2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g+2\,e\,k-e\,m-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g+2\,e\,k-e\,m-\frac{m\,\pi}{2}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g-2\,i\,e\,k+i\,e\,m-i\,(2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\right)-c\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g-2\,i\,e\,k+i\,e\,m+\frac{i\,m\,\pi}{2}\right)-c\sqrt{2\,\pi}\,S\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g-2\,i\,e\,k+i\,e\,m-\frac{1}{2}\,i\,(1-m)\,\pi\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(a\,z^r)\sinh(c\,z^r+g)$

01.19.21.0645.01

$$\int \sin^m(b z^r)\sinh(c z^r+g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left(e^{-g}(c z^r)^{-1/r}\Gamma\left(\frac{1}{r}, c z^r\right) - e^{g}(-c z^r)^{-1/r}\Gamma\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m e^g\,\Gamma\left(\frac{1}{r}, (-c-2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-1/r} + (-1)^{m+1} e^{-g}((c - 2 i b k + i b m) z^r)^{-1/r}\Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + e^g((-c + 2 i b k - i b m) z^r)^{-1/r}\Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{-g}((c + 2 i b k - i b m) z^r)^{-1/r}\Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0646.01

$$\int \sin^m(b z^2)\sinh(c z^2+g)\,dz = i\, 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i c + 2 b k - b m}}\left(S\left(\sqrt{-i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right)\cos\left(i g + \frac{m\pi}{2}\right) - \sin\left(i g + \frac{m\pi}{2}\right) C\left(\sqrt{-i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}}\left(-\cosh\left(g + \frac{i m\pi}{2}\right) S\left(\sqrt{i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right) - i\, C\left(\sqrt{i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right)\sinh\left(g + \frac{i m\pi}{2}\right)\right)\right) - \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i c}}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cosh(g)\, S\left(\frac{c\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) - i\, C\left(\frac{c\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right)\sinh(g)\right) /; m \in \mathbb{N}^+$$

01.19.21.0647.01

$$\int \sin^m\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\, c + g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(c\sqrt{z}\cosh\left(\sqrt{z}\, c + g\right) - \sinh\left(\sqrt{z}\, c + g\right)\right)}{c^2} - i\, 2^{1-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{(i c + b(2k-m))^2}\left(\sin\left(i g + \frac{m\pi}{2} + (i c + b(2k-m))\sqrt{z}\right) - (i c + b(2k-m))\sqrt{z}\cos\left(i g + \frac{m\pi}{2} + (i c + b(2k-m))\sqrt{z}\right)\right) + \frac{1}{(-i c + b(2k-m))^2}\left((-i c + b(2k-m))\sqrt{z}\cosh\left(g + i(-i c + b(2k-m))\sqrt{z} + \frac{i m\pi}{2}\right) + i\sinh\left(g + i(-i c + b(2k-m))\sqrt{z} + \frac{i m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(a z^r + e)\sinh(c z^r + g)$

01.19.21.0648.01

$$\int \sin^m(b z^r + e) \sinh(c z^r + g) \, dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left(e^{-g} (c z^r)^{-1/r} \Gamma\left(\frac{1}{r}, c z^r\right) - e^g (-c z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -c z^r\right)\right) (1 - m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{g+2 i e k - i e m} \Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right) ((-c - 2 i b k + i b m) z^r)^{-1/r} + (-1)^{m+1} e^{-g+2 i e k - i e m} ((c - 2 i b k + i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + e^{g-2 i e k + i e m} ((-c + 2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{-g-2 i e k + i e m} ((c + 2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0649.01

$$\int \sin^m(b z^2 + e) \sinh(c z^2 + g) \, dz = i \, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(-i g + e (2 k - m) - \frac{m \pi}{2}\right) S\left(\sqrt{-i c + 2 b k - b m} \sqrt{\frac{2}{\pi}} z\right) + C\left(\sqrt{-i c + 2 b k - b m} \sqrt{\frac{2}{\pi}} z\right) \sin\left(-i g + e (2 k - m) - \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(g - i e (2 k - m) + \frac{i m \pi}{2}\right) S\left(\sqrt{i c + 2 b k - b m} \sqrt{\frac{2}{\pi}} z\right) - i C\left(\sqrt{i c + 2 b k - b m} \sqrt{\frac{2}{\pi}} z\right) \sinh\left(g - i e (2 k - m) + \frac{i m \pi}{2}\right)\right)\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh(g) S\left(\frac{c \sqrt{\frac{2}{\pi}} z}{\sqrt{i c}}\right) - i C\left(\frac{c \sqrt{\frac{2}{\pi}} z}{\sqrt{i c}}\right) \sinh(g)\right) /; m \in \mathbb{N}^+$$

01.19.21.0650.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(c \sqrt{z} \cosh\left(\sqrt{z}\, c+g\right)-\sinh\left(\sqrt{z}\, c+g\right)\right)}{c^2} - i\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{(i c+b (2 k-m))^2} \left(-(i c+b (2 k-m)) \sqrt{z} \cos\left(-i g+e (m-2 k)-\frac{m \pi}{2}-(i c+b (2 k-m)) \sqrt{z}\right)- \sin\left(-i g+e (m-2 k)-\frac{m \pi}{2}-(i c+b (2 k-m)) \sqrt{z}\right)\right)+ \frac{1}{(-i c+b (2 k-m))^2} \left((-i c+b (2 k-m)) \sqrt{z} \cosh\left(g-i e (m-2 k)+i (-i c+b (2 k-m)) \sqrt{z}+\frac{i m \pi}{2}\right)+ i \sinh\left(g-i e (m-2 k)+i (-i c+b (2 k-m)) \sqrt{z}+\frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r+d z\right) \sinh\left(c z^r+g\right)$

01.19.21.0651.01

$$\int \sin^m\left(b z^2+d z\right) \sinh\left(c z^2+g\right) dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(i\, C\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) \sinh(g)-\cosh(g)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right)\right)+2^{-m-\frac{1}{2}}\, i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c+2 b k-b m}} \left(S\left(\frac{2 d k-d m+2 (-i c+2 b k-b m) z}{\sqrt{-i c+2 b k-b m} \sqrt{2 \pi}}\right) \cos\left(\frac{(2 d k-d m)^2}{4 (-i c+2 b k-b m)}+i g+\frac{m \pi}{2}\right)- \sin\left(\frac{(2 d k-d m)^2}{4 (-i c+2 b k-b m)}+i g+\frac{m \pi}{2}\right) C\left(\frac{2 d k-d m+2 (-i c+2 b k-b m) z}{\sqrt{-i c+2 b k-b m} \sqrt{2 \pi}}\right)\right)+ \frac{1}{\sqrt{i c+2 b k-b m}} \left(-\cosh\left(\frac{i (2 d k-d m)^2}{4 (i c+2 b k-b m)}+g+\frac{i m \pi}{2}\right) S\left(\frac{2 d k-d m+2 (i c+2 b k-b m) z}{\sqrt{i c+2 b k-b m} \sqrt{2 \pi}}\right)- i\, C\left(\frac{2 d k-d m+2 (i c+2 b k-b m) z}{\sqrt{i c+2 b k-b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (2 d k-d m)^2}{4 (i c+2 b k-b m)}+g+\frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0652.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(\sqrt{z}\, c + g\right) - \sinh\left(\sqrt{z}\, c + g\right)\right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(2\, d\, s - d\, m)^{3/2}} \left(2 \sqrt{2\, d\, s - d\, m} \cosh\left(g + i\,(2\, d\, s - d\, m)\, z + i\,(-i\, c - b\, m + 2\, b\, s) \sqrt{z} + \frac{i\, m\, \pi}{2}\right) + \sqrt{2\pi}\, (-i\, c - b\, m + 2\, b\, s) \cosh\left(-\frac{i\,(-i\, c - b\, m + 2\, b\, s)^2}{4\,(2\, d\, s - d\, m)} + g + \frac{i\, m\, \pi}{2}\right) S\left(\frac{-i\, c - b\, m + 2\, b\, s + 2\,(2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, d\, s - d\, m}}\right) + i \sqrt{2\pi}\, (i\, c + b\, m - 2\, b\, s)\, C\left(\frac{-i\, c - b\, m + 2\, b\, s + 2\,(2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, d\, s - d\, m}}\right) \sinh\left(-\frac{i\,(-i\, c - b\, m + 2\, b\, s)^2}{4\,(2\, d\, s - d\, m)} + g + \frac{i\, m\, \pi}{2}\right)\right) + \frac{1}{(d\, m - 2\, d\, s)^{3/2}} \left(2 \sqrt{d\, m - 2\, d\, s} \cosh\left(g + i\,(d\, m - 2\, d\, s)\, z + i\,(-i\, c + b\, m - 2\, b\, s) \sqrt{z} - \frac{i\, m\, \pi}{2}\right) + \sqrt{2\pi}\, (-i\, c + b\, m - 2\, b\, s) \cosh\left(-\frac{i\,(-i\, c + b\, m - 2\, b\, s)^2}{4\,(d\, m - 2\, d\, s)} + g - \frac{i\, m\, \pi}{2}\right) S\left(\frac{-i\, c + b\, m - 2\, b\, s + 2\,(d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{d\, m - 2\, d\, s}}\right) + i \sqrt{2\pi}\, (i\, c - b\, m + 2\, b\, s)\, C\left(\frac{-i\, c + b\, m - 2\, b\, s + 2\,(d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{d\, m - 2\, d\, s}}\right) \sinh\left(-\frac{i\,(-i\, c + b\, m - 2\, b\, s)^2}{4\,(d\, m - 2\, d\, s)} + g - \frac{i\, m\, \pi}{2}\right)\right)\right) /;\; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + g\right)$

01.19.21.0653.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(i C\left(\frac{c \sqrt{\frac{2}{\pi}} z}{\sqrt{i c}}\right) \sinh(g) - \cosh(g) S\left(\frac{c \sqrt{\frac{2}{\pi}} z}{\sqrt{i c}}\right)\right) +$$

$$2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} - i g + e (2 k - m) - \frac{m \pi}{2}\right)\right.\right.$$

$$S\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right)$$

$$\left.\sin\left(-\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} - i g + e (2 k - m) - \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}}$$

$$\left(-\cosh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i e (2 k - m) + \frac{i m \pi}{2}\right) S\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) -\right.$$

$$\left.\left.\left. i C\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i e (2 k - m) + \frac{i m \pi}{2}\right)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0654.01

$$\int \sin^m\left(\sqrt{z}\, b+e+d\, z\right) \sinh\left(\sqrt{z}\, c+g\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(c \sqrt{z} \cosh\left(\sqrt{z}\, c+g\right) - \sinh\left(\sqrt{z}\, c+g\right)\right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s}$$
$$\left(\frac{1}{(2 d s - d m)^{3/2}} \left(2 \sqrt{2 d s - d m} \cosh\left(g - i e m + 2 i e s + i (2 d s - d m) z + i (-i c - b m + 2 b s) \sqrt{z} + \frac{i m \pi}{2}\right) + \right.\right.$$
$$\sqrt{2\pi}\, (-i c - b m + 2 b s) \cosh\left(-\frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)} + g - i e m + 2 i e s + \frac{i m \pi}{2}\right)$$
$$S\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 d s - d m}}\right) + i \sqrt{2\pi}\, (i c + b m - 2 b s)$$
$$\left. C\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 d s - d m}}\right) \sinh\left(-\frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)} + g - i e m + 2 i e s + \frac{i m \pi}{2}\right)\right) +$$
$$\frac{1}{(d m - 2 d s)^{3/2}} \left(2 \sqrt{d m - 2 d s} \cosh\left(g + i e m - 2 i e s + i (d m - 2 d s) z + i (-i c + b m - 2 b s) \sqrt{z} - \frac{i m \pi}{2}\right) + \right.$$
$$\sqrt{2\pi}\, (-i c + b m - 2 b s) \cosh\left(-\frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} + g + i e m - 2 i e s - \frac{i m \pi}{2}\right)$$
$$S\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{d m - 2 d s}}\right) +$$
$$i \sqrt{2\pi}\, (i c - b m + 2 b s)\, C\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{d m - 2 d s}}\right)$$
$$\left.\left.\left. \sinh\left(-\frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} + g + i e m - 2 i e s - \frac{i m \pi}{2}\right)\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m(d\, z) \sinh\left(c\, z^r + f\, z\right)$

01.19.21.0655.01

$$\int \sin^m(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\cos\left(\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)-\sin\left(\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+\frac{m\,\pi}{2}\right)C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\right)-\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+\frac{i\,m\,\pi}{2}\right)\right)\right)-\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0656.01

$$\int \sin^m(d\,z)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(2\sqrt{i\,f}\,\cosh\left(\sqrt{z}\,c+f\,z\right)+c\sqrt{2\,\pi}\left(\cosh\left(\frac{c^2}{4\,f}\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{c^2}{4\,f}\right)\right)\right)\right)+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+i\,(-i\,f+2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}-\frac{m\,\pi}{2}\right)\right)\Big/(-i\,f+2\,d\,k-d\,m)^{3/2}+\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c-i\,(i\,f+2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\,\pi}\,\cosh\left(\frac{i\,m\,\pi}{2}-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-c\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,m\,\pi}{2}-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0657.01

$$\int \sin^m(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cos\left(-\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)+C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)\right)-\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}\right)\right)}{\sqrt{i\,c}}\;/;\;m\in\mathbb{N}^+$$

01.19.21.0658.01

$$\int \sin^m(e+d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\right.$$
$$\left(2\sqrt{i\,f}\;\cosh\left(\sqrt{z}\;c+f\,z\right)+c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\,f}\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,f}\right)\right)\right)+$$
$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\left(\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\;\cosh\left(\sqrt{z}\;c+2\,i\,e\,k-i\,e\,m+i\,(-i\,f+2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\right)+\right.\right.\right.$$
$$c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+$$
$$c\,i\sqrt{2\pi}\;C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)$$
$$\left.\left.\sin\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{m\,\pi}{2}\right)\right)\right/(-i\,f+2\,d\,k-d\,m)^{3/2}+$$
$$\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\;\cosh\left(\sqrt{z}\;c-2\,i\,e\,k+i\,e\,m-i\,(i\,f+2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\right)+\right.$$
$$c\,i\sqrt{2\pi}\;\cosh\left(-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}-2\,i\,e\,k+i\,e\,m+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)-$$
$$\left.\left.\left.c\sqrt{2\pi}\;C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}-2\,i\,e\,k+i\,e\,m+\frac{i\,m\,\pi}{2}\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0659.01

$$\int \sin^m(b z^2) \sinh(c z^2 + f z) \, dz = \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4c}\right) S\left(-\frac{f+2cz}{\sqrt{i c} \sqrt{2\pi}}\right) + i\, C\left(-\frac{f+2cz}{\sqrt{i c} \sqrt{2\pi}}\right) \sinh\left(\frac{f^2}{4c}\right)\right)}{\sqrt{i c}} + 2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2bk - bm}} \left(\cos\left(\frac{f^2}{4(-i c + 2bk - bm)} - \frac{m\pi}{2}\right) S\left(\frac{-i f + 2(-i c + 2bk - bm) z}{\sqrt{-i c + 2bk - bm} \sqrt{2\pi}}\right) + C\left(\frac{-i f + 2(-i c + 2bk - bm) z}{\sqrt{-i c + 2bk - bm} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4(-i c + 2bk - bm)} - \frac{m\pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2bk - bm}} \left(-\cosh\left(\frac{i m \pi}{2} - \frac{i f^2}{4(i c + 2bk - bm)}\right) S\left(\frac{i f + 2(i c + 2bk - bm) z}{\sqrt{i c + 2bk - bm} \sqrt{2\pi}}\right) - i\, C\left(\frac{i f + 2(i c + 2bk - bm) z}{\sqrt{i c + 2bk - bm} \sqrt{2\pi}}\right) \sinh\left(\frac{i m \pi}{2} - \frac{i f^2}{4(i c + 2bk - bm)}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0660.01

$$\int \sin^m(b \sqrt{z}) \sinh(\sqrt{z}\, c + f z) \, dz = \frac{1}{(i f)^{3/2}} \left(2^{-m-1} i \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i f} \cosh(\sqrt{z}\, c + f z) - c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4f}\right) S\left(-\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) + i\, C\left(-\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4f}\right)\right)\right)\right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(\frac{i \pi m}{2} + f z - i (i c + 2bk - bm) \sqrt{z}\right) + (i c + 2bk - bm) \sqrt{2\pi} \cosh\left(\frac{(i c + 2bk - bm)^2}{4f} + \frac{i m \pi}{2}\right) S\left(\frac{i c + 2bk - bm + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) - i(-i c - 2bk + bm) \sqrt{2\pi}\, C\left(\frac{i c + 2bk - bm + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) \sinh\left(\frac{(i c + 2bk - bm)^2}{4f} + \frac{i m \pi}{2}\right)\right) - \frac{1}{(-i f)^{3/2}} \left(2 \sqrt{-i f} \cosh\left(-\frac{1}{2} i \pi m + f z + i(-i c + 2bk - bm) \sqrt{z}\right) + (-i c + 2bk - bm) \sqrt{2\pi} \cos\left(\frac{i(-i c + 2bk - bm)^2}{4f} + \frac{m\pi}{2}\right) S\left(\frac{-i c + 2bk - bm - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) + (i c - 2bk + bm) \sqrt{2\pi}\, C\left(\frac{-i c + 2bk - bm - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) \sin\left(\frac{i(-i c + 2bk - bm)^2}{4f} + \frac{m\pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e)\sinh(c z^r + f z)$

01.19.21.0661.01

$$\int \sin^m(b z^2 + e)\sinh(c z^2 + f z)\,dz = \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cosh\left(\frac{f^2}{4c}\right)S\left(-\frac{f+2cz}{\sqrt{ic}\sqrt{2\pi}}\right) + i\,C\left(-\frac{f+2cz}{\sqrt{ic}\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4c}\right)\right)}{\sqrt{ic}} + 2^{-m-\frac{1}{2}}\, i\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$
$$\left(\frac{1}{\sqrt{-ic+2bk-bm}}\left(\cos\left(\frac{f^2}{4(-ic+2bk-bm)} + e(2k-m) - \frac{m\pi}{2}\right)S\left(\frac{-if + 2(-ic+2bk-bm)z}{\sqrt{-ic+2bk-bm}\sqrt{2\pi}}\right) + \right.\right.$$
$$\left. C\left(\frac{-if+2(-ic+2bk-bm)z}{\sqrt{-ic+2bk-bm}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(-ic+2bk-bm)} + e(2k-m) - \frac{m\pi}{2}\right)\right) +$$
$$\frac{1}{\sqrt{ic+2bk-bm}}\left(-\cosh\left(-\frac{i f^2}{4(ic+2bk-bm)} - i e(2k-m) + \frac{i m\pi}{2}\right)S\left(\frac{if+2(ic+2bk-bm)z}{\sqrt{ic+2bk-bm}\sqrt{2\pi}}\right) - \right.$$
$$\left.\left. i\,C\left(\frac{if+2(ic+2bk-bm)z}{\sqrt{ic+2bk-bm}\sqrt{2\pi}}\right)\sinh\left(-\frac{i f^2}{4(ic+2bk-bm)} - i e(2k-m) + \frac{i m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0662.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+f z\right) dz = \frac{1}{(i f)^{3/2}} \left(2^{-m-1} i \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(2 \sqrt{i f} \cosh\left(\sqrt{z}\, c+f z\right) - c \sqrt{2 \pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(-\frac{c+2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) + i C\left(-\frac{c+2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(2 i e k - i e m + f z + i (-i c+2 b k-b m) \sqrt{z} - \frac{i m \pi}{2}\right) - (-i c+2 b k-b m) \sqrt{2 \pi} \cos\left(-\frac{i (-i c+2 b k-b m)^2}{4 f} + 2 e k - e m - \frac{m \pi}{2}\right) S\left(\frac{-i c+2 b k-b m-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) + (i c-2 b k+b m) \sqrt{2 \pi}\, C\left(\frac{-i c+2 b k-b m-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sin\left(-\frac{i (-i c+2 b k-b m)^2}{4 f} + 2 e k - e m - \frac{m \pi}{2}\right)\right) + \frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(-2 e i k + i e m + f z - i (i c+2 b k-b m) \sqrt{z} + \frac{i m \pi}{2}\right) + (i c+2 b k-b m) \sqrt{2 \pi} \cosh\left(\frac{(i c+2 b k-b m)^2}{4 f} - 2 i e k + i e m + \frac{i m \pi}{2}\right) S\left(\frac{i c+2 b k-b m+2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) - i (-i c-2 b k+b m) \sqrt{2 \pi}\, C\left(\frac{i c+2 b k-b m+2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(i c+2 b k-b m)^2}{4 f} - 2 i e k + i e m + \frac{i m \pi}{2}\right)\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh\left(c z^r + f z\right)$

01.19.21.0663.01

$$\int \sin^m(b z^2 + d z) \sinh(c z^2 + f z) \, dz = i \, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) \cos\left(\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + \frac{m \pi}{2} \right) - \sin\left(\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + \frac{m \pi}{2} \right) C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) \right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + \frac{i m \pi}{2} \right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) - i \, C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + \frac{i m \pi}{2} \right) \right) \right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} \right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}} \right) + i \, C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}} \right) \sinh\left(\frac{f^2}{4 c} \right) \right)}{\sqrt{i c}} \; /; \; m \in \mathbb{N}^+$$

01.19.21.0664.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \left(2^{-m-1}\, i \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\right.$$
$$\left(2\sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c + f\, z\right) + c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c + 2 f\sqrt{z}}{\sqrt{i\, f}\,\sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f\sqrt{z}}{\sqrt{i\, f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right) +$$
$$2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\left(\left(-2\sqrt{-i\, f + 2 d k - d m}\, \cosh\left(-\frac{1}{2} i\, \pi\, m + i\,(-i\, f + 2 d k - d m)\, z + i\,(-i\, c + 2 b k - b m)\sqrt{z}\right) - \right.\right.\right.$$
$$(-i\, c + 2 b k - b m)\sqrt{2\pi}\, S\left(\frac{-i\, c + 2 b k - b m + 2(-i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{-i\, f + 2 d k - d m}\,\sqrt{2\pi}}\right) \cos\left(\frac{(-i\, c + 2 b k - b m)^2}{4(-i\, f + 2 d k - d m)} + \right.$$
$$\left.\frac{m\pi}{2}\right) - (i\, c - 2 b k + b m)\sqrt{2\pi}\, C\left(\frac{-i\, c + 2 b k - b m + 2(-i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{-i\, f + 2 d k - d m}\,\sqrt{2\pi}}\right)$$
$$\left.\left.\sin\left(\frac{(-i\, c + 2 b k - b m)^2}{4(-i\, f + 2 d k - d m)} + \frac{m\pi}{2}\right)\right)\right/ (-i\, f + 2 d k - d m)^{3/2} + \frac{1}{(i\, f + 2 d k - d m)^{3/2}}$$
$$\left(2\sqrt{i\, f + 2 d k - d m}\, \cosh\left(\frac{i\,\pi\, m}{2} - i\,(i\, f + 2 d k - d m)\, z - i\,(i\, c + 2 b k - b m)\sqrt{z}\right) + (i\, c + 2 b k - b m)\sqrt{2\pi}\right.$$
$$\cosh\left(\frac{i\,(i\, c + 2 b k - b m)^2}{4(i\, f + 2 d k - d m)} + \frac{i\, m\pi}{2}\right) S\left(\frac{i\, c + 2 b k - b m + 2(i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{i\, f + 2 d k - d m}\,\sqrt{2\pi}}\right) - i\,(-i\, c - 2 b k + b m)$$
$$\left.\left.\left.\sqrt{2\pi}\, C\left(\frac{i\, c + 2 b k - b m + 2(i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{i\, f + 2 d k - d m}\,\sqrt{2\pi}}\right) \sinh\left(\frac{i\,(i\, c + 2 b k - b m)^2}{4(i\, f + 2 d k - d m)} + \frac{i\, m\pi}{2}\right)\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + f\, z\right)$

01.19.21.0665.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c}\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c}\right)\right)\right) +$$

$$2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(-\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + e (2 k - m) - \frac{m \pi}{2}\right)\right.\right.$$

$$S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right)$$

$$\left.\sin\left(-\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + e (2 k - m) - \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}}$$

$$\left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} - i e (2 k - m) + \frac{i m \pi}{2}\right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) -\right.$$

$$\left.\left.\left. i C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} - i e (2 k - m) + \frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0666.01

$$\begin{aligned}
&\int \sin^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \Bigg(2^{-m-1}\, i \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \\
&\quad \left(2 \sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right) + \\
&\quad 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \Bigg(\Bigg(-2 \sqrt{-i\, f + 2 d k - d m}\, \cosh\Big(2 i e k - i e m + i(-i\, f + 2 d k - d m) z + i(-i\, c + 2 b k - b m) \\
&\quad \sqrt{z} - \frac{i\, m \pi}{2}\Big) - (-i\, c + 2 b k - b m) \sqrt{2\pi}\, S\left(\frac{-i\, c + 2 b k - b m + 2(-i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{-i\, f + 2 d k - d m}\, \sqrt{2\pi}}\right) \\
&\quad \cos\left(-\frac{(-i\, c + 2 b k - b m)^2}{4(-i\, f + 2 d k - d m)} + 2 e k - e m - \frac{m\pi}{2}\right) + (i\, c - 2 b k + b m)\sqrt{2\pi} \\
&\quad C\left(\frac{-i\, c + 2 b k - b m + 2(-i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{-i\, f + 2 d k - d m}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(-i\, c + 2 b k - b m)^2}{4(-i\, f + 2 d k - d m)} + 2 e k - e m - \frac{m\pi}{2}\right)\Bigg) \Big/ \\
&\quad (-i\, f + 2 d k - d m)^{3/2} + \frac{1}{(i\, f + 2 d k - d m)^{3/2}} \Bigg(2 \sqrt{i\, f + 2 d k - d m} \\
&\quad \cosh\left(-2 e i k + i e m - i(i\, f + 2 d k - d m) z - i(i\, c + 2 b k - b m)\sqrt{z} + \frac{i\, m\pi}{2}\right) + (i\, c + 2 b k - b m)\sqrt{2\pi} \\
&\quad \cosh\left(\frac{i(i\, c + 2 b k - b m)^2}{4(i\, f + 2 d k - d m)} - 2 i e k + i e m + \frac{i\, m\pi}{2}\right) S\left(\frac{i\, c + 2 b k - b m + 2(i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{i\, f + 2 d k - d m}\, \sqrt{2\pi}}\right) - \\
&\quad i(-i\, c - 2 b k + b m)\sqrt{2\pi}\, C\left(\frac{i\, c + 2 b k - b m + 2(i\, f + 2 d k - d m)\sqrt{z}}{\sqrt{i\, f + 2 d k - d m}\, \sqrt{2\pi}}\right) \\
&\quad \sinh\left(\frac{i(i\, c + 2 b k - b m)^2}{4(i\, f + 2 d k - d m)} - 2 i e k + i e m + \frac{i\, m\pi}{2}\right)\Bigg)\Bigg)\Bigg) \;/;\; m \in \mathbb{N}^+
\end{aligned}$$

Involving $\sin^m(d\, z)\sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0667.01

$$\int \sin^m(d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\cos\left(\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+i\,g+\frac{m\,\pi}{2}\right)-\sin\left(\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+i\,g+\frac{m\,\pi}{2}\right)C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\right)-\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g+\frac{i\,m\,\pi}{2}\right)\right)\right)-\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}-g\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}-g\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0668.01

$$\int \sin^m(d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(2\sqrt{i\,f}\,\cosh\left(\sqrt{z}\,c+g+f\,z\right)+c\sqrt{2\,\pi}\left(\cosh\left(\frac{c^2}{4\,f}-g\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{c^2}{4\,f}-g\right)\right)\right)\right)+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g+i\,(-i\,f+2\,d\,k-d\,m)\,z-\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}-i\,g-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}-i\,g-\frac{m\,\pi}{2}\right)\right)\Big/(-i\,f+2\,d\,k-d\,m)^{3/2}+\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g-i\,(i\,f+2\,d\,k-d\,m)\,z+\frac{i\,m\,\pi}{2}\right)+c\,i\sqrt{2\,\pi}\,\cosh\left(-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}+g+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-c\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(i\,f+2\,d\,k-d\,m)}+g+\frac{i\,m\,\pi}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0669.01

$$\int \sin^m(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cos\left(-\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,g+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)+\right.\right.$$

$$\left.C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{i\,(-i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,g+e\,(2\,k-m)-\frac{m\,\pi}{2}\right)\right)-$$

$$\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+\right.$$

$$\left.\left.i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)+\frac{i\,m\,\pi}{2}\right)\right)\right)-$$

$$\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}-g\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}-g\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0670.01

$$\int \sin^m(e + d\,z)\sinh\left(\sqrt{z}\;c + g + f\,z\right) dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\right.$$
$$\left(2\sqrt{i\,f}\;\cosh\left(\sqrt{z}\;c + g + f\,z\right) + c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\,f} - g\right) S\left(\frac{c + 2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right) + i\,C\left(\frac{c + 2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,f} - g\right)\right)\right)\Bigg) +$$
$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\Bigg(\Bigg(\Bigg(-2\sqrt{-i\,f + 2\,d\,k - d\,m}\;\cosh\left(\sqrt{z}\;c + g + 2\,i\,e\,k - i\,e\,m + i\,(-i\,f + 2\,d\,k - d\,m)\,z - \frac{i\,m\,\pi}{2}\right) +$$
$$c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,(-i\,f + 2\,d\,k - d\,m)} - i\,g + 2\,e\,k - e\,m - \frac{m\,\pi}{2}\right) S\left(\frac{-i\,c + 2\,(-i\,f + 2\,d\,k - d\,m)\sqrt{z}}{\sqrt{-i\,f + 2\,d\,k - d\,m}\;\sqrt{2\pi}}\right) +$$
$$c\,i\sqrt{2\pi}\;C\left(\frac{-i\,c + 2\,(-i\,f + 2\,d\,k - d\,m)\sqrt{z}}{\sqrt{-i\,f + 2\,d\,k - d\,m}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(-i\,f + 2\,d\,k - d\,m)} - i\,g + 2\,e\,k - e\,m - \frac{m\,\pi}{2}\right)\Bigg)\Bigg/$$
$$(-i\,f + 2\,d\,k - d\,m)^{3/2} + \frac{1}{(i\,f + 2\,d\,k - d\,m)^{3/2}}$$
$$\Bigg(2\sqrt{i\,f + 2\,d\,k - d\,m}\;\cosh\left(\sqrt{z}\;c + g - 2\,i\,e\,k + i\,e\,m - i\,(i\,f + 2\,d\,k - d\,m)\,z + \frac{i\,m\,\pi}{2}\right) + c\,i\sqrt{2\pi}$$
$$\cosh\left(-\frac{i\,c^2}{4\,(i\,f + 2\,d\,k - d\,m)} + g - 2\,i\,e\,k + i\,e\,m + \frac{i\,m\,\pi}{2}\right) S\left(\frac{i\,c + 2\,(i\,f + 2\,d\,k - d\,m)\sqrt{z}}{\sqrt{i\,f + 2\,d\,k - d\,m}\;\sqrt{2\pi}}\right) - c\sqrt{2\pi}$$
$$C\left(\frac{i\,c + 2\,(i\,f + 2\,d\,k - d\,m)\sqrt{z}}{\sqrt{i\,f + 2\,d\,k - d\,m}\;\sqrt{2\pi}}\right)\sinh\left(-\frac{i\,c^2}{4\,(i\,f + 2\,d\,k - d\,m)} + g - 2\,i\,e\,k + i\,e\,m + \frac{i\,m\,\pi}{2}\right)\Bigg)\Bigg)\;/;\; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r\right)\sinh\left(c\,z^r + f\,z + g\right)$

01.19.21.0671.01

$$\int \sin^m(b z^2) \sinh(c z^2 + f z + g) \, dz = \frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(-\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i\, C\left(-\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right)\right)\right) + 2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (-i c + 2 b k - b m)} - i g - \frac{m \pi}{2}\right) S\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (-i c + 2 b k - b m)} - i g - \frac{m \pi}{2}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(-\frac{i f^2}{4 (i c + 2 b k - b m)} + g + \frac{i m \pi}{2}\right) S\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i\, C\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(-\frac{i f^2}{4 (i c + 2 b k - b m)} + g + \frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0672.01

$$\int \sin^m(b \sqrt{z}) \sinh(\sqrt{z}\, c + g + f z) \, dz = \frac{1}{(i f)^{3/2}} \left(2^{-m-1} i \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i f} \cosh(\sqrt{z}\, c + g + f z) - c \sqrt{2 \pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(-\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) + i\, C\left(-\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right)\right)\right)\right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(g + f z - i (i c + 2 b k - b m) \sqrt{z} + \frac{i m \pi}{2}\right) + (i c + 2 b k - b m) \sqrt{2 \pi} \cosh\left(\frac{(i c + 2 b k - b m)^2}{4 f} + g + \frac{i m \pi}{2}\right) S\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) - i (-i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(i c + 2 b k - b m)^2}{4 f} + g + \frac{i m \pi}{2}\right)\right) - \frac{1}{(-i f)^{3/2}} \left(2 \sqrt{-i f} \cosh\left(g + f z + i (-i c + 2 b k - b m) \sqrt{z} - \frac{i m \pi}{2}\right) + (-i c + 2 b k - b m) \sqrt{2 \pi} \cos\left(\frac{i (-i c + 2 b k - b m)^2}{4 f} + i g + \frac{m \pi}{2}\right) S\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) + (i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sin\left(\frac{i (-i c + 2 b k - b m)^2}{4 f} + i g + \frac{m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + e)\sinh(c z^r + f z + g)$

01.19.21.0673.01

$$\int \sin^m(b z^2 + e)\sinh(c z^2 + f z + g)\,dz = \frac{1}{\sqrt{i c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(-\frac{f + 2 c z}{\sqrt{i c}\sqrt{2\pi}}\right) + i\, C\left(-\frac{f + 2 c z}{\sqrt{i c}\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4 c} - g\right)\right)\right) +$$

$$2^{-m-\frac{1}{2}}\, i \sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\left(\frac{1}{\sqrt{-i c + 2 b k - b m}}\left(\cos\left(\frac{f^2}{4(-i c + 2 b k - b m)} - i g + e(2 k - m) - \frac{m\pi}{2}\right) S\left(\frac{-i f + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\sqrt{2\pi}}\right) + \right.\right.$$

$$\left. C\left(\frac{-i f + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(-i c + 2 b k - b m)} - i g + e(2 k - m) - \frac{m\pi}{2}\right)\right) +$$

$$\frac{1}{\sqrt{i c + 2 b k - b m}}\left(-\cosh\left(-\frac{i f^2}{4(i c + 2 b k - b m)} + g - i e(2 k - m) + \frac{i m\pi}{2}\right) S\left(\frac{i f + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\sqrt{2\pi}}\right) - \right.$$

$$\left.\left. i\, C\left(\frac{i f + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\sqrt{2\pi}}\right)\sinh\left(-\frac{i f^2}{4(i c + 2 b k - b m)} + g - i e(2 k - m) + \frac{i m\pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0674.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g+f z\right) dz = \frac{1}{(i f)^{3/2}} \left(2^{-m-1}\, i \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(2 \sqrt{i f} \cosh\left(\sqrt{z}\, c+g+f z\right) - c\sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f}-g\right) S\left(-\frac{c+2 f \sqrt{z}}{\sqrt{i f}\, \sqrt{2\pi}}\right) + i\, C\left(-\frac{c+2 f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f}-g\right)\right)\right)\right) + 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{(-i f)^{3/2}} \left(-2\sqrt{-i f} \cosh\left(g+2 i e k - i e m + f z + i(-i c+2 b k - b m)\sqrt{z} - \frac{i m \pi}{2}\right) - (-i c+2 b k-b m)\sqrt{2\pi} \cos\left(-\frac{i(-i c+2 b k-b m)^2}{4 f} - i g + 2 e k - e m - \frac{m\pi}{2}\right) S\left(\frac{-i c+2 b k-b m-2 i f\sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) + (i c - 2 b k + b m)\sqrt{2\pi}\, C\left(\frac{-i c+2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) \sin\left(-\frac{i(-i c+2 b k-b m)^2}{4 f} - i g + 2 e k - e m - \frac{m\pi}{2}\right)\right) + \frac{1}{(i f)^{3/2}} \left(2\sqrt{i f} \cosh\left(g - 2 i e k + i e m + f z - i(i c+2 b k-b m)\sqrt{z} + \frac{i m\pi}{2}\right) + (i c+2 b k-b m)\sqrt{2\pi} \cosh\left(\frac{(i c+2 b k-b m)^2}{4 f} + g - 2 i e k + i e m + \frac{i m \pi}{2}\right) S\left(\frac{i c+2 b k-b m+2 i f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) - i(-i c-2 b k+b m)\sqrt{2\pi}\, C\left(\frac{i c+2 b k-b m+2 i f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{(i c+2 b k-b m)^2}{4 f} + g - 2 i e k + i e m + \frac{i m\pi}{2}\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh\left(c z^r + f z + g\right)$

01.19.21.0675.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh\left(c z^2 + f z + g\right) dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2\pi}}\right) + i\, C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2\pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right)\right)\right) +$$

$$2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k}$$

$$\left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2\pi}}\right) \cos\left(\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + i g + \frac{m \pi}{2}\right) - \sin\left(\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + i g + \frac{m \pi}{2}\right) C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2\pi}}\right)\right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g + \frac{i m \pi}{2}\right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2\pi}}\right) - i\, C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2\pi}}\right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g + \frac{i m \pi}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0676.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \Bigg(2^{-m-1}\, i \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \Bigg(2\sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c + g + f\, z\right) + c\sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(\frac{c + 2 f\sqrt{z}}{\sqrt{i\, f}\,\sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f\sqrt{z}}{\sqrt{i\, f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right)\right)\Bigg)\Bigg) + 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \Bigg(\Bigg(\Bigg(-2\sqrt{-i\, f + 2 d\, k - d\, m}\, \cosh\left(g + i\,(-i\, f + 2 d\, k - d\, m)\, z + i\,(-i\, c + 2 b\, k - b\, m)\sqrt{z} - \frac{i\, m\, \pi}{2}\right) - (-i\, c + 2 b\, k - b\, m)\sqrt{2\pi}\; S\left(\frac{-i\, c + 2 b\, k - b\, m + 2\,(-i\, f + 2 d\, k - d\, m)\sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\,\sqrt{2\pi}}\right) \cos\left(\frac{(-i\, c + 2 b\, k - b\, m)^2}{4\,(-i\, f + 2 d\, k - d\, m)} + i\, g + \frac{m\,\pi}{2}\right) - (i\, c - 2 b\, k + b\, m)\sqrt{2\pi}\; C\left(\frac{-i\, c + 2 b\, k - b\, m + 2\,(-i\, f + 2 d\, k - d\, m)\sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\,\sqrt{2\pi}}\right) \sin\left(\frac{(-i\, c + 2 b\, k - b\, m)^2}{4\,(-i\, f + 2 d\, k - d\, m)} + i\, g + \frac{m\,\pi}{2}\right)\Bigg) \Big/ (-i\, f + 2 d\, k - d\, m)^{3/2} + \frac{1}{(i\, f + 2 d\, k - d\, m)^{3/2}} \Bigg(2\sqrt{i\, f + 2 d\, k - d\, m}\, \cosh\left(g - i\,(i\, f + 2 d\, k - d\, m)\, z - i\,(i\, c + 2 b\, k - b\, m)\sqrt{z} + \frac{i\, m\, \pi}{2}\right) + (i\, c + 2 b\, k - b\, m)\sqrt{2\pi}\, \cosh\left(\frac{i\,(i\, c + 2 b\, k - b\, m)^2}{4\,(i\, f + 2 d\, k - d\, m)} + g + \frac{i\, m\,\pi}{2}\right) S\left(\frac{i\, c + 2 b\, k - b\, m + 2\,(i\, f + 2 d\, k - d\, m)\sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\,\sqrt{2\pi}}\right) - i\,(-i\, c - 2 b\, k + b\, m)\sqrt{2\pi}\; C\left(\frac{i\, c + 2 b\, k - b\, m + 2\,(i\, f + 2 d\, k - d\, m)\sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\,\sqrt{2\pi}}\right) \sinh\left(\frac{i\,(i\, c + 2 b\, k - b\, m)^2}{4\,(i\, f + 2 d\, k - d\, m)} + g + \frac{i\, m\,\pi}{2}\right)\Bigg)\Bigg) \;/;\; m \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0677.01

$$\int \sin^m(b z^2 + d z + e) \sinh(c z^2 + f z + g) \, dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i \, C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right) \right) \right) + 2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(-\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} - i g + e (2 k - m) - \frac{m \pi}{2}\right) S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(-\frac{(-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} - i g + e (2 k - m) - \frac{m \pi}{2}\right) \right) + \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i e (2 k - m) + \frac{i m \pi}{2}\right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i \, C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i e (2 k - m) + \frac{i m \pi}{2}\right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.0678.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz =$$

$$2^{-m-2} \left(\frac{e^{g-\frac{f^2}{4c}} \operatorname{erfi}\left(\frac{f+2cz}{2\sqrt{c}}\right)}{\sqrt{c}} - \frac{e^{\frac{f^2}{4c}-g} \operatorname{erfi}\left(\frac{-f-2cz}{2\sqrt{-c}}\right)}{\sqrt{-c}} \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{-c + 2 i b k - i b m} \left((-1)^{3/4} e^{\frac{i\left(4k^2 d^2 + m^2 d^2 - 4 k m d^2 + 4 i f k d - 2 i f m d - f^2\right)}{4(-i c - 2 b k + b m)} + \frac{1}{2}(-2g + 4 i e k - 2 i e m + i m \pi)} \sqrt{-i c - 2 b k + b m} \right.\right.$$

$$\left.\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (-f + 2 i d k - i d m - 2 c z + 4 i b k z - 2 i b m z)}{2\sqrt{-i c - 2 b k + b m}} \right)\right) +$$

$$\frac{1}{-c - 2 i b k + i b m} \left(\sqrt[4]{-1}\, e^{\frac{1}{2}(-2g - 4 i e k + 2 i e m - i m \pi) - \frac{i\left(4k^2 d^2 + m^2 d^2 - 4 k m d^2 - 4 i f k d + 2 i f m d - f^2\right)}{4(i c - 2 b k + b m)}} \right.$$

$$\left. \sqrt{i c - 2 b k + b m}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (-f - 2 i d k + i d m - 2 c z - 4 i b k z + 2 i b m z)}{2\sqrt{i c - 2 b k + b m}} \right)\right) -$$

$$\frac{1}{c - 2 i b k + i b m} \left(\sqrt[4]{-1}\, e^{\frac{1}{2}(2g - 4 i e k + 2 i e m - i m \pi) - \frac{i\left(4k^2 d^2 + m^2 d^2 - 4 k m d^2 + 4 i f k d - 2 i f m d - f^2\right)}{4(-i c - 2 b k + b m)}} \sqrt{-i c - 2 b k + b m} \right.$$

$$\left.\operatorname{erfi}\left(\frac{(-1)^{3/4} (f - 2 i d k + i d m + 2 c z - 4 i b k z + 2 i b m z)}{2\sqrt{-i c - 2 b k + b m}} \right)\right) -$$

$$\frac{1}{c + 2 i b k - i b m} \left((-1)^{3/4} e^{\frac{i\left(4k^2 d^2 + m^2 d^2 - 4 k m d^2 - 4 i f k d + 2 i f m d - f^2\right)}{4(i c - 2 b k + b m)} + \frac{1}{2}(2g + 4 i e k - 2 i e m + i m \pi)} \sqrt{i c - 2 b k + b m} \right.$$

$$\left.\left.\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (f + 2 i d k - i d m + 2 c z + 4 i b k z - 2 i b m z)}{2\sqrt{i c - 2 b k + b m}} \right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0679.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i f)^{3/2}} \left(2^{-m-1}\, i \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i f} \cosh\left(\sqrt{z}\, c + g + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right)\right)\right)\right) + 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\left(-2 \sqrt{-i f + 2 d k - d m} \cosh\left(g + 2 i e k - i e m + i (-i f + 2 d k - d m) z + i (-i c + 2 b k - b m) \sqrt{z} - \frac{i m \pi}{2}\right) - (-i c + 2 b k - b m) \sqrt{2\pi}\, S\left(\frac{-i c + 2 b k - b m + 2 (-i f + 2 d k - d m) \sqrt{z}}{\sqrt{-i f + 2 d k - d m} \sqrt{2\pi}}\right) \cos\left(-\frac{(-i c + 2 b k - b m)^2}{4 (-i f + 2 d k - d m)} - i g + 2 e k - e m - \frac{m \pi}{2}\right) + (i c - 2 b k + b m) \sqrt{2\pi}\, C\left(\frac{-i c + 2 b k - b m + 2 (-i f + 2 d k - d m) \sqrt{z}}{\sqrt{-i f + 2 d k - d m} \sqrt{2\pi}}\right) \sin\left(-\frac{(-i c + 2 b k - b m)^2}{4 (-i f + 2 d k - d m)} - i g + 2 e k - e m - \frac{m \pi}{2}\right)\right) \Big/ (-i f + 2 d k - d m)^{3/2} + \frac{1}{(i f + 2 d k - d m)^{3/2}} \left(2 \sqrt{i f + 2 d k - d m} \cosh\left(g - 2 i e k + i e m - i (i f + 2 d k - d m) z - i (i c + 2 b k - b m) \sqrt{z} + \frac{i m \pi}{2}\right) + (i c + 2 b k - b m) \sqrt{2\pi} \cosh\left(\frac{i (i c + 2 b k - b m)^2}{4 (i f + 2 d k - d m)} + g - 2 i e k + i e m + \frac{i m \pi}{2}\right) S\left(\frac{i c + 2 b k - b m + 2 (i f + 2 d k - d m) \sqrt{z}}{\sqrt{i f + 2 d k - d m} \sqrt{2\pi}}\right) - i (-i c - 2 b k + b m) \sqrt{2\pi}\, C\left(\frac{i c + 2 b k - b m + 2 (i f + 2 d k - d m) \sqrt{z}}{\sqrt{i f + 2 d k - d m} \sqrt{2\pi}}\right) \sinh\left(\frac{i (i c + 2 b k - b m)^2}{4 (i f + 2 d k - d m)} + g - 2 i e k + i e m + \frac{i m \pi}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.0680.01

$$\int \sin^m\left(b\sqrt{z}+d\,z+e\right)\sinh\left(c\sqrt{z}+f\,z+g\right)dz = 2^{-m-1}\left(\frac{2\cosh\left(\sqrt{z}\,c+g+f\,z\right)}{f}+\frac{c\,e^{\frac{c^2-4fg}{4f}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2f\sqrt{z}}{2\sqrt{-f}}\right)}{2(-f)^{3/2}}-\frac{c\sqrt{\pi}\,e^{-\frac{c^2-4fg}{4f}}\,\mathrm{erfi}\left(\frac{c+2f\sqrt{z}}{2\sqrt{f}}\right)}{2f^{3/2}}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)+$$

$$2^{-m-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{1}{2}e^{-g-\frac{1}{2}i(4ek-2em+m\pi)}\sqrt{\pi}\right.$$

$$\left(e^{2g}\left(\left(i\,e^{-\frac{i(c-2ibk+ibm)^2}{4if+8dk-4dm}}(i\,c+2bk-bm)\,\mathrm{erfi}\left(\frac{c-i\left(b(2k-m)+2(i\,f+2dk-dm)\sqrt{z}\right)}{2\sqrt{f-2idk+idm}}\right)\right)\Big/\right.\right.$$

$$(f-2idk+idm)^{3/2}-\frac{1}{(f+di(2k-m))^{3/2}}\left(e^{i\left(\frac{(c+bi(2k-m))^2}{-4if+8dk-4dm}+4ek+m(\pi-2e)\right)}\right.$$

$$\left.\left.\left.(c+bi(2k-m))\,\mathrm{erfi}\left(\frac{c+i\left(b(2k-m)+2(-i\,f+2dk-dm)\sqrt{z}\right)}{2\sqrt{f+di(2k-m)}}\right)\right)\right)+$$

$$\left(e^{i\left(\frac{(c-2ibk+ibm)^2}{4if+8dk-4dm}+4ek+m(\pi-2e)\right)}(i\,c+2bk-bm)\,\mathrm{erfi}\left(\frac{c-i\left(b(2k-m)+2(i\,f+2dk-dm)\sqrt{z}\right)}{2\sqrt{i\,d(2k-m)-f}}\right)\right)\Big/$$

$$\left(\sqrt{i\,d(2k-m)-f}\,(-i\,f+d(m-2k))\right)-\left(e^{-\frac{i(c+bi(2k-m))^2}{-4if+8dk-4dm}}(-c-2ibk+ibm)\right.$$

$$\left.\left.\mathrm{erfi}\left(\frac{c+i\left(b(2k-m)+2(-i\,f+2dk-dm)\sqrt{z}\right)}{2\sqrt{-f-2idk+idm}}\right)\right)\Big/(-f-2idk+idm)^{3/2}\right)+$$

$$\frac{1}{f-2idk+idm}\left(2\cosh\left(\sqrt{z}\,(-c+2ibk-ibm)+\frac{1}{2}(-2g+4iek-2iem+im\pi)+\right.\right.$$

$$\left.\left.(-f+2idk-idm)z\right)\right)+\frac{1}{f+2idk-idm}$$

$$\left.\left(2\cosh\left(\sqrt{z}\,(c+2ibk-ibm)+\frac{1}{2}(2g+4iek-2iem+im\pi)+(f+2idk-idm)z\right)\right)\right)/;\ m\in\mathbb{N}^+$$

Involving products of sin

Involving $\sin(a\,z)\sin(b\,z)\sinh(c\,z)$

01.19.21.0681.01

$$\int \sin(a z)\sin(b z)\sinh(c z)\,dz = \frac{1}{2}\left(\frac{c\cos((a-b)z)\cosh(cz)}{a^2-2ba+b^2+c^2} - \frac{c\cos((a+b)z)\cosh(cz)}{a^2+2ba+b^2+c^2} + \frac{(a-b)\sin((a-b)z)\sinh(cz)}{a^2-2ba+b^2+c^2} - \frac{(a+b)\sin((a+b)z)\sinh(cz)}{a^2+2ba+b^2+c^2}\right)$$

Involving rational functions of sin

Involving $\frac{\sinh(c z)}{a+b\sin(d z)}$

01.19.21.0682.01

$$\int \frac{\sinh(c z)}{a+b\sin(d z)}\,dz = -\frac{i}{2b\sqrt{a^2-b^2}} e^{i d z - c z}\left(\frac{1}{c-i d}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1+\frac{i c}{d}, 1; 2+\frac{i c}{d}; \frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right) + \left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1+\frac{i c}{d}, 1; 2+\frac{i c}{d}; \frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)\right) + \frac{1}{c+i d} e^{2 c z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1-\frac{i c}{d}, 1; 2-\frac{i c}{d}; \frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right) + \left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1-\frac{i c}{d}, 1; 2-\frac{i c}{d}; \frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)$$

Involving $(a+b\sin(d z))^{-n}\sinh(c z)$

01.19.21.0683.01

$$\int \frac{\sinh(c\,z)}{(a+b\sin(d\,z))^2}\,dz = -\frac{1}{2\,b\,(a^2-b^2)^{3/2}}\Bigg(i\Bigg(\frac{1}{i\,d-c}\Bigg(e^{i\,d\,z-c\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(1+\frac{i\,c}{d},1;2+\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(1+\frac{i\,c}{d},1;2+\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\!\left(1+\frac{i\,c}{d},2;2+\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\!\left(1+\frac{i\,c}{d},2;2+\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)-\frac{1}{c+i\,d}\Bigg(e^{(c+i\,d)\,z}\Bigg(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\!\left(1-\frac{i\,c}{d},1;2-\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\!\left(1-\frac{i\,c}{d},1;2-\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\!\left(1-\frac{i\,c}{d},2;2-\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\!\left(1-\frac{i\,c}{d},2;2-\frac{i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{\sinh(c\,z)}{a+b\sin^2(d\,z)}$

01.19.21.0684.01

$$\int \frac{\sinh(c\,z)}{a+b\sin^2(d\,z)}\,dz = -\frac{1}{2\sqrt{a}\,b\sqrt{a+b}}\Bigg(\frac{1}{c-2\,i\,d}\,e^{2\,i\,d\,z-c\,z}\Bigg(\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1+\frac{i\,c}{2\,d},1;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1+\frac{i\,c}{2\,d},1;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)+\frac{1}{c+2\,i\,d}\,e^{(c+2\,i\,d)\,z}\Bigg(\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i\,c}{2\,d},1;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i\,c}{2\,d},1;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)$$

Involving $\left(a+b\sin^2(d\,z)\right)^{-n}\sinh(c\,z)$

01.19.21.0685.01

$$\int \frac{\sinh(c\,z)}{\left(a+b\sin^2(d\,z)\right)^2}\,dz = \frac{1}{4\,a^{3/2}\,b\,(a+b)^{3/2}}$$
$$\left(\frac{1}{2\,i\,d-c}\left(e^{2\,i\,d\,z-c\,z}\left((2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1+\frac{i\,c}{2\,d},1;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.\right.$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1+\frac{i\,c}{2\,d},1;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2\,a^{3/2}-2\sqrt{a+b}\,a+2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1+\frac{i\,c}{2\,d},2;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.$$
$$\left.\left.\left.\left(2\,a^{3/2}+2\sqrt{a+b}\,a+2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1+\frac{i\,c}{2\,d},2;2+\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)-$$
$$\frac{1}{c+2\,i\,d}\left(e^{(c+2\,i\,d)\,z}\left((2\,a+b)\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{i\,c}{2\,d},1;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+\right.\right.$$
$$(2\,a+b)\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{i\,c}{2\,d},1;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$
$$2\sqrt{a}\left(\left(2\,a^{3/2}-2\sqrt{a+b}\,a+2\,b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i\,c}{2\,d},2;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)-\right.$$
$$\left.\left.\left.\left.\left(2\,a^{3/2}+2\sqrt{a+b}\,a+2\,b\sqrt{a}+b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i\,c}{2\,d},2;2-\frac{i\,c}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $\frac{\sin(e\,z)\sinh(c\,z)}{a+b\sin(d\,z)}$

01.19.21.0686.01

$$\int \frac{\sin(e z)\sinh(c z)}{a+b\sin(d z)}\,dz = \frac{i b}{4\sqrt{b^2-a^2}} \left(\frac{e^{(-c-i e+i d) z}\,{}_2F_1\left(\frac{d+(c+i e) i}{d}, 1; \frac{2 d+(c+i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d+(c+i e) i)} + \frac{e^{(-c-i e+i d) z}\,{}_2F_1\left(\frac{d+(c+i e) i}{d}, 1; \frac{2 d+(c+i e) i}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(d+(c+i e) i)} + \frac{e^{(c+i d+i e) z}\,{}_2F_1\left(\frac{d-i(c+i e)}{d}, 1; \frac{2 d-i(c+i e)}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d-i(c+i e))} + \frac{e^{(c+i d+i e) z}\,{}_2F_1\left(\frac{d-i(c+i e)}{d}, 1; \frac{2 d-i(c+i e)}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(d-i(c+i e))} - \frac{e^{(-c+i d+i e) z}\,{}_2F_1\left(\frac{d+(c-i e) i}{d}, 1; \frac{2 d+(c-i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d+(c-i e) i)} - \frac{e^{(c-i e+i d) z}\,{}_2F_1\left(\frac{d-e+-i c}{d}, 1; \frac{2 d-e+-i c}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d-e+-i c)} - \frac{e^{(c-i e+i d) z}\,{}_2F_1\left(\frac{d-e+-i c}{d}, 1; \frac{2 d-e+-i c}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(d-e+-i c)} - \frac{e^{(-c+i d+i e) z}\,{}_2F_1\left(\frac{d+(c-i e) i}{d}, 1; \frac{2 d+(c-i e) i}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(d+(c-i e) i)} \right)$$

Involving $\sin(e z)\sinh(c z)(a+b\sin(d z))^{-n}$

01.19.21.0687.01

$$\int \frac{\sin(e z)\sinh(c z)}{(a+b\sin(d z))^2}\,dz = -\frac{1}{8\left(b^2-a^2\right)^{3/2}} \left(b \left(\frac{\left(i a+\sqrt{b^2-a^2}\right) e^{(-c-i e+i d) z}\,{}_2F_1\left(\frac{d+(c+i e) i}{d}, 1; \frac{2 d+(c+i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d+(c+i e) i)} + \frac{e^{(-c-i e+i d) z}\,{}_2F_1\left(\frac{d+(c+i e) i}{d}, 1; \frac{2 d+(c+i e) i}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{d+(c+i e) i} + \frac{2\sqrt{b^2-a^2}\; e^{(-c-i e+i d) z}\,{}_2F_1\left(\frac{d+(c+i e) i}{d}, 2; \frac{2 d+(c+i e) i}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(d+(c+i e) i)} + \frac{\left(i a+\sqrt{b^2-a^2}\right) e^{(c+i d+i e) z}\,{}_2F_1\left(\frac{d-i(c+i e)}{d}, 1; \frac{2 d-i(c+i e)}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(d-i(c+i e))} + \right.\right.$$

$$\frac{e^{(c+i d+i e) z} {}_2F_1\left(\frac{d-i (c+i e)}{d}, 1; \frac{2 d-i (c+i e)}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{d-i (c+i e)}+$$

$$\frac{2 \sqrt{b^2-a^2}\, e^{(c+i d+i e) z} {}_2F_1\left(\frac{d-i (c+i e)}{d}, 2; \frac{2 d-i (c+i e)}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (d-i (c+i e))}+$$

$$\frac{e^{(-c+i d+i e) z} {}_2F_1\left(\frac{d+(c-i e) i}{d}, 1; \frac{2 d+(c-i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{d+(c-i e) i}+$$

$$\frac{\left(-i a+\sqrt{b^2-a^2}\right) e^{(-c+i d+i e) z} {}_2F_1\left(\frac{d+(c-i e) i}{d}, 1; \frac{2 d+(c-i e) i}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (d+(c-i e) i)}+$$

$$\frac{2 \sqrt{b^2-a^2}\, e^{(-c+i d+i e) z} {}_2F_1\left(\frac{d+(c-i e) i}{d}, 2; \frac{2 d+(c-i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (d+(c-i e) i)}+$$

$$\frac{e^{(c-i e+i d) z} {}_2F_1\left(\frac{d-i (c-i e)}{d}, 1; \frac{2 d-i (c-i e)}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{d-i (c-i e)}+$$

$$\frac{\left(-i a+\sqrt{b^2-a^2}\right) e^{(c-i e+i d) z} {}_2F_1\left(\frac{d-i (c-i e)}{d}, 1; \frac{2 d-i (c-i e)}{d}; -\frac{b e^{i d z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (d-i (c-i e))}+$$

$$\frac{2 \sqrt{b^2-a^2}\, e^{(c-i e+i d) z} {}_2F_1\left(\frac{d-i (c-i e)}{d}, 2; \frac{2 d-i (c-i e)}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (d-i (c-i e))}-$$

$$\frac{e^{(-c-i e+i d) z} {}_2F_1\left(\frac{d+(c+i e) i}{d}, 1; \frac{2 d+(c+i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{d+(c+i e) i}-$$

$$\frac{2 \sqrt{b^2-a^2}\, e^{(-c-i e+i d) z} {}_2F_1\left(\frac{d+(c+i e) i}{d}, 2; \frac{2 d+(c+i e) i}{d}; \frac{b e^{i d z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (d+(c+i e) i)}-$$

$$\frac{\left(-\mathbb{i}\, a+\sqrt{b^2-a^2}\right) \mathbb{e}^{(-c-\mathbb{i}\, e+\mathbb{i}\, d)\, z}\, {}_2F_1\!\left(\frac{d+(c+\mathbb{i}\, e)\, \mathbb{i}}{d}, 1; \frac{2\, d+(c+\mathbb{i}\, e)\, \mathbb{i}}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d+(c+\mathbb{i}\, e)\, \mathbb{i})} -$$

$$\frac{\mathbb{e}^{(c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}, 1; \frac{2\, d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}; \frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{-\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{d-\mathbb{i}\,(c+\mathbb{i}\, e)} -$$

$$\frac{2 \sqrt{b^2-a^2}\;\, \mathbb{e}^{(c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}, 2; \frac{2\, d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}; \frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{-\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(-\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d-\mathbb{i}\,(c+\mathbb{i}\, e))} -$$

$$\frac{\left(-\mathbb{i}\, a+\sqrt{b^2-a^2}\right) \mathbb{e}^{(c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}, 1; \frac{2\, d-\mathbb{i}\,(c+\mathbb{i}\, e)}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d-\mathbb{i}\,(c+\mathbb{i}\, e))} -$$

$$\frac{\mathbb{e}^{(-c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}, 1; \frac{2\, d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{d+(c-\mathbb{i}\, e)\, \mathbb{i}} -$$

$$\frac{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) \mathbb{e}^{(-c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}, 1; \frac{2\, d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}; \frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{-\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(-\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d+(c-\mathbb{i}\, e)\, \mathbb{i})} -$$

$$\frac{2 \sqrt{b^2-a^2}\;\, \mathbb{e}^{(-c+\mathbb{i}\, d+\mathbb{i}\, e)\, z}\, {}_2F_1\!\left(\frac{d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}, 2; \frac{2\, d+(c-\mathbb{i}\, e)\, \mathbb{i}}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d+(c-\mathbb{i}\, e)\, \mathbb{i})} -$$

$$\frac{\mathbb{e}^{(c-\mathbb{i}\, e+\mathbb{i}\, d)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}, 1; \frac{2\, d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{d-\mathbb{i}\,(c-\mathbb{i}\, e)} -$$

$$\frac{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) \mathbb{e}^{(c-\mathbb{i}\, e+\mathbb{i}\, d)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}, 1; \frac{2\, d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}; \frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{-\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(-\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d-\mathbb{i}\,(c-\mathbb{i}\, e))} -$$

$$\left.\left.\frac{2 \sqrt{b^2-a^2}\;\, \mathbb{e}^{(c-\mathbb{i}\, e+\mathbb{i}\, d)\, z}\, {}_2F_1\!\left(\frac{d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}, 2; \frac{2\, d-\mathbb{i}\,(c-\mathbb{i}\, e)}{d}; -\frac{b\, \mathbb{e}^{\mathbb{i}\, d\, z}}{\mathbb{i}\, a+\sqrt{b^2-a^2}}\right)}{\left(\mathbb{i}\, a+\sqrt{b^2-a^2}\right) (d-\mathbb{i}\,(c-\mathbb{i}\, e))}\right)\right)$$

Involving $\frac{\sin(e\,z)\sinh(c\,z)}{a+b\sin^2(d\,z)}$

01.19.21.0688.01

$$\int \frac{\sin(e\,z)\sinh(c\,z)}{b\sin^2(d\,z)+a}\,dz = \frac{1}{4}\,i\left(\left(e^{(c-2\,i\,d+i\,e)\,z}\left(\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1+\frac{i\,(c+i\,e)}{2\,d},1;2+\frac{i\,(c+i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a+2\sqrt{a+b}\,\sqrt{a}-b}\right)+\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1+\frac{i\,(c+i\,e)}{2\,d},1;2+\frac{i\,(c+i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a-2\sqrt{a+b}\,\sqrt{a}-b}\right)\right)\right)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(c-2\,i\,d+i\,e)\right)+\left(e^{(-c-2\,i\,d-i\,e)\,z}\left(\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1+\frac{i\,(-c-i\,e)}{2\,d},1;2+\frac{i\,(-c-i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a+2\sqrt{a+b}\,\sqrt{a}-b}\right)+\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1+\frac{i\,(-c-i\,e)}{2\,d},1;2+\frac{i\,(-c-i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a-2\sqrt{a+b}\,\sqrt{a}-b}\right)\right)\right)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(-c-2\,i\,d-i\,e)\right)-\left(e^{(-c-2\,i\,d+i\,e)\,z}\left(\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1+\frac{i\,(i\,e-c)}{2\,d},1;2+\frac{i\,(i\,e-c)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a+2\sqrt{a+b}\,\sqrt{a}-b}\right)+\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1+\frac{i\,(i\,e-c)}{2\,d},1;2+\frac{i\,(i\,e-c)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a-2\sqrt{a+b}\,\sqrt{a}-b}\right)\right)\right)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(-c-2\,i\,d+i\,e)\right)-\left(e^{(c-2\,i\,d-i\,e)\,z}\left(\left(2\,a+2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\left(1+\frac{i\,(c-i\,e)}{2\,d},1;2+\frac{i\,(c-i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a+2\sqrt{a+b}\,\sqrt{a}-b}\right)+\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\left(1+\frac{i\,(c-i\,e)}{2\,d},1;2+\frac{i\,(c-i\,e)}{2\,d};-\frac{b\,e^{-2\,i\,d\,z}}{-2\,a-2\sqrt{a+b}\,\sqrt{a}-b}\right)\right)\right)\Big/\left(\sqrt{a}\,b\sqrt{a+b}\,(c-2\,i\,d-i\,e)\right)\right)$$

Involving $\sin(e\,z)\sinh(c\,z)\left(a+b\sin^2(d\,z)\right)^{-n}$

01.19.21.0689.01

$$\int \frac{\sin(e\,z)\sinh(c\,z)}{\left(a+b\sin^2(d\,z)\right)^2}\,dz = \frac{1}{16\,a^{3/2}\,(a+b)^{3/2}}\left(b\left(\left(\left(-2\,a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(-c-i\,e+2\,i\,d)\,z}\,{}_2F_1\left(\frac{2\,d+(c+i\,e)\,i}{2\,d},1;\frac{4\,d+(c+i\,e)\,i}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/\right.\right.$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2d+(c+i e)i)\right)+\frac{e^{(-c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d+(c+i e)i}{2d},1;\frac{4d+(c+i e)i}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2d+(c+i e)i}+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d+(c+i e)i}{2d},2;\frac{4d+(c+i e)i}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2d+(c+i e)i)}+$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)e^{(c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d-i(c+i e)}{2d},1;\frac{4d-i(c+i e)}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2d-i(c+i e))\right)+\frac{e^{(c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d-i(c+i e)}{2d},1;\frac{4d-i(c+i e)}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2d-i(c+i e)}+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d-i(c+i e)}{2d},2;\frac{4d-i(c+i e)}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2d-i(c+i e))}+$$

$$\frac{e^{(-c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d+(c-i e)i}{2d},1;\frac{4d+(c-i e)i}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2d+(c-i e)i}+$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)e^{(-c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d+(c-i e)i}{2d},1;\frac{4d+(c-i e)i}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2d+(c-i e)i)\right)+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-c+2 i d+i e)z}\,{}_2F_1\left(\frac{2d+(c-i e)i}{2d},2;\frac{4d+(c-i e)i}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2d+(c-i e)i)}+$$

$$\frac{e^{(c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d-i(c-i e)}{2d},1;\frac{4d-i(c-i e)}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2d-i(c-i e)}+$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)e^{(c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d-i(c-i e)}{2d},1;\frac{4d-i(c-i e)}{2d};\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2d-i(c-i e))\right)+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d-i(c-i e)}{2d},2;\frac{4d-i(c-i e)}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2d-i(c-i e))}-$$

$$\frac{e^{(-c-i e+2 i d)z}\,{}_2F_1\left(\frac{2d+(c+i e)i}{2d},1;\frac{4d+(c+i e)i}{2d};\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2d+(c+i e)i}-$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(-c-ie+2id)z}\,{}_2F_1\!\left(\frac{2d+(c+ie)i}{2d},1;\frac{4d+(c+ie)i}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2d+(c+ie)i)\right)-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-c-ie+2id)z}\,{}_2F_1\!\left(\frac{2d+(c+ie)i}{2d},2;\frac{4d+(c+ie)i}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2d+(c+ie)i)}-$$

$$\frac{e^{(c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d-i(c+ie)}{2d},1;\frac{4d-i(c+ie)}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2d-i(c+ie)}-$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d-i(c+ie)}{2d},1;\frac{4d-i(c+ie)}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2d-i(c+ie))\right)-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d-i(c+ie)}{2d},2;\frac{4d-i(c+ie)}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2d-i(c+ie))}-$$

$$\frac{e^{(-c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d+(c-ie)i}{2d},1;\frac{4d+(c-ie)i}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2d+(c-ie)i}-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d+(c-ie)i}{2d},2;\frac{4d+(c-ie)i}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2d+(c-ie)i)}-$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(-c+2id+ie)z}\,{}_2F_1\!\left(\frac{2d+(c-ie)i}{2d},1;\frac{4d+(c-ie)i}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2d+(c-ie)i)\right)-\frac{e^{(c-ie+2id)z}\,{}_2F_1\!\left(\frac{2d-i(c-ie)}{2d},1;\frac{4d-i(c-ie)}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2d-i(c-ie)}-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(c-ie+2id)z}\,{}_2F_1\!\left(\frac{2d-i(c-ie)}{2d},2;\frac{4d-i(c-ie)}{2d};\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2d-i(c-ie))}-$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(c-ie+2id)z}\,{}_2F_1\!\left(\frac{2d-i(c-ie)}{2d},1;\frac{4d-i(c-ie)}{2d};\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left.\left.\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2d-i(c-ie))\right)\right)\right)$$

Involving algebraic functions of sin

Involving $(a+b\sin(d z))^{\beta}\sinh(c z)$

01.19.21.0690.01

$$\int (a+b\sin(d z))^{\beta}\sinh(c z)\,dz = \frac{1}{2\left(c^2+d^2\beta^2\right)} e^{-c z}\left(1+\frac{i b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta} \left(a-\frac{1}{2} i b e^{-i d z}\left(-1+e^{2 i d z}\right)\right)^{\beta}\left(e^{2 c z}(c+i d\beta) F_1\left(-\frac{i c}{d}-\beta;-\beta,-\beta;1-\frac{i c}{d}-\beta;\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right)+ (c-i d\beta) F_1\left(\frac{i c}{d}-\beta;-\beta,-\beta;1+\frac{i c}{d}-\beta;\frac{i b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{i b e^{i d z}}{a-\sqrt{a^2-b^2}}\right)\right)$$

Involving $\left(a+b\sin^2(d z)\right)^{\beta}\sinh(c z)$

01.19.21.0691.01

$$\int \left(a+b\sin^2(d z)\right)^{\beta}\sinh(c z)\,dz = \frac{1}{2\left(c^2+4 d^2\beta^2\right)} e^{-c z}\left(1-\frac{b e^{2 i d z}}{2 a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b e^{2 i d z}}{2 a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4} b e^{-2 i d z}\left(-1+e^{2 i d z}\right)^2\right)^{\beta} \left(e^{2 c z}(c+2 i d\beta) F_1\left(-\frac{i c}{2 d}-\beta;-\beta,-\beta;1-\frac{i c}{2 d}-\beta;\frac{b e^{2 i d z}}{2 a+b+2\sqrt{a(a+b)}},\frac{b e^{2 i d z}}{2 a+b-2\sqrt{a(a+b)}}\right)+ (c-2 i d\beta) F_1\left(\frac{i c}{2 d}-\beta;-\beta,-\beta;1+\frac{i c}{2 d}-\beta;\frac{b e^{2 i d z}}{2 a+b+2\sqrt{a(a+b)}},\frac{b e^{2 i d z}}{2 a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving $\sin(e z)\sinh(c z)(a+b\sin(d z))^{\beta}$

01.19.21.0692.01

$$\int \sin(e\,z)\sinh(c\,z)\,(a+b\sin(d\,z))^{\beta}\,dz = -\frac{1}{4}\,i\left(1+\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}(a+b\sin(d\,z))^{\beta}$$
$$\left(\frac{e^{(i\,e-c)\,z}}{c-i\,e+i\,d\,\beta}\,F_1\!\left(\frac{e+i\,c-d\,\beta}{d};-\beta,-\beta;\frac{-\beta\,d+d+e+i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)-\right.$$
$$\frac{e^{(-c-i\,e)\,z}}{c+i\,(e+d\,\beta)}\,F_1\!\left(\frac{i\,(c+i\,(e+d\,\beta))}{d};-\beta,-\beta;\frac{-\beta\,d+d-e+i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)-$$
$$\frac{e^{(c-i\,e)\,z}}{c-i\,e-i\,d\,\beta}\,F_1\!\left(-\frac{e+i\,c+d\,\beta}{d};-\beta,-\beta;-\frac{e+i\,c+d\,(\beta-1)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)+$$
$$\left.\frac{e^{(c+i\,e)\,z}}{c+i\,e-i\,d\,\beta}\,F_1\!\left(-\frac{i\,(c+i\,e-i\,d\,\beta)}{d};-\beta,-\beta;\frac{-\beta\,d+d+e-i\,c}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{i\,d\,z}}{a-\sqrt{a^2-b^2}}\right)\right)$$

Involving $\sin(e\,z)\sinh(c\,z)\left(a+b\sin^2(d\,z)\right)^{\beta}$

01.19.21.0693.01

$$\int \sin(e\,z)\sinh(c\,z)\left(a+b\sin^2(d\,z)\right)^{\beta}dz =$$
$$-\frac{1}{4}\,i\left(1-\frac{b\,e^{2\,i\,d\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)^{-\beta}\left(1-\frac{b\,e^{2\,i\,d\,z}}{2\,a+b+2\sqrt{a\,(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}\,b\,e^{-2\,i\,d\,z}\left(-1+e^{2\,i\,d\,z}\right)^2\right)^{\beta}\left(-\frac{e^{(-c-i\,e)\,z}}{c+i\,e+2\,i\,d\,\beta}\right.$$
$$F_1\!\left(\frac{i\,(c+i\,e+2\,i\,d\,\beta)}{2\,d};-\beta,-\beta;\frac{i\,(c+i\,(e+2\,d\,(\beta-1)))}{2\,d};\frac{b\,e^{2\,i\,d\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,d\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)+$$
$$\frac{e^{(i\,e-c)\,z}}{c-i\,e+2\,i\,d\,\beta}\,F_1\!\left(\frac{e+i\,c-2\,d\,\beta}{2\,d};-\beta,-\beta;\frac{e+i\,c}{2\,d}-\beta+1;\frac{b\,e^{2\,i\,d\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,d\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)-$$
$$\frac{e^{(c-i\,e)\,z}}{c-i\,e-2\,i\,d\,\beta}\,F_1\!\left(-\frac{e+i\,c+2\,d\,\beta}{2\,d};-\beta,-\beta;1-\frac{i\,(c-i\,e)}{2\,d}-\beta;\frac{b\,e^{2\,i\,d\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,d\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)+$$
$$\left.\frac{e^{(c+i\,e)\,z}}{c+i\,e-2\,i\,d\,\beta}\,F_1\!\left(-\frac{i\,(c+i\,e-2\,i\,d\,\beta)}{2\,d};-\beta,-\beta;1-\frac{i\,(c+i\,e)}{2\,d}-\beta;\frac{b\,e^{2\,i\,d\,z}}{2\,a+b+2\sqrt{a\,(a+b)}},\frac{b\,e^{2\,i\,d\,z}}{2\,a+b-2\sqrt{a\,(a+b)}}\right)\right)$$

Involving cos

Involving $\cos(c\,z)\sinh(a\,z)$

01.19.21.0694.01

$$\int \cos(c\,z)\sinh(a\,z)\,dz = \frac{a\cos(c\,z)\cosh(a\,z)+c\sin(c\,z)\sinh(a\,z)}{a^2+c^2}$$

01.19.21.0695.01

$$\int \cos(c\,z)\sinh(c\,z)\,dz = \frac{\cos(c\,z)\cosh(c\,z)+\sin(c\,z)\sinh(c\,z)}{2\,c}$$

Involving $\cos(c\,z+d)\sinh(a\,z)$

01.19.21.0696.01

$$\int \cos(d+c\,z)\sinh(a\,z)\,dz = \frac{a\cos(d+c\,z)\cosh(a\,z)+c\sin(d+c\,z)\sinh(a\,z)}{a^2+c^2}$$

Involving $\cos(c\,z)\sinh(a\,z+b)$

01.19.21.0697.01

$$\int \cos(c\,z)\sinh(b+a\,z)\,dz = \frac{a\cos(c\,z)\cosh(b+a\,z)+c\sin(c\,z)\sinh(b+a\,z)}{a^2+c^2}$$

Involving $\cos(c\,z+d)\sinh(a\,z+b)$

01.19.21.0698.01

$$\int \cos(d+c\,z)\sinh(b+a\,z)\,dz = \frac{a\cos(d+c\,z)\cosh(b+a\,z)+c\sin(d+c\,z)\sinh(b+a\,z)}{a^2+c^2}$$

Involving $\cos(b\,z^r)\sinh(c\,z)$

01.19.21.0699.01

$$\int \cos(b\,z^2)\sinh(c\,z)\,dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{i\,c+2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,b}\right)-\cos\left(\frac{c^2}{4\,b}\right)S\left(\frac{i\,c+2\,b\,z}{\sqrt{-b}\,\sqrt{2\,\pi}}\right)}{\sqrt{-b}}+\frac{\cos\left(\frac{c^2}{4\,b}\right)S\left(\frac{-i\,c+2\,b\,z}{\sqrt{b}\,\sqrt{2\,\pi}}\right)+C\left(\frac{-i\,c+2\,b\,z}{\sqrt{b}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,b}\right)}{\sqrt{b}}\right)$$

01.19.21.0700.01

$$\int \cos\left(\sqrt{z}\,b\right)\sinh(c\,z)\,dz = \frac{1}{4}\,i\left(\frac{1}{(-i\,c)^{3/2}}\left(-2\sqrt{-i\,c}\,\cos\left(\sqrt{z}\,b-i\,c\,z\right)-b\sqrt{2\,\pi}\left(\cosh\left(\frac{b^2}{4\,c}\right)S\left(\frac{b-2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{b-2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{b^2}{4\,c}\right)\right)\right)+\frac{1}{(-i\,c)^{3/2}}\left(-2\sqrt{-i\,c}\,\cos\left(\sqrt{z}\,b+i\,c\,z\right)-b\sqrt{2\,\pi}\left(\cosh\left(\frac{b^2}{4\,c}\right)S\left(\frac{b+2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{b+2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{b^2}{4\,c}\right)\right)\right)\right)$$

Involving $\cos(b\,z^r+e)\sinh(c\,z)$

01.19.21.0701.01

$$\int \cos\left(b z^2+e\right) \sinh(c z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{i c+2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}+e\right) - \cos\left(\frac{c^2}{4b}+e\right) S\left(\frac{i c+2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)}{\sqrt{-b}} + \frac{\cos\left(\frac{c^2}{4b}+e\right) S\left(\frac{-i c+2 b z}{\sqrt{b}\sqrt{2\pi}}\right) + C\left(\frac{-i c+2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}+e\right)}{\sqrt{b}} \right)$$

01.19.21.0702.01

$$\int \cos\left(\sqrt{z}\, b+e\right) \sinh(c z)\, dz = \frac{1}{4} i \left(\frac{1}{(-i c)^{3/2}} \left(-2\sqrt{-i c}\, \cos\left(\sqrt{z}\, b+e-i c z\right) - b\sqrt{2\pi} \left(\cosh\left(\frac{b^2}{4c}+i e\right) S\left(\frac{b-2 i c\sqrt{z}}{\sqrt{-i c}\sqrt{2\pi}}\right) - i C\left(\frac{b-2 i c\sqrt{z}}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4c}+i e\right) \right) \right) + \frac{1}{(-i c)^{3/2}} \left(-2\sqrt{-i c}\, \cos\left(\sqrt{z}\, b+e+i c z\right) - b\sqrt{2\pi} \left(\cosh\left(\frac{b^2}{4c}-i e\right) S\left(\frac{b+2 i c\sqrt{z}}{\sqrt{-i c}\sqrt{2\pi}}\right) - i C\left(\frac{b+2 i c\sqrt{z}}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4c}-i e\right) \right) \right) \right)$$

Involving $\cos\left(b z^r+d z\right) \sinh(c z)$

01.19.21.0703.01

$$\int \cos\left(b z^2+d z\right) \sinh(c z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(d-i c)^2}{4b}\right) S\left(\frac{d-i c+2 b z}{\sqrt{b}\sqrt{2\pi}}\right) - C\left(\frac{d-i c+2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{(d-i c)^2}{4b}\right)}{\sqrt{b}} - \frac{\cos\left(\frac{(d+i c)^2}{4b}\right) S\left(\frac{d+i c+2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) + C\left(\frac{d+i c+2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(\frac{(d+i c)^2}{4b}\right)}{\sqrt{-b}} \right)$$

01.19.21.0704.01

$$\int \cos\left(\sqrt{z}\, b+d z\right) \sinh(c z)\, dz = \frac{1}{4} i \left(\frac{1}{(-d-i c)^{3/2}} \left(-2\sqrt{-d-i c}\, \cos\left(\sqrt{z}\, b+(d+i c) z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(-d-i c)}\right) S\left(\frac{b+2(d+i c)\sqrt{z}}{\sqrt{-d-i c}\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{b+2(d+i c)\sqrt{z}}{\sqrt{-d-i c}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4(-d-i c)}\right) \right) + \frac{1}{(d-i c)^{3/2}} \left(-2\sqrt{d-i c}\, \cos\left(\sqrt{z}\, b+(d-i c) z\right) - b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(d-i c)}\right) S\left(\frac{b+2(d-i c)\sqrt{z}}{\sqrt{d-i c}\sqrt{2\pi}}\right) + b\sqrt{2\pi}\, C\left(\frac{b+2(d-i c)\sqrt{z}}{\sqrt{d-i c}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4(d-i c)}\right) \right) \right)$$

Involving $\cos\left(b z^r+d z+e\right) \sinh(c z)$

01.19.21.0705.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh(c z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(d - i c)^2}{4 b} - e\right) S\left(\frac{d - i c + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) - C\left(\frac{d - i c + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{(d - i c)^2}{4 b} - e\right)}{\sqrt{b}} - \frac{\cos\left(\frac{(-d - i c)^2}{4 b} - e\right) S\left(\frac{d + i c + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) + C\left(\frac{d + i c + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(\frac{(-d - i c)^2}{4 b} - e\right)}{\sqrt{-b}} \right)$$

01.19.21.0706.01

$$\int \cos\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = \frac{1}{4} i \left(\frac{1}{(d - i c)^{3/2}} \left(-2 \sqrt{d - i c} \cos\left(\sqrt{z}\, b + e + (d - i c) z\right) - b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (d - i c)} - e\right) S\left(\frac{b + 2 (d - i c) \sqrt{z}}{\sqrt{d - i c} \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2 (d - i c) \sqrt{z}}{\sqrt{d - i c} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4 (d - i c)} - e\right) \right) + \frac{1}{(-d - i c)^{3/2}} \left(-2 \sqrt{-d - i c} \cos\left(\sqrt{z}\, b + e + (d + i c) z\right) - b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (-d - i c)} + e\right) S\left(\frac{b + 2 (d + i c) \sqrt{z}}{\sqrt{-d - i c} \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2 (d + i c) \sqrt{z}}{\sqrt{-d - i c} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4 (-d - i c)} + e\right) \right) \right)$$

Involving $\cos\left(b z^r\right) \sinh(f z + g)$

01.19.21.0707.01

$$\int \cos\left(b z^2\right) \sinh(g + f z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4 b} + i g\right) - \cos\left(\frac{f^2}{4 b} + i g\right) S\left(\frac{i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right)}{\sqrt{-b}} + \frac{\cos\left(\frac{f^2}{4 b} - i g\right) S\left(\frac{-i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + C\left(\frac{-i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4 b} - i g\right)}{\sqrt{b}} \right)$$

01.19.21.0708.01

$$\int \cos\left(b \sqrt{z}\right) \sinh(g + f z)\, dz = \frac{1}{4} i \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cos\left(\sqrt{z}\, b + i g + i f z\right) - b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 f} + g\right) S\left(\frac{b + 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) + b i \sqrt{2\pi}\, C\left(\frac{b + 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4 f} + g\right) \right) + \frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cos\left(\sqrt{z}\, b - i g - i f z\right) - b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 f} + g\right) S\left(\frac{b - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) + b i \sqrt{2\pi}\, C\left(\frac{b - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4 f} + g\right) \right) \right)$$

Involving $\cos(b z^r + e) \sinh(f z + g)$

01.19.21.0709.01

$$\int \cos(b z^2 + e) \sinh(g + f z) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4b} + e + i g\right) - \cos\left(\frac{f^2}{4b} + e + i g\right) S\left(\frac{i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right)}{\sqrt{-b}} + \frac{\cos\left(\frac{f^2}{4b} + e - i g\right) S\left(\frac{-i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + C\left(\frac{-i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4b} + e - i g\right)}{\sqrt{b}} \right)$$

01.19.21.0710.01

$$\int \cos(\sqrt{z}\, b + e) \sinh(g + f z) \, dz = \frac{1}{4} i \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cos(\sqrt{z}\, b + e + i g + i f z) - b \sqrt{2\pi} \cos\left(\frac{i b^2}{4 f} + e + i g\right) S\left(\frac{b + 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) \sin\left(\frac{i b^2}{4 f} + e + i g\right) \right) + \frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cos(\sqrt{z}\, b + e - i g - i f z) - b \sqrt{2\pi} \cos\left(-\frac{i b^2}{4 f} + e - i g\right) S\left(\frac{b - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, C\left(\frac{b - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}}\right) \sin\left(-\frac{i b^2}{4 f} + e - i g\right) \right) \right)$$

Involving $\cos(b z^r + d z) \sinh(f z + g)$

01.19.21.0711.01

$$\int \cos(b z^2 + d z) \sinh(g + f z) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(d - i f)^2}{4b} + i g\right) S\left(\frac{d - i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) - C\left(\frac{d - i f + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{(d - i f)^2}{4b} + i g\right)}{\sqrt{b}} + \frac{C\left(\frac{d + i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(i g - \frac{(d + i f)^2}{4b}\right) - \cos\left(i g - \frac{(-d - i f)^2}{4b}\right) S\left(\frac{d + i f + 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right)}{\sqrt{-b}} \right)$$

01.19.21.0712.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \sinh(g + f\, z)\, dz = \frac{1}{4} i \left(\frac{1}{(-d - i\, f)^{3/2}} \left(-2 \sqrt{-d - i\, f}\, \cos\left(\sqrt{z}\, b + i\, g + (d + i\, f)\, z\right) - b \sqrt{2\pi} \cos\left(\frac{b^2}{4(-d - i\, f)} + i\, g\right) S\left(\frac{b + 2(d + i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2(d + i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4(-d - i\, f)} + i\, g\right) \right) + \frac{1}{(d - i\, f)^{3/2}} \left(-2 \sqrt{d - i\, f}\, \cos\left(\sqrt{z}\, b - i\, g + (d - i\, f)\, z\right) - b \sqrt{2\pi} \cos\left(\frac{b^2}{4(d - i\, f)} + i\, g\right) S\left(\frac{b + 2(d - i\, f)\sqrt{z}}{\sqrt{d - i\, f}\, \sqrt{2\pi}}\right) + b \sqrt{2\pi}\, C\left(\frac{b + 2(d - i\, f)\sqrt{z}}{\sqrt{d - i\, f}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4(d - i\, f)} + i\, g\right) \right) \right)$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \sinh(f\, z + g)$

01.19.21.0713.01

$$\int \cos\left(b\, z^2 + d\, z + e\right) \sinh(g + f\, z)\, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{d + i\, f + 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(d + i\, f)^2}{4\, b} + e + i\, g\right) - \cos\left(-\frac{(-d - i\, f)^2}{4\, b} + e + i\, g\right) S\left(\frac{d + i\, f + 2\, b\, z}{\sqrt{-b}\, \sqrt{2\pi}}\right)}{\sqrt{-b}} + \frac{\cos\left(-\frac{(d - i\, f)^2}{4\, b} + e - i\, g\right) S\left(\frac{d - i\, f + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) + C\left(\frac{d - i\, f + 2\, b\, z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(d - i\, f)^2}{4\, b} + e - i\, g\right)}{\sqrt{b}} \right)$$

01.19.21.0714.01

$$\int \cos\left(\sqrt{z}\, b+e+d\, z\right) \sinh(g+f\, z)\, dz = \frac{1}{4} i \left(\frac{1}{(-d-i f)^{3/2}} \left(-2 \sqrt{-d-i f} \cos\left(\sqrt{z}\, b+e+i g+(d+i f) z\right)-b \sqrt{2\pi} \cos\left(\frac{b^2}{4(-d-i f)}+e+i g\right) S\left(\frac{b+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right)+b\sqrt{2\pi}\, C\left(\frac{b+2(d+i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4(-d-i f)}+e+i g\right)\right)+\frac{1}{(d-i f)^{3/2}} \left(-2\sqrt{d-i f} \cos\left(\sqrt{z}\, b+e-i g+(d-i f) z\right)-b\sqrt{2\pi} \cos\left(-\frac{b^2}{4(d-i f)}+e-i g\right) S\left(\frac{b+2(d-i f)\sqrt{z}}{\sqrt{d-i f}\sqrt{2\pi}}\right)-b\sqrt{2\pi}\, C\left(\frac{b+2(d-i f)\sqrt{z}}{\sqrt{d-i f}\sqrt{2\pi}}\right) \sin\left(-\frac{b^2}{4(d-i f)}+e-i g\right)\right)\right)$$

Involving $\cos(b\, z) \sinh(c\, z^r)$

01.19.21.0715.01

$$\int \cos(b\, z) \sinh\left(c\, z^2\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{i\, C\left(\frac{b+2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4c}\right)-\cosh\left(\frac{b^2}{4c}\right) S\left(\frac{b+2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right)}{\sqrt{-i c}}-\frac{\cosh\left(\frac{b^2}{4c}\right) S\left(\frac{2 i c z-b}{\sqrt{i c}\sqrt{2\pi}}\right)+i\, C\left(\frac{2 i c z-b}{\sqrt{i c}\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4c}\right)}{\sqrt{i c}}\right)$$

01.19.21.0716.01

$$\int \cos(b\, z) \sinh\left(\sqrt{z}\, c\right) dz = \frac{1}{4} i \left(\frac{1}{(-b)^{3/2}} \left(-2\sqrt{-b} \cos\left(b\, z+i c\sqrt{z}\right)-i c\sqrt{2\pi} \cos\left(\frac{c^2}{4b}\right) S\left(\frac{2\sqrt{z}\, b+i c}{\sqrt{-b}\sqrt{2\pi}}\right)+c\, i\sqrt{2\pi}\, C\left(\frac{2\sqrt{z}\, b+i c}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}\right)\right)+\frac{1}{(-b)^{3/2}} \left(2\sqrt{-b} \cos\left(b\, z-i c\sqrt{z}\right)+c\, i\sqrt{2\pi} \cos\left(\frac{c^2}{4b}\right) S\left(\frac{i c-2 b\sqrt{z}}{\sqrt{-b}\sqrt{2\pi}}\right)-i c\sqrt{2\pi}\, C\left(\frac{i c-2 b\sqrt{z}}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(\frac{c^2}{4b}\right)\right)\right)$$

Involving $\cos(d\, z+e) \sinh(c\, z^r)$

01.19.21.0717.01

$$\int \cos(e+d\,z)\sinh\left(c\,z^2\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{i\,C\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{d^2}{4\,c}-i\,e\right)-\cosh\left(\frac{d^2}{4\,c}-i\,e\right)S\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)}{\sqrt{-i\,c}} - \frac{\cosh\left(\frac{d^2}{4\,c}+i\,e\right)S\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{d^2}{4\,c}+i\,e\right)}{\sqrt{i\,c}}\right)$$

01.19.21.0718.01

$$\int \cos(e+d\,z)\sinh\left(\sqrt{z}\,c\right)dz = \frac{1}{4}\,i\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\,\cos\left(e+d\,z+i\,c\sqrt{z}\right)-i\,c\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,d}+e\right)S\left(\frac{2\sqrt{z}\,d+i\,c}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{2\sqrt{z}\,d+i\,c}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\,\cos\left(e+d\,z-i\,c\sqrt{z}\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,d}+e\right)S\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)-i\,c\sqrt{2\,\pi}\,C\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e\right)\right)\right)$$

Involving $\cos(a\,z^r)\sinh(c\,z^r)$

01.19.21.0719.01

$$\int \cos(b\,z^r)\sinh(c\,z^r)\,dz = -\frac{1}{4\,r}\left(z\left(\Gamma\left(\frac{1}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-1/r}+((i\,b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,b-c)\,z^r\right)-((c-i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-i\,b)\,z^r\right)-((c+i\,b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.0720.01

$$\int \cos\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{S\left(\sqrt{-b-i\,c}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{-b-i\,c}}-\frac{S\left(\sqrt{i\,c-b}\,\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0721.01

$$\int \cos\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = -i\left(\frac{(b-i\,c)\sqrt{z}\,\cos\left((i\,c-b)\sqrt{z}\right)+\sin\left((i\,c-b)\sqrt{z}\right)}{(i\,c-b)^2}+\frac{\sin\left((b+i\,c)\sqrt{z}\right)-(b+i\,c)\sqrt{z}\,\cos\left((b+i\,c)\sqrt{z}\right)}{(b+i\,c)^2}\right)$$

Involving $\cos(a\,z^r+e)\sinh(c\,z^r)$

01.19.21.0722.01

$$\int \cos(b z^r + e) \sinh(c z^r) \, dz = -\frac{1}{4 r} \left(z \left(e^{i e} \Gamma\left(\frac{1}{r}, (-c - i b) z^r\right) ((-c - i b) z^r)^{-1/r} + e^{-i e} ((i b - c) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - c) z^r\right) - e^{i e} ((c - i b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - i b) z^r\right) - e^{-i e} ((c + i b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c + i b) z^r\right) \right) \right)$$

01.19.21.0723.01

$$\int \cos(b z^2 + e) \sinh(c z^2) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos(e) S\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) - C\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) \sin(e)}{\sqrt{-b - i c}} + \frac{C\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) \sin(e) - \cos(e) S\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right)}{\sqrt{i c - b}} \right)$$

01.19.21.0724.01

$$\int \cos\left(\sqrt{z} b + e\right) \sinh\left(c \sqrt{z}\right) dz = -i \left(\frac{(-b - i c) \sqrt{z} \cos\left(\sqrt{z} (b + i c) + e\right) + \sin\left(\sqrt{z} (b + i c) + e\right)}{(b + i c)^2} + \frac{(b - i c) \sqrt{z} \cos\left(e - (i c - b) \sqrt{z}\right) - \sin\left(e - (i c - b) \sqrt{z}\right)}{(i c - b)^2} \right)$$

Involving $\cos(b z^r + d z) \sinh(c z^r)$

01.19.21.0725.01

$$\int \cos(b z^2 + d z) \sinh(c z^2) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{d^2}{4(-b - i c)}\right) S\left(\frac{2(-b - i c) z - d}{\sqrt{-b - i c} \sqrt{2 \pi}}\right) - C\left(\frac{2(-b - i c) z - d}{\sqrt{-b - i c} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4(-b - i c)}\right)}{\sqrt{-b - i c}} - \frac{\cos\left(\frac{d^2}{4(i c - b)}\right) S\left(\frac{2(i c - b) z - d}{\sqrt{i c - b} \sqrt{2 \pi}}\right) - C\left(\frac{2(i c - b) z - d}{\sqrt{i c - b} \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4(i c - b)}\right)}{\sqrt{i c - b}} \right)$$

01.19.21.0726.01

$$\int \cos\left(\sqrt{z} b + d z\right) \sinh\left(\sqrt{z} c\right) dz = -\frac{1}{4} i \left(\frac{1}{d^{3/2}} \left(2 \sqrt{d} \cos\left(\sqrt{z} (b - i c) + d z\right) + (b - i c) \sqrt{2 \pi} \cos\left(\frac{(b - i c)^2}{4 d}\right) S\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) + (i c - b) \sqrt{2 \pi} C\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2 \pi}}\right) \sin\left(\frac{(b - i c)^2}{4 d}\right) \right) + \frac{1}{(-d)^{3/2}} \left(2 \sqrt{-d} \cos\left(\sqrt{z} (b + i c) + d z\right) + (b + i c) \sqrt{2 \pi} \cos\left(\frac{(b + i c)^2}{4 d}\right) S\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2 \pi}}\right) + (b + i c) \sqrt{2 \pi} C\left(\frac{b + i c + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2 \pi}}\right) \sin\left(\frac{(b + i c)^2}{4 d}\right) \right) \right)$$

Involving $\cos(b z^r + d z + e)\sinh(c z^r)$

01.19.21.0727.01

$$\int \cos(b z^2 + d z + e)\sinh(c z^2)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{d^2}{4(-b-i c)} + e\right) S\left(\frac{2(-b-i c) z - d}{\sqrt{-b-i c}\sqrt{2\pi}}\right) - C\left(\frac{2(-b-i c) z - d}{\sqrt{-b-i c}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(-b-i c)} + e\right)}{\sqrt{-b-i c}} - \frac{\cos\left(\frac{d^2}{4(i c-b)} + e\right) S\left(\frac{2(i c-b) z - d}{\sqrt{i c-b}\sqrt{2\pi}}\right) - C\left(\frac{2(i c-b) z - d}{\sqrt{i c-b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(i c-b)} + e\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0728.01

$$\int \cos\left(\sqrt{z}\, b + e + d z\right)\sinh\left(\sqrt{z}\, c\right) dz = -\frac{1}{4} i \left(\frac{1}{d^{3/2}} \left(2\sqrt{d} \cos\left(\sqrt{z}\,(b - i c) + e + d z\right) + (b - i c)\sqrt{2\pi} \cos\left(\frac{(b - i c)^2}{4 d} - e\right) S\left(\frac{b - i c + 2 d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) + (i c - b)\sqrt{2\pi}\, C\left(\frac{b - i c + 2 d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{(b - i c)^2}{4 d} - e\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(\sqrt{z}\,(b + i c) + e + d z\right) + (b + i c)\sqrt{2\pi} \cos\left(\frac{(b + i c)^2}{4 d} - e\right) S\left(\frac{b + i c + 2 d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + (b + i c)\sqrt{2\pi}\, C\left(\frac{b + i c + 2 d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{(b + i c)^2}{4 d} - e\right)\right)\right)$$

Involving $\cos(d z)\sinh(c z^r + g)$

01.19.21.0729.01

$$\int \cos(d z)\sinh(c z^2 + g)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{i\, C\left(\frac{d + 2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 c} + g\right) - \cosh\left(\frac{d^2}{4 c} + g\right) S\left(\frac{d + 2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right)}{\sqrt{-i c}} - \frac{\cosh\left(\frac{d^2}{4 c} + g\right) S\left(\frac{2 i c z - d}{\sqrt{i c}\sqrt{2\pi}}\right) + i\, C\left(\frac{2 i c z - d}{\sqrt{i c}\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 c} + g\right)}{\sqrt{i c}} \right)$$

01.19.21.0730.01

$$\int \cos(d\,z)\sinh\left(\sqrt{z}\;c+g\right)dz = \frac{1}{4}i\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\;\cos\left(i\,g+i\,c\sqrt{z}\;+d\,z\right)-i\,c\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,d}+i\,g\right)S\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\;C\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}+i\,g\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\;\cos\left(-i\,g-i\,c\sqrt{z}\;+d\,z\right)+c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,d}-i\,g\right)S\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\;C\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}-i\,g\right)\right)\right)$$

Involving $\cos(d\,z+e)\sinh\left(c\,z^r+g\right)$

01.19.21.0731.01

$$\int \cos(e+d\,z)\sinh\left(c\,z^2+g\right)dz = \frac{1}{2}i\sqrt{\frac{\pi}{2}}\left(\frac{i\,C\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\;\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4\,c}-i\,e+g\right)-\cosh\left(\frac{d^2}{4\,c}-i\,e+g\right)S\left(\frac{d+2\,i\,c\,z}{\sqrt{-i\,c}\;\sqrt{2\pi}}\right)}{\sqrt{-i\,c}}-\frac{\cosh\left(\frac{d^2}{4\,c}+g+i\,e\right)S\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\;\sqrt{2\pi}}\right)+i\,C\left(\frac{2\,i\,c\,z-d}{\sqrt{i\,c}\;\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4\,c}+g+i\,e\right)}{\sqrt{i\,c}}\right)$$

01.19.21.0732.01

$$\int \cos(e+d\,z)\sinh\left(\sqrt{z}\;c+g\right)dz = \frac{1}{4}i\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\;\cos\left(e+i\,g\;+d\,z+i\,c\sqrt{z}\right)-i\,c\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,d}+e+i\,g\right)S\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\;C\left(\frac{2\sqrt{z}\;d+i\,c}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e+i\,g\right)\right)+\frac{1}{(-d)^{3/2}}\left(2\sqrt{-d}\;\cos\left(e-i\,g+d\,z-i\,c\sqrt{z}\right)+c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,d}+e-i\,g\right)S\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\;C\left(\frac{i\,c-2\,d\sqrt{z}}{\sqrt{-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,d}+e-i\,g\right)\right)\right)$$

Involving $\cos\left(a\,z^r\right)\sinh\left(c\,z^r+g\right)$

01.19.21.0733.01

$$\int \cos(b\,z^r)\sinh(c\,z^r+g)\,dz = -\frac{1}{4\,r}\left(z\left(e^g\,\Gamma\left(\frac{1}{r},(-c-i\,b)\,z^r\right)\left((-c-i\,b)\,z^r\right)^{-1/r}+e^g\left((i\,b-c)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(i\,b-c)\,z^r\right)-e^{-g}\left((c-i\,b)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(c-i\,b)\,z^r\right)-e^{-g}\left((c+i\,b)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.0734.01

$$\int \cos\left(b z^2\right) \sinh\left(c z^2 + g\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos(i g) S\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) - C\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) \sin(i g)}{\sqrt{-b - i c}} - \frac{\cos(i g) S\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) + C\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) \sin(i g)}{\sqrt{i c - b}} \right)$$

01.19.21.0735.01

$$\int \cos\left(b \sqrt{z}\right) \sinh\left(\sqrt{z}\, c + g\right) dz = -i \left(\frac{(b - i c) \sqrt{z} \cos\left(\sqrt{z}\, (i c - b) + i g\right) + \sin\left(\sqrt{z}\, (i c - b) + i g\right)}{(i c - b)^2} + \frac{\sin\left(\sqrt{z}\, (b + i c) + i g\right) - (b + i c) \sqrt{z} \cos\left(\sqrt{z}\, (b + i c) + i g\right)}{(-b - i c)^2} \right)$$

Involving $\cos(a z^r + e) \sinh(c z^r + g)$

01.19.21.0736.01

$$\int \cos(b z^r + e) \sinh(c z^r + g)\, dz = -\frac{1}{4 r} \left(z \left(e^{g + i e}\, \Gamma\left(\frac{1}{r}, (-c - i b) z^r\right) ((-c - i b) z^r)^{-1/r} + e^{g - i e} ((i b - c) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i b - c) z^r\right) - e^{i e - g} ((c - i b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c - i b) z^r\right) - e^{-g - i e} ((c + i b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c + i b) z^r\right) \right) \right)$$

01.19.21.0737.01

$$\int \cos\left(b z^2 + e\right) \sinh\left(c z^2 + g\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos(e + i g) S\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) - C\left(\sqrt{-b - i c} \sqrt{\frac{2}{\pi}} z\right) \sin(e + i g)}{\sqrt{-b - i c}} + \frac{C\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right) \sin(e - i g) - \cos(e - i g) S\left(\sqrt{i c - b} \sqrt{\frac{2}{\pi}} z\right)}{\sqrt{i c - b}} \right)$$

01.19.21.0738.01

$$\int \cos\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g\right) dz = -i \left(\frac{(b-i c) \sqrt{z} \cos\left(-\sqrt{z}\, (i c-b)+e-i g\right)-\sin\left(-\sqrt{z}\, (i c-b)+e-i g\right)}{(i c-b)^2}+\right.$$
$$\left.\frac{(-b-i c) \sqrt{z} \cos\left(-\sqrt{z}\, (-b-i c)+e+i g\right)+\sin\left(-\sqrt{z}\, (-b-i c)+e+i g\right)}{(-b-i c)^2}\right)$$

Involving $\cos\left(b z^r+d z\right) \sinh\left(c z^r+g\right)$

01.19.21.0739.01

$$\int \cos\left(b z^2+d z\right) \sinh\left(c z^2+g\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{d^2}{4(-b-i c)}+i g\right) S\left(\frac{2(-b-i c) z-d}{\sqrt{-b-i c}\, \sqrt{2\pi}}\right)-C\left(\frac{2(-b-i c) z-d}{\sqrt{-b-i c}\, \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(-b-i c)}+i g\right)}{\sqrt{-b-i c}}-\right.$$
$$\left.\frac{\cos\left(\frac{d^2}{4(i c-b)}-i g\right) S\left(\frac{2(i c-b) z-d}{\sqrt{i c-b}\, \sqrt{2\pi}}\right)-C\left(\frac{2(i c-b) z-d}{\sqrt{i c-b}\, \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(i c-b)}-i g\right)}{\sqrt{i c-b}}\right)$$

01.19.21.0740.01

$$\int \cos\left(\sqrt{z}\, b+d z\right) \sinh\left(\sqrt{z}\, c+g\right) dz =$$
$$-\frac{1}{4} i \left(\frac{1}{d^{3/2}} \left(2 \sqrt{d} \cos\left(\sqrt{z}\, (b-i c)-i g+d z\right)+(b-i c) \sqrt{2\pi} \cos\left(\frac{(b-i c)^2}{4 d}+i g\right) S\left(\frac{b-i c+2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right)+\right.\right.$$
$$\left.(i c-b) \sqrt{2\pi}\, C\left(\frac{b-i c+2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{(b-i c)^2}{4 d}+i g\right)\right)+$$
$$\frac{1}{(-d)^{3/2}} \left(2 \sqrt{-d} \cos\left(\sqrt{z}\, (b+i c)+i g+d z\right)+(b+i c) \sqrt{2\pi} \cos\left(\frac{(b+i c)^2}{4 d}-i g\right) S\left(\frac{b+i c+2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right)+\right.$$
$$\left.\left.(b+i c) \sqrt{2\pi}\, C\left(\frac{b+i c+2 d \sqrt{z}}{\sqrt{-d}\, \sqrt{2\pi}}\right) \sin\left(\frac{(b+i c)^2}{4 d}-i g\right)\right)\right)$$

Involving $\cos\left(b z^r+d z+e\right) \sinh\left(c z^r+g\right)$

01.19.21.0741.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{d^2}{4(-b-i c)} + e + i g\right) S\left(\frac{2(-b-i c) z - d}{\sqrt{-b-i c}\sqrt{2\pi}}\right) - C\left(\frac{2(-b-i c) z - d}{\sqrt{-b-i c}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(-b-i c)} + e + i g\right)}{\sqrt{-b-i c}} - \frac{\cos\left(\frac{d^2}{4(i c-b)} + e - i g\right) S\left(\frac{2(i c-b) z - d}{\sqrt{i c-b}\sqrt{2\pi}}\right) - C\left(\frac{2(i c-b) z - d}{\sqrt{i c-b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4(i c-b)} + e - i g\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0742.01

$$\int \cos\left(\sqrt{z}\, b + e + d z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = -\frac{1}{4} i \left(\frac{1}{d^{3/2}} \left(2\sqrt{d} \cos\left(\sqrt{z}\,(b - i c) + e - i g + d z\right) + (b - i c)\sqrt{2\pi} \cos\left(\frac{(b - i c)^2}{4 d} - e + i g\right) S\left(\frac{b - i c + 2 d \sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) + (i c - b)\sqrt{2\pi}\, C\left(\frac{b - i c + 2 d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{(b - i c)^2}{4 d} - e + i g\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(\sqrt{z}\,(b + i c) + e + i g + d z\right) + (b + i c)\sqrt{2\pi} \cos\left(\frac{(b + i c)^2}{4 d} - e - i g\right) S\left(\frac{b + i c + 2 d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + (b + i c)\sqrt{2\pi}\, C\left(\frac{b + i c + 2 d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{(b + i c)^2}{4 d} - e - i g\right)\right)\right)$$

Involving $\cos(d z) \sinh\left(c z^r + f z\right)$

01.19.21.0743.01

$$\int \cos(d z) \sinh\left(c z^2 + f z\right) dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{-\cosh\left(\frac{(i f - d)^2}{4 c}\right) S\left(\frac{-d + i f + 2 i c z}{\sqrt{i c}\sqrt{2\pi}}\right) - i\, C\left(\frac{-d + i f + 2 i c z}{\sqrt{i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(i f - d)^2}{4 c}\right)}{\sqrt{i c}} + \frac{\cosh\left(\frac{(-d - i f)^2}{4 c}\right) S\left(\frac{-d - i f - 2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) - i\, C\left(\frac{-d - i f - 2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(-d - i f)^2}{4 c}\right)}{\sqrt{-i c}} \right)$$

01.19.21.0744.01

$$\int \cos(d\,z)\sinh\left(\sqrt{z}\,c + f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\,\cos\left(i\,c\sqrt{z} + (i\,f-d)\,z\right) + c\,i\sqrt{2\pi}\,\cos\left(\frac{c^2}{4\,(i\,f-d)}\right)S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right) + c\,i\sqrt{2\pi}\,C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(i\,f-d)}\right)\right) + \frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\,\cos\left(i\,c\sqrt{z} - (-d-i\,f)\,z\right) + c\,i\sqrt{2\pi}\,\cos\left(\frac{c^2}{4\,(-d-i\,f)}\right)S\left(\frac{2\,(-d-i\,f)\sqrt{z} - i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right) + c\,i\sqrt{2\pi}\,C\left(\frac{2\,(-d-i\,f)\sqrt{z} - i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(-d-i\,f)}\right)\right)\right)$$

Involving $\cos(d\,z+e)\sinh\left(c\,z^r + f\,z\right)$

01.19.21.0745.01

$$\int \cos(e+d\,z)\sinh\left(c\,z^2 + f\,z\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{i\,(-d-i\,f)^2}{4\,c}+e\right)S\left(\frac{-d-i\,f-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right) - C\left(\frac{-d-i\,f-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(-d-i\,f)^2}{4\,c}+e\right)}{\sqrt{-i\,c}} + \frac{C\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sin\left(-\frac{i\,(i\,f-d)^2}{4\,c}+e\right) - \cos\left(-\frac{i\,(i\,f-d)^2}{4\,c}+e\right)S\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)}{\sqrt{i\,c}}\right)$$

01.19.21.0746.01

$$\int \cos(e+d\,z)\sinh\left(\sqrt{z}\,c + f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\,\cos\left(e-(-d-i\,f)\,z + i\,c\sqrt{z}\right) + c\,i\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4\,(-d-i\,f)}+e\right)S\left(\frac{2\,(-d-i\,f)\sqrt{z} - i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right) - i\,c\sqrt{2\pi}\,C\left(\frac{2\,(-d-i\,f)\sqrt{z} - i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(-d-i\,f)}+e\right)\right) + \frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\,\cos\left(e-(i\,f-d)\,z - i\,c\sqrt{z}\right) + c\,i\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4\,(i\,f-d)}+e\right)S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right) - i\,c\sqrt{2\pi}\,C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(i\,f-d)}+e\right)\right)\right)$$

Involving $\cos\left(b\,z^r\right)\sinh\left(c\,z^r + f\,z\right)$

01.19.21.0747.01

$$\int \cos(b z^2)\sinh(c z^2 + f z)\,dz = -\frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{f^2}{4(i c-b)}\right) S\left(\frac{i f+2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) + C\left(\frac{i f+2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4(i c-b)}\right)}{\sqrt{i c-b}} + \frac{\cos\left(\frac{f^2}{4(-b-i c)}\right) S\left(\frac{i f+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) + C\left(\frac{i f+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) \sin\left(\frac{f^2}{4(-b-i c)}\right)}{\sqrt{-b-i c}} \right)$$

01.19.21.0748.01

$$\int \cos(b\sqrt{z})\sinh(\sqrt{z}\,c + f z)\,dz = \frac{1}{4} i \left(\frac{1}{(i f)^{3/2}} \left(2\sqrt{i f}\,\cos(\sqrt{z}\,(i c-b) + i f z) + (i c-b)\sqrt{2\pi}\,\cosh\left(\frac{(i c-b)^2}{4 f}\right) S\left(\frac{-b+i c+2 i f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) - (c+i b)\sqrt{2\pi}\, C\left(\frac{-b+i c+2 i f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{(i c-b)^2}{4 f}\right)\right) + \frac{1}{(-i f)^{3/2}} \left(-2\sqrt{-i f}\,\cos(\sqrt{z}\,(b+i c) + i f z) - (b+i c)\sqrt{2\pi}\,\cosh\left(\frac{(b+i c)^2}{4 f}\right) S\left(\frac{b+i c+2 i f\sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) + (i b-c)\sqrt{2\pi}\, C\left(\frac{b+i c+2 i f\sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) \sinh\left(\frac{(b+i c)^2}{4 f}\right)\right)\right)$$

Involving $\cos(b z^r + e)\sinh(c z^r + f z)$

01.19.21.0749.01

$$\int \cos(b z^2 + e)\sinh(c z^2 + f z)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{C\left(\frac{i f+2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) \sin\left(e - \frac{f^2}{4(i c-b)}\right) - \cos\left(e - \frac{f^2}{4(i c-b)}\right) S\left(\frac{i f+2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right)}{\sqrt{i c-b}} + \frac{C\left(\frac{i f+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) \sin\left(e - \frac{f^2}{4(-b-i c)}\right) - \cos\left(e - \frac{f^2}{4(-b-i c)}\right) S\left(\frac{i f+2(b+i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right)}{\sqrt{-b-i c}} \right)$$

01.19.21.0750.01

$$\int \cos\left(\sqrt{z}\; b+e\right)\sinh\left(\sqrt{z}\; c+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(-i\,f)^{3/2}}\left(-2\sqrt{-i\,f}\;\cos\left(\sqrt{z}\;(b+i\,c)+e+i\,f\,z\right)-(b+i\,c)\sqrt{2\pi}\;\cos\left(\frac{i\,(b+i\,c)^2}{4\,f}+e\right)S\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\;\sqrt{2\pi}}\right)+(b+i\,c)\sqrt{2\pi}\;C\left(\frac{b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\;\sqrt{2\pi}}\right)\sin\left(\frac{i\,(b+i\,c)^2}{4\,f}+e\right)\right)+\frac{1}{(i\,f)^{3/2}}\left(2\sqrt{i\,f}\;\cos\left(-\sqrt{z}\;(i\,c-b)+e-i\,f\,z\right)+(i\,c-b)\sqrt{2\pi}\;\cos\left(e-\frac{i\,(i\,c-b)^2}{4\,f}\right)S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)+(b-i\,c)\sqrt{2\pi}\;C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)\sin\left(e-\frac{i\,(i\,c-b)^2}{4\,f}\right)\right)\right)$$

Involving $\cos\left(b\,z^r+d\,z\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0751.01

$$\int \cos\left(b\,z^2+d\,z\right)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{C\left(\frac{-d+i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\;\sqrt{2\pi}}\right)\sin\left(\frac{(i\,f-d)^2}{4\,(i\,c-b)}\right)-\cos\left(\frac{(i\,f-d)^2}{4\,(i\,c-b)}\right)S\left(\frac{-d+i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\;\sqrt{2\pi}}\right)}{\sqrt{i\,c-b}}+\frac{\cos\left(\frac{(d+i\,f)^2}{4\,(-b-i\,c)}\right)S\left(\frac{-d-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\;\sqrt{2\pi}}\right)-C\left(\frac{-d-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\;\sqrt{2\pi}}\right)\sin\left(\frac{(d+i\,f)^2}{4\,(-b-i\,c)}\right)}{\sqrt{-b-i\,c}}\right)$$

01.19.21.0752.01

$$\int \cos\left(\sqrt{z}\; b+d\,z\right)\sinh\left(\sqrt{z}\; c+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\;\cos\left(\sqrt{z}\;(i\,c-b)+(i\,f-d)\,z\right)+(i\,c-b)\sqrt{2\pi}\;\cos\left(\frac{(i\,c-b)^2}{4\,(i\,f-d)}\right)S\left(\frac{-b+i\,c+2\,(i\,f-d)\sqrt{z}}{\sqrt{i\,f-d}\;\sqrt{2\pi}}\right)+(b-i\,c)\sqrt{2\pi}\;C\left(\frac{-b+i\,c+2\,(i\,f-d)\sqrt{z}}{\sqrt{i\,f-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{(i\,c-b)^2}{4\,(i\,f-d)}\right)\right)+\frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\;\cos\left(\sqrt{z}\;(b+i\,c)+(d+i\,f)\,z\right)-(-b-i\,c)\sqrt{2\pi}\;\cos\left(\frac{(b+i\,c)^2}{4\,(d+i\,f)}\right)S\left(\frac{-b-i\,c+2\,(-d-i\,f)\sqrt{z}}{\sqrt{-d-i\,f}\;\sqrt{2\pi}}\right)+(b+i\,c)\sqrt{2\pi}\;C\left(\frac{-b-i\,c+2\,(-d-i\,f)\sqrt{z}}{\sqrt{-d-i\,f}\;\sqrt{2\pi}}\right)\sin\left(\frac{(b+i\,c)^2}{4\,(d+i\,f)}\right)\right)\right)$$

Involving $\cos(b z^r + d z + e) \sinh(c z^r + f z)$

01.19.21.0753.01

$$\int \cos(b z^2 + d z + e) \sinh(c z^2 + f z) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(-d-i f)^2}{4(-b-i c)} + e\right) S\left(\frac{-d-i f+2(-b-i c) z}{\sqrt{-b-i c} \sqrt{2\pi}}\right) - C\left(\frac{-d-i f+2(-b-i c) z}{\sqrt{-b-i c} \sqrt{2\pi}}\right) \sin\left(\frac{(-d-i f)^2}{4(-b-i c)} + e\right)}{\sqrt{-b-i c}} + \frac{C\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b} \sqrt{2\pi}}\right) \sin\left(\frac{(i f-d)^2}{4(i c-b)} + e\right) - \cos\left(\frac{(i f-d)^2}{4(i c-b)} + e\right) S\left(\frac{-d+i f+2(i c-b) z}{\sqrt{i c-b} \sqrt{2\pi}}\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0754.01

$$\int \cos(\sqrt{z}\, b + e + d z) \sinh(\sqrt{z}\, c + f z) \, dz = \frac{1}{4} i \left(\frac{1}{(-d-i f)^{3/2}} \left(-2\sqrt{-d-i f} \cos(-\sqrt{z}(-b-i c) + e - (-d-i f) z) - (-b-i c)\sqrt{2\pi} \cos\left(\frac{(-b-i c)^2}{4(-d-i f)} + e\right) S\left(\frac{-b-i c+2(-d-i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right) - (b+i c)\sqrt{2\pi}\, C\left(\frac{-b-i c+2(-d-i f)\sqrt{z}}{\sqrt{-d-i f}\sqrt{2\pi}}\right) \sin\left(\frac{(-b-i c)^2}{4(-d-i f)} + e\right) \right) + \frac{1}{(i f-d)^{3/2}} \left(2\sqrt{i f-d} \cos(-\sqrt{z}(i c-b) + e - (i f-d) z) + (i c-b)\sqrt{2\pi} \cos\left(\frac{(i c-b)^2}{4(i f-d)} + e\right) S\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\sqrt{2\pi}}\right) + (b-i c)\sqrt{2\pi}\, C\left(\frac{-b+i c+2(i f-d)\sqrt{z}}{\sqrt{i f-d}\sqrt{2\pi}}\right) \sin\left(\frac{(i c-b)^2}{4(i f-d)} + e\right) \right) \right)$$

Involving $\cos(d z) \sinh(c z^r + f z + g)$

01.19.21.0755.01

$$\int \cos(d z) \sinh(c z^2 + f z + g) \, dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{-\cosh\left(\frac{(i f-d)^2}{4c} + g\right) S\left(\frac{-d+i f+2 i c z}{\sqrt{i c}\sqrt{2\pi}}\right) - i\, C\left(\frac{-d+i f+2 i c z}{\sqrt{i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(i f-d)^2}{4c} + g\right)}{\sqrt{i c}} + \frac{\cosh\left(\frac{(-d-i f)^2}{4c} + g\right) S\left(\frac{-d-i f-2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) - i\, C\left(\frac{-d-i f-2 i c z}{\sqrt{-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(-d-i f)^2}{4c} + g\right)}{\sqrt{-i c}} \right)$$

01.19.21.0756.01

$$\int \cos(d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\;\cos\left(i\,g+i\,c\sqrt{z}\;+(i\,f-d)\,z\right)+c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,(i\,f-d)}+i\,g\right)S\left(\frac{2\sqrt{z}\;(i\,f-d)+i\,c}{\sqrt{i\,f-d}\;\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\;C\left(\frac{2\sqrt{z}\;(i\,f-d)+i\,c}{\sqrt{i\,f-d}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(i\,f-d)}+i\,g\right)\right)+\frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\;\cos\left(i\,g+i\,c\sqrt{z}\;-(-d-i\,f)\,z\right)+c\,i\sqrt{2\pi}\;\cos\left(i\,g-\frac{c^2}{4\,(-d-i\,f)}\right)S\left(\frac{2\,(-d-i\,f)\sqrt{z}\;-i\,c}{\sqrt{-d-i\,f}\;\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\;C\left(\frac{2\,(-d-i\,f)\sqrt{z}\;-i\,c}{\sqrt{-d-i\,f}\;\sqrt{2\pi}}\right)\sin\left(i\,g-\frac{c^2}{4\,(-d-i\,f)}\right)\right)\right)$$

Involving $\cos(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0757.01

$$\int \cos(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{i\,(-d-i\,f)^2}{4\,c}+e+i\,g\right)S\left(\frac{-d-i\,f-2\,i\,c\,z}{\sqrt{-i\,c}\;\sqrt{2\pi}}\right)-C\left(\frac{-d-i\,f-2\,i\,c\,z}{\sqrt{-i\,c}\;\sqrt{2\pi}}\right)\sin\left(\frac{i\,(-d-i\,f)^2}{4\,c}+e+i\,g\right)}{\sqrt{-i\,c}}+\frac{C\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\;\sqrt{2\pi}}\right)\sin\left(-\frac{i\,(i\,f-d)^2}{4\,c}+e-i\,g\right)-\cos\left(-\frac{i\,(i\,f-d)^2}{4\,c}+e-i\,g\right)S\left(\frac{-d+i\,f+2\,i\,c\,z}{\sqrt{i\,c}\;\sqrt{2\pi}}\right)}{\sqrt{i\,c}}\right)$$

01.19.21.0758.01

$$\int \cos(e+d\,z)\,\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\,\cos\left(e+i\,g-(-d-i\,f)\,z+i\,c\sqrt{z}\right)+c\,i\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4\,(-d-i\,f)}+e+i\,g\right) S\left(\frac{2\,(-d-i\,f)\sqrt{z}-i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,C\left(\frac{2\,(-d-i\,f)\sqrt{z}-i\,c}{\sqrt{-d-i\,f}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(-d-i\,f)}+e+i\,g\right)\right)+\frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\,\cos\left(e-i\,g-(i\,f-d)\,z-i\,c\sqrt{z}\right)+c\,i\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4\,(i\,f-d)}+e-i\,g\right) S\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,C\left(\frac{2\sqrt{z}\,(i\,f-d)+i\,c}{\sqrt{i\,f-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(i\,f-d)}+e-i\,g\right)\right)\right)$$

Involving $\cos\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0759.01

$$\int \cos\left(b\,z^2\right)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(i\,g-\frac{f^2}{4(-b-i\,c)}\right) S\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)-C\left(\frac{-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\,\sqrt{2\pi}}\right)\sin\left(i\,g-\frac{f^2}{4(-b-i\,c)}\right)}{\sqrt{-b-i\,c}}-\frac{\cos\left(\frac{f^2}{4(i\,c-b)}+i\,g\right) S\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)+C\left(\frac{i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(i\,c-b)}+i\,g\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0760.01

$$\int \cos\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(i\,f)^{3/2}}\left(2\sqrt{i\,f}\,\cos\left(\sqrt{z}\,(i\,c-b)+i\,g+i\,f\,z\right)+(i\,c-b)\sqrt{2\pi}\,\cos\left(\frac{i\,(i\,c-b)^2}{4\,f}+i\,g\right) S\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)-(b-i\,c)\sqrt{2\pi}\,C\left(\frac{-b+i\,c+2\,i\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(i\,c-b)^2}{4\,f}+i\,g\right)\right)+\frac{1}{(-i\,f)^{3/2}}\left(-2\sqrt{-i\,f}\,\cos\left(-\sqrt{z}\,(-b-i\,c)+i\,g+i\,f\,z\right)-(-b-i\,c)\sqrt{2\pi}\,\cos\left(\frac{i\,(-b-i\,c)^2}{4\,f}+i\,g\right) S\left(\frac{-b-i\,c-2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)-(b+i\,c)\sqrt{2\pi}\,C\left(\frac{-b-i\,c-2\,i\,f\sqrt{z}}{\sqrt{-i\,f}\,\sqrt{2\pi}}\right)\sin\left(\frac{i\,(-b-i\,c)^2}{4\,f}+i\,g\right)\right)\right)$$

Involving $\cos(b z^r + e)\sinh(c z^r + f z + g)$

01.19.21.0761.01

$$\int \cos(b z^2 + e)\sinh(c z^2 + f z + g)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(-\frac{f^2}{4(-b-i c)} + e + i g\right) S\left(\frac{-i f + 2(-b-i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) - C\left(\frac{-i f + 2(-b-i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(-b-i c)} + e + i g\right)}{\sqrt{-b-i c}} + \frac{C\left(\frac{i f + 2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) \sin\left(-\frac{f^2}{4(i c-b)} + e - i g\right) - \cos\left(-\frac{f^2}{4(i c-b)} + e - i g\right) S\left(\frac{i f + 2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0762.01

$$\int \cos(\sqrt{z}\, b + e)\sinh(\sqrt{z}\, c + g + f z)\,dz = \frac{1}{4} i \left(\frac{1}{(-i f)^{3/2}} \left(-2\sqrt{-i f}\, \cos\left(-\sqrt{z}\,(-b - i c) + e + i g + i f z\right) - (-b - i c)\sqrt{2\pi}\, \cos\left(\frac{i(-b - i c)^2}{4 f} + e + i g\right) S\left(\frac{-b - i c - 2 i f \sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) - (b + i c)\sqrt{2\pi}\, C\left(\frac{-b - i c - 2 i f \sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right) \sin\left(\frac{i(-b - i c)^2}{4 f} + e + i g\right)\right) + \frac{1}{(i f)^{3/2}} \left(2\sqrt{i f}\, \cos\left(-\sqrt{z}\,(i c - b) + e - i g - i f z\right) + (i c - b)\sqrt{2\pi}\, \cos\left(-\frac{i(i c - b)^2}{4 f} + e - i g\right) S\left(\frac{-b + i c + 2 i f \sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) + (b - i c)\sqrt{2\pi}\, C\left(\frac{-b + i c + 2 i f \sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right) \sin\left(-\frac{i(i c - b)^2}{4 f} + e - i g\right)\right)\right)$$

Involving $\cos(b z^r + d z)\sinh(c z^r + f z + g)$

01.19.21.0763.01

$$\int \cos(b z^2 + d z)\sinh(c z^2 + f z + g)\,dz = \frac{1}{2} i \sqrt{\frac{\pi}{2}} \left(\frac{\cos\left(\frac{(-d-i f)^2}{4(-b-i c)} + i g\right) S\left(\frac{-d - i f + 2(-b-i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) - C\left(\frac{-d - i f + 2(-b-i c) z}{\sqrt{-b-i c}\,\sqrt{2\pi}}\right) \sin\left(\frac{(-d-i f)^2}{4(-b-i c)} + i g\right)}{\sqrt{-b-i c}} + \frac{C\left(\frac{-d + i f + 2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right) \sin\left(\frac{(i f-d)^2}{4(i c-b)} - i g\right) - \cos\left(\frac{(i f-d)^2}{4(i c-b)} - i g\right) S\left(\frac{-d + i f + 2(i c-b) z}{\sqrt{i c-b}\,\sqrt{2\pi}}\right)}{\sqrt{i c-b}} \right)$$

01.19.21.0764.01

$$\int \cos\left(\sqrt{z}\ b+d\,z\right)\sinh\left(\sqrt{z}\ c+g+f\,z\right)dz = \frac{1}{4}\,i\left(\frac{1}{(-d-i\,f)^{3/2}}\left(-2\sqrt{-d-i\,f}\ \cos\left(-\sqrt{z}\ (-b-i\,c)+i\,g-(-d-i\,f)\,z\right)-(-b-i\,c)\sqrt{2\pi}\ \cos\left(\frac{(-b-i\,c)^2}{4\,(-d-i\,f)}+i\,g\right) S\left(\frac{-b-i\,c+2\,(-d-i\,f)\sqrt{z}}{\sqrt{-d-i\,f}\ \sqrt{2\pi}}\right)-(b+i\,c)\sqrt{2\pi}\ C\left(\frac{-b-i\,c+2\,(-d-i\,f)\sqrt{z}}{\sqrt{-d-i\,f}\ \sqrt{2\pi}}\right)\sin\left(\frac{(-b-i\,c)^2}{4\,(-d-i\,f)}+i\,g\right)\right)+\frac{1}{(i\,f-d)^{3/2}}\left(2\sqrt{i\,f-d}\ \cos\left(-\sqrt{z}\ (i\,c-b)-i\,g-(i\,f-d)\,z\right)+(i\,c-b)\sqrt{2\pi}\ \cos\left(\frac{(i\,c-b)^2}{4\,(i\,f-d)}-i\,g\right) S\left(\frac{-b+i\,c+2\,(i\,f-d)\sqrt{z}}{\sqrt{i\,f-d}\ \sqrt{2\pi}}\right)+(b-i\,c)\sqrt{2\pi}\ C\left(\frac{-b+i\,c+2\,(i\,f-d)\sqrt{z}}{\sqrt{i\,f-d}\ \sqrt{2\pi}}\right)\sin\left(\frac{(i\,c-b)^2}{4\,(i\,f-d)}-i\,g\right)\right)\right)$$

Involving $\cos\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0765.01

$$\int \cos\left(b\,z^2+d\,z+e\right)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{2}\,i\sqrt{\frac{\pi}{2}}\left(\frac{\cos\left(\frac{(-d-i\,f)^2}{4\,(-b-i\,c)}+e+i\,g\right) S\left(\frac{-d-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\ \sqrt{2\pi}}\right)-C\left(\frac{-d-i\,f+2\,(-b-i\,c)\,z}{\sqrt{-b-i\,c}\ \sqrt{2\pi}}\right)\sin\left(\frac{(-d-i\,f)^2}{4\,(-b-i\,c)}+e+i\,g\right)}{\sqrt{-b-i\,c}}+\frac{C\left(\frac{-d+i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\ \sqrt{2\pi}}\right)\sin\left(\frac{(i\,f-d)^2}{4\,(i\,c-b)}+e-i\,g\right)-\cos\left(\frac{(i\,f-d)^2}{4\,(i\,c-b)}+e-i\,g\right) S\left(\frac{-d+i\,f+2\,(i\,c-b)\,z}{\sqrt{i\,c-b}\ \sqrt{2\pi}}\right)}{\sqrt{i\,c-b}}\right)$$

01.19.21.0766.01

$$\int \cos\left(a\,z^2+p\,z+q\right)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{\sqrt[4]{-1}\ e^{g-\frac{i\,(f-i\,p)^2}{4\,(a+i\,c)}-i\,q}\sqrt{\pi}\ \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\ (f-i\,p-2\,i\,a\,z+2\,c\,z)}{2\sqrt{a+i\,c}}\right)}{8\sqrt{a+i\,c}}-\frac{\left(i\sqrt[4]{-1}\ \sqrt{\pi}\right)e^{-g+\frac{i\,(f-i\,p)^2}{4\,(a+i\,c)}+i\,q}\operatorname{erfi}\left(\frac{(-1)^{3/4}\,(-f+i\,p-2\,c\,z+2\,i\,a\,z)}{2\sqrt{a+i\,c}}\right)}{8\sqrt{a+i\,c}}+\frac{(-1)^{3/4}\,e^{g+\frac{i\,(f+i\,p)^2}{4\,(a-i\,c)}+i\,q}\sqrt{\pi}\ \operatorname{erfi}\left(\frac{(-1)^{3/4}\,(f+i\,p+2\,c\,z+2\,i\,a\,z)}{2\sqrt{a-i\,c}}\right)}{8\sqrt{a-i\,c}}+\frac{\left(i\,(-1)^{3/4}\sqrt{\pi}\right)e^{-g-\frac{i\,(f+i\,p)^2}{4\,(a-i\,c)}-i\,q}\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\ (-f-i\,p-2\,i\,a\,z-2\,c\,z)}{2\sqrt{a-i\,c}}\right)}{8\sqrt{a-i\,c}}$$

01.19.21.0767.01

$$\int \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{4} i \left(\frac{1}{(-d - i\, f)^{3/2}} \left(-2 \sqrt{-d - i\, f}\, \cos\left(-\sqrt{z}\, (-b - i\, c) + e + i\, g - (-d - i\, f)\, z\right) - (-b - i\, c) \sqrt{2\pi}\, \cos\left(\frac{(-b - i\, c)^2}{4(-d - i\, f)} + e + i\, g \right) S\left(\frac{-b - i\, c + 2(-d - i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}} \right) - (b + i\, c) \sqrt{2\pi}\, C\left(\frac{-b - i\, c + 2(-d - i\, f)\sqrt{z}}{\sqrt{-d - i\, f}\, \sqrt{2\pi}} \right) \sin\left(\frac{(-b - i\, c)^2}{4(-d - i\, f)} + e + i\, g \right) \right) + \frac{1}{(i\, f - d)^{3/2}} \left(2 \sqrt{i\, f - d}\, \cos\left(-\sqrt{z}\, (i\, c - b) + e - i\, g - (i\, f - d)\, z\right) + (i\, c - b) \sqrt{2\pi}\, \cos\left(\frac{(i\, c - b)^2}{4(i\, f - d)} + e - i\, g \right) S\left(\frac{-b + i\, c + 2(i\, f - d)\sqrt{z}}{\sqrt{i\, f - d}\, \sqrt{2\pi}} \right) + (b - i\, c) \sqrt{2\pi}\, C\left(\frac{-b + i\, c + 2(i\, f - d)\sqrt{z}}{\sqrt{i\, f - d}\, \sqrt{2\pi}} \right) \sin\left(\frac{(i\, c - b)^2}{4(i\, f - d)} + e - i\, g \right) \right) \right)$$

01.19.21.0768.01

$$\int \cos\left(\sqrt{z}\, a + p\, z + q\right) \sinh\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{2} \left(\frac{\cosh\left(\sqrt{z}\, (c + i\, a) + g + i\, q + (f + i\, p)\, z\right)}{f + i\, p} + \frac{\cosh\left(\sqrt{z}\, (c - i\, a) + g - i\, q + (f - i\, p)\, z\right)}{f - i\, p} + \frac{1}{4} \sqrt{\pi} \left(\frac{e^{\frac{(a - i\, c)^2 + 4(f + i\, p)(g + i\, q)}{4(f + i\, p)}} (-c - i\, a)\, \mathrm{erfi}\left(\frac{c + i\left(a + 2(-i\, f + p)\sqrt{z}\right)}{2\sqrt{f + i\, p}} \right)}{(f + i\, p)^{3/2}} + \frac{e^{-\frac{(a - i\, c)^2 + 4(f + i\, p)(g + i\, q)}{4(f + i\, p)}} (a - i\, c)\, \mathrm{erfi}\left(\frac{-a + i\, c + 2(i\, f - p)\sqrt{z}}{2\sqrt{f + i\, p}} \right)}{(f + i\, p)^{3/2}} + \frac{e^{-\frac{i(c - i\, a)^2}{4\, i\, f + 4\, p} + g - i\, q} (i\, a - c)\, \mathrm{erfi}\left(\frac{c - i\left(a + 2(i\, f + p)\sqrt{z}\right)}{2\sqrt{f - i\, p}} \right)}{(f - i\, p)^{3/2}} - \frac{(a + i\, c)\, e^{-\frac{(a + i\, c)^2 + 4(f - i\, p)(g - i\, q)}{4(f - i\, p)}}\, \mathrm{erfi}\left(\frac{a + i\, c + 2(i\, f + p)\sqrt{z}}{2\sqrt{f - i\, p}} \right)}{(f - i\, p)^{3/2}} \right) \right)$$

Involving powers of cos

Involving $\cos^{\mu}(c\, z) \sinh(a\, z)$

01.19.21.0769.01

$$\int \cos^{\mu}(c\, z) \sinh(a\, z)\, dz = \frac{1}{2\left(a^2 + c^2 \mu^2\right)} e^{-a\, z} \cos^{\mu}(c\, z) \left(1 + e^{2\, i\, c\, z}\right)^{-\mu} \left(e^{2\, a\, z} (a + i\, c\, \mu)\, {}_2F_1\left(-\frac{i\, a + c\, \mu}{2\, c}, -\mu; \frac{1}{2}\left(2 - \frac{i\, a}{c} - \mu\right); -e^{2\, i\, c\, z} \right) + (a - i\, c\, \mu)\, {}_2F_1\left(\frac{i(a + i\, c\, \mu)}{2\, c}, -\mu; 1 + \frac{i\, a}{2\, c} - \frac{\mu}{2}; -e^{2\, i\, c\, z} \right) \right)$$

01.19.21.0770.01

$$\int \cos^m(c\,z)\sinh(a\,z)\,dz = \frac{2^{-m}\cosh(a\,z)\,(1-m \bmod 2)}{a}\binom{m}{\frac{m}{2}} + 2^{1-m}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{(a\cos(c\,(m-2\,s)\,z)\cosh(a\,z)+c\,(m-2\,s)\sin(c\,(m-2\,s)\,z)\sinh(a\,z))}{a^2+c^2\,(m-2\,s)^2}\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^\mu(c\,z+d)\sinh(a\,z)$

01.19.21.0771.01

$$\int \cos^\mu(d+c\,z)\sinh(a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu}\cos^\mu(d+c\,z)\left(\frac{e^{a\,z}}{a-i\,c\,\mu}\,{}_2F_1\!\left(-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)+\frac{e^{-a\,z}}{a+i\,c\,\mu}\,{}_2F_1\!\left(\frac{i\,(a+i\,c\,\mu)}{2\,c},-\mu;1+\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)\right)$$

01.19.21.0772.01

$$\int \cos^m(d+c\,z)\sinh(a\,z)\,dz = \frac{2^{-m}\cosh(a\,z)\;(1-m \bmod 2)}{a}\binom{m}{\frac{m}{2}} + 2^{1-m}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{a^2+c^2\,(m-2\,s)^2}\left(\binom{m}{s}(a\cos((m-2\,s)\,(d+c\,z))\cosh(a\,z)+c\,(m-2\,s)\sin((m-2\,s)\,(d+c\,z))\sinh(a\,z))\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^\mu(c\,z)\sinh(a\,z+b)$

01.19.21.0773.01

$$\int \cos^\mu(c\,z)\sinh(b+a\,z)\,dz = \frac{1}{2}\,e^{-b}\left(1+e^{2\,i\,c\,z}\right)^{-\mu}\cos^\mu(c\,z)\left(\frac{e^{2\,b+a\,z}}{a-i\,c\,\mu}\,{}_2F_1\!\left(-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,c\,z}\right)+\frac{e^{-a\,z}}{a+i\,c\,\mu}\,{}_2F_1\!\left(\frac{i\,(a+i\,c\,\mu)}{2\,c},-\mu;1+\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,c\,z}\right)\right)$$

01.19.21.0774.01

$$\int \cos^m(c\,z)\sinh(b+a\,z)\,dz = \frac{2^{-m}\cosh(b+a\,z)\binom{m}{\frac{m}{2}}(1-m \bmod 2)}{a} + 2^{1-m}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{s}(a\cos((m-2\,s)\,c\,z)\cosh(b+a\,z)+c\,(m-2\,s)\sin((m-2\,s)\,c\,z)\sinh(b+a\,z))}{a^2+c^2\,(m-2\,s)^2}\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^\mu(c\,z+d)\sinh(a\,z+b)$

01.19.21.0775.01

$$\int \cos^\mu(d+c\,z)\sinh(b+a\,z)\,dz = \frac{1}{2}\,e^{-b}\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu}\cos^\mu(d+c\,z)\left(\frac{e^{2\,b+a\,z}}{a-i\,c\,\mu}\,{}_2F_1\!\left(-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)+\frac{e^{-a\,z}}{a+i\,c\,\mu}\,{}_2F_1\!\left(\frac{i\,(a+i\,c\,\mu)}{2\,c},-\mu;1+\frac{i\,a}{2\,c}-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)\right)$$

01.19.21.0776.01

$$\int \cos^m(d+c\,z)\sinh(b+a\,z)\,dz = \frac{2^{-m}\cosh(b+a\,z)\,(1-m \bmod 2)}{a}\binom{m}{\frac{m}{2}} + 2^{1-m}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{a^2+c^2(m-2s)^2}\left(\binom{m}{s}(a\cos((m-2s)(d+c\,z))\cosh(b+a\,z)+c\,(m-2s)\sin((m-2s)(d+c\,z))\sinh(b+a\,z))\right)\,/;\, m\in\mathbb{N}^+$$

Involving $\cos^m(b\,z^r)\sinh(c\,z)$

01.19.21.0777.01

$$\int \cos^m(b\,z^2)\sinh(c\,z)\,dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{\cos\left(\frac{c^2}{4(2bs-bm)}\right)S\left(\frac{-i\,c+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)+C\left(\frac{-i\,c+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)\sin\left(\frac{c^2}{4(2bs-bm)}\right)}{\sqrt{2bs-bm}}+\frac{\cos\left(\frac{c^2}{4(bm-2bs)}\right)S\left(\frac{-i\,c+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)+C\left(\frac{-i\,c+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)\sin\left(\frac{c^2}{4(bm-2bs)}\right)}{\sqrt{bm-2bs}}\right)-\frac{\left(-\frac{1}{2}\right)^m\binom{m}{\frac{m}{2}}\cosh(c\,z)\,(m \bmod 2-1)}{c}\,/;\, m\in\mathbb{N}^+$$

01.19.21.0778.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = \frac{\binom{m}{\frac{m}{2}}\cosh(c\,z)\,(1-m \bmod 2)\left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1}\,i\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{(-i\,c)^{3/2}}\left(-2\sqrt{-i\,c}\,\cos\left(i\,c\,z-(2bs-bm)\sqrt{z}\right)-b\sqrt{2\pi}\,(m-2s)\left(\cosh\left(\frac{(bm-2bs)^2}{4c}\right)S\left(\frac{b(m-2s)+2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\sqrt{2\pi}}\right)-i\,C\left(\frac{b(m-2s)+2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\sqrt{2\pi}}\right)\sinh\left(\frac{(bm-2bs)^2}{4c}\right)\right)\right)+\frac{1}{(-i\,c)^{3/2}}\left(-2\sqrt{-i\,c}\,\cos\left((bm-2bs)\sqrt{z}-i\,c\,z\right)-b\sqrt{2\pi}\,(m-2s)\left(\cosh\left(\frac{(bm-2bs)^2}{4c}\right)S\left(\frac{b(m-2s)-2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\sqrt{2\pi}}\right)-i\,C\left(\frac{b(m-2s)-2\,i\,c\sqrt{z}}{\sqrt{-i\,c}\sqrt{2\pi}}\right)\sinh\left(\frac{(bm-2bs)^2}{4c}\right)\right)\right)\right)\,/;\, m\in\mathbb{N}^+$$

Involving $\cos^m(b\,z^r+e)\sinh(c\,z)$

01.19.21.0779.01

$$\int \cos^m\left(b z^2+e\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{c^2}{4(2 b s - b m)} + e(2 s - m) \right) S\left(\frac{-i c + 2(2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) + C\left(\frac{-i c + 2(2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{c^2}{4(2 b s - b m)} + e(2 s - m) \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(e(2 s - m) - \frac{c^2}{4(b m - 2 b s)} \right) S\left(\frac{-i c + 2(b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) - C\left(\frac{-i c + 2(b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \sin\left(e(2 s - m) - \frac{c^2}{4(b m - 2 b s)} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z)(m \bmod 2 - 1)}{c} /;\ m \in \mathbb{N}^+$$

01.19.21.0780.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z)(1 - m \bmod 2)\left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cos\left(e m - 2 e s + i c z - (2 b s - b m) \sqrt{z} \right) - b \sqrt{2\pi}\, (m - 2 s) \left(\cos\left(\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s \right) S\left(\frac{b(m - 2 s) + 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2\pi}} \right) - C\left(\frac{b(m - 2 s) + 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2\pi}} \right) \sin\left(\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s \right) \right) \right) + \frac{1}{(-i c)^{3/2}} \left(-2 \sqrt{-i c} \cos\left(e m - 2 e s - i c z + (b m - 2 b s) \sqrt{z} \right) - b \sqrt{2\pi}\, (m - 2 s) \left(\cos\left(-\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s \right) S\left(\frac{b(m - 2 s) - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2\pi}} \right) + C\left(\frac{b(m - 2 s) - 2 i c \sqrt{z}}{\sqrt{-i c} \sqrt{2\pi}} \right) \sin\left(-\frac{i (b m - 2 b s)^2}{4 c} + e m - 2 e s \right) \right) \right) \right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z\right) \sinh(c z)$

01.19.21.0781.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} \right) S\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) - C\left(\frac{-i c - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{(-i c - d m + 2 d s)^2}{4 (2 b s - b m)} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} \right) S\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) - C\left(\frac{-i c + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{(-i c + d m - 2 d s)^2}{4 (b m - 2 b s)} \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (m \bmod 2 - 1)}{c} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0782.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh(c z)\, dz = \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z) (1 - m \bmod 2)}{c} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(2 \sqrt{-i c - d m + 2 d s}\, \cos\left(\sqrt{z}\, (2 b s - b m) + (-i c - d m + 2 d s) z \right) + \sqrt{2\pi}\, (2 b s - b m) \cos\left(\frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} \right) S\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i c - d m + 2 d s}} \right) + \sqrt{2\pi}\, (b m - 2 b s)\, C\left(\frac{-b m + 2 b s + 2 (-i c - d m + 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i c - d m + 2 d s}} \right) \sin\left(\frac{(2 b s - b m)^2}{4 (-i c - d m + 2 d s)} \right) \right) \Big/ (-i c - d m + 2 d s)^{3/2} + \left(2 \sqrt{-i c + d m - 2 d s}\, \cos\left(\sqrt{z}\, (b m - 2 b s) + (-i c + d m - 2 d s) z \right) + \sqrt{2\pi}\, (b m - 2 b s) \cos\left(\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} \right) S\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i c + d m - 2 d s}} \right) + \sqrt{2\pi}\, (2 b s - b m)\, C\left(\frac{b m - 2 b s + 2 (-i c + d m - 2 d s) \sqrt{z}}{\sqrt{2\pi} \sqrt{-i c + d m - 2 d s}} \right) \sin\left(\frac{(b m - 2 b s)^2}{4 (-i c + d m - 2 d s)} \right) \right) \Big/ (-i c + d m - 2 d s)^{3/2} \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z + e\right) \sinh(c z)$

01.19.21.0783.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh(c z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(e(2s-m) - \frac{(-i c - d m + 2 d s)^2}{4(2 b s - b m)} \right) S\left(\frac{-i c - d m + 2 d s + 2(2 b s - b m) z}{\sqrt{2\pi}\sqrt{2 b s - b m}} \right) + C\left(\frac{-i c - d m + 2 d s + 2(2 b s - b m) z}{\sqrt{2\pi}\sqrt{2 b s - b m}} \right) \sin\left(e(2s-m) - \frac{(-i c - d m + 2 d s)^2}{4(2 b s - b m)} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(-i c + d m - 2 d s)^2}{4(b m - 2 b s)} + e(2s-m) \right) S\left(\frac{-i c + d m - 2 d s + 2(b m - 2 b s) z}{\sqrt{2\pi}\sqrt{b m - 2 b s}} \right) - C\left(\frac{-i c + d m - 2 d s + 2(b m - 2 b s) z}{\sqrt{2\pi}\sqrt{b m - 2 b s}} \right) \sin\left(\frac{(-i c + d m - 2 d s)^2}{4(b m - 2 b s)} + e(2s-m) \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(c z)\, (m \bmod 2 - 1)}{c} /;\, m \in \mathbb{N}^+$$

01.19.21.0784.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(c z)\, (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{c} + 2^{-m-1}\, i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(-2\sqrt{-i c - d m + 2 d s}\, \cos\left(e m - 2 e s - (-i c - d m + 2 d s) z - (2 b s - b m)\sqrt{z} \right) - \sqrt{2\pi}\, (2 b s - b m) \cos\left(\frac{(2 b s - b m)^2}{4(-i c - d m + 2 d s)} + e m - 2 e s \right) S\left(\frac{-b m + 2 b s + 2(-i c - d m + 2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{-i c - d m + 2 d s}} \right) - \sqrt{2\pi}\, (b m - 2 b s) C\left(\frac{-b m + 2 b s + 2(-i c - d m + 2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{-i c - d m + 2 d s}} \right) \sin\left(\frac{(2 b s - b m)^2}{4(-i c - d m + 2 d s)} + e m - 2 e s \right) \right) \Big/ (-i c - d m + 2 d s)^{3/2} + \left(-2\sqrt{-i c + d m - 2 d s}\, \cos\left(e m - 2 e s + (-i c + d m - 2 d s) z + (b m - 2 b s)\sqrt{z} \right) - \sqrt{2\pi}\, (b m - 2 b s) \cos\left(-\frac{(b m - 2 b s)^2}{4(-i c + d m - 2 d s)} + e m - 2 e s \right) S\left(\frac{b m - 2 b s + 2(-i c + d m - 2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{-i c + d m - 2 d s}} \right) + \sqrt{2\pi}\, (2 b s - b m) C\left(\frac{b m - 2 b s + 2(-i c + d m - 2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{-i c + d m - 2 d s}} \right) \sin\left(-\frac{(b m - 2 b s)^2}{4(-i c + d m - 2 d s)} + e m - 2 e s \right) \right) \Big/ (-i c + d m - 2 d s)^{3/2} \right) /;\, m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r\right) \sinh(f z + g)$

01.19.21.0785.01

$$\int \cos^m\left(b z^2\right) \sinh(g+f z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cosh\left(\frac{i f^2}{4 (2 b s - b m)} + g \right) S\left(\frac{-i f + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) - i\, C\left(\frac{-i f + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \sinh\left(\frac{i f^2}{4 (2 b s - b m)} + g \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cosh\left(\frac{i f^2}{4 (b m - 2 b s)} + g \right) S\left(\frac{-i f + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) - i\, C\left(\frac{-i f + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \sinh\left(\frac{i f^2}{4 (b m - 2 b s)} + g \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0786.01

$$\int \cos^m\left(\sqrt{z}\, b\right) \sinh(g+f z)\, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g + f z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g + f z + i (2 b s - b m) \sqrt{z}\right) - \sqrt{2\pi}\, (2 b s - b m) \cosh\left(\frac{(2 b s - b m)^2}{4 f} + g \right) S\left(\frac{-b m + 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) - i \sqrt{2\pi}\, (b m - 2 b s)\, C\left(\frac{-b m + 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \sinh\left(\frac{(2 b s - b m)^2}{4 f} + g \right) \right) + \frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g + f z + i (b m - 2 b s) \sqrt{z}\right) - \sqrt{2\pi}\, (b m - 2 b s) \cosh\left(\frac{(b m - 2 b s)^2}{4 f} + g \right) S\left(\frac{b m - 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) - i \sqrt{2\pi}\, (2 b s - b m)\, C\left(\frac{b m - 2 b s - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2\pi}} \right) \sinh\left(\frac{(b m - 2 b s)^2}{4 f} + g \right) \right) \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + e\right) \sinh(f z + g)$

01.19.21.0787.01

$$\int \cos^m\left(b z^2+e\right) \sinh(g+f z)\,dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s-b m}} \left(\cosh\left(\frac{i f^2}{4 (2 b s-b m)}+g+e\, i\, (2 s-m)\right) S\left(\frac{-i f+2 (2 b s-b m) z}{\sqrt{2 \pi} \sqrt{2 b s-b m}}\right)- i\, C\left(\frac{-i f+2 (2 b s-b m) z}{\sqrt{2 \pi} \sqrt{2 b s-b m}}\right) \sinh\left(\frac{i f^2}{4 (2 b s-b m)}+g+e\, i\, (2 s-m)\right)\right)+ \frac{1}{\sqrt{b m-2 b s}} \left(\cosh\left(\frac{i f^2}{4 (b m-2 b s)}+g-i\, e\, (2 s-m)\right) S\left(\frac{-i f+2 (b m-2 b s) z}{\sqrt{2 \pi} \sqrt{b m-2 b s}}\right)-i\, C\left(\frac{-i f+2 (b m-2 b s) z}{\sqrt{2 \pi} \sqrt{b m-2 b s}}\right) \sinh\left(\frac{i f^2}{4 (b m-2 b s)}+g-i\, e\, (2 s-m)\right)\right)\right)- \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g+f z) (m \bmod 2-1)}{f} \;/;\; m\in \mathbb{N}^+$$

01.19.21.0788.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \sinh(g+f z)\,dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g+f z) (1-m \bmod 2) \left(-\frac{1}{2}\right)^m}{f}+ 2^{-m-1} i \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g-i e m+2 i e s+f z+i (2 b s-b m) \sqrt{z}\right)- \sqrt{2 \pi} (2 b s-b m) \cosh\left(\frac{(2 b s-b m)^2}{4 f}+g-i e m+2 i e s\right) S\left(\frac{-b m+2 b s-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right)- i \sqrt{2 \pi} (b m-2 b s)\, C\left(\frac{-b m+2 b s-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(2 b s-b m)^2}{4 f}+g-i e m+2 i e s\right)\right)+ \frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g+i e m-2 i e s+f z+i (b m-2 b s) \sqrt{z}\right)- \sqrt{2 \pi} (b m-2 b s) \cosh\left(\frac{(b m-2 b s)^2}{4 f}+g+i e m-2 i e s\right) S\left(\frac{b m-2 b s-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right)- i \sqrt{2 \pi} (2 b s-b m)\, C\left(\frac{b m-2 b s-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(b m-2 b s)^2}{4 f}+g+i e m-2 i e s\right)\right)\right) \;/;\; m\in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r+d z\right) \sinh(f z+g)$

01.19.21.0789.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh(g + f z) \, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + i g \right) S\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) - C\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{(-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + i g \right) \right) + \frac{1}{\sqrt{2 b s - b m}} \left(\cosh\left(-\frac{i (-i f - d m + 2 d s)^2}{4 (2 b s - b m)} + g \right) S\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) - i\, C\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sinh\left(-\frac{i (-i f - d m + 2 d s)^2}{4 (2 b s - b m)} + g \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0790.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh(g + f z) \, dz = \frac{\binom{m}{\frac{m}{2}} \cosh(g + f z) (1 - m \bmod 2) \left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\left(-2 \sqrt{-i f - d m + 2 d s}\, \cosh\left(g + i (-i f - d m + 2 d s) z + i (2 b s - b m) \sqrt{z}\right) - \sqrt{2 \pi}\, (2 b s - b m) \cosh\left(-\frac{i (2 b s - b m)^2}{4 (-i f - d m + 2 d s)} + g \right) S\left(\frac{-b m + 2 b s + 2 (-i f - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i f - d m + 2 d s}} \right) - i \sqrt{2 \pi}\, (b m - 2 b s)\, C\left(\frac{-b m + 2 b s + 2 (-i f - d m + 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i f - d m + 2 d s}} \right) \sinh\left(-\frac{i (2 b s - b m)^2}{4 (-i f - d m + 2 d s)} + g \right) \right) \Big/ (-i f - d m + 2 d s)^{3/2} + \left(-2 \sqrt{-i f + d m - 2 d s}\, \cosh\left(g + i (-i f + d m - 2 d s) z + i (b m - 2 b s) \sqrt{z}\right) - \sqrt{2 \pi}\, (b m - 2 b s) \cosh\left(-\frac{i (b m - 2 b s)^2}{4 (-i f + d m - 2 d s)} + g \right) S\left(\frac{b m - 2 b s + 2 (-i f + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i f + d m - 2 d s}} \right) - i \sqrt{2 \pi}\, (2 b s - b m)\, C\left(\frac{b m - 2 b s + 2 (-i f + d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{-i f + d m - 2 d s}} \right) \sinh\left(-\frac{i (b m - 2 b s)^2}{4 (-i f + d m - 2 d s)} + g \right) \right) \Big/ (-i f + d m - 2 d s)^{3/2} \right) \;/;\; m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z + e\right) \sinh(f z + g)$

01.19.21.0791.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + i g + e (2 s - m) \right) S\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) - C\left(\frac{-i f + d m - 2 d s + 2 (b m - 2 b s) z}{\sqrt{2 \pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{(-i f + d m - 2 d s)^2}{4 (b m - 2 b s)} + i g + e (2 s - m) \right) \right) + \frac{1}{\sqrt{2 b s - b m}} \left(\cosh\left(-\frac{i (-i f - d m + 2 d s)^2}{4 (2 b s - b m)} + g + e\, i (2 s - m) \right) S\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) - i\, C\left(\frac{-i f - d m + 2 d s + 2 (2 b s - b m) z}{\sqrt{2 \pi} \sqrt{2 b s - b m}} \right) \sinh\left(-\frac{i (-i f - d m + 2 d s)^2}{4 (2 b s - b m)} + g + e\, i (2 s - m) \right) \right) \right) - \frac{\left(-\frac{1}{2}\right)^m \binom{m}{\frac{m}{2}} \cosh(g + f z) (m \bmod 2 - 1)}{f} \;/;\; m \in \mathbb{N}^+$$

01.19.21.0792.01

$$\int \cos^m\left(\sqrt{z}\, b+e+d\,z\right)\sinh(g+f\,z)\,dz = \frac{\binom{m}{\frac{m}{2}}\cosh(g+f\,z)\,(1-m \bmod 2)\left(-\frac{1}{2}\right)^m}{f} + 2^{-m-1}\,i\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\bigg(-2\sqrt{-i\,f-d\,m+2\,d\,s}\,\cosh\left(g-i\,e\,m+2\,i\,e\,s+i\,(-i\,f-d\,m+2\,d\,s)\,z+i\,(2\,b\,s-b\,m)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,b\,s-b\,m)\cosh\left(-\frac{i\,(2\,b\,s-b\,m)^2}{4\,(-i\,f-d\,m+2\,d\,s)}+g-i\,e\,m+2\,i\,e\,s\right)S\left(\frac{-b\,m+2\,b\,s+2\,(-i\,f-d\,m+2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,f-d\,m+2\,d\,s}}\right)-i\sqrt{2\pi}\,(b\,m-2\,b\,s)\,C\left(\frac{-b\,m+2\,b\,s+2\,(-i\,f-d\,m+2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,f-d\,m+2\,d\,s}}\right)\sinh\left(-\frac{i\,(2\,b\,s-b\,m)^2}{4\,(-i\,f-d\,m+2\,d\,s)}+g-i\,e\,m+2\,i\,e\,s\right)\bigg)\bigg/(-i\,f-d\,m+2\,d\,s)^{3/2}+\bigg(-2\sqrt{-i\,f+d\,m-2\,d\,s}\,\cosh\left(g+i\,e\,m-2\,i\,e\,s+i\,(-i\,f+d\,m-2\,d\,s)\,z+i\,(b\,m-2\,b\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(b\,m-2\,b\,s)\cosh\left(-\frac{i\,(b\,m-2\,b\,s)^2}{4\,(-i\,f+d\,m-2\,d\,s)}+g+i\,e\,m-2\,i\,e\,s\right)S\left(\frac{b\,m-2\,b\,s+2\,(-i\,f+d\,m-2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,f+d\,m-2\,d\,s}}\right)-i\sqrt{2\pi}\,(2\,b\,s-b\,m)\,C\left(\frac{b\,m-2\,b\,s+2\,(-i\,f+d\,m-2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,f+d\,m-2\,d\,s}}\right)\sinh\left(-\frac{i\,(b\,m-2\,b\,s)^2}{4\,(-i\,f+d\,m-2\,d\,s)}+g+i\,e\,m-2\,i\,e\,s\right)\bigg)\bigg/(-i\,f+d\,m-2\,d\,s)^{3/2}\Bigg)\ /;\ m\in\mathbb{N}^+$$

Involving $\cos^m(b\,z)\sinh(c\,z^r)$

01.19.21.0793.01

$$\int \cos^m(b\,z)\sinh\left(c\,z^2\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{\cosh\left(\frac{(2\,b\,k-b\,m)^2}{4\,c}\right)S\left(\frac{2\,b\,k-b\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{2\,b\,k-b\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,b\,k-b\,m)^2}{4\,c}\right)}{\sqrt{-i\,c}} - \frac{\cosh\left(\frac{(2\,b\,k-b\,m)^2}{4\,c}\right)S\left(\frac{2\,b\,k-b\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{2\,b\,k-b\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,b\,k-b\,m)^2}{4\,c}\right)}{\sqrt{i\,c}}\right) - \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\,/;\,m\in\mathbb{N}^+$$

01.19.21.0794.01

$$\int \cos^m(b\,z)\sinh\left(c\sqrt{z}\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(c\sqrt{z}\cosh\left(c\sqrt{z}\right)-\sinh\left(c\sqrt{z}\right)\right)}{c^2} + 2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(2\,b\,k-b\,m)^{3/2}}\left(-2\sqrt{2\,b\,k-b\,m}\,\cosh\left(\sqrt{z}\,c+i\,(2\,b\,k-b\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(2\,b\,k-b\,m)}\right)S\left(\frac{-i\,c+2\,(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,b\,k-b\,m)}\right)\right) + \frac{1}{(2\,b\,k-b\,m)^{3/2}}\left(2\sqrt{2\,b\,k-b\,m}\,\cos\left(i\,c\sqrt{z}+(2\,b\,k-b\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(2\,b\,k-b\,m)}\right)S\left(\frac{i\,c+2\,(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(2\,b\,k-b\,m)\sqrt{z}}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,b\,k-b\,m)}\right)\right)\right)\,/;\,m\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh\left(c\,z^r\right)$

01.19.21.0795.01

$$\int \cos^m(e+d\,z)\sinh(c\,z^2)\,dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+e\,i\,(2\,k-m)\right)S\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+e\,i\,(2\,k-m)\right)\right)-\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)\right)S\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0796.01

$$\int \cos^m(e+d\,z)\sinh\left(\sqrt{z}\,c\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(c\sqrt{z}\cosh\left(\sqrt{z}\,c\right)-\sinh\left(\sqrt{z}\,c\right)\right)}{c^2}+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\cos\left(-2\,e\,k+e\,m-i\,c\sqrt{z}-(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\cos\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}-2\,e\,k+e\,m\right)S\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-i\,c\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}-2\,e\,k+e\,m\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(-2\sqrt{2\,d\,k-d\,m}\cosh\left(\sqrt{z}\,c+2\,i\,e\,k-i\,e\,m+i\,(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\cosh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+2\,i\,e\,k-i\,e\,m\right)S\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+2\,i\,e\,k-i\,e\,m\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(a\,z^r)\sinh(c\,z^r)$

01.19.21.0797.01

$$\int \cos^m(b z^r)\sinh(c z^r)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left((c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, c z^r\right) - (-c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-1/r} - ((c - 2 i b k + i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + ((-c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - ((c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0798.01

$$\int \cos^m(b z^2)\sinh(c z^2)\,dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{S\left(\sqrt{-i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{-i c + 2 b k - b m}} - \frac{S\left(\sqrt{i c + 2 b k - b m}\,\sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{i c + 2 b k - b m}} \right) - \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0799.01

$$\int \cos^m\left(b \sqrt{z}\right)\sinh\left(c \sqrt{z}\right) dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z}\, \cosh\left(c \sqrt{z}\right) - \sinh\left(c \sqrt{z}\right)\right)}{c^2} - i\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{(-i c + b (2 k - m)) \sqrt{z}\, \cos\left((-i c + b (2 k - m)) \sqrt{z}\right) - \sin\left((-i c + b (2 k - m)) \sqrt{z}\right)}{(-i c + b (2 k - m))^2} + \frac{\sin\left((i c + b (2 k - m)) \sqrt{z}\right) - (i c + b (2 k - m)) \sqrt{z}\, \cos\left((i c + b (2 k - m)) \sqrt{z}\right)}{(i c + b (2 k - m))^2} \right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m(a z^r + e)\sinh(c z^r)$

01.19.21.0800.01

$$\int \cos^m(b z^r + e)\sinh(c z^r)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}}\left((c z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, c z^r\right) - (-c z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{2^{-m-1} z}{r}\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor}\binom{m}{k}\left(e^{2 i e k - i e m}\,\Gamma\!\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-1/r} - e^{2 i e k - i e m}((c - 2 i b k + i b m) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + e^{-2 i e k + i e m}((-c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{-2 i e k + i e m}((c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0801.01

$$\int \cos^m\left(b z^2 + e\right)\sinh\left(c z^2\right)dz = i\, 2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i c + 2 b k - b m}}\left(\cos(e(2k - m))\, S\!\left(\sqrt{-i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right) + C\!\left(\sqrt{-i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e(2k - m))\right) - \frac{1}{\sqrt{i c + 2 b k - b m}}\left(\cos(e(2k - m))\, S\!\left(\sqrt{i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right) + C\!\left(\sqrt{i c + 2 b k - b m}\sqrt{\frac{2}{\pi}}\, z\right)\sin(e(2k - m))\right)\right) - \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i c}}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\, S\!\left(\frac{c\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0802.01

$$\int \cos^m\left(\sqrt{z}\, b + e\right)\sinh\left(c\sqrt{z}\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(c\sqrt{z}\cosh\left(c\sqrt{z}\right) - \sinh\left(c\sqrt{z}\right)\right)}{c^2} - i\, 2^{1-m}\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor}\binom{m}{k}\left(\frac{1}{(-i c + b(2k - m))^2}\left((-i c + b(2k - m))\sqrt{z}\cos\left((-i c + b(2k - m))\sqrt{z} - e(m - 2k)\right) - \sin\left((-i c + b(2k - m))\sqrt{z} - e(m - 2k)\right)\right) + \frac{1}{(i c + b(2k - m))^2}\left(-(i c + b(2k - m))\sqrt{z}\cos\left(e(m - 2k) - (i c + b(2k - m))\sqrt{z}\right) - \sin\left(e(m - 2k) - (i c + b(2k - m))\sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z\right)\sinh\left(c z^r\right)$

01.19.21.0803.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh\left(c z^2\right) dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} \right) S\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) - C\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{(2 d k - d m)^2}{4 (-i c + 2 b k - b m)} \right) \right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cos\left(\frac{(2 d k - d m)^2}{4 (i c + 2 b k - b m)} \right) S\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) - C\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}} \right) \sin\left(\frac{(2 d k - d m)^2}{4 (i c + 2 b k - b m)} \right) \right) \right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}} \right) /;\ m \in \mathbb{N}^+$$

01.19.21.0804.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh\left(c \sqrt{z}\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(c \sqrt{z}\right) - \sinh\left(c \sqrt{z}\right) \right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(2 d s - d m)^{3/2}} \left(2 \sqrt{2 d s - d m} \cos\left(\sqrt{z} (-i c - b m + 2 b s) + (2 d s - d m) z \right) + \sqrt{2 \pi} (-i c - b m + 2 b s) \cos\left(\frac{(-i c - b m + 2 b s)^2}{4 (2 d s - d m)} \right) S\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d s - d m}} \right) + \sqrt{2 \pi} (i c + b m - 2 b s)\, C\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 d s - d m}} \right) \sin\left(\frac{(-i c - b m + 2 b s)^2}{4 (2 d s - d m)} \right) \right) + \frac{1}{(d m - 2 d s)^{3/2}} \left(2 \sqrt{d m - 2 d s} \cos\left(\sqrt{z} (-i c + b m - 2 b s) + (d m - 2 d s) z \right) + \sqrt{2 \pi} (-i c + b m - 2 b s) \cos\left(\frac{(-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} \right) S\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d m - 2 d s}} \right) + \sqrt{2 \pi} (i c - b m + 2 b s)\, C\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d m - 2 d s}} \right) \sin\left(\frac{(-i c + b m - 2 b s)^2}{4 (d m - 2 d s)} \right) \right) \right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z + e\right) \sinh\left(c z^r\right)$

01.19.21.0805.01

$$\int \cos^m\left(b z^2+d z+e\right)\sinh\left(c z^2\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i c+2 b k-b m}}\left(\cos\left(e(2k-m)-\frac{(2 d k-d m)^2}{4(-i c+2 b k-b m)}\right)S\left(\frac{2 d k-d m+2(-i c+2 b k-b m)z}{\sqrt{-i c+2 b k-b m}\sqrt{2\pi}}\right)+C\left(\frac{2 d k-d m+2(-i c+2 b k-b m)z}{\sqrt{-i c+2 b k-b m}\sqrt{2\pi}}\right)\sin\left(e(2k-m)-\frac{(2 d k-d m)^2}{4(-i c+2 b k-b m)}\right)\right)-\frac{1}{\sqrt{i c+2 b k-b m}}\left(\cos\left(\frac{(2 d k-d m)^2}{4(i c+2 b k-b m)}-e(2k-m)\right)S\left(\frac{2 d k-d m+2(i c+2 b k-b m)z}{\sqrt{i c+2 b k-b m}\sqrt{2\pi}}\right)-C\left(\frac{2 d k-d m+2(i c+2 b k-b m)z}{\sqrt{i c+2 b k-b m}\sqrt{2\pi}}\right)\sin\left(\frac{(2 d k-d m)^2}{4(i c+2 b k-b m)}-e(2k-m)\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i c}}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i c}}\right)\,/;\, m\in\mathbb{N}^+$$

01.19.21.0806.01

$$\int \cos^m\left(\sqrt{z}\,b+e+d z\right)\sinh\left(\sqrt{z}\,c\right)dz = \frac{(-1)^m 2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(c\sqrt{z}\cosh\left(\sqrt{z}\,c\right)-\sinh\left(\sqrt{z}\,c\right)\right)}{c^2}-i\,2^{-m-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{(2 d s-d m)^{3/2}}\left(2\sqrt{2 d s-d m}\cosh\left(-i e m+2 i e s+i(2 d s-d m)z+i(-i c-b m+2 b s)\sqrt{z}\right)+\sqrt{2\pi}(-i c-b m+2 b s)\cosh\left(-\frac{i(-i c-b m+2 b s)^2}{4(2 d s-d m)}-i e m+2 i e s\right)S\left(\frac{-i c-b m+2 b s+2(2 d s-d m)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 d s-d m}}\right)+i\sqrt{2\pi}(i c+b m-2 b s)\,C\left(\frac{-i c-b m+2 b s+2(2 d s-d m)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 d s-d m}}\right)\sinh\left(-\frac{i(-i c-b m+2 b s)^2}{4(2 d s-d m)}-i e m+2 i e s\right)\right)+\frac{1}{(d m-2 d s)^{3/2}}\left(2\sqrt{d m-2 d s}\cosh\left(i e m-2 i e s+i(d m-2 d s)z+i(-i c+b m-2 b s)\sqrt{z}\right)+\sqrt{2\pi}(-i c+b m-2 b s)\cosh\left(-\frac{i(-i c+b m-2 b s)^2}{4(d m-2 d s)}+i e m-2 i e s\right)S\left(\frac{-i c+b m-2 b s+2(d m-2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{d m-2 d s}}\right)+i\sqrt{2\pi}(i c-b m+2 b s)\,C\left(\frac{-i c+b m-2 b s+2(d m-2 d s)\sqrt{z}}{\sqrt{2\pi}\sqrt{d m-2 d s}}\right)\sinh\left(-\frac{i(-i c+b m-2 b s)^2}{4(d m-2 d s)}+i e m-2 i e s\right)\right)\right)\,/;\, m\in\mathbb{N}^+$$

Involving $\cos^m(d\,z)\sinh(c\,z^r+g)$

01.19.21.0807.01

$$\int \cos^m(d\,z)\sinh(c\,z^2+g)\,dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g\right)S\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g\right)}{\sqrt{-i\,c}} - \frac{\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g\right)S\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g\right)}{\sqrt{i\,c}}\right) - \frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cosh(g)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)-i\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\sinh(g)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0808.01

$$\int \cos^m(d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(c\sqrt{z}\,\cosh\left(\sqrt{z}\,c+g\right)-\sinh\left(\sqrt{z}\,c+g\right)\right)}{c^2} + 2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\,\cos\left(i\,g+i\,c\sqrt{z}+(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+i\,g\right)S\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\,i\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(2\,d\,k-d\,m)}+i\,g\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(-2\sqrt{2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g+i\,(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cosh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g\right)S\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh(c\,z^r+g)$

01.19.21.0809.01

$$\int \cos^m(e+d\,z)\sinh\left(c\,z^2+g\right)dz = i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+e\,i\,(2\,k-m)\right)S\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g+e\,i\,(2\,k-m)\right)\right)-\frac{1}{\sqrt{i\,c}}\left(\cosh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)\right)S\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)\right)\right)\right)-\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh(g)\,S\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)-i\,C\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\sinh(g)\right)\,/;\,m\in\mathbb{N}^+$$

01.19.21.0810.01

$$\int \cos^m(e+d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(c\sqrt{z}\,\cosh\left(\sqrt{z}\,c+g\right)-\sinh\left(\sqrt{z}\,c+g\right)\right)}{c^2}+2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{2\,d\,k-d\,m}\,\cos\left(-i\,g-2\,e\,k+e\,m-i\,c\sqrt{z}-(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cos\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g-2\,e\,k+e\,m\right)S\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)-i\,c\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{c^2}{4\,(2\,d\,k-d\,m)}-i\,g-2\,e\,k+e\,m\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(-2\sqrt{2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g+2\,i\,e\,k-i\,e\,m+i\,(2\,d\,k-d\,m)\,z\right)+c\,i\sqrt{2\,\pi}\,\cosh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g+2\,i\,e\,k-i\,e\,m\right)S\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\sqrt{2\,\pi}\,C\left(\frac{-i\,c+2\,(2\,d\,k-d\,m)\sqrt{z}}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,c^2}{4\,(2\,d\,k-d\,m)}+g+2\,i\,e\,k-i\,e\,m\right)\right)\right)\,/;\,m\in\mathbb{N}^+$$

Involving $\cos^m(a\,z^r)\sinh(c\,z^r+g)$

01.19.21.0811.01

$$\int \cos^m(b\,z^r)\sinh(c\,z^r+g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left(e^{-g}\,(c\,z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r},\,c\,z^r\right) - e^{g}\,(-c\,z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r},\,-c\,z^r\right)\right)(1-m \bmod 2)}{r} -$$
$$\frac{2^{-m-1}\,z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{g}\,\Gamma\!\left(\frac{1}{r},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^r\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-1/r} -\right.$$
$$e^{-g}\,((c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r},\,(c-2\,i\,b\,k+i\,b\,m)\,z^r\right) + e^{g}\,((-c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-1/r}$$
$$\left.\Gamma\!\left(\frac{1}{r},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^r\right) - e^{-g}\,((c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-1/r}\,\Gamma\!\left(\frac{1}{r},\,(c+2\,i\,b\,k-i\,b\,m)\,z^r\right)\right) /;\ m\in\mathbb{N}^+$$

01.19.21.0812.01

$$\int \cos^m\!\left(b\,z^2\right)\sinh\!\left(c\,z^2+g\right)dz =$$
$$i\,2^{-m-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{\cosh(g)\,S\!\left(\sqrt{-i\,c+2\,b\,k-b\,m}\,\sqrt{\frac{2}{\pi}}\,z\right) - i\,C\!\left(\sqrt{-i\,c+2\,b\,k-b\,m}\,\sqrt{\frac{2}{\pi}}\,z\right)\sinh(g)}{\sqrt{-i\,c+2\,b\,k-b\,m}} -\right.$$
$$\left.\frac{\cosh(g)\,S\!\left(\sqrt{i\,c+2\,b\,k-b\,m}\,\sqrt{\frac{2}{\pi}}\,z\right) + i\,C\!\left(\sqrt{i\,c+2\,b\,k-b\,m}\,\sqrt{\frac{2}{\pi}}\,z\right)\sinh(g)}{\sqrt{i\,c+2\,b\,k-b\,m}}\right) -$$
$$\frac{2^{-m-\frac{1}{2}}\sqrt{\pi}}{\sqrt{i\,c}}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cosh(g)\,S\!\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right) - i\,C\!\left(\frac{c\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,c}}\right)\sinh(g)\right) /;\ m\in\mathbb{N}^+$$

01.19.21.0813.01

$$\int \cos^m\!\left(b\sqrt{z}\right)\sinh\!\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(c\sqrt{z}\,\cosh\!\left(\sqrt{z}\,c+g\right)-\sinh\!\left(\sqrt{z}\,c+g\right)\right)}{c^2} -$$
$$i\,2^{1-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(-i\,c+b\,(2\,k-m))^2}\left((-i\,c+b\,(2\,k-m))\sqrt{z}\,\cosh\!\left(g+i\,(-i\,c+b\,(2\,k-m))\sqrt{z}\right)+\right.\right.$$
$$\left.i\sinh\!\left(g+i\,(-i\,c+b\,(2\,k-m))\sqrt{z}\right)\right)+\frac{1}{(i\,c+b\,(2\,k-m))^2}$$
$$\left.\left(i\sinh\!\left(g-i\,(i\,c+b\,(2\,k-m))\sqrt{z}\right)-(i\,c+b\,(2\,k-m))\sqrt{z}\,\cosh\!\left(g-i\,(i\,c+b\,(2\,k-m))\sqrt{z}\right)\right)\right) /;\ m\in\mathbb{N}^+$$

Involving $\cos^m\!\left(a\,z^r+e\right)\sinh\!\left(c\,z^r+g\right)$

01.19.21.0814.01

$$\int \cos^m(b z^r + e)\sinh(c z^r + g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z \binom{m}{\frac{m}{2}} \left(e^{-g} (c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, c z^r\right) - e^g (-c z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{g+2 i e k - i e m}\,\Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-1/r} - e^{-g+2 i e k - i e m} ((c - 2 i b k + i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m) z^r\right) + e^{g-2 i e k + i e m} ((-c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{-g-2 i e k + i e m} ((c + 2 i b k - i b m) z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0815.01

$$\int \cos^m(b z^2 + e)\sinh(c z^2 + g)\,dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh(g + e\, i\,(2k - m))\, S\left(\sqrt{-i c + 2 b k - b m}\, \sqrt{\frac{2}{\pi}}\, z\right) - i\, C\left(\sqrt{-i c + 2 b k - b m}\, \sqrt{\frac{2}{\pi}}\, z\right) \sinh(g + e\, i\,(2k - m))\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cos(i g + e(2k - m))\, S\left(\sqrt{i c + 2 b k - b m}\, \sqrt{\frac{2}{\pi}}\, z\right) + C\left(\sqrt{i c + 2 b k - b m}\, \sqrt{\frac{2}{\pi}}\, z\right) \sin(i g + e(2k - m))\right)\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh(g)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) - i\, C\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) \sinh(g)\right) /; m \in \mathbb{N}^+$$

01.19.21.0816.01

$$\int \cos^m\left(\sqrt{z}\, b + e\right)\sinh\left(\sqrt{z}\, c + g\right)dz = \frac{2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(\sqrt{z}\, c + g\right) - \sinh\left(\sqrt{z}\, c + g\right)\right)}{c^2} - i\, 2^{1-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(-i c + b(2k - m))^2} \left((-i c + b(2k - m)) \sqrt{z} \cosh\left(g - i e(m - 2k) + i(-i c + b(2k - m)) \sqrt{z}\right) + i \sinh\left(g - i e(m - 2k) + i(-i c + b(2k - m)) \sqrt{z}\right)\right) + \frac{1}{(i c + b(2k - m))^2} \left(i \sinh\left(g + e\, i\,(m - 2k) - i(i c + b(2k - m)) \sqrt{z}\right) - (i c + b(2k - m)) \sqrt{z} \cosh\left(g + e\, i\,(m - 2k) - i(i c + b(2k - m)) \sqrt{z}\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + d z) \sinh(c z^r + g)$

01.19.21.0817.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh\left(c z^2 + g\right) dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(g - \frac{i (2 d k - d m)^2}{4 (-i c + 2 b k - b m)}\right) S\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\, \sqrt{2\pi}}\right) - i\, C\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\, \sqrt{2\pi}}\right) \sinh\left(g - \frac{i (2 d k - d m)^2}{4 (-i c + 2 b k - b m)}\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cosh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g\right) S\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\, \sqrt{2\pi}}\right) \sinh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g\right)\right)\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh(g)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) - i\, C\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) \sinh(g)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0818.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c \sqrt{z} \cosh\left(\sqrt{z}\, c + g\right) - \sinh\left(\sqrt{z}\, c + g\right)\right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(2 d s - d m)^{3/2}} \left(2 \sqrt{2 d s - d m} \cosh\left(g + i (2 d s - d m) z + i (-i c - b m + 2 b s) \sqrt{z}\right) + \sqrt{2\pi}\, (-i c - b m + 2 b s) \cosh\left(g - \frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)}\right) S\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2 d s - d m}}\right) + i \sqrt{2\pi}\, (i c + b m - 2 b s)\, C\left(\frac{-i c - b m + 2 b s + 2 (2 d s - d m) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2 d s - d m}}\right) \sinh\left(g - \frac{i (-i c - b m + 2 b s)^2}{4 (2 d s - d m)}\right)\right) + \frac{1}{(d m - 2 d s)^{3/2}} \left(2 \sqrt{d m - 2 d s} \cosh\left(g + i (d m - 2 d s) z + i (-i c + b m - 2 b s) \sqrt{z}\right) + \sqrt{2\pi}\, (-i c + b m - 2 b s) \cosh\left(g - \frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)}\right) S\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d m - 2 d s}}\right) + i \sqrt{2\pi}\, (i c - b m + 2 b s)\, C\left(\frac{-i c + b m - 2 b s + 2 (d m - 2 d s) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d m - 2 d s}}\right) \sinh\left(g - \frac{i (-i c + b m - 2 b s)^2}{4 (d m - 2 d s)}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z + e\right) \sinh\left(c z^r + g\right)$

01.19.21.0819.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz = i\, 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(-\frac{i (2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + g + e\, i\, (2 k - m)\right) S\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i\, C\left(\frac{2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(-\frac{i (2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + g + e\, i\, (2 k - m)\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cosh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i\, e\, (2 k - m)\right) S\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) + i\, C\left(\frac{2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g - i\, e\, (2 k - m)\right)\right)\right) - \frac{2^{-m-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i c}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh(g)\, S\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) - i\, C\left(\frac{c \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i c}}\right) \sinh(g)\right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.0820.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = \frac{(-1)^m\, 2^{1-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(c\sqrt{z}\, \cosh\left(\sqrt{z}\, c + g\right) - \sinh\left(\sqrt{z}\, c + g\right)\right)}{c^2} - i\, 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(2\, d\, s - d\, m)^{3/2}} \left(2\sqrt{2\, d\, s - d\, m}\, \cosh\left(g - i\, e\, m + 2\, i\, e\, s + i\, (2\, d\, s - d\, m)\, z + i\, (-i\, c - b\, m + 2\, b\, s) \sqrt{z}\right) + \sqrt{2\pi}\, (-i\, c - b\, m + 2\, b\, s) \cosh\left(-\frac{i\, (-i\, c - b\, m + 2\, b\, s)^2}{4\, (2\, d\, s - d\, m)} + g - i\, e\, m + 2\, i\, e\, s\right) S\left(\frac{-i\, c - b\, m + 2\, b\, s + 2\, (2\, d\, s - d\, m)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, s - d\, m}}\right) + i\sqrt{2\pi}\, (i\, c + b\, m - 2\, b\, s)\, C\left(\frac{-i\, c - b\, m + 2\, b\, s + 2\, (2\, d\, s - d\, m)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, s - d\, m}}\right) \sinh\left(-\frac{i\, (-i\, c - b\, m + 2\, b\, s)^2}{4\, (2\, d\, s - d\, m)} + g - i\, e\, m + 2\, i\, e\, s\right)\right) + \frac{1}{(d\, m - 2\, d\, s)^{3/2}} \left(2\sqrt{d\, m - 2\, d\, s}\, \cosh\left(g + i\, e\, m - 2\, i\, e\, s + i\, (d\, m - 2\, d\, s)\, z + i\, (-i\, c + b\, m - 2\, b\, s)\sqrt{z}\right) + \sqrt{2\pi}\, (-i\, c + b\, m - 2\, b\, s) \cosh\left(-\frac{i\, (-i\, c + b\, m - 2\, b\, s)^2}{4\, (d\, m - 2\, d\, s)} + g + i\, e\, m - 2\, i\, e\, s\right) S\left(\frac{-i\, c + b\, m - 2\, b\, s + 2\, (d\, m - 2\, d\, s)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d\, m - 2\, d\, s}}\right) + i\sqrt{2\pi}\, (i\, c - b\, m + 2\, b\, s)\, C\left(\frac{-i\, c + b\, m - 2\, b\, s + 2\, (d\, m - 2\, d\, s)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d\, m - 2\, d\, s}}\right) \sinh\left(-\frac{i\, (-i\, c + b\, m - 2\, b\, s)^2}{4\, (d\, m - 2\, d\, s)} + g + i\, e\, m - 2\, i\, e\, s\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\cos^m(d\, z) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0821.01

$$\int \cos^m(d\, z) \sinh\left(c\, z^2 + f\, z\right) dz = -\frac{1}{\sqrt{i\, c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4\, c}\right) S\left(\frac{f + 2\, c\, z}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{f + 2\, c\, z}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{f^2}{4\, c}\right)\right)\right) + 2^{-m-\frac{1}{2}}\, i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i\, c}} \left(\cosh\left(\frac{(-i\, f + 2\, d\, k - d\, m)^2}{4\, c}\right) S\left(\frac{-i\, f + 2\, d\, k - d\, m - 2\, i\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) - i\, C\left(\frac{-i\, f + 2\, d\, k - d\, m - 2\, i\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(-i\, f + 2\, d\, k - d\, m)^2}{4\, c}\right)\right) + \frac{1}{\sqrt{i\, c}} \left(-\cosh\left(\frac{(i\, f + 2\, d\, k - d\, m)^2}{4\, c}\right) S\left(\frac{i\, f + 2\, d\, k - d\, m + 2\, i\, c\, z}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) - i\, C\left(\frac{i\, f + 2\, d\, k - d\, m + 2\, i\, c\, z}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(i\, f + 2\, d\, k - d\, m)^2}{4\, c}\right)\right)\right) /;\, m \in \mathbb{N}^+$$

01.19.21.0822.01

$$\int \cos^m(d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right.$$
$$\left(2\sqrt{i\,f}\;\cosh\left(\sqrt{z}\;c+f\,z\right)+c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\,f}\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,f}\right)\right)\right)+$$
$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\;\cosh\left(\sqrt{z}\;c+i\,(-i\,f+2\,d\,k-d\,m)\,z\right)+\right.\right.$$
$$c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+$$
$$\left.c\,i\sqrt{2\pi}\;C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(-i\,f+2\,d\,k-d\,m)}\right)\right)\Big/(-i\,f+2\,d\,k-d\,m)^{3/2}+$$
$$\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\;\cos\left(i\,c\sqrt{z}\;+(i\,f+2\,d\,k-d\,m)\,z\right)+\right.$$
$$c\,i\sqrt{2\pi}\;\cos\left(\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+$$
$$\left.\left.\left.c\,i\sqrt{2\pi}\;C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sin\left(\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0823.01

$$\int \cos^m(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz ==$$

$$-\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}\right)\right)\right)+$$

$$2^{-m-\frac{1}{2}}\,i\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cosh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+e\,i\,(2\,k-m)\right)S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-\right.\right.$$

$$\left.i\,C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+e\,i\,(2\,k-m)\right)\right)+$$

$$\frac{1}{\sqrt{i\,c}}\left(-\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)-\right.$$

$$\left.\left.i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}-i\,e\,(2\,k-m)\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0824.01

$$\int \cos^m(e+d\,z)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{i\,f}\,\cosh\left(\sqrt{z}\,c+f\,z\right)+c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\,f}\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,f}\right)\right)\right)+\right.$$

$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\,\cos\left(-2\,e\,k+e\,m-i\,c\sqrt{z}-(i\,f+2\,d\,k-d\,m)\,z\right)+\right.\right.$$

$$c\,i\sqrt{2\pi}\,\cos\left(-\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}-2\,e\,k+e\,m\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)-$$

$$\left.i\,c\sqrt{2\pi}\,C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}-2\,e\,k+e\,m\right)\right)+$$

$$\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+2\,i\,e\,k-i\,e\,m+i\,(-i\,f+2\,d\,k-d\,m)\,z\right)+\right.$$

$$c\,i\sqrt{2\pi}\,\cosh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+2\,i\,e\,k-i\,e\,m\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+$$

$$c\sqrt{2\pi}\,C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)$$

$$\left.\left.\left.\sinh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+2\,i\,e\,k-i\,e\,m\right)\right)\middle/(-i\,f+2\,d\,k-d\,m)^{3/2}\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(b\,z^r)\sinh(c\,z^r+f\,z)$

01.19.21.0825.01

$$\int \cos^m(b z^2) \sinh(c z^2 + f z) \, dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c}\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i\, C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c}\right) \right) + 2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (-i c + 2 b k - b m)}\right) S\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (-i c + 2 b k - b m)}\right) \right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (i c + 2 b k - b m)}\right) S\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (i c + 2 b k - b m)}\right) \right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.0826.01

$$\int \cos^m(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + f z) \, dz = \frac{1}{(i f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i f} \cosh(\sqrt{z}\, c + f z) + c \sqrt{2 \pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{c^2}{4 f}\right) \right) \right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(f z + i (-i c + 2 b k - b m) \sqrt{z}\right) - (-i c + 2 b k - b m) \sqrt{2 \pi} \cosh\left(\frac{(-i c + 2 b k - b m)^2}{4 f}\right) S\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) - i (i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(-i c + 2 b k - b m)^2}{4 f}\right) \right) + \frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(f z - i (i c + 2 b k - b m) \sqrt{z}\right) + (i c + 2 b k - b m) \sqrt{2 \pi} \cosh\left(\frac{(i c + 2 b k - b m)^2}{4 f}\right) S\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) - i (-i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(i c + 2 b k - b m)^2}{4 f}\right) \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + e)\sinh(c z^r + f z)$

01.19.21.0827.01

$$\int \cos^m(b z^2 + e)\sinh(c z^2 + f z)\,dz = -\frac{1}{\sqrt{i c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left(\cosh\left(\frac{f^2}{4c}\right)S\left(\frac{f + 2 c z}{\sqrt{i c}\sqrt{2\pi}}\right) + i\,C\left(\frac{f + 2 c z}{\sqrt{i c}\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4c}\right)\right)\right) + 2^{-m-\frac{1}{2}}\, i\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i c + 2 b k - b m}}\left(\cosh\left(\frac{i f^2}{4(-i c + 2 b k - b m)} + e\, i(2k - m)\right)S\left(\frac{-i f + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\sqrt{2\pi}}\right) - i\,C\left(\frac{-i f + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m}\sqrt{2\pi}}\right)\sinh\left(\frac{i f^2}{4(-i c + 2 b k - b m)} + e\, i(2k - m)\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}}\left(\cos\left(\frac{f^2}{4(i c + 2 b k - b m)} + e(2k - m)\right)S\left(\frac{i f + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\sqrt{2\pi}}\right) + C\left(\frac{i f + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m}\sqrt{2\pi}}\right)\sin\left(\frac{f^2}{4(i c + 2 b k - b m)} + e(2k - m)\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0828.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+f z\right) dz = \frac{1}{(i f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(2 \sqrt{i f} \cosh\left(\sqrt{z}\, c+f z\right)+c \sqrt{2 \pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c+2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right)+i\, C\left(\frac{c+2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right)+\right.$$

$$2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(2 i e k-i e m+f z+i (-i c+2 b k-b m) \sqrt{z}\right)-\right.\right.$$

$$(-i c+2 b k-b m) \sqrt{2 \pi} \cosh\left(\frac{(-i c+2 b k-b m)^2}{4 f}+2 i e k-i e m\right) S\left(\frac{-i c+2 b k-b m-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right)-$$

$$\left. i (i c-2 b k+b m) \sqrt{2 \pi}\, C\left(\frac{-i c+2 b k-b m-2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(-i c+2 b k-b m)^2}{4 f}+2 i e k-i e m\right)\right)+$$

$$\frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(-2 e i k+i e m+f z-i (i c+2 b k-b m) \sqrt{z}\right)+(i c+2 b k-b m) \sqrt{2 \pi}\right.$$

$$\cosh\left(\frac{(i c+2 b k-b m)^2}{4 f}-2 i e k+i e m\right) S\left(\frac{i c+2 b k-b m+2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right)-i (-i c-2 b k+b m)$$

$$\left.\left.\left. \sqrt{2 \pi}\, C\left(\frac{i c+2 b k-b m+2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(i c+2 b k-b m)^2}{4 f}-2 i e k+i e m\right)\right)\right)\right) /; m \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r+d z\right) \sinh\left(c z^r+f z\right)$

01.19.21.0829.01

$$\int \cos^m(b z^2 + d z) \sinh(c z^2 + f z) \, dz = -\frac{2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4c}\right) S\left(\frac{f+2cz}{\sqrt{i c} \sqrt{2\pi}}\right) + i\, C\left(\frac{f+2cz}{\sqrt{i c} \sqrt{2\pi}}\right) \sinh\left(\frac{f^2}{4c}\right)\right)}{\sqrt{i c}} - i\, 2^{-m-\frac{1}{2}} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cos\left(\frac{(-i f + 2 d k - d m)^2}{4(-i c + 2 b k - b m)}\right) S\left(\frac{-i f + 2 d k - d m + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2\pi}}\right) - C\left(\frac{-i f + 2 d k - d m + 2(-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(\frac{(-i f + 2 d k - d m)^2}{4(-i c + 2 b k - b m)}\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(C\left(\frac{i f + 2 d k - d m + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2\pi}}\right) \sin\left(\frac{(i f + 2 d k - d m)^2}{4(i c + 2 b k - b m)}\right) - \cos\left(\frac{(i f + 2 d k - d m)^2}{4(i c + 2 b k - b m)}\right) S\left(\frac{i f + 2 d k - d m + 2(i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2\pi}}\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0830.01

$$\int \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right)\right) + 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(i\, f + 2 d\, k - d\, m)^{3/2}} \left(2 \sqrt{i\, f + 2 d\, k - d\, m}\, \cos\left(\sqrt{z}\, (i\, c + 2 b\, k - b\, m) + (i\, f + 2 d\, k - d\, m) z\right) + (i\, c + 2 b\, k - b\, m) \sqrt{2\pi}\, \cos\left(\frac{(i\, c + 2 b\, k - b\, m)^2}{4 (i\, f + 2 d\, k - d\, m)}\right) S\left(\frac{i\, c + 2 b\, k - b\, m + 2 (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) + (-i\, c - 2 b\, k + b\, m) \sqrt{2\pi}\, C\left(\frac{i\, c + 2 b\, k - b\, m + 2 (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) \sin\left(\frac{(i\, c + 2 b\, k - b\, m)^2}{4 (i\, f + 2 d\, k - d\, m)}\right)\right) - \left(2 \sqrt{-i\, f + 2 d\, k - d\, m}\, \cosh\left(i \sqrt{z}\, (-i\, c + 2 b\, k - b\, m) + i (-i\, f + 2 d\, k - d\, m) z\right) + (-i\, c + 2 b\, k - b\, m) \sqrt{2\pi}\, \cos\left(\frac{(-i\, c + 2 b\, k - b\, m)^2}{4 (-i\, f + 2 d\, k - d\, m)}\right) S\left(\frac{-i\, c + 2 b\, k - b\, m + 2 (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) + (i\, c - 2 b\, k + b\, m) \sqrt{2\pi}\, C\left(\frac{-i\, c + 2 b\, k - b\, m + 2 (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) \sin\left(\frac{(-i\, c + 2 b\, k - b\, m)^2}{4 (-i\, f + 2 d\, k - d\, m)}\right)\right) \Big/ (-i\, f + 2 d\, k - d\, m)^{3/2} \right) /;\ m \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + f\, z\right)$

01.19.21.0831.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c}\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c}\right)\right)\right) - i 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(-\frac{i (-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + e i (2 k - m)\right) S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(-\frac{i (-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + e i (2 k - m)\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} - i e (2 k - m)\right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} - i e (2 k - m)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0832.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i\, f} \cosh\left(\sqrt{z}\, c + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f}\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f} \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f} \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f}\right)\right)\right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\left(-2 \sqrt{-i\, f + 2 d k - d m} \cosh\left(2 i e k - i e m + i (-i\, f + 2 d k - d m) z + i (-i\, c + 2 b k - b m) \sqrt{z}\right) - (-i\, c + 2 b k - b m) \sqrt{2\pi} \cosh\left(-\frac{i (-i\, c + 2 b k - b m)^2}{4 (-i\, f + 2 d k - d m)} + 2 i e k - i e m\right) S\left(\frac{-i\, c + 2 b k - b m + 2 (-i\, f + 2 d k - d m) \sqrt{z}}{\sqrt{-i\, f + 2 d k - d m} \sqrt{2\pi}}\right) - i (i\, c - 2 b k + b m) \sqrt{2\pi}\, C\left(\frac{-i\, c + 2 b k - b m + 2 (-i\, f + 2 d k - d m) \sqrt{z}}{\sqrt{-i\, f + 2 d k - d m} \sqrt{2\pi}}\right) \sinh\left(-\frac{i (-i\, c + 2 b k - b m)^2}{4 (-i\, f + 2 d k - d m)} + 2 i e k - i e m\right)\right) \Big/ (-i\, f + 2 d k - d m)^{3/2} + \frac{1}{(i\, f + 2 d k - d m)^{3/2}} \left(2 \sqrt{i\, f + 2 d k - d m} \cos\left(-2 e k + e m - (i\, c + 2 b k - b m) \sqrt{z} - (i\, f + 2 d k - d m) z\right) + (i\, c + 2 b k - b m) \sqrt{2\pi} \cosh\left(\frac{i (i\, c + 2 b k - b m)^2}{4 (i\, f + 2 d k - d m)} - 2 i e k + i e m\right) S\left(\frac{i\, c + 2 b k - b m + 2 (i\, f + 2 d k - d m) \sqrt{z}}{\sqrt{i\, f + 2 d k - d m} \sqrt{2\pi}}\right) - i (-i\, c - 2 b k + b m) \sqrt{2\pi}\, C\left(\frac{i\, c + 2 b k - b m + 2 (i\, f + 2 d k - d m) \sqrt{z}}{\sqrt{i\, f + 2 d k - d m} \sqrt{2\pi}}\right) \sinh\left(\frac{i (i\, c + 2 b k - b m)^2}{4 (i\, f + 2 d k - d m)} - 2 i e k + i e m\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\cos^m(d\, z) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0833.01

$$\int \cos^m(d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = -\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}-g\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}-g\right)\right)\right)+$$
$$2^{-m-\frac{1}{2}}\,i\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cosh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+g\right)S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-\right.\right.$$
$$\left.i\,C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+g\right)\right)+\frac{1}{\sqrt{i\,c}}\left(-\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g\right)\right.$$
$$\left.\left.S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)-i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g\right)\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0834.01

$$\int \cos^m(d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right.$$
$$\left(2\sqrt{i\,f}\,\cosh\left(\sqrt{z}\,c+g+f\,z\right)+c\sqrt{2\,\pi}\left(\cosh\left(\frac{c^2}{4\,f}-g\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{c^2}{4\,f}-g\right)\right)\right)\Bigg)+$$
$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\,\cos\left(-i\,g-i\,c\sqrt{z}-(i\,f+2\,d\,k-d\,m)\,z\right)+\right.\right.$$
$$c\,i\sqrt{2\,\pi}\,\cos\left(\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}+i\,g\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+$$
$$\left.c\,i\sqrt{2\,\pi}\,C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}+i\,g\right)\right)+$$
$$\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\,\cosh\left(\sqrt{z}\,c+g+i\,(-i\,f+2\,d\,k-d\,m)\,z\right)+\right.$$
$$c\,i\sqrt{2\,\pi}\,\cosh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+g\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)+c\sqrt{2\,\pi}$$
$$\left.\left.C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+g\right)\right)\Big/(-i\,f+2\,d\,k-d\,m)^{3/2}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.0835.01

$$\int \cos^m(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = -\frac{1}{\sqrt{i\,c}}\left(2^{-m-\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\cosh\left(\frac{f^2}{4\,c}-g\right)S\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)+i\,C\left(\frac{f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{f^2}{4\,c}-g\right)\right)\right)+$$

$$2^{-m-\frac{1}{2}}\,i\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{\sqrt{-i\,c}}\left(\cosh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+g+e\,i\,(2\,k-m)\right)S\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)-\right.\right.$$

$$\left.i\,C\left(\frac{-i\,f+2\,d\,k-d\,m-2\,i\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(-i\,f+2\,d\,k-d\,m)^2}{4\,c}+g+e\,i\,(2\,k-m)\right)\right)+$$

$$\frac{1}{\sqrt{i\,c}}\left(-\cosh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)\right)S\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)-\right.$$

$$\left.\left.i\,C\left(\frac{i\,f+2\,d\,k-d\,m+2\,i\,c\,z}{\sqrt{i\,c}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(i\,f+2\,d\,k-d\,m)^2}{4\,c}+g-i\,e\,(2\,k-m)\right)\right)\right)\ /;\ m\in\mathbb{N}^+$$

01.19.21.0836.01

$$\int \cos^m(e+d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = \frac{1}{(i\,f)^{3/2}}\left(i\,2^{-m-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(2\sqrt{i\,f}\;\cosh\left(\sqrt{z}\;c+g+f\,z\right)+c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\,f}-g\right)S\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)+i\,C\left(\frac{c+2\,f\sqrt{z}}{\sqrt{i\,f}\;\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,f}-g\right)\right)\right)\right)+$$

$$2^{-m-1}\,i\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\frac{1}{(i\,f+2\,d\,k-d\,m)^{3/2}}\left(2\sqrt{i\,f+2\,d\,k-d\,m}\;\cos\left(-i\,g-2\,e\,k+e\,m-i\,c\sqrt{z}-(i\,f+2\,d\,k-d\,m)\,z\right)+\right.\right.$$

$$c\,i\sqrt{2\pi}\;\cos\left(-\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}-i\,g-2\,e\,k+e\,m\right)S\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)-$$

$$\left.i\,c\sqrt{2\pi}\;C\left(\frac{i\,c+2\,(i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sin\left(-\frac{c^2}{4\,(i\,f+2\,d\,k-d\,m)}-i\,g-2\,e\,k+e\,m\right)\right)+$$

$$\left(-2\sqrt{-i\,f+2\,d\,k-d\,m}\;\cosh\left(\sqrt{z}\;c+g+2\,i\,e\,k-i\,e\,m+i\,(-i\,f+2\,d\,k-d\,m)\,z\right)+\right.$$

$$c\,i\sqrt{2\pi}\;\cosh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+g+2\,i\,e\,k-i\,e\,m\right)S\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+$$

$$c\sqrt{2\pi}\;C\left(\frac{-i\,c+2\,(-i\,f+2\,d\,k-d\,m)\sqrt{z}}{\sqrt{-i\,f+2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)$$

$$\left.\left.\sinh\left(\frac{i\,c^2}{4\,(-i\,f+2\,d\,k-d\,m)}+g+2\,i\,e\,k-i\,e\,m\right)\right)\Big/(-i\,f+2\,d\,k-d\,m)^{3/2}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $\cos^m(b\,z^r)\sinh(c\,z^r+f\,z+g)$

01.19.21.0837.01

$$\int \cos^m(b z^2) \sinh(c z^2 + f z + g) \, dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right) \right) \right) + 2^{-m-\frac{1}{2}} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(\frac{i f^2}{4 (-i c + 2 b k - b m)} + g\right) S\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i C\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i f^2}{4 (-i c + 2 b k - b m)} + g\right) \right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (i c + 2 b k - b m)} + i g\right) S\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (i c + 2 b k - b m)} + i g\right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.0838.01

$$\int \cos^m(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + g + f z) \, dz = \frac{1}{(i f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i f} \cosh(\sqrt{z}\, c + g + f z) + c \sqrt{2 \pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) + i C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right) \right) \right) \right) + 2^{-m-1} i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(-i f)^{3/2}} \left(-2 \sqrt{-i f} \cosh\left(g + f z + i (-i c + 2 b k - b m) \sqrt{z}\right) - (-i c + 2 b k - b m) \sqrt{2 \pi} \cosh\left(\frac{(-i c + 2 b k - b m)^2}{4 f} + g\right) S\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) - i (i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{-i c + 2 b k - b m - 2 i f \sqrt{z}}{\sqrt{-i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(-i c + 2 b k - b m)^2}{4 f} + g\right) \right) + \frac{1}{(i f)^{3/2}} \left(2 \sqrt{i f} \cosh\left(g + f z - i (i c + 2 b k - b m) \sqrt{z}\right) + (i c + 2 b k - b m) \sqrt{2 \pi} \cosh\left(\frac{(i c + 2 b k - b m)^2}{4 f} + g\right) S\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) - i (-i c - 2 b k + b m) \sqrt{2 \pi}\, C\left(\frac{i c + 2 b k - b m + 2 i f \sqrt{z}}{\sqrt{i f} \sqrt{2 \pi}}\right) \sinh\left(\frac{(i c + 2 b k - b m)^2}{4 f} + g\right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + e) \sinh(c z^r + f z + g)$

01.19.21.0839.01

$$\int \cos^m(b z^2 + e) \sinh(c z^2 + f z + g)\, dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i\, C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right)\right)\right) + 2^{-m-\frac{1}{2}}\, i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(\frac{i f^2}{4 (-i c + 2 b k - b m)} + g + e\, i\, (2 k - m)\right) S\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i\, C\left(\frac{-i f + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i f^2}{4 (-i c + 2 b k - b m)} + g + e\, i\, (2 k - m)\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(\cos\left(\frac{f^2}{4 (i c + 2 b k - b m)} + i g + e (2 k - m)\right) S\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) + C\left(\frac{i f + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sin\left(\frac{f^2}{4 (i c + 2 b k - b m)} + i g + e (2 k - m)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0840.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g+f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(2\sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c+g+f\, z\right)+c\sqrt{2\pi}\left(\cosh\left(\frac{c^2}{4\, f}-g\right) S\left(\frac{c+2\, f\sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right)+i\, C\left(\frac{c+2\, f\sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4\, f}-g\right)\right)\right)\right)+$$

$$2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{1}{(-i\, f)^{3/2}} \left(-2\sqrt{-i\, f}\, \cosh\left(g+2\, i\, e\, k-i\, e\, m+f\, z+i\,(-i\, c+2\, b\, k-b\, m)\sqrt{z}\right)-(-i\, c+2\, b\, k-b\, m) \sqrt{2\pi}\, \cosh\left(\frac{(-i\, c+2\, b\, k-b\, m)^2}{4\, f}+g+2\, i\, e\, k-i\, e\, m\right) S\left(\frac{-i\, c+2\, b\, k-b\, m-2\, i\, f\sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right)-i\,(i\, c-2\, b\, k+b\, m)\sqrt{2\pi}\, C\left(\frac{-i\, c+2\, b\, k-b\, m-2\, i\, f\sqrt{z}}{\sqrt{-i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(-i\, c+2\, b\, k-b\, m)^2}{4\, f}+g+2\, i\, e\, k-i\, e\, m\right)\right)+$$

$$\frac{1}{(i\, f)^{3/2}} \left(2\sqrt{i\, f}\, \cosh\left(g-2\, i\, e\, k+i\, e\, m+f\, z-i\,(i\, c+2\, b\, k-b\, m)\sqrt{z}\right)+(i\, c+2\, b\, k-b\, m)\sqrt{2\pi}\, \cosh\left(\frac{(i\, c+2\, b\, k-b\, m)^2}{4\, f}+g-2\, i\, e\, k+i\, e\, m\right) S\left(\frac{i\, c+2\, b\, k-b\, m+2\, i\, f\sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right)-i\,(-i\, c-2\, b\, k+b\, m)\sqrt{2\pi}\, C\left(\frac{i\, c+2\, b\, k-b\, m+2\, i\, f\sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(i\, c+2\, b\, k-b\, m)^2}{4\, f}+g-2\, i\, e\, k+i\, e\, m\right)\right)\right) /;\, m \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r+d\, z\right) \sinh\left(c\, z^r+f\, z+g\right)$

01.19.21.0841.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh\left(c z^2 + f z + g\right) dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c} - g\right) S\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) + i C\left(\frac{f + 2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c} - g\right)\right)\right) - i 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-\frac{1}{\sqrt{-i c + 2 b k - b m}} \left(\cosh\left(-\frac{i (-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + g\right) S\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i C\left(\frac{-i f + 2 d k - d m + 2 (-i c + 2 b k - b m) z}{\sqrt{-i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(-\frac{i (-i f + 2 d k - d m)^2}{4 (-i c + 2 b k - b m)} + g\right)\right) - \frac{1}{\sqrt{i c + 2 b k - b m}} \left(-\cosh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g\right) S\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) - i C\left(\frac{i f + 2 d k - d m + 2 (i c + 2 b k - b m) z}{\sqrt{i c + 2 b k - b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f + 2 d k - d m)^2}{4 (i c + 2 b k - b m)} + g\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0842.01

$$\int \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \Bigg(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i\, f} \cosh\left(\sqrt{z}\, c + g + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right)\right)\right) +$$

$$2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \Bigg(\Bigg(-2 \sqrt{-i\, f + 2 d\, k - d\, m} \cosh\left(g + i\, (-i\, f + 2 d\, k - d\, m)\, z + i\, (-i\, c + 2 b\, k - b\, m) \sqrt{z}\right) - (-i\, c + 2 b\, k - b\, m) \sqrt{2\pi} \cosh\left(-\frac{i\, (-i\, c + 2 b\, k - b\, m)^2}{4\, (-i\, f + 2 d\, k - d\, m)} + g\right) S\left(\frac{-i\, c + 2 b\, k - b\, m + 2\, (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) -$$

$$i\, (i\, c - 2 b\, k + b\, m) \sqrt{2\pi}\, C\left(\frac{-i\, c + 2 b\, k - b\, m + 2\, (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right)$$

$$\sinh\left(-\frac{i\, (-i\, c + 2 b\, k - b\, m)^2}{4\, (-i\, f + 2 d\, k - d\, m)} + g\right)\Bigg) \Big/ (-i\, f + 2 d\, k - d\, m)^{3/2} + \frac{1}{(i\, f + 2 d\, k - d\, m)^{3/2}}$$

$$\Bigg(2 \sqrt{i\, f + 2 d\, k - d\, m} \cos\left(-i\, g - (i\, c + 2 b\, k - b\, m) \sqrt{z} - (i\, f + 2 d\, k - d\, m)\, z\right) + (i\, c + 2 b\, k - b\, m)$$

$$\sqrt{2\pi} \cosh\left(\frac{i\, (i\, c + 2 b\, k - b\, m)^2}{4\, (i\, f + 2 d\, k - d\, m)} + g\right) S\left(\frac{i\, c + 2 b\, k - b\, m + 2\, (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) - i\, (-i\, c - 2 b\, k + b\, m)$$

$$\sqrt{2\pi}\, C\left(\frac{i\, c + 2 b\, k - b\, m + 2\, (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) \sinh\left(\frac{i\, (i\, c + 2 b\, k - b\, m)^2}{4\, (i\, f + 2 d\, k - d\, m)} + g\right)\Bigg)\Bigg)\Bigg) /;\; m \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0843.01

$$\int \cos^m\left(b z^2+d z+e\right) \sinh\left(c z^2+f z+g\right) dz = -\frac{1}{\sqrt{i c}} \left(2^{-m-\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\cosh\left(\frac{f^2}{4 c}-g\right) S\left(\frac{f+2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right)+i C\left(\frac{f+2 c z}{\sqrt{i c} \sqrt{2 \pi}}\right) \sinh\left(\frac{f^2}{4 c}-g\right)\right)\right)- i 2^{-m-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-\frac{1}{\sqrt{-i c+2 b k-b m}} \left(\cosh\left(-\frac{i (-i f+2 d k-d m)^2}{4 (-i c+2 b k-b m)}+g+e i (2 k-m)\right) S\left(\frac{-i f+2 d k-d m+2 (-i c+2 b k-b m) z}{\sqrt{-i c+2 b k-b m} \sqrt{2 \pi}}\right)-i C\left(\frac{-i f+2 d k-d m+2 (-i c+2 b k-b m) z}{\sqrt{-i c+2 b k-b m} \sqrt{2 \pi}}\right) \sinh\left(-\frac{i (-i f+2 d k-d m)^2}{4 (-i c+2 b k-b m)}+g+e i (2 k-m)\right)\right)-\frac{1}{\sqrt{i c+2 b k-b m}} \left(-\cosh\left(\frac{i (i f+2 d k-d m)^2}{4 (i c+2 b k-b m)}+g-i e (2 k-m)\right) S\left(\frac{i f+2 d k-d m+2 (i c+2 b k-b m) z}{\sqrt{i c+2 b k-b m} \sqrt{2 \pi}}\right)- i C\left(\frac{i f+2 d k-d m+2 (i c+2 b k-b m) z}{\sqrt{i c+2 b k-b m} \sqrt{2 \pi}}\right) \sinh\left(\frac{i (i f+2 d k-d m)^2}{4 (i c+2 b k-b m)}+g-i e (2 k-m)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0844.01

$$\int \cos^m\left(b z^2+d z+e\right) \sinh\left(c z^2+f z+g\right) dz = \frac{2^{-m} \sqrt{\pi} (1-m \bmod 2)}{4 \sqrt{c}} \left(e^{g-\frac{f^2}{4 c}} \operatorname{erfi}\left(\frac{f+2 c z}{2 \sqrt{c}}\right)-e^{\frac{f^2}{4 c}-g} \operatorname{erf}\left(\frac{f+2 c z}{2 \sqrt{c}}\right)\right) \binom{m}{\frac{m}{2}} + 2^{-m-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{i \left(e^{\frac{(f-i d (m-2 s))^2}{4 (c-i b (m-2 s))}-g+i e m-2 i e s} \operatorname{erfi}\left(\frac{i f+d m-2 d s+2 i c z+2 b m z-4 b s z}{2 \sqrt{c-i b m+2 i b s}}\right)\right)}{\sqrt{c-i b m+2 i b s}}+ \frac{e^{\frac{(-i f+d (m-2 s))^2}{4 (c+b i (m-2 s))}+g+i e m-2 i e s} \operatorname{erfi}\left(\frac{f+i d m-2 i d s+2 c z+2 i b m z-4 i b s z}{2 \sqrt{c+i b m-2 i b s}}\right)}{\sqrt{c+i b m-2 i b s}}+ \frac{e^{\frac{(i f+d (m-2 s))^2}{4 (c-i b (m-2 s))}+g-i e m+2 i e s} \operatorname{erfi}\left(\frac{f-i d m+2 i d s+2 c z-2 i b m z+4 i b s z}{2 \sqrt{c-i b m+2 i b s}}\right)}{\sqrt{c-i b m+2 i b s}}+ \frac{i e^{\frac{(f+d i (m-2 s))^2}{4 (c+b i (m-2 s))}-g-i e m+2 i e s} \operatorname{erfi}\left(\frac{i f-d m+2 d s+2 i c z-2 b m z+4 b s z}{2 \sqrt{c+i b m-2 i b s}}\right)}{\sqrt{c+i b m-2 i b s}}\right) /; m \in \mathbb{N}^+$$

01.19.21.0845.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i\, f)^{3/2}} \left(i\, 2^{-m-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(2 \sqrt{i\, f}\, \cosh\left(\sqrt{z}\, c + g + f\, z\right) + c \sqrt{2\pi} \left(\cosh\left(\frac{c^2}{4 f} - g\right) S\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) + i\, C\left(\frac{c + 2 f \sqrt{z}}{\sqrt{i\, f}\, \sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4 f} - g\right)\right)\right) + 2^{-m-1}\, i \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\left(-2 \sqrt{-i\, f + 2 d\, k - d\, m}\, \cosh\left(g + 2\, i\, e\, k - i\, e\, m + i\, (-i\, f + 2 d\, k - d\, m)\, z + i\, (-i\, c + 2 b\, k - b\, m) \sqrt{z}\right) - (-i\, c + 2 b\, k - b\, m) \sqrt{2\pi}\, \cosh\left(-\frac{i\, (-i\, c + 2 b\, k - b\, m)^2}{4\, (-i\, f + 2 d\, k - d\, m)} + g + 2\, i\, e\, k - i\, e\, m\right) S\left(\frac{-i\, c + 2 b\, k - b\, m + 2\, (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) - i\, (i\, c - 2 b\, k + b\, m) \sqrt{2\pi}\, C\left(\frac{-i\, c + 2 b\, k - b\, m + 2\, (-i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{-i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) \sinh\left(-\frac{i\, (-i\, c + 2 b\, k - b\, m)^2}{4\, (-i\, f + 2 d\, k - d\, m)} + g + 2\, i\, e\, k - i\, e\, m\right)\right) \Big/ (-i\, f + 2 d\, k - d\, m)^{3/2} + \frac{1}{(i\, f + 2 d\, k - d\, m)^{3/2}} \left(2 \sqrt{i\, f + 2 d\, k - d\, m}\, \cos\left(-i\, g - 2 e\, k + e\, m - (i\, c + 2 b\, k - b\, m) \sqrt{z} - (i\, f + 2 d\, k - d\, m)\, z\right) + (i\, c + 2 b\, k - b\, m) \sqrt{2\pi}\, \cosh\left(\frac{i\, (i\, c + 2 b\, k - b\, m)^2}{4\, (i\, f + 2 d\, k - d\, m)} + g - 2\, i\, e\, k + i\, e\, m\right) S\left(\frac{i\, c + 2 b\, k - b\, m + 2\, (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) - i\, (-i\, c - 2 b\, k + b\, m) \sqrt{2\pi}\, C\left(\frac{i\, c + 2 b\, k - b\, m + 2\, (i\, f + 2 d\, k - d\, m) \sqrt{z}}{\sqrt{i\, f + 2 d\, k - d\, m}\, \sqrt{2\pi}}\right) \sinh\left(\frac{i\, (i\, c + 2 b\, k - b\, m)^2}{4\, (i\, f + 2 d\, k - d\, m)} + g - 2\, i\, e\, k + i\, e\, m\right)\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.0846.01

$$\int \cos^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{1}{2^{m+2} f^{3/2}} \binom{m}{\frac{m}{2}} \left(4 \sqrt{f} \cosh\left(\sqrt{z}\, c + g + f\, z\right) + c\, e^{-\frac{c^2}{4 f} - g} \sqrt{\pi} \left(e^{\frac{c^2}{2 f}} \operatorname{erf}\left(\frac{c + 2 f \sqrt{z}}{2 \sqrt{f}}\right) - e^{2 g} \operatorname{erfi}\left(\frac{c + 2 f \sqrt{z}}{2 \sqrt{f}}\right)\right)\right)$$

$$(1 - m \bmod 2) + 2^{-m} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{4} \sqrt{\pi} \left(-\frac{i}{(f + d\, i\, (m - 2 s))^{3/2}} e^{\frac{-c^2 - 2 i\, b\, (m-2 s)\, c + (m-2 s)\left((m-2 s)\, b^2 + d\, (4 i\, g - 4 e\, m + 8 e\, s)\right) + 4 f\, (g + e\, i\, (m-2 s))}{4 (f + d\, i\, (m-2 s))}}\right.\right.$$

$$(-i\, c + b\, (m - 2 s)) \operatorname{erfi}\left(\frac{c + i\left(b\, (m - 2 s) + 2 (-i\, f + d\, m - 2 d\, s) \sqrt{z}\right)}{2 \sqrt{f + d\, i\, (m - 2 s)}}\right) +$$

$$\frac{1}{(f + d\, i\, (m - 2 s))^{3/2}} e^{\frac{c^2 + 2 b\, i\, (m-2 s)\, c - 4 f\, (g + e\, i\, (m-2 s)) + (m-2 s)\left(4 d\, (-i\, g + e\, m - 2 e\, s) - b^2\, (m-2 s)\right)}{4 (f + d\, i\, (m-2 s))}} (-i\, c + b\, (m - 2 s))$$

$$\operatorname{erfi}\left(\frac{i\, c - b\, (m - 2 s) + 2 (i\, f - d\, m + 2 d\, s) \sqrt{z}}{2 \sqrt{f + d\, i\, (m - 2 s)}}\right) + \frac{1}{(f - i\, d\, (m - 2 s))^{3/2}}$$

$$\left(i\, e^{-\frac{i\, (c - i\, b\, (m-2 s))^2}{4 i\, f + 4 d\, (m-2 s)} + g - i\, e\, m + 2 i\, e\, s} (i\, c + b\, (m - 2 s)) \operatorname{erfi}\left(\frac{c - i\left(b\, (m - 2 s) + 2 (i\, f + d\, m - 2 d\, s) \sqrt{z}\right)}{2 \sqrt{f - i\, d\, (m - 2 s)}}\right)\right)\right) +$$

$$\frac{1}{(f - i\, d\, (m - 2 s))^{3/2}} e^{\frac{c^2 - 2 i\, b\, (m-2 s)\, c - 4 f\, (g - i\, e\, (m-2 s)) + (m-2 s)\left(4 d\, (i\, g + e\, m - 2 e\, s) - b^2\, (m-2 s)\right)}{4 (f - i\, d\, (m-2 s))}}$$

$$(-i\, c - b\, m + 2 b\, s) \operatorname{erfi}\left(\frac{i\, c + b\, (m - 2 s) + 2 (i\, f + d\, m - 2 d\, s) \sqrt{z}}{2 \sqrt{f - i\, d\, (m - 2 s)}}\right)\right) +$$

$$\frac{\cosh\left(g - i\, e\, m + 2 i\, e\, s + (f - i\, d\, m + 2 i\, d\, s)\, z + (c - i\, b\, m + 2 i\, b\, s) \sqrt{z}\right)}{f - i\, d\, m + 2 i\, d\, s} +$$

$$\left.\frac{\cosh\left(g + i\, e\, m - 2 i\, e\, s + (f + i\, d\, m - 2 i\, d\, s)\, z + (c + i\, b\, m - 2 i\, b\, s) \sqrt{z}\right)}{f + i\, d\, m - 2 i\, d\, s}\right) /;\ m \in \mathbb{N}^+$$

Involving products of cos

Involving $\cos(a\, z) \cos(b\, z) \sinh(c\, z)$

01.19.21.0847.01

$$\int \cos(a\, z) \cos(b\, z) \sinh(c\, z)\, dz = \frac{1}{2} \left(\frac{c \cos((a - b)\, z) \cosh(c\, z)}{a^2 - 2 b\, a + b^2 + c^2} + \frac{c \cos((a + b)\, z) \cosh(c\, z)}{a^2 + 2 b\, a + b^2 + c^2} + \frac{(a - b) \sin((a - b)\, z) \sinh(c\, z)}{a^2 - 2 b\, a + b^2 + c^2} + \frac{(a + b) \sin((a + b)\, z) \sinh(c\, z)}{a^2 + 2 b\, a + b^2 + c^2}\right)$$

Involving rational functions of cos

Involving $\frac{\sinh(c z)}{a+b\cos(d z)}$

01.19.21.0848.01

$$\int \frac{\sinh(c z)}{a+b\cos(d z)}\,dz = \frac{1}{2 b\sqrt{a^2-b^2}}\left(\frac{1}{c+i d}e^{(c+i d) z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1-\frac{i c}{d}, 1; 2-\frac{i c}{d}; \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1-\frac{i c}{d}, 1; 2-\frac{i c}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)\right)+\frac{1}{c-i d}e^{i d z-c z}\left(\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(1+\frac{i c}{d}, 1; 2+\frac{i c}{d}; \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(1+\frac{i c}{d}, 1; 2+\frac{i c}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)$$

Involving $(a+b\cos(d z))^{-n}\sinh(c z)$

01.19.21.0849.01

$$\int \frac{\sinh(c\,z)}{(a+b\cos(d\,z))^2}\,dz = \frac{1}{2}\left(\frac{1}{b\,(a^2-b^2)^{3/2}\,(c+i\,d)}\left(e^{(c+i\,d)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(c+i\,d)}{d},1;2-\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(c+i\,d)}{d},1;2-\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(c+i\,d)}{d},2;2-\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-{}_2F_1\left(-\frac{i\,(c+i\,d)}{d},2;2-\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)-a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(c+i\,d)}{d},2;2-\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(c+i\,d)}{d},2;2-\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)-\frac{1}{b\,(a^2-b^2)^{3/2}\,(i\,d-c)}\left(e^{(i\,d-c)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(i\,d-c)}{d},1;2+\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(i\,d-c)}{d},1;2+\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(i\,d-c)}{d},2;2+\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-{}_2F_1\left(-\frac{i\,(i\,d-c)}{d},2;2+\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)-a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(i\,d-c)}{d},2;2+\frac{i\,c}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(i\,d-c)}{d},2;2+\frac{i\,c}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\right)$$

Involving $\frac{\sinh(c\,z)}{a+b\cos^2(d\,z)}$

01.19.21.0850.01

$$\int \frac{\sinh(c z)}{a + b\cos^2(d z)}\, dz = \frac{1}{2\sqrt{a}\, b\sqrt{a+b}}\left(\frac{1}{c - 2 i d} e^{2 i d z - c z}\left(\left(2a + 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 + \frac{i c}{2d}, 1; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right) - \left(2a - 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 + \frac{i c}{2d}, 1; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right)\right) + \frac{1}{c + 2 i d} e^{(c + 2 i d) z}\left(\left(2a + 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 - \frac{i c}{2d}, 1; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right) - \left(2a - 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 - \frac{i c}{2d}, 1; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right)\right)\right)$$

Involving $\left(a + b\cos^2(d z)\right)^{-n}\sinh(c z)$

01.19.21.0851.01

$$\int \frac{\sinh(c z)}{\left(a + b\cos^2(d z)\right)^2}\, dz = \frac{1}{2}\left(\left(e^{(2 i d - c) z}\left(-(2a + b)\left(-2a + 2\sqrt{a+b}\sqrt{a} - b\right){}_2F_1\left(1 + \frac{i c}{2d}, 1; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right) + (-2a - b)\left(2a + 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 + \frac{i c}{2d}, 1; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right) + 2\sqrt{a}\left(\left(-2a^{3/2} + 2\sqrt{a+b}\, a - 2b\sqrt{a} + b\sqrt{a+b}\right){}_2F_1\left(1 + \frac{i c}{2d}, 2; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right) + \left(2a^{3/2} + 2\sqrt{a+b}\, a + 2b\sqrt{a} + b\sqrt{a+b}\right){}_2F_1\left(1 + \frac{i c}{2d}, 2; 2 + \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right)\right)\right)\right) \Big/ \left(2a^{3/2} b (a+b)^{3/2} (2 i d - c)\right) - \left(e^{(c + 2 i d) z}\left(-(2a + b)\left(-2a + 2\sqrt{a+b}\sqrt{a} - b\right) {}_2F_1\left(1 - \frac{i c}{2d}, 1; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right) + (-2a - b)\left(2a + 2\sqrt{a+b}\sqrt{a} + b\right){}_2F_1\left(1 - \frac{i c}{2d}, 1; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right) + 2\sqrt{a}\left(\left(-2a^{3/2} + 2\sqrt{a+b}\, a - 2b\sqrt{a} + b\sqrt{a+b}\right){}_2F_1\left(1 - \frac{i c}{2d}, 2; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a + 2\sqrt{a+b}\sqrt{a} + b}\right) + \left(2a^{3/2} + 2\sqrt{a+b}\, a + 2b\sqrt{a} + b\sqrt{a+b}\right) {}_2F_1\left(1 - \frac{i c}{2d}, 2; 2 - \frac{i c}{2d}; -\frac{b e^{2 i d z}}{2a - 2\sqrt{a+b}\sqrt{a} + b}\right)\right)\right)\right) \Big/ \left(2a^{3/2} b (a+b)^{3/2} (c + 2 i d)\right)\right)$$

Involving $\frac{\cos(e\,z)\sinh(c\,z)}{a+b\cos(d\,z)}$

01.19.21.0852.01

$$\int \frac{\cos(e\,z)\sinh(c\,z)}{a+b\cos(d\,z)}\,dz = \frac{1}{4}\Bigg(\frac{1}{b\sqrt{a^2-b^2}\,(c+i\,d+i\,e)}\Bigg(e^{(c+i\,d+i\,e)z}\Bigg(\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(-\frac{i\,(c+i\,d+i\,e)}{d},1;2-\frac{i\,(c+i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\Bigg)+\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(-\frac{i\,(c+i\,d+i\,e)}{d},1;2-\frac{i\,(c+i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)+\frac{1}{b\sqrt{a^2-b^2}\,(c-i\,e+i\,d)}\Bigg(e^{(c-i\,e+i\,d)z}\Bigg(\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(-\frac{i\,(c-i\,e+i\,d)}{d},1;2-\frac{i\,(c-i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\Bigg)+\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(-\frac{i\,(c-i\,e+i\,d)}{d},1;2-\frac{i\,(c-i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)-\Bigg(e^{(-c+i\,d+i\,e)z}\Bigg(\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(-\frac{i\,(-c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,e-c)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\Bigg)+\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(-\frac{i\,(-c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,e-c)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg/\Big(b\sqrt{a^2-b^2}\,(-c+i\,d+i\,e)\Big)-\Bigg(e^{(-c-i\,e+i\,d)z}\Bigg(\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(-\frac{i\,(-c-i\,e+i\,d)}{d},1;2-\frac{i\,(-c-i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\Bigg)+\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(-\frac{i\,(-c-i\,e+i\,d)}{d},1;2-\frac{i\,(-c-i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\Bigg)\Bigg)\Bigg)\Bigg/\Big(b\sqrt{a^2-b^2}\,(-c-i\,e+i\,d)\Big)\Bigg)$$

Involving $\cos(e\,z)\sinh(c\,z)\,(a+b\cos(d\,z))^{-n}$

01.19.21.0853.01

$$\int \frac{\cos(e\,z)\sinh(c\,z)}{(a+b\cos(d\,z))^2}\,dz = \frac{1}{4}\Bigg(\frac{1}{b\,(a^2-b^2)^{3/2}\,(c+i\,d+i\,e)}\Bigg(e^{(c+i\,d+i\,e)z}\Bigg(a\Big(a+\sqrt{a^2-b^2}\Big)\,{}_2F_1\Bigg(-\frac{i\,(c+i\,d+i\,e)}{d},1;2-\frac{i\,(c+i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\Bigg)+a\Big(\sqrt{a^2-b^2}-a\Big)\,{}_2F_1\Bigg(-\frac{i\,(c+i\,d+i\,e)}{d},1;2-\frac{i\,(c+i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\Bigg)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(c+i\,d+i\,e)}{d},2;2-\frac{i\,(c+i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.{}_2F_1\left(-\frac{i\,(c+i\,d+i\,e)}{d},2;2-\frac{i\,(c+i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(c+i\,d+i\,e)}{d},2;\right.\right.$$

$$\left.\left.2-\frac{i\,(c+i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(c+i\,d+i\,e)}{d},2;2-\frac{i\,(c+i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)+$$

$$\frac{1}{b\left(a^2-b^2\right)^{3/2}(c-i\,e+i\,d)}\left(e^{(c-i\,e+i\,d)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},1;2-\frac{i\,(c-i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},1;2-\frac{i\,(c-i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},2;2-\frac{i\,(c-i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.{}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},2;2-\frac{i\,(c-i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},2;\right.\right.$$

$$\left.\left.2-\frac{i\,(c-i\,e)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(c-i\,e+i\,d)}{d},2;2-\frac{i\,(c-i\,e)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)-$$

$$\left(e^{(-c+i\,d+i\,e)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,e-c)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e)}{d},1;2-\frac{i\,(i\,e-c)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e)}{d},2;2-\frac{i\,(i\,e-c)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.{}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e)}{d},2;2-\frac{i\,(i\,e-c)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e)}{d},2;2-\frac{i\,(i\,e-c)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.$$

$$ {}_2F_1\left(-\frac{i\,(-c+i\,d\,+i\,e\,)}{d},\,2;\,2-\frac{i\,(i\,e-c)}{d};\,-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(b\left(a^2-b^2\right)^{3/2}(-c+i\,d\,+i\,e\,)\right)- $$

$$ \Bigg(e^{(-c-i\,e+i\,d\,)\,z}\Bigg(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,1;\,2-\frac{i\,(-c-i\,e)}{d};\,\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+ $$

$$ a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,1;\,2-\frac{i\,(-c-i\,e)}{d};\,-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+ $$

$$ \left(b^2-a^2\right)\Bigg({}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,2;\,2-\frac{i\,(-c-i\,e)}{d};\,\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)- $$

$$ {}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,2;\,2-\frac{i\,(-c-i\,e)}{d};\,-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)- $$

$$ a\sqrt{a^2-b^2}\Bigg({}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,2;\,2-\frac{i\,(-c-i\,e)}{d};\,\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+ $$

$$ {}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d\,)}{d},\,2;\,2-\frac{i\,(-c-i\,e)}{d};\,-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(b\left(a^2-b^2\right)^{3/2}(-c-i\,e+i\,d\,)\right)\Bigg) $$

Involving $\frac{\cos(e\,z)\sinh(c\,z)}{a+b\cos^2(d\,z)}$

01.19.21.0854.01

$$\int \frac{\cos(e z)\sinh(c z)}{a+b\cos^2(d z)}\,dz = \frac{1}{4}\Bigg(\Bigg(e^{(-c+2 i d+i e) z}\Bigg(\left(2 a-2 \sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i (i e-c)}{2 d}, 1; 2-\frac{i (i e-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+ \left(-2 a-2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i (i e-c)}{2 d}, 1; 2-\frac{i (i e-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a-2 \sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/ \left(\sqrt{a}\, b \sqrt{a+b}\, (-c+2 i d+i e)\right)+\Bigg(e^{(-c-i e+2 i d) z}\Bigg(\left(2 a-2 \sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i (-c-i e)}{2 d}, 1; 2-\frac{i (-c-i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2 a-2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i (-c-i e)}{2 d}, 1; 2-\frac{i (-c-i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a-2 \sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\, b \sqrt{a+b}\, (-c-i e+2 i d)\right)- \Bigg(e^{(c+2 i d+i e) z}\Bigg(\left(2 a-2 \sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i (c+i e)}{2 d}, 1; 2-\frac{i (c+i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+ \left(-2 a-2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i (c+i e)}{2 d}, 1; 2-\frac{i (c+i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a-2 \sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/ \left(\sqrt{a}\, b \sqrt{a+b}\, (c+2 i d+i e)\right)-\Bigg(e^{(c-i e+2 i d) z}\Bigg(\left(2 a-2 \sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i (c-i e)}{2 d}, 1; 2-\frac{i (c-i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+\left(-2 a-2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i (c-i e)}{2 d}, 1; 2-\frac{i (c-i e)}{2 d}; -\frac{b e^{2 i d z}}{2 a-2 \sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Big/\left(\sqrt{a}\, b \sqrt{a+b}\, (c-i e+2 i d)\right)\Bigg)$$

Involving $\cos(e z)\sinh(c z)\left(a+b\cos^2(d z)\right)^{-n}$

01.19.21.0855.01

$$\int \frac{\cos(e z)\sinh(c z)}{\left(a+b\cos^2(d z)\right)^2}\,dz = \frac{1}{4}\Bigg(\Bigg(e^{(-c+2 i d+i e) z}\Bigg(-(2 a+b)\left(-2 a+2 \sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\left(1-\frac{i (i e-c)}{2 d}, 1; 2-\frac{i (i e-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+ (-2 a-b)\left(2 a+2 \sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\left(1-\frac{i (i e-c)}{2 d}, 1; 2-\frac{i (i e-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a-2 \sqrt{a+b}\,\sqrt{a}+b}\right)+ 2\sqrt{a}\Bigg(\left(-2 a^{3/2}+2 \sqrt{a+b}\, a-2 b \sqrt{a}+b \sqrt{a+b}\right) {}_2F_1\left(1-\frac{i (i e-c)}{2 d}, 2; 2-\frac{i (i e-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a+2 \sqrt{a+b}\,\sqrt{a}+b}\right)+\left(2 a^{3/2}+2 \sqrt{a+b}\, a+2 b \sqrt{a}+b \sqrt{a+b}\right)$$

$$ {}_2F_1\left(1-\frac{i\,(i\,e-c)}{2\,d},\,2;\,2-\frac{i\,(i\,e-c)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/ $$

$$ \left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(-c+2\,i\,d\,+i\,e\,)\right)+\Bigg(e^{(-c-i\,e+2\,i\,d\,)\,z}\Bigg(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right) $$

$$ {}_2F_1\left(1-\frac{i\,(-c-i\,e)}{2\,d},\,1;\,2-\frac{i\,(-c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ (-2\,a-b)\left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b\right){}_2F_1\left(1-\frac{i\,(-c-i\,e)}{2\,d},\,1;\,2-\frac{i\,(-c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\Bigg(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\Bigg(1-\frac{i\,(-c-i\,e)}{2\,d},\,2;\,2-\frac{i\,(-c-i\,e)}{2\,d}; $$

$$ -\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\Bigg)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right) $$

$$ {}_2F_1\left(1-\frac{i\,(-c-i\,e)}{2\,d},\,2;\,2-\frac{i\,(-c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/ $$

$$ \left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(-c-i\,e+2\,i\,d\,)\right)-\Bigg(e^{(c+2\,i\,d\,+i\,e\,)\,z}\Bigg(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right) $$

$$ {}_2F_1\left(1-\frac{i\,(c+i\,e\,)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e\,)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ (-2\,a-b)\left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b\right){}_2F_1\left(1-\frac{i\,(c+i\,e\,)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e\,)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\Bigg(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,)}{2\,d},\,2;\,2-\frac{i\,(c+i\,e\,)}{2\,d}; $$

$$ -\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\Bigg)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,)}{2\,d}, $$

$$ 2;\,2-\frac{i\,(c+i\,e\,)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(c+2\,i\,d\,+i\,e\,)\right)- $$

$$ \Bigg(e^{(c-i\,e+2\,i\,d\,)\,z}\Bigg(-(2\,a+b)\left(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,-b\right){}_2F_1\left(1-\frac{i\,(c-i\,e)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ (-2\,a-b)\left(2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b\right){}_2F_1\left(1-\frac{i\,(c-i\,e)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)+ $$

$$ 2\,\sqrt{a}\,\Bigg(\left(-2\,a^{3/2}+2\,\sqrt{a+b}\,\,a-2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1\Bigg(1-\frac{i\,(c-i\,e)}{2\,d},\,2;\,2-\frac{i\,(c-i\,e)}{2\,d}; $$

$$ -\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\,\sqrt{a+b}\,\sqrt{a}\,+b}\Bigg)+\left(2\,a^{3/2}+2\,\sqrt{a+b}\,\,a+2\,b\,\sqrt{a}\,+b\,\sqrt{a+b}\,\right){}_2F_1 $$

$$ \left(1-\frac{i\,(c-i\,e)}{2\,d},\,2;\,2-\frac{i\,(c-i\,e)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\,\sqrt{a+b}\,\sqrt{a}\,+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\left(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(c-i\,e+2\,i\,d\,)\right)\Bigg) $$

Involving algebraic functions of cos

Involving $(a+b\cos(d\,z))^{\beta}\sinh(c\,z)$

01.19.21.0856.01

$$\int (a+b\cos(d\,z))^{\beta}\sinh(c\,z)\,dz = \frac{1}{2\left(c^2+d^2\beta^2\right)} e^{-c z}\left(\frac{e^{i d z} b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i d z} b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta} \left(a+\frac{1}{2} b\left(e^{-i d z}+e^{i d z}\right)\right)^{\beta}\left(e^{2 c z}(c+i d \beta) F_1\left(-\frac{i c}{d}-\beta;-\beta,-\beta;1-\frac{i c}{d}-\beta;-\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+ (c-i d \beta) F_1\left(\frac{i c}{d}-\beta;-\beta,-\beta;1+\frac{i c}{d}-\beta;-\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}},\frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $\left(a+b\cos^2(d\,z)\right)^{\beta}\sinh(c\,z)$

01.19.21.0857.01

$$\int \left(a+b\cos^2(d\,z)\right)^{\beta}\sinh(c\,z)\,dz = \frac{1}{2\left(c^2+4 d^2\beta^2\right)} e^{c z}\left(\frac{e^{2 i d z} b}{2a-2\sqrt{a+b}\sqrt{a}+b}+1\right)^{-\beta}\left(\frac{e^{2 i d z} b}{2a+2\sqrt{a+b}\sqrt{a}+b}+1\right)^{-\beta}\left(\frac{1}{4} b e^{-2 i d z}\left(1+e^{2 i d z}\right)^2+a\right)^{\beta} \left((c+2 i d\beta) F_1\left(-\frac{i c}{2d}-\beta;-\beta,-\beta;1-\frac{i c}{2d}-\beta;-\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b},-\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)+ e^{-2 c z}(c-2 i d\beta) F_1\left(\frac{i c}{2d}-\beta;-\beta,-\beta;1+\frac{i c}{2d}-\beta;-\frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\sqrt{a}+b},-\frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)$$

Involving $\cos(e\,z)\sinh(c\,z)(a+b\cos(d\,z))^{\beta}$

01.19.21.0858.01

$$\int (a+b\cos(d z))^{\beta}\cos(e z)\sinh(c z)\,dz = \frac{1}{4}\left(\frac{e^{i d z} b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i d z} b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2} b\, e^{-i d z}\left(1+e^{2 i d z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(-c-i e) z}}{c+i e+i d\beta} F_1\left(\frac{i(c+i e+i d\beta)}{d}; -\beta, -\beta; -\frac{i(-c-i e+i d-i d\beta)}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+\right.$$
$$\frac{e^{(i e-c) z}}{c-i e+i d\beta} F_1\left(-\frac{i(-c+i e-i d\beta)}{d}; -\beta, -\beta; -\frac{i(-c+i d+i e-i d\beta)}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+$$
$$\frac{e^{(c+i e) z}}{c+i e-i d\beta} F_1\left(-\frac{i(c+i e-i d\beta)}{d}; -\beta, -\beta; -\frac{i(c+i d+i e-i d\beta)}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)+$$
$$\left.\frac{e^{(c-i e) z}}{c-i e-i d\beta} F_1\left(-\frac{i(c-i e-i d\beta)}{d}; -\beta, -\beta; -\frac{i(c-i e+i d-i d\beta)}{d}; -\frac{b e^{i d z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i d z}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $\cos(e z)\sinh(c z)\left(a+b\cos^2(d z)\right)^{\beta}$

01.19.21.0859.01

$$\int \left(b\cos^2(d z)+a\right)^{\beta}\cos(e z)\sinh(c z)\,dz =$$
$$\frac{1}{4}\left(\frac{e^{2 i d z} b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2 i d z} b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4} b\, e^{-2 i d z}\left(1+e^{2 i d z}\right)^2+a\right)^{\beta}$$
$$\left(\frac{e^{(-c-i e) z}}{c+i e+2 i d\beta} F_1\left(\frac{i(c+i e+2 i d\beta)}{2d}; -\beta, -\beta; \frac{i(c+i e+2 d i(\beta-1))}{2d}; -\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}},\right.\right.$$
$$\left.-\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)+\frac{e^{(i e-c) z}}{c-i e+2 i d\beta} F_1\left(-\frac{i(-c+i e-2 i d\beta)}{2d}; -\beta, -\beta; 1-\frac{i(i e-c)}{2d}-\beta;\right.$$
$$\left.-\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}}, -\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)+\frac{e^{(c+i e) z}}{c+i e-2 i d\beta} F_1\left(-\frac{i(c+i e-2 i d\beta)}{2d};\right.$$
$$\left.-\beta, -\beta; 1-\frac{i(c+i e)}{2d}-\beta; -\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}}, -\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)+\frac{e^{(c-i e) z}}{c-i e-2 i d\beta}$$
$$\left.F_1\left(-\frac{i(c-i e-2 i d\beta)}{2d}; -\beta, -\beta; 1-\frac{i(c-i e)}{2d}-\beta; -\frac{b e^{2 i d z}}{2a+b+2\sqrt{a(a+b)}}, -\frac{b e^{2 i d z}}{2a+b-2\sqrt{a(a+b)}}\right)\right)$$

Involving rational functions of sin and cos

Involving $\sinh(d z)\,(a\sin(e z)+b\cos(e z))^{-n}$

01.19.21.0860.01

$$\int \frac{\sinh(d\,z)}{a\sin(e\,z)+b\cos(e\,z)}\,dz = \frac{1}{b+i\,a}\left(\frac{e^{(i\,e-d)\,z}}{d-i\,e}\,{}_2F_1\!\left(\frac{e+i\,d}{2\,e},1;\frac{i\,(d-3\,i\,e)}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\frac{e^{(d+i\,e)\,z}}{d+i\,e}\,{}_2F_1\!\left(-\frac{i\,(d+i\,e)}{2\,e},1;-\frac{i\,(d+3\,i\,e)}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)$$

01.19.21.0861.01

$$\int \frac{\sinh(d\,z)}{(a\sin(e\,z)+b\cos(e\,z))^2}\,dz = -\frac{2}{(a-i\,b)^2}\left(\frac{e^{(2\,i\,e-d)\,z}}{d-2\,i\,e}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,e},2;2+\frac{i\,d}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+\frac{e^{(d+2\,i\,e)\,z}}{d+2\,i\,e}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,e},2;2-\frac{i\,d}{2\,e};\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)$$

Involving $\sinh(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{-n}$

01.19.21.0862.01

$$\int \frac{\sinh(d\,z)}{a+b\sin(e\,z)+c\cos(e\,z)}\,dz = \frac{1}{2\,(c+i\,b)\sqrt{a^2-b^2-c^2}}\left(\frac{1}{d-i\,e}\left(e^{(i\,e-d)\,z}\left(\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\!\left(\frac{e+i\,d}{e},1;2+\frac{i\,d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\left(\sqrt{a^2-b^2-c^2}-a\right){}_2F_1\!\left(\frac{e+i\,d}{e},1;2+\frac{i\,d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)+\frac{1}{d+i\,e}\left(e^{(d+i\,e)\,z}\left(\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\!\left(-\frac{i\,(d+i\,e)}{e},1;2-\frac{i\,d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\left(\sqrt{a^2-b^2-c^2}-a\right){}_2F_1\!\left(-\frac{i\,(d+i\,e)}{e},1;2-\frac{i\,d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)$$

01.19.21.0863.01

$$\int \frac{\sinh(d\,z)}{(a+b\sin(e\,z)+c\cos(e\,z))^2}\,dz = \frac{1}{2\,(c+i\,b)\left(a^2-b^2-c^2\right)^{3/2}}\left(-\frac{1}{d-i\,e}\left(e^{(i\,e-d)\,z}\left({}_2F_1\!\left(\frac{e+i\,d}{e},2;2+\frac{i\,d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a^2-{}_2F_1\!\left(\frac{e+i\,d}{e},2;2+\frac{i\,d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+\left(a-\sqrt{a^2-b^2-c^2}\right){}_2F_1\!\left(\frac{e+i\,d}{e},1;2+\frac{i\,d}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+\sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(\frac{e+i\,d}{e},2;2+\frac{i\,d}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a+\sqrt{a^2-b^2-c^2}\;{}_2F_1\!\left(\frac{e+i\,d}{e},2;2+\frac{i\,d}{e};\right.\right.\right.$$

$$\left.\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a - a\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(\frac{e+i\,d}{e},\,1;\,2+\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$b^2\,{}_2F_1\left(\frac{e+i\,d}{e},\,2;\,2+\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-c^2\,{}_2F_1\left(\frac{e+i\,d}{e},\,2;\,2+\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+$$

$$\left.\left.\left.b^2\,{}_2F_1\left(\frac{e+i\,d}{e},\,2;\,2+\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+c^2\,{}_2F_1\left(\frac{e+i\,d}{e},\,2;\,2+\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)-\frac{1}{d+i\,e}$$

$$\left(e^{(d+i\,e)\,z}\left({}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a^2-{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right.\right.$$

$$a^2+\left(a-\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,1;\,2-\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\;{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-$$

$$a\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,1;\,2-\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$b^2\,{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-c^2\,{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+$$

$$\left.\left.\left.\left.b^2\,{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+c^2\,{}_2F_1\left(-\frac{i\,(d+i\,e)}{e},\,2;\,2-\frac{i\,d}{e};\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\right)\right)$$

Involving $\sinh(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{-n}$

01.19.21.0864.01

$$\int \frac{\sinh(d\,z)}{a\sin^2(e\,z)+b\cos^2(e\,z)}\,dz = \frac{i}{2\sqrt{-a}\,\sqrt{b}\,(b-a)}\left(\frac{1}{2\,i\,e-d}\,e^{(2\,i\,e-d)\,z}\left(\left(\sqrt{-a}+i\sqrt{b}\right)^2\,{}_2F_1\!\left(1+\frac{i\,d}{2\,e},1;2+\frac{i\,d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}-i\sqrt{b}\right)^2\,{}_2F_1\!\left(1+\frac{i\,d}{2\,e},1;2+\frac{i\,d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)-\frac{1}{d+2\,i\,e}\,e^{(d+2\,i\,e)\,z}\left(\left(\sqrt{-a}+i\sqrt{b}\right)^2\,{}_2F_1\!\left(1-\frac{i\,d}{2\,e},1;2-\frac{i\,d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}-i\sqrt{b}\right)^2}\right)-\left(\sqrt{-a}-i\sqrt{b}\right)^2\,{}_2F_1\!\left(1-\frac{i\,d}{2\,e},1;2-\frac{i\,d}{2\,e};\frac{(b-a)\,e^{2\,i\,e\,z}}{\left(\sqrt{-a}+i\sqrt{b}\right)^2}\right)\right)\right)$$

01.19.21.0865.01

$$\int \frac{\sinh(d z)}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^2} \, dz = \frac{i}{4 (-a)^{3/2} b^{3/2} (b-a)} \Biggl(\frac{1}{2 i e - d} e^{(2 i e - d) z} \Biggl(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\!\left(1 + \frac{i d}{2 e}, 1; 2 + \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) -$$

$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\!\left(1 + \frac{i d}{2 e}, 1; 2 + \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$

$$2 i \sqrt{-a} \sqrt{b} \Biggl({}_2F_1\!\left(1 + \frac{i d}{2 e}, 2; 2 + \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 +$$

$$\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\!\left(1 + \frac{i d}{2 e}, 2; 2 + \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\Biggr)\Biggr) -$$

$$\frac{1}{d + 2 i e} e^{(d + 2 i e) z} \Biggl(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\!\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) -$$

$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\!\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$

$$2 i \sqrt{-a} \sqrt{b} \Biggl({}_2F_1\!\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 +$$

$$\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\!\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\Biggr)\Biggr)\Biggr)$$

Involving $\sinh(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{-n}$

01.19.21.0866.01

$$\int \frac{\sinh(d\,z)}{a + b\sin^2(e\,z) + c\cos^2(e\,z)}\,dz = \frac{1}{2\sqrt{(a+b)(a+c)}\,(c-b)} \left(\frac{1}{d + 2 i e}\left(e^{(d+2 i e) z}\left(\left(-2a - b - c + 2\sqrt{(a+b)(a+c)}\right) {}_2F_1\!\left(1 - \frac{i d}{2e}, 1; 2 - \frac{i d}{2e}; \frac{(b-c)\,e^{2 i e z}}{2a + b + c + 2\sqrt{(a+b)(a+c)}}\right) + \left(2a + b + c + 2\sqrt{(a+b)(a+c)}\right) {}_2F_1\!\left(1 - \frac{i d}{2e}, 1; 2 - \frac{i d}{2e}; \frac{(b-c)\,e^{2 i e z}}{2a + b + c - 2\sqrt{(a+b)(a+c)}}\right)\right)\right) - \frac{1}{2 i e - d}\left(e^{(2 i e - d) z}\left(\left(-2a - b - c + 2\sqrt{(a+b)(a+c)}\right) {}_2F_1\!\left(1 + \frac{i d}{2e}, 1; 2 + \frac{i d}{2e}; \frac{(b-c)\,e^{2 i e z}}{2a + b + c + 2\sqrt{(a+b)(a+c)}}\right) + \left(2a + b + c + 2\sqrt{(a+b)(a+c)}\right) {}_2F_1\!\left(1 + \frac{i d}{2e}, 1; 2 + \frac{i d}{2e}; \frac{(b-c)\,e^{2 i e z}}{2a + b + c - 2\sqrt{(a+b)(a+c)}}\right)\right)\right)\right)$$

01.19.21.0867.01

$$\int \frac{\sinh(d\,z)}{\left(a+b\sinh^2(e\,z)+c\cosh^2(e\,z)\right)^2}\,dz = \frac{1}{2}\Bigg(\Bigg((b+c)\,e^{(2e-d)z}\Bigg(2\sqrt{(a-b)(a+c)}\Bigg(\frac{{}_2F_1\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{{}_2F_1\left(1-\frac{d}{2e},2;2-\frac{d}{2e};\frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\Bigg) + \frac{(2a-b+c)\,{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{(2a-b+c)\,{}_2F_1\left(1-\frac{d}{2e},1;2-\frac{d}{2e};\frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c-2\sqrt{(a-b)(a+c)}}\Bigg)\Bigg) \Big/ \left(2\,((a-b)(a+c))^{3/2}\,(2e-d)\right) - \Bigg((b+c)\,e^{(d+2e)z}\Bigg(2\sqrt{(a-b)(a+c)}\Bigg(\frac{{}_2F_1\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{{}_2F_1\left(\frac{d}{2e}+1,2;\frac{d}{2e}+2;\frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\Bigg) + \frac{(2a-b+c)\,{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{(2a-b+c)\,{}_2F_1\left(\frac{d}{2e}+1,1;\frac{d}{2e}+2;\frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c-2\sqrt{(a-b)(a+c)}}\Bigg)\Bigg) \Big/ \left(2\,((a-b)(a+c))^{3/2}\,(d+2e)\right)\Bigg)$$

Involving $\sinh(d\,z)\left(a\sin^2(e\,z)+b\sin(2\,e\,z)+c\cos^2(e\,z)\right)^{-n}$

01.19.21.0868.01

$$\int \frac{\sinh(d z)}{a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)} \, dz = -\left((-a - 2 i b + c) \left(\frac{1}{2 i e - d} \left(e^{(2 i e - d) z} \left(\left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 + \frac{i d}{2 e}, 1; 2 + \frac{i d}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 + \frac{i d}{2 e}, 1; 2 + \frac{i d}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right)\right)\right) - \frac{1}{d + 2 i e} \left(e^{(d + 2 i e) z} \left(\left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2 \sqrt{a c - b^2}}\right) + \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2 \sqrt{a c - b^2}}\right)\right)\right)\right)\right) \Big/ \left(2 \sqrt{a c - b^2} \left(a^2 - 2 c a + 4 b^2 + c^2\right)\right)$$

01.19.21.0869.01

$$\int \frac{\sinh(d z)}{\left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^2} \, dz = \frac{1}{2} \left(\left((-a - 2 i b + c) e^{(d + 2 i e) z} \left(-4 \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c + 2 \sqrt{a c - b^2}}\right) b^2 + 4 \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c - 2 \sqrt{a c - b^2}}\right) b^2 + (-a - c) \left(a + c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c + 2 \sqrt{a c - b^2}}\right) + (-a - c) \left(-a - c + 2 \sqrt{a c - b^2}\right) {}_2F_1\left(1 - \frac{i d}{2 e}, 1; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c - 2 \sqrt{a c - b^2}}\right) + 4 a c \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c + 2 \sqrt{a c - b^2}}\right) + 2 a \sqrt{a c - b^2} \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c + 2 \sqrt{a c - b^2}}\right) + 2 c \sqrt{a c - b^2} \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c + 2 \sqrt{a c - b^2}}\right) - 4 a c \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c - 2 \sqrt{a c - b^2}}\right) + 2 a \sqrt{a c - b^2} \, {}_2F_1\left(1 - \frac{i d}{2 e}, 2; 2 - \frac{i d}{2 e}; \frac{(-a - 2 i b + c) e^{2 i e z}}{-a - c - 2 \sqrt{a c - b^2}}\right) + \right.\right.\right.$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1-\frac{i\,d}{2\,e},\,2;\,2-\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)\Big/$$

$$\left(2\left(a\,c-b^2\right)^{3/2}\left(-a-c+2\,\sqrt{a\,c-b^2}\right)\left(a+c+2\,\sqrt{a\,c-b^2}\right)(d+2\,i\,e)\right)-$$

$$\Bigg((-a-2\,i\,b+c)\,e^{(2\,i\,e-d)\,z}\Bigg(-4\,{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$4\,{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)b^2+(-a-c)\left(a+c+2\,\sqrt{a\,c-b^2}\right)$$

$${}_2F_1\left(1+\frac{i\,d}{2\,e},\,1;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+(-a-c)\left(-a-c+2\,\sqrt{a\,c-b^2}\right)$$

$${}_2F_1\left(1+\frac{i\,d}{2\,e},\,1;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+4\,a\,c\,{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+2\,c\,\sqrt{a\,c-b^2}$$

$${}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)-4\,a\,c\,{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1+\frac{i\,d}{2\,e},\,2;\,2+\frac{i\,d}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Big/$$

$$\left(2\left(a\,c-b^2\right)^{3/2}\left(-a-c+2\,\sqrt{a\,c-b^2}\right)\left(a+c+2\,\sqrt{a\,c-b^2}\right)(2\,i\,e-d)\right)\Bigg)$$

Involving algebraic functions of sin and cos

Involving $\sinh(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^{\beta}$

01.19.21.0870.01

$$\int (a\sin(e\,z)+b\cos(e\,z))^{\beta}\sinh(d\,z)\,dz = \frac{1}{(d-i\,e\,\beta)(d+i\,e\,\beta)}\left(2^{-\beta-1}\left(\frac{e^{2\,i\,e\,z}(b-i\,a)}{b+i\,a}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)-i\,a\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^{\beta}\left(e^{-d\,z}(d-i\,e\,\beta)\,{}_2F_1\left(\frac{i(d+i\,e\,\beta)}{2\,e},-\beta;\frac{1}{2}\left(2+\frac{i\,d}{e}-\beta\right);\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+e^{d\,z}(d+i\,e\,\beta)\,{}_2F_1\left(-\frac{i(d-i\,e\,\beta)}{2\,e},-\beta;\frac{1}{2}\left(2-\frac{i\,d}{e}-\beta\right);\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)$$

Involving $\sinh(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^{\beta}$

01.19.21.0871.01

$$\int (a+b\sin(e\,z)+c\cos(e\,z))^{\beta}\sinh(d\,z)\,dz = \frac{1}{(d-i\,e\,\beta)(d+i\,e\,\beta)}\left(2^{-\beta-1}\left(1+\frac{i(b+i\,c)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)^{-\beta}\left(\frac{e^{i\,e\,z}(c-i\,b)}{a+\sqrt{a^2-b^2-c^2}}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(2\,e^{i\,e\,z}\,a+c\,e^{2\,i\,e\,z}+c-i\,b\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^{\beta}\left(e^{-d\,z}(d-i\,e\,\beta)\,F_1\left(\frac{i\,d}{e}-\beta;-\beta,-\beta;1+\frac{i\,d}{e}-\beta;\frac{i(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+e^{d\,z}(d+i\,e\,\beta)\,F_1\left(-\frac{i\,d}{e}-\beta;-\beta,-\beta;1-\frac{i\,d}{e}-\beta;\frac{i(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)\right)\right)$$

Involving $\sinh(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}$

01.19.21.0872.01

$$\int \left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^{\beta}\sinh(d\,z)\,dz = \frac{1}{(d-2\,i\,e\,\beta)(d+2\,i\,e\,\beta)}\left(2^{-2\beta-1}\left(\frac{e^{2\,i\,e\,z}(b-a)}{a+b-2\sqrt{a\,b}}+1\right)^{-\beta}\left(\frac{e^{2\,i\,e\,z}(b-a)}{a+b+2\sqrt{a\,b}}+1\right)^{-\beta}\left(e^{-2\,i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)^2-a\left(-1+e^{2\,i\,e\,z}\right)^2\right)\right)^{\beta}\left(e^{-d\,z}(d-2\,i\,e\,\beta)\,F_1\left(\frac{i\,d}{2\,e}-\beta;-\beta,-\beta;1+\frac{i\,d}{2\,e}-\beta;\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b+2\sqrt{a\,b}},\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b-2\sqrt{a\,b}}\right)+e^{d\,z}(d+2\,i\,e\,\beta)\,F_1\left(-\frac{i\,d}{2\,e}-\beta;-\beta,-\beta;1-\frac{i\,d}{2\,e}-\beta;\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b+2\sqrt{a\,b}},\frac{(a-b)\,e^{2\,i\,e\,z}}{a+b-2\sqrt{a\,b}}\right)\right)\right)$$

Involving $\sinh(d\,z)\left(a+b\sin^2(e\,z)+c\cos^2(e\,z)\right)^{\beta}$

01.19.21.0873.01

$$\int \left(a+b\sin^2(e z)+c\cos^2(e z)\right)^{\beta}\sinh(d z)\,dz = \frac{1}{(d-2 i e\beta)(d+2 i e\beta)}\left(2^{-2\beta-1}\left(\frac{e^{2 i e z}(c-b)}{2a+b+c-2\sqrt{(a+b)(a+c)}}+1\right)^{-\beta}\left(\frac{e^{2 i e z}(c-b)}{2a+b+c+2\sqrt{(a+b)(a+c)}}+1\right)^{-\beta}\left(e^{-2 i e z}\left(-b\left(-1+e^{2 i e z}\right)^2+4 a e^{2 i e z}+c\left(1+e^{2 i e z}\right)^2\right)\right)^{\beta}\left(e^{-d z}(d-2 i e\beta)F_1\left(\frac{i d}{2e}-\beta;-\beta,-\beta;1+\frac{i d}{2e}-\beta;\frac{(b-c)e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}},\frac{(b-c)e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)+e^{d z}(d+2 i e\beta)F_1\left(-\frac{i d}{2e}-\beta;-\beta,-\beta;1-\frac{i d}{2e}-\beta;\frac{(b-c)e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}},\frac{(b-c)e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right)$$

Involving $\sinh(d z)\left(a\sin^2(e z)+b\sin(2 e z)+c\cos^2(e z)\right)^{\beta}$

01.19.21.0874.01

$$\int \left(a\sin^2(e z)+b\sin(2 e z)+c\cos^2(e z)\right)^{\beta}\sinh(d z)\,dz = \frac{1}{(d-2 i e\beta)(d+2 i e\beta)}\left(2^{-2\beta-1}\left(\frac{e^{2 i e z}(-a-2 i b+c)}{a+c-2\sqrt{a c-b^2}}+1\right)^{-\beta}\left(\frac{e^{2 i e z}(-a-2 i b+c)}{a+c+2\sqrt{a c-b^2}}+1\right)^{-\beta}\left(e^{-2 i e z}\left(\left(1+e^{2 i e z}\right)\left(c\left(1+e^{2 i e z}\right)-2 i b\left(-1+e^{2 i e z}\right)\right)-a\left(-1+e^{2 i e z}\right)^2\right)\right)^{\beta}\left(e^{-d z}(d-2 i e\beta)F_1\left(\frac{i d}{2e}-\beta;-\beta,-\beta;1+\frac{i d}{2e}-\beta;\frac{(a-c+2 i b)e^{2 i e z}}{a+c+2\sqrt{a c-b^2}},-\frac{(-a-2 i b+c)e^{2 i e z}}{a+c-2\sqrt{a c-b^2}}\right)+e^{d z}(d+2 i e\beta)F_1\left(-\frac{i d}{2e}-\beta;-\beta,-\beta;1-\frac{i d}{2e}-\beta;\frac{(a-c+2 i b)e^{2 i e z}}{a+c+2\sqrt{a c-b^2}},-\frac{(-a-2 i b+c)e^{2 i e z}}{a+c-2\sqrt{a c-b^2}}\right)\right)\right)$$

Involving tan

01.19.21.0875.01

$$\int \tan(b z)\sinh(c z)\,dz = \frac{i}{2\left(c^3+4 b^2 c\right)}e^{-c z}\left(\left(4b^2+c^2\right){}_2F_1\left(\frac{i c}{2b},1;1+\frac{i c}{2b};-e^{2 i b z}\right)+\left(4b^2+c^2\right)e^{2 c z}\,{}_2F_1\left(-\frac{i c}{2b},1;1-\frac{i c}{2b};-e^{2 i b z}\right)-c\left((c+2 i b)e^{2 i b z}\,{}_2F_1\left(1+\frac{i c}{2b},1;2+\frac{i c}{2b};-e^{2 i b z}\right)+(c-2 i b)e^{2(c+i b)z}\,{}_2F_1\left(1-\frac{i c}{2b},1;2-\frac{i c}{2b};-e^{2 i b z}\right)\right)\right)$$

Involving cot

01.19.21.0876.01

$$\int \cot(b\,z)\sinh(c\,z)\,dz = -\frac{i}{2\left(c^3+4\,b^2\,c\right)}\,e^{-c\,z}\left(\left(4\,b^2+c^2\right){}_2F_1\!\left(\frac{i\,c}{2\,b},1;1+\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)+\left(4\,b^2+c^2\right)e^{2\,c\,z}\,{}_2F_1\!\left(-\frac{i\,c}{2\,b},1;1-\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)+c\left((c+2\,i\,b)\,e^{2\,i\,b\,z}\,{}_2F_1\!\left(1+\frac{i\,c}{2\,b},1;2+\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)+(c-2\,i\,b)\,e^{2\,(c+i\,b)\,z}\,{}_2F_1\!\left(1-\frac{i\,c}{2\,b},1;2-\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)\right)\right)$$

Involving csc

01.19.21.0877.01

$$\int \csc(b\,z)\sinh(c\,z)\,dz = \frac{e^{i\,b\,z-c\,z}}{b^2+c^2}\left((b-i\,c)\,{}_2F_1\!\left(\frac{b+i\,c}{2\,b},1;\frac{3}{2}+\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)-(b+i\,c)\,e^{2\,c\,z}\,{}_2F_1\!\left(\frac{b-i\,c}{2\,b},1;\frac{3}{2}-\frac{i\,c}{2\,b};e^{2\,i\,b\,z}\right)\right)$$

Involving sec

01.19.21.0878.01

$$\int \sec(b\,z)\sinh(c\,z)\,dz = \frac{e^{i\,b\,z-c\,z}}{(b+i\,c)\,(c+i\,b)}\left((b+i\,c)\,e^{2\,c\,z}\,{}_2F_1\!\left(\frac{b-i\,c}{2\,b},1;\frac{3}{2}-\frac{i\,c}{2\,b};-e^{2\,i\,b\,z}\right)-(b-i\,c)\,{}_2F_1\!\left(\frac{b+i\,c}{2\,b},1;\frac{3}{2}+\frac{i\,c}{2\,b};-e^{2\,i\,b\,z}\right)\right)$$

Involving trigonometric and a power functions

Involving sin and power

Involving $z^{\alpha-1}\sin(c\,z)\sinh(a\,z)$

01.19.21.0879.01

$$\int z^{\alpha-1}\sin(c\,z)\sinh(a\,z)\,dz = \frac{1}{4}\,i\,z^{\alpha}\left(\Gamma(\alpha,-(a+i\,c)\,z)\,(-(a+i\,c)\,z)^{-\alpha}+((a+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+i\,c)\,z)-(-(a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a-i\,c)\,z)-((a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a-i\,c)\,z)\right)$$

01.19.21.0880.01

$$\int z^n\sin(c\,z)\sinh(a\,z)\,dz = \frac{1}{4}\,i\,n!\left((-a-i\,c)^{-n-1}\,e^{(a+i\,c)\,z}\sum_{k=0}^{n}\frac{(-(a+i\,c)\,z)^k}{k!}+(a+i\,c)^{-n-1}\,e^{-(a+i\,c)\,z}\sum_{k=0}^{n}\frac{((a+i\,c)\,z)^k}{k!}-(i\,c-a)^{-n-1}\,e^{(a-i\,c)\,z}\sum_{k=0}^{n}\frac{(-(a-i\,c)\,z)^k}{k!}-(a-i\,c)^{-n-1}\,e^{i\,c\,z-a\,z}\sum_{k=0}^{n}\frac{((a-i\,c)\,z)^k}{k!}\right)/;\,n\in\mathbb{N}$$

01.19.21.0881.01

$$\int z^{-n}\sin(c\,z)\sinh(a\,z)\,dz = \frac{1}{2}\,i\left(\frac{1}{2\,(a-i\,c)\,(a+i\,c)\,(n-1)!}\left(e^{(i\,c-a)\,z}\left(-(a+i\,c)\,e^{2\,(a-i\,c)\,z}\,(n-1)!\left(\sum_{k=1}^{n-1}\frac{(i\,c-a)^{k-n}\,z^{k-n}}{(1-n)_k}\right)(i\,c-a)^n + (-1)^n\,e^{(a-i\,c)\,z}\,((a+i\,c)\,\mathrm{Ei}((a-i\,c)\,z)\,(i\,c-a)^n + (a-i\,c)\,(a+i\,c)^n\,\mathrm{Ei}((-a-i\,c)\,z)) - (a-i\,c)\,(a+i\,c)^n\,e^{-2\,i\,c\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(a+i\,c)^{k-n}\,z^{k-n}}{(1-n)_k}\right)\right) - \frac{1}{2\,(a-i\,c)\,(a+i\,c)\,(n-1)!}\left(e^{(-a-i\,c)\,z}\left(-(a-i\,c)\,e^{2\,(a+i\,c)\,z}\,(n-1)!\left(\sum_{k=1}^{n-1}\frac{(-a-i\,c)^{k-n}\,z^{k-n}}{(1-n)_k}\right)(-a-i\,c)^n + (-1)^n\,e^{(a+i\,c)\,z}\,((a-i\,c)\,\mathrm{Ei}((a+i\,c)\,z)\,(-a-i\,c)^n + (a-i\,c)^n\,(a+i\,c)\,\mathrm{Ei}((i\,c-a)\,z)) - (a-i\,c)^n\,(a+i\,c)\,e^{2\,i\,c\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(a-i\,c)^{k-n}\,z^{k-n}}{(1-n)_k}\right)\right)\right) /;\ n\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin(c\,z+d)\sinh(a\,z)$

01.19.21.0882.01

$$\int z^{\alpha-1}\sin(d+c\,z)\sinh(a\,z)\,dz = \frac{1}{4}\,i\,e^{-i\,d}\,z^{\alpha}\left(e^{2\,i\,d}\,\Gamma(\alpha,-(a+i\,c)\,z)\,(-(a+i\,c)\,z)^{-\alpha} + ((a+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+i\,c)\,z) - (-(a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a-i\,c)\,z) - e^{2\,i\,d}\,((a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a-i\,c)\,z)\right)$$

Involving $z^{\alpha-1}\sin(c\,z)\sinh(a\,z+b)$

01.19.21.0883.01

$$\int z^{\alpha-1}\sin(c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4}\,i\,e^{-b}\,z^{\alpha}\left(e^{2\,b}\,\Gamma(\alpha,-(a+i\,c)\,z)\,(-(a+i\,c)\,z)^{-\alpha} + ((a+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+i\,c)\,z) - e^{2\,b}\,(-(a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a-i\,c)\,z) - ((a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a-i\,c)\,z)\right)$$

Involving $z^{\alpha-1}\sin(c\,z+d)\sinh(a\,z+b)$

01.19.21.0884.01

$$\int z^{\alpha-1}\sin(d+c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4}\,i\,e^{-b-i\,d}\,z^{\alpha}\left(e^{2\,b+2\,i\,d}\,\Gamma(\alpha,-(a+i\,c)\,z)\,(-(a+i\,c)\,z)^{-\alpha} + ((a+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+i\,c)\,z) - e^{2\,b}\,(-(a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a-i\,c)\,z) - e^{2\,i\,d}\,((a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,(a-i\,c)\,z)\right)$$

Involving $z^n\sin\left(b\,z^r\right)\sinh(c\,z)$

01.19.21.0885.01

$$\int z^n \sin\left(b z^2\right) \sinh(c z)\, dz = \frac{1}{8} i \left(e^{-\frac{i c^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b z)^{j+1} \left(-\frac{i (-c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i c^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b z)^{j+1} \left(-\frac{i (c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b z - c)^{j+1} \left(\frac{i (2 i b z - c)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - c)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 i b z)^{j+1} \left(\frac{i (c + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0886.01

$$\int z^n \sin\left(\sqrt{z}\, b\right) \sinh(c\, z)\, dz = 2^{-2n-3} c^{-2(n+1)} i$$
$$\left(-e^{-\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(-2\sqrt{z}\, c - i\, b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\, b\left(-2\sqrt{z}\, c - i\, b\right)\right.\right.$$
$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right)\right) +\right.$$
$$e^{-\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b)^{-h-j+2n} \left(i\, b - 2c\sqrt{z}\right)^{h+j} \left(\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(i\, b\left(i\, b - 2c\sqrt{z}\right)\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right)\right) +$$
$$e^{\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(2c\sqrt{z} - i\, b\right)^{h+j} \left(-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2c\sqrt{-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}}\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right) - i\, b\left(2c\sqrt{z} - i\, b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right)\right) -$$
$$e^{\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b)^{-h-j+2n} \left(2\sqrt{z}\, c + i\, b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$
$$\left(b\, i\left(2\sqrt{z}\, c + i\, b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right) +\right.$$
$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}}\, c\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \sin\left(b\, z^r + e\right) \sinh(c\, z)$

01.19.21.0887.01

$$\int z^n \sin\left(b z^2 + e\right) \sinh(c z)\, dz = \frac{1}{8} i \left(e^{-\frac{i c^2}{4 b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b z)^{j+1} \left(-\frac{i (-c - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - e^{-\frac{i c^2}{4 b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b z)^{j+1} \left(-\frac{i (c - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i c^2}{4 b} + i e} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b z - c)^{j+1} \left(\frac{i (2 i b z - c)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - c)^2}{4 b} \right) + (i b)^{-n-1} e^{\frac{i c^2}{4 b} + i e} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 i b z)^{j+1} \left(\frac{i (c + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 i b z)^2}{4 b} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0888.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh(c\, z)\, dz = 2^{-2n-3} c^{-2(n+1)} i \left(-e^{-\frac{b^2}{4c} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(-2\sqrt{z}\, c - i\, b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b \left(-2\sqrt{z}\, c - i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right) - 2c \sqrt{\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right)\right) + e^{i e - \frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b)^{-h-j+2n} \left(i\, b - 2c\sqrt{z}\right)^{h+j} \left(\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i\, b \left(i\, b - 2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right) - 2c \sqrt{\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right)\right) + e^{\frac{b^2}{4c} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(2c\sqrt{z} - i\, b\right)^{h+j} \left(-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2c \sqrt{-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right) - i\, b \left(2c\sqrt{z} - i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right)\right) - e^{\frac{b^2}{4c} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b)^{-h-j+2n} \left(2\sqrt{z}\, c + i\, b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(2\sqrt{z}\, c + i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}}\, c\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \sin\left(b\, z^r + d\, z\right) \sinh(c\, z)$

01.19.21.0889.01

$$\int z^n \sin(b z^2 + d z) \sinh(c z) \, dz = \frac{1}{8} i \left(e^{-\frac{i(-c-i d)^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (c + i d)^{n-j} (-c - i d - 2 i b z)^{j+1} \left(-\frac{i(-c - i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - e^{-\frac{i(c-i d)^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d - c)^{n-j} (c - i d - 2 i b z)^{j+1} \left(-\frac{i(c - i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i(i d-c)^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (c - i d)^{n-j} (-c + i d + 2 i b z)^{j+1} \left(\frac{i(-c + i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + i d + 2 i b z)^2}{4 b} \right) + (i b)^{-n-1} e^{\frac{i(c+i d)^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-c - i d)^{n-j} (c + i d + 2 i b z)^{j+1} \left(\frac{i(c + i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + i d + 2 i b z)^2}{4 b} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0890.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh(c z) \, dz = -i\, 2^{-2n-3} \left(-e^{\frac{b^2}{4(i d-c)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z} (i d - c) + i b \right)^{h+j} \left(-\frac{\left(2\sqrt{z} (i d - c) + i b\right)^2}{i d - c} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(2\sqrt{z} (i d - c) + i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2\sqrt{z} (i d - c) + i b\right)^2}{4 (i d - c)} \right) + 2 \sqrt{-\frac{\left(2\sqrt{z} (i d - c) + i b\right)^2}{i d - c}} (i d - c) \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2\sqrt{z} (i d - c) + i b\right)^2}{4 (i d - c)} \right) \right) \right) (i d - c)^{-2(n+1)} + (c + i d)^{-2(n+1)} e^{\frac{b^2}{4(c+i d)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z} (c + i d) + i b \right)^{h+j} \left(-\frac{\left(2\sqrt{z} (c + i d) + i b\right)^2}{c + i d} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{c+i\,d}}\,(c+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)\right)+$$

$$(c+i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(-c-i\,d)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c-i\,d)\sqrt{-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)\right)-$$

$$(c-i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(c-i\,d)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c-i\,d)\sqrt{-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)-\right.$$

$$\left.\left.i\,b\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r + d\,z + e\right)\sinh(c\,z)$

01.19.21.0891.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh(c z)\, dz = \frac{1}{8} i \left(e^{-\frac{i(-c-i d)^2}{4b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (c + i d)^{n-j} (-c - i d - 2 i b z)^{j+1} \left(-\frac{i(-c - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i(c-i d)^2}{4b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d - c)^{n-j} (c - i d - 2 i b z)^{j+1} \left(-\frac{i(c - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i(i d - c)^2}{4b} + i e} \sum_{j=0}^{n} 2^{j-n} (c - i d)^{n-j} (-c + i d + 2 i b z)^{j+1} \left(\frac{i(-c + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + i d + 2 i b z)^2}{4b}\right) + (i b)^{-n-1} e^{\frac{i(c+i d)^2}{4b} + i e} \sum_{j=0}^{n} 2^{j-n} (-c - i d)^{n-j} (c + i d + 2 i b z)^{j+1} \left(\frac{i(c + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + i d + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0892.01

$$\int z^n \sin\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = -i\, 2^{-2n-3} \left(-e^{\frac{b^2}{4(i d - c)} + i e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\, (i d - c) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, (i d - c) + i b\right)^2}{i d - c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(2\sqrt{z}\, (i d - c) + i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2\sqrt{z}\, (i d - c) + i b\right)^2}{4(i d - c)}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, (i d - c) + i b\right)^2}{i d - c}}\, (i d - c)\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2\sqrt{z}\, (i d - c) + i b\right)^2}{4(i d - c)}\right)\right)\right)(i d - c)^{-2(n+1)} + (c + i d)^{-2(n+1)} e^{\frac{b^2}{4(c+i d)} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\, (c + i d) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, (c + i d) + i b\right)^2}{c + i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{c+i\,d}}\,(c+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)\right)\right)+(c+i\,d)^{-2\,(n+1)}$$

$$e^{\frac{b^2}{4\,(-c-i\,d)}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c-i\,d)\sqrt{-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)-\right.$$

$$\left.\left.i\,b\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)\right)\right)-$$

$$(c-i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(c-i\,d)}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c-i\,d)\sqrt{-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)-\right.$$

$$\left.\left.\left.i\,b\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r\right) \sinh(f\,z+g)$

01.19.21.0893.01

$$\int z^n \sin\left(b z^2\right) \sinh(g + f z)\, dz = \frac{1}{8} i \left(e^{-\frac{i f^2}{4 b}-g} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b z)^{j+1} \left(-\frac{i (-f - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i f^2}{4 b}+g} \left(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b z)^{j+1} \left(-\frac{i (f - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i f^2}{4 b}-g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b z - f)^{j+1} \left(\frac{i (2 i b z - f)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - f)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i f^2}{4 b}+g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 i b z)^{j+1} \left(\frac{i (f + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0894.01

$$\int z^n \sin\left(\sqrt{z}\, b\right) \sinh(g + f z)\, dz = 2^{-2n-3} f^{-2(n+1)}\, i \left(-e^{-\frac{b^2}{4f}-g} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-2\sqrt{z}\, f - i b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i b\left(-2\sqrt{z}\, f - i b\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right)\right) + e^{-\frac{b^2}{4f}-g} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b - 2 f\sqrt{z}\right)^{h+j} \left(\frac{\left(i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(i b\left(i b - 2 f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i b - 2 f\sqrt{z}\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(i b - 2 f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i b - 2 f\sqrt{z}\right)^2}{4f}\right)\right) + e^{\frac{b^2}{4f}+g} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2 f\sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2 f\sqrt{z} - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2 f \sqrt{-\frac{\left(2 f\sqrt{z} - i b\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 f\sqrt{z} - i b\right)^2}{4f}\right) - i b\left(2 f\sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 f\sqrt{z} - i b\right)^2}{4f}\right)\right) - e^{\frac{b^2}{4f}+g} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\, f + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, f + i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(b\, i\left(2\sqrt{z}\, f + i b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, f + i b\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, f + i b\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, f + i b\right)^2}{4f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \sin\left(b z^r + e\right) \sinh(f z + g)$

01.19.21.0895.01

$$\int z^n \sin\left(b z^2+e\right) \sinh(g+f z)\, dz == \frac{1}{8} i \left(e^{-\frac{i f^2}{4 b}-g-i e} \left(\sum_{j=0}^n 2^{j-n} f^{n-j} (-f-2 i b z)^{j+1} \left(-\frac{i (-f-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f-2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i f^2}{4 b}+g-i e} \left(\sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f-2 i b z)^{j+1} \left(-\frac{i (f-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f-2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i f^2}{4 b}-g+i e} \sum_{j=0}^n 2^{j-n} f^{n-j} (2 i b z-f)^{j+1} \left(\frac{i (2 i b z-f)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z-f)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i f^2}{4 b}+g+i e} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2 i b z)^{j+1} \left(\frac{i (f+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f+2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0896.01

$$\int z^n \sin\left(\sqrt{z}\, b+e\right) \sinh(g+f z)\, dz == 2^{-2 n-3} f^{-2(n+1)} i \left(-e^{-\frac{b^2}{4 f}-g-i e} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-2 \sqrt{z}\, f-i b\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, f-i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-2 \sqrt{z}\, f-i b\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, f-i b\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-2 \sqrt{z}\, f-i b\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2 \sqrt{z}\, f-i b\right)^2}{4 f}\right)\right) + e^{-\frac{b^2}{4 f}-g+i e} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b)^{-h-j+2 n} \left(i b-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(i b-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i b \left(i b-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i b-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(i b-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i b-2 f \sqrt{z}\right)^2}{4 f}\right)\right) + \right.$$

$$e^{\frac{b^2}{4f}+g-i e} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2 f \sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2 f \sqrt{-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}} \,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4 f}\right) -\right.$$

$$\left. i b \left(2 f \sqrt{z} - i b\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{b^2}{4f}+g+i e} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2 \sqrt{z}\, f + i b\right)^{h+j} \left(-\frac{\left(2 \sqrt{z}\, f + i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(b\, i \left(2 \sqrt{z}\, f + i b\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2 \sqrt{z}\, f + i b\right)^2}{4 f}\right) +\right.$$

$$\left.\left. 2 \sqrt{-\frac{\left(2 \sqrt{z}\, f + i b\right)^2}{f}}\, f\, \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2 \sqrt{z}\, f + i b\right)^2}{4 f}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z\right) \sinh(f z + g)$

01.19.21.0897.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh(g + f z)\, dz = \frac{1}{8} i \left(e^{-\frac{i(-f-i d)^2}{4 b}-g} \left(\sum_{j=0}^n 2^{j-n} (f + i d)^{n-j} (-f - i d - 2 i b z)^{j+1} \left(-\frac{i(-f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i(f-i d)^2}{4 b}+g} \left(\sum_{j=0}^n 2^{j-n} (i d - f)^{n-j} (f - i d - 2 i b z)^{j+1} \left(-\frac{i(f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i(i d-f)^2}{4 b}-g} \sum_{j=0}^n 2^{j-n} (f - i d)^{n-j} (-f + i d + 2 i b z)^{j+1} \left(\frac{i(-f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + i d + 2 i b z)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i(f+i d)^2}{4 b}+g} \sum_{j=0}^n 2^{j-n} (-f - i d)^{n-j} (f + i d + 2 i b z)^{j+1} \left(\frac{i(f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + i d + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0898.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh(g + f z)\, dz = -i\, 2^{-2 n-3} \left(e^{\frac{b^2}{4(-f-i d)}-g} \left(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(2(-f - i d)\sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2(-f - i d) \sqrt{-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}}\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right) - i b\left(2(-f - i d)\sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right)\right)\right) (-f - i d)^{-2(n+1)} - e^{\frac{b^2}{4(i d-f)}-g} (i d - f)^{-2(n+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b)^{-h-j+2 n} \left(2\sqrt{z}\,(i d - f) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(i d - f) + i b\right)^2}{i d - f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{i\,d-f}}\,(i\,d-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)\right)-$$

$$e^{\frac{b^2}{4(f-i\,d)}+g}\,(f-i\,d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2n}\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(f-i\,d)\sqrt{-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)\right)+$$

$$e^{\frac{b^2}{4(f+i\,d)}+g}\,(f+i\,d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r + d\,z + e\right) \sinh(f\,z + g)$

01.19.21.0899.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz = \frac{1}{8} i \left(e^{-\frac{i(-f+-i d)^2}{4 b} - g - i e} \left(\sum_{j=0}^{n} 2^{j-n} (f + i d)^{n-j} (-f - i d - 2 i b z)^{j+1} \left(-\frac{i(-f - i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - e^{-\frac{i(f-i d)^2}{4 b} + g - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f)^{n-j} (f - i d - 2 i b z)^{j+1} \left(-\frac{i(f - i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i(i d - f)^2}{4 b} - g + i e} \sum_{j=0}^{n} 2^{j-n} (f - i d)^{n-j} (-f + i d + 2 i b z)^{j+1} \left(\frac{i(-f + i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + i d + 2 i b z)^2}{4 b} \right) + (i b)^{-n-1} e^{\frac{i(f+i d)^2}{4 b} + g + i e} \sum_{j=0}^{n} 2^{j-n} (-f - i d)^{n-j} (f + i d + 2 i b z)^{j+1} \left(\frac{i(f + i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + i d + 2 i b z)^2}{4 b} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0900.01

$$\int z^n \sin\left(\sqrt{z}\, b + e + d z\right) \sinh(g + f z)\, dz = -i\, 2^{-2n-3} \left(e^{\frac{b^2}{4(-f+-i d)} - g - i e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2(-f - i d)\sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2(-f - i d) \sqrt{-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}}\; \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)} \right) - i b \left(2(-f - i d)\sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)} \right) \right) \right) (-f - i d)^{-2(n+1)} - e^{\frac{b^2}{4(i d - f)} - g + i e} (i d - f)^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\,(i d - f) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(i d - f) + i b\right)^2}{i d - f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{i\,d-f}}\,(i\,d-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)\right)-$$

$$e^{\frac{b^2}{4(f-i\,d)}+g-i\,e}\,(f-i\,d)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(f-i\,d)\sqrt{-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)\right)+e^{\frac{b^2}{4(f+i\,d)}+g+i\,e}\,(f+i\,d)^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin(b\,z)\sinh(c\,z^r)$

01.19.21.0901.01

$$\int z^n \sin(b z) \sinh\left(c z^2\right) dz = \frac{1}{8} i \left(e^{-\frac{b^2}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b - 2 c z)^{j+1} \left(\frac{(-i b - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i b - 2 c z)^2}{4 c} \right) \right) (-c)^{-n-1} - e^{-\frac{b^2}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b - 2 c z)^{j+1} \left(\frac{(i b - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i b - 2 c z)^2}{4 c} \right) \right) (-c)^{-n-1} - c^{-n-1} e^{\frac{b^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b + 2 c z)^{j+1} \left(-\frac{(-i b + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b + 2 c z)^2}{4 c} \right) + c^{-n-1} e^{\frac{b^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b + 2 c z)^{j+1} \left(-\frac{(i b + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b + 2 c z)^2}{4 c} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0902.01

$$\int z^n \sin(b z) \sinh\left(\sqrt{z}\, c\right) dz = (-1)^{n-1} 2^{-2n-3} b^{-2(n+1)} i \left(e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 i b \sqrt{z} - c\right)^{h+j} \left(\frac{i \left(2 i b \sqrt{z} - c\right)^2}{b} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i b \sqrt{\frac{i \left(2 i b \sqrt{z} - c\right)^2}{b}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2 i b \sqrt{z} - c\right)^2}{4 b} \right) - c \left(2 i b \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(2 i b \sqrt{z} - c\right)^2}{4 b} \right) \right) - e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 i b \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + 2 i b \sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 i b \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(c + 2 i b \sqrt{z}\right)^2}{4 b} \right) + 2 \sqrt{\frac{i \left(c + 2 i b \sqrt{z}\right)^2}{b}}\, b i \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c + 2 i b \sqrt{z}\right)^2}{4 b} \right) \right) - e^{-\frac{i c^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(-c - 2 i b \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-c - 2 i b \sqrt{z}\right)^2}{b} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(-c\left(-c-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.\left.2\,i\,b\sqrt{-\frac{i\left(-c-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)\right)+$$

$$e^{-\frac{i\,c^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.\left.\left.2\,i\,b\sqrt{-\frac{i\left(c-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)\right)\right)\text{/; } n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\sinh(c\,z^r)$

01.19.21.0903.01

$$\int z^n \sin(e+d\,z)\sinh\left(c\,z^2\right)dz ==$$

$$\frac{1}{8}\,i\left(e^{-\frac{d^2}{4c}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-\right.$$

$$e^{-\frac{d^2}{4c}+i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,z)^{j+1}\left(\frac{(i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$

$$c^{-n-1}\,e^{\frac{d^2}{4c}-i\,e}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,z)^2}{4\,c}\right)+$$

$$\left.c^{-n-1}\,e^{\frac{d^2}{4c}+i\,e}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,z)^2}{4\,c}\right)\right)\text{/; } n\in\mathbb{N}$$

01.19.21.0904.01

$$\int z^n \sin(e + d\,z) \sinh\left(\sqrt{z}\; c\right) dz = (-1)^{n-1}\, 2^{-2n-3}\, d^{-2(n+1)}\, i \left(e^{\frac{i c^2}{4d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2\, i\, d \sqrt{z} - c\right)^{h+j} \left(\frac{i\left(2\, i\, d \sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2\, i\, d \sqrt{\frac{i\left(2\, i\, d \sqrt{z} - c\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2\, i\, d \sqrt{z} - c\right)^2}{4d}\right) - c\left(2\, i\, d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(2\, i\, d \sqrt{z} - c\right)^2}{4d}\right)\right) - e^{\frac{i c^2}{4d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2\, i\, d \sqrt{z}\right)^{h+j} \left(\frac{i\left(c + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c + 2\, i\, d \sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{\frac{i\left(c + 2\, i\, d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c + 2\, i\, d \sqrt{z}\right)^2}{4d}\right)\right) - e^{-\frac{i c^2}{4d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2\, i\, d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c - 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c\left(-c - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-c - 2\, i\, d \sqrt{z}\right)^2}{4d}\right) - 2\, i\, d \sqrt{-\frac{i\left(-c - 2\, i\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-c - 2\, i\, d \sqrt{z}\right)^2}{4d}\right)\right) + e^{-\frac{i c^2}{4d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c - 2\, i\, d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(c - 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c - 2\, i\, d \sqrt{z}\right)^2}{4d}\right) - 2\, i\, d \sqrt{-\frac{i\left(c - 2\, i\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c - 2\, i\, d \sqrt{z}\right)^2}{4d}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1}\sin(b z^r)\sinh(c z^r)$

01.19.21.0905.01

$$\int z^{\alpha-1}\sin(b z^r)\sinh(c z^r)\,dz = \frac{1}{4r}\left(i z^{\alpha}\left(\Gamma\left(\frac{\alpha}{r},(-c-i b)z^r\right)((-c-i b)z^r)^{-\frac{\alpha}{r}}-((i b-c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(i b-c)z^r\right)-((c-i b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(c-i b)z^r\right)+((c+i b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(c+i b)z^r\right)\right)\right)$$

01.19.21.0906.01

$$\int z^n\sin(b z^2)\sinh(c z^2)\,dz = \frac{1}{8}i z^{n+1}\left(\Gamma\left(\frac{n+1}{2},(-c-i b)z^2\right)\left((-c-i b)z^2\right)^{\frac{1}{2}(-n-1)}-\left((i b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i b-c)z^2\right)-\left((c-i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-i b)z^2\right)+\left((c+i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c+i b)z^2\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.0907.01

$$\int z^n\sin\left(\sqrt{z}\,b\right)\sinh\left(\sqrt{z}\,c\right)dz = \frac{1}{2}i\left(\Gamma\left(2(n+1),(-c-i b)\sqrt{z}\right)(-c-i b)^{-2(n+1)}-(i b-c)^{-2(n+1)}\Gamma\left(2(n+1),(i b-c)\sqrt{z}\right)-(c-i b)^{-2(n+1)}\Gamma\left(2(n+1),(c-i b)\sqrt{z}\right)+(c+i b)^{-2(n+1)}\Gamma\left(2(n+1),(c+i b)\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(b z^r+e)\sinh(c z^r)$

01.19.21.0908.01

$$\int z^{\alpha-1}\sin(b z^r+e)\sinh(c z^r)\,dz = \frac{1}{4r}\left(i z^{\alpha}\left(e^{i e}\,\Gamma\left(\frac{\alpha}{r},(-c-i b)z^r\right)((-c-i b)z^r)^{-\frac{\alpha}{r}}-e^{-i e}((i b-c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(i b-c)z^r\right)-e^{i e}((c-i b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(c-i b)z^r\right)+e^{-i e}((c+i b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(c+i b)z^r\right)\right)\right)$$

01.19.21.0909.01

$$\int z^n\sin(b z^2+e)\sinh(c z^2)\,dz = \frac{1}{8}i z^{n+1}\left(e^{i e}\,\Gamma\left(\frac{n+1}{2},(-c-i b)z^2\right)\left((-c-i b)z^2\right)^{\frac{1}{2}(-n-1)}-e^{-i e}\left((i b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i b-c)z^2\right)-e^{i e}\left((c-i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-i b)z^2\right)+e^{-i e}\left((c+i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c+i b)z^2\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.0910.01

$$\int z^n\sin\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c\right)dz = \frac{1}{2}i\left(e^{i e}\,\Gamma\left(2(n+1),(-c-i b)\sqrt{z}\right)(-c-i b)^{-2(n+1)}-(i b-c)^{-2(n+1)}e^{-i e}\,\Gamma\left(2(n+1),(i b-c)\sqrt{z}\right)-(c-i b)^{-2(n+1)}e^{i e}\,\Gamma\left(2(n+1),(c-i b)\sqrt{z}\right)+(c+i b)^{-2(n+1)}e^{-i e}\,\Gamma\left(2(n+1),(c+i b)\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\sin(b z^r+d z)\sinh(c z^r)$

01.19.21.0911.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh\left(c z^2\right) dz = \frac{1}{8} i \left(e^{\frac{d^2}{4(-c-i b)}} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)} \right) \right) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)} \right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)} \right) + (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0912.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c\right) dz = -(-1)^n 2^{-2n-3} d^{-2n-2} i \left(e^{\frac{i (i b - c)^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c) \left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) + 2 \sqrt{\frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) \right) - e^{\frac{i (c + i b)^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c + i b)^{-h-j+2n} \left(c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \right.$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{-\frac{i(-c-i\,b)^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b)^{-h-j+2\,n}\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i\,b)\left(-c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(c-i\,b)^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r + d\,z + e\right)\sinh\left(c\,z^r\right)$

01.19.21.0913.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh\left(c z^2\right) dz = \frac{1}{8} i \left(e^{\frac{d^2}{4(-c-i b)} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)} \right) \right) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)} + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)} \right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)} \right) + (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)} + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0914.01

$$\int z^n \sin\left(\sqrt{z}\, b + e + d z\right) \sinh\left(c \sqrt{z}\right) dz = -(-1)^n 2^{-2n-3} d^{-2n-2} i \left(e^{\frac{i (i b - c)^2}{4 d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c) \left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) + 2 \sqrt{\frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) \right) - e^{\frac{i (c + i b)^2}{4 d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c + i b)^{-h-j+2n} \left(c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\ d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{-\frac{i(-c-i\,b)^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b)^{-h-j+2\,n}\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i\,b)\left(-c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(c-i\,b)^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n \sin(d\,z) \sinh\left(c\,z^r+g\right)$

01.19.21.0915.01

$$\int z^n \sin(d\,z)\sinh\left(c\,z^2+g\right)dz = \frac{1}{8}\,i\left(e^{-\frac{d^2}{4c}-g}\left(\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d-2\,c\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-\right.$$
$$e^{-\frac{d^2}{4c}-g}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d-2\,c\,z)^{j+1}\left(\frac{(i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$
$$c^{-n-1}\,e^{\frac{d^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d+2\,c\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d+2\,c\,z)^2}{4\,c}\right)+$$
$$\left.c^{-n-1}\,e^{\frac{d^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d+2\,c\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(i\,d+2\,c\,z)^2}{4\,c}\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.0916.01

$$\int z^n \sin(d\,z)\sinh\left(\sqrt{z}\;c+g\right)dz = (-1)^{n-1}\,2^{-2\,n-3}\,d^{-2\,(n+1)}\,i$$
$$\left(e^{\frac{i\,c^2}{4d}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,i\,d\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\sqrt{\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{d}}\right.\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{4\,d}\right)-c\left(2\,i\,d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)-$$
$$e^{\frac{i\,c^2}{4d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,i\,d\sqrt{z}\right)\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+2\sqrt{\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)-$$
$$e^{-\frac{i\,c^2}{4d}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(-c-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(-c\left(-c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{-\frac{i\,c^2}{4\,d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\sinh(c\,z^r+g)$

01.19.21.0917.01

$$\int z^n \sin(e+d\,z)\sinh\left(c\,z^2+g\right)dz==$$

$$\frac{1}{8}\,i\left(e^{-\frac{d^2}{4c}-i\,e-g}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-\right.$$

$$e^{-\frac{d^2}{4c}-g+i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,z)^{j+1}\left(\frac{(i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$

$$c^{-n-1}\,e^{\frac{d^2}{4c}-i\,e+g}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,z)^2}{4\,c}\right)+$$

$$\left.c^{-n-1}\,e^{\frac{d^2}{4c}+g+i\,e}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,z)^2}{4\,c}\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.0918.01

$$\int z^n \sin(e + d z) \sinh\left(\sqrt{z}\, c + g\right) dz = (-1)^{n-1}\, 2^{-2n-3}\, d^{-2(n+1)}\, i$$

$$\Bigg(e^{\frac{i c^2}{4d} - g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2 i d \sqrt{z} - c\right)^{h+j} \left(\frac{i\left(2 i d \sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2 i d \sqrt{\frac{i\left(2 i d \sqrt{z} - c\right)^2}{d}}$$

$$\Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(2 i d \sqrt{z} - c\right)^2}{4d}\right) - c\left(2 i d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(2 i d \sqrt{z} - c\right)^2}{4d}\right)\Bigg) -$$

$$e^{\frac{i c^2}{4d} + g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(c + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c\left(c + 2 i d \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(c + 2 i d \sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i\left(c + 2 i d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(c + 2 i d \sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$e^{-\frac{i c^2}{4d} - i e - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c - 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(-c\left(-c - 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{i\left(-c - 2 i d \sqrt{z}\right)^2}{4d}\right) -$$

$$2 i d \sqrt{-\frac{i\left(-c - 2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{i\left(-c - 2 i d \sqrt{z}\right)^2}{4d}\right)\Bigg) +$$

$$e^{-\frac{i c^2}{4d} - i e + g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c - 2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(c - 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg(c\left(c - 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{i\left(c - 2 i d \sqrt{z}\right)^2}{4d}\right) -$$

$$2 i d \sqrt{-\frac{i\left(c - 2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{i\left(c - 2 i d \sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1}\sin(b z^r)\sinh(c z^r+g)$

01.19.21.0919.01

$$\int z^{\alpha-1}\sin(b z^r)\sinh(c z^r+g)\,dz = \frac{1}{4r}\left(i z^{\alpha}\left(e^{g}\,\Gamma\left(\frac{\alpha}{r},(-c-i b)z^r\right)((-c-i b)z^r)^{-\frac{\alpha}{r}} - e^{g}((i b-c)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i b-c)z^r\right) - e^{-g}((c-i b)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-i b)z^r\right) + e^{-g}((c+i b)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c+i b)z^r\right)\right)\right)$$

01.19.21.0920.01

$$\int z^n\sin(b z^2)\sinh(c z^2+g)\,dz = \frac{1}{8} i z^{n+1}\left(e^{g}\,\Gamma\left(\frac{n+1}{2},(-c-i b)z^2\right)\left((-c-i b)z^2\right)^{\frac{1}{2}(-n-1)} - e^{g}\left((i b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i b-c)z^2\right) - e^{-g}\left((c-i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-i b)z^2\right) + e^{-g}\left((c+i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c+i b)z^2\right)\right)\ /;\ n\in\mathbb{N}$$

01.19.21.0921.01

$$\int z^n\sin\left(\sqrt{z}\,b\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{1}{2} i\left(e^{g}\,\Gamma\left(2(n+1),(-c-i b)\sqrt{z}\right)(-c-i b)^{-2(n+1)} - (i b-c)^{-2(n+1)}e^{g}\,\Gamma\left(2(n+1),(i b-c)\sqrt{z}\right) - (c-i b)^{-2(n+1)}e^{-g}\,\Gamma\left(2(n+1),(c-i b)\sqrt{z}\right) + (c+i b)^{-2(n+1)}e^{-g}\,\Gamma\left(2(n+1),(c+i b)\sqrt{z}\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin(b z^r+e)\sinh(c z^r+g)$

01.19.21.0922.01

$$\int z^{\alpha-1}\sin(b z^r+e)\sinh(c z^r+g)\,dz = \frac{1}{4r}\left(i z^{\alpha}\left(e^{g+i e}\,\Gamma\left(\frac{\alpha}{r},(-c-i b)z^r\right)((-c-i b)z^r)^{-\frac{\alpha}{r}} - e^{g-i e}((i b-c)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i b-c)z^r\right) - e^{i e-g}((c-i b)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-i b)z^r\right) + e^{-g-i e}((c+i b)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c+i b)z^r\right)\right)\right)$$

01.19.21.0923.01

$$\int z^n\sin(b z^2+e)\sinh(c z^2+g)\,dz = \frac{1}{8} i z^{n+1}\left(e^{g+i e}\,\Gamma\left(\frac{n+1}{2},(-c-i b)z^2\right)\left((-c-i b)z^2\right)^{\frac{1}{2}(-n-1)} - e^{g-i e}\left((i b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(i b-c)z^2\right) - e^{i e-g}\left((c-i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-i b)z^2\right) + e^{-g-i e}\left((c+i b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c+i b)z^2\right)\right)\ /;\ n\in\mathbb{N}$$

01.19.21.0924.01

$$\int z^n\sin\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{1}{2} i\left(e^{g+i e}\,\Gamma\left(2(n+1),(-c-i b)\sqrt{z}\right)(-c-i b)^{-2(n+1)} - (i b-c)^{-2(n+1)}e^{g-i e}\,\Gamma\left(2(n+1),(i b-c)\sqrt{z}\right) - (c-i b)^{-2(n+1)}e^{i e-g}\,\Gamma\left(2(n+1),(c-i b)\sqrt{z}\right) + (c+i b)^{-2(n+1)}e^{-g-i e}\,\Gamma\left(2(n+1),(c+i b)\sqrt{z}\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n \sin(b z^r + d z) \sinh(c z^r + g)$

01.19.21.0925.01

$$\int z^n \sin(b z^2 + d z) \sinh(c z^2 + g)\, dz = \frac{1}{8} i \Bigg(e^{\frac{d^2}{4(-c-i b)}-g} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c-i b) z)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)}\right)\Bigg) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)}-g} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)}+g} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)}\right) + (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)}+g} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)}\right)\Bigg) /; n \in \mathbb{N}$$

01.19.21.0926.01

$$\int z^n \sin(\sqrt{z}\, b + d z) \sinh(\sqrt{z}\, c + g)\, dz = -(-1)^n 2^{-2n-3} d^{-2n-2} i \Bigg(e^{\frac{i (i b - c)^2}{4 d} - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg((i b - c)\left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right)\Bigg) -$$

$$e^{\frac{i(c+i b)^2}{4d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+i b)^{-h-j+2n}\left(c+i b+2 i d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+i b+2 i d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i b)\left(c+i b+2 i d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+i b+2 i d\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i b+2 i d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+i b+2 i d\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{-\frac{i(-c-i b)^2}{4d}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i b)^{-h-j+2n}\left(-c-i b-2 i d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i b-2 i d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i b)\left(-c-i b-2 i d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-i b-2 i d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i b-2 i d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-i b-2 i d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$e^{-\frac{i(c-i b)^2}{4d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i b)^{-h-j+2n}\left(c-i b-2 i d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i b-2 i d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i b)\left(c-i b-2 i d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-i b-2 i d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-i b-2 i d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-i b-2 i d\sqrt{z}\right)^2}{4d}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z + e\right) \sinh\left(c z^r + g\right)$

01.19.21.0927.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz = \frac{1}{8} i \left(e^{\frac{d^2}{4(-c-i b)} - i e - g} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)} \right) \right) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)} - g + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)} \right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)} - i e + g} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)} \right) + (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)} + g + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0928.01

$$\int z^n \sin\left(\sqrt{z}\, b + e + d z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = -(-1)^n 2^{-2n-3} d^{-2n-2} i \left(e^{\frac{i(i b - c)^2}{4 d} - g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) + 2 \sqrt{\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d} \right) \right) - e^{\frac{i(c + i b)^2}{4 d} + g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c + i b)^{-h-j+2n} \left(c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(c + i b + 2 i d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i b)\left(c+i b+2 i d \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c+i b+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.2 \sqrt{\frac{i\left(c+i b+2 i d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c+i b+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)-$$

$$e^{-\frac{i(-c-i b)^2}{4 d}-i e-g} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h}\, 4^j\, (-c-i b)^{-h-j+2 n} \left(-c-i b-2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i b)\left(-c-i b-2 i d \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-c-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left.2 i d \sqrt{-\frac{i\left(-c-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-c-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)+$$

$$e^{-\frac{i(c-i b)^2}{4 d}-i e+g} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h}\, 4^j\, (c-i b)^{-h-j+2 n} \left(c-i b-2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(c-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i b)\left(c-i b-2 i d \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left.\left.2 i d \sqrt{-\frac{i\left(c-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin(d z) \sinh\left(c z^r + f z\right)$

01.19.21.0929.01

$$\int z^n \sin(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{8}\,i\left(e^{\frac{(-f-i\,d)^2}{4c}}\left(\sum_{j=0}^{n}2^{j-n}\,(f+i\,d)^{n-j}\,(-f-i\,d-2\,c\,z)^{j+1}\left(\frac{(-f-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-e^{\frac{(i\,d-f)^2}{4c}}\left(\sum_{j=0}^{n}2^{j-n}\,(f-i\,d)^{n-j}\,(-f+i\,d-2\,c\,z)^{j+1}\left(\frac{(-f+i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-c^{-n-1}\,e^{-\frac{(f-i\,d)^2}{4c}}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f)^{n-j}\,(f-i\,d+2\,c\,z)^{j+1}\left(-\frac{(f-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f-i\,d+2\,c\,z)^2}{4\,c}\right)+c^{-n-1}\,e^{-\frac{(f+i\,d)^2}{4c}}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d)^{n-j}\,(f+i\,d+2\,c\,z)^{j+1}\left(-\frac{(f+i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+i\,d+2\,c\,z)^2}{4\,c}\right)\right)/;\,n\in\mathbb{N}$$

01.19.21.0930.01

$$\int z^n \sin(d\,z)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-2n-3}\,i\left(-e^{-\frac{c^2}{4(-f-i\,d)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(-f-i\,d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-f-i\,d)\sqrt{-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{4\,(-f-i\,d)}\right)-c\left(2\,(-f-i\,d)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{4\,(-f-i\,d)}\right)\right)\right)(-f-i\,d)^{-2n-2}+e^{-\frac{c^2}{4(i\,d-f)}}\,(i\,d-f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f)\sqrt{-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)-\right.$$

$$c\left(2(i\,d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(i\,d-f)\sqrt{z}-c\right)^2}{4(i\,d-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-i\,d)}}(f-i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\,(f-i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)\right)-$$

$$e^{-\frac{c^2}{4(f+i\,d)}}(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0931.01

$$\int z^n \sin(e + d\,z) \sinh\left(c\,z^2 + f\,z\right) dz = \frac{1}{8} i \left(e^{\frac{(-f+-i\,d)^2}{4c} - i\,e} \left(\sum_{j=0}^{n} 2^{j-n} (f + i\,d)^{n-j} (-f - i\,d - 2\,c\,z)^{j+1} \left(\frac{(-f - i\,d - 2\,c\,z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f - i\,d - 2\,c\,z)^2}{4\,c} \right) \right) (-c)^{-n-1} - e^{\frac{(i\,d-f)^2}{4c} + i\,e} \left(\sum_{j=0}^{n} 2^{j-n} (f - i\,d)^{n-j} (-f + i\,d - 2\,c\,z)^{j+1} \left(\frac{(-f + i\,d - 2\,c\,z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f + i\,d - 2\,c\,z)^2}{4\,c} \right) \right) (-c)^{-n-1} - c^{-n-1} e^{-\frac{(f-i\,d)^2}{4c} - i\,e} \sum_{j=0}^{n} 2^{j-n} (i\,d - f)^{n-j} (f - i\,d + 2\,c\,z)^{j+1} \left(-\frac{(f - i\,d + 2\,c\,z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f - i\,d + 2\,c\,z)^2}{4\,c} \right) + c^{-n-1} e^{-\frac{(f+i\,d)^2}{4c} + i\,e} \sum_{j=0}^{n} 2^{j-n} (-f - i\,d)^{n-j} (f + i\,d + 2\,c\,z)^{j+1} \left(-\frac{(f + i\,d + 2\,c\,z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + i\,d + 2\,c\,z)^2}{4\,c} \right) \right) /;\ n \in \mathbb{N}$$

01.19.21.0932.01

$$\int z^n \sin(e + d\,z) \sinh\left(\sqrt{z}\; c + f\,z\right) dz = 2^{-2n-3} i \left(-e^{-\frac{c^2}{4(-f+-i\,d)} - i\,e} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(-f - i\,d)\sqrt{z} - c\right)^{h+j} \left(-\frac{\left(2(-f - i\,d)\sqrt{z} - c\right)^2}{-f - i\,d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2(-f - i\,d) \sqrt{-\frac{\left(2(-f - i\,d)\sqrt{z} - c\right)^2}{-f - i\,d}}\; \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2(-f - i\,d)\sqrt{z} - c\right)^2}{4(-f - i\,d)} \right) - c\left(2(-f - i\,d)\sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2(-f - i\,d)\sqrt{z} - c\right)^2}{4(-f - i\,d)} \right) \right) \right) (-f - i\,d)^{-2n-2} + e^{-\frac{c^2}{4(i\,d-f)} + i\,e} (i\,d - f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(i\,d - f)\sqrt{z} - c\right)^{h+j} \left(-\frac{\left(2(i\,d - f)\sqrt{z} - c\right)^2}{i\,d - f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(i\,d-f)\sqrt{-\frac{\left(2(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(i\,d-f)\sqrt{z}-c\right)^2}{4(i\,d-f)}\right)-\right.$$

$$\left.\left. c\left(2(i\,d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(i\,d-f)\sqrt{z}-c\right)^2}{4(i\,d-f)}\right)\right)\right)+$$

$$e^{-\frac{c^2}{4(f-i\,d)}-i\,e}(f-i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\;(f-i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)\right)\right)-$$

$$e^{-\frac{c^2}{4(f+i\,d)}+i\,e}(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)+\right.$$

$$\left.\left.\left. 2\sqrt{-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.0933.01

$$\int z^n \sin(b z^2) \sinh(c z^2 + f z)\, dz ==$$

$$\frac{1}{8} i \left(e^{-\frac{f^2}{4(-c-i b)}} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c-i b) z - f)^{j+1} \left(-\frac{(2(-c-i b) z - f)^2}{-c-i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c-i b) z - f)^2}{4(-c-i b)}\right)\right) \right.$$

$$(-c-i b)^{-n-1} - (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b-c)}}$$

$$\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)}\right) -$$

$$(c - i b)^{-n-1} e^{-\frac{f^2}{4(c-i b)}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)}\right) + (c + i b)^{-n-1} e^{-\frac{f^2}{4(c+i b)}}$$

$$\left. \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /;\, n \in \mathbb{N}$$

01.19.21.0934.01

$$\int z^n \sin(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + f z)\, dz ==$$

$$2^{-2n-3} i f^{-2n-2} \left(-e^{\frac{(-c-i b)^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c-i b)^{-h-j+2n} \left(-c - i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \right.$$

$$\binom{j}{h} \binom{n}{j} \left((-c - i b) \left(-c - i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left. 2 f \sqrt{\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f}\right)\right) +$$

$$e^{\frac{(i b-c)^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((i b - c) \left(-c + i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$2\,f\,\sqrt{\frac{\left(-c+i\,b-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+i\,b-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c-i\,b)^2}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c-i\,b+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c-i\,b)\left(c-i\,b+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c-i\,b+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c-i\,b+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c-i\,b+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)-$$

$$e^{-\frac{(c+i\,b)^2}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+i\,b)^{-h-j+2\,n}\left(c+i\,b+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+i\,b+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+i\,b)\left(c+i\,b+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+i\,b+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c+i\,b+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+i\,b+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(b\,z^r + e)\sinh(c\,z^r + f\,z)$

01.19.21.0935.01

$$\int z^n \sin\left(b z^2 + e\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8} i \left(e^{-\frac{f^2}{4(-c+-i b)} - i e} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c - i b) z - f)^{j+1} \left(-\frac{(2(-c - i b) z - f)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c - i b) z - f)^2}{4(-c - i b)}\right)\right) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)} + i e} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{-\frac{f^2}{4(c - i b)} - i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)}\right) + (c + i b)^{-n-1} e^{-\frac{f^2}{4(c + i b)} + i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0936.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-3} i f^{-2n-2} \left(-e^{\frac{(-c+-i b)^2}{4 f} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c - i b)^{-h-j+2n} \left(-c - i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-c - i b)\left(-c - i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{(i b - c)^2}{4 f} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c + i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.\right.$$

$$2 f \sqrt{\frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) +$$

$$e^{-\frac{(c - i b)^2}{4 f} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c - i b)^{-h-j+2n} \left(c - i b + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c - i b + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c - i b)\left(c - i b + 2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c - i b + 2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(c - i b + 2 f \sqrt{z}\right)^2}{f}} \, f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c - i b + 2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) -$$

$$e^{-\frac{(c + i b)^2}{4 f} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c + i b)^{-h-j+2n} \left(c + i b + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + i b + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c + i b)\left(c + i b + 2 f \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + i b + 2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(c + i b + 2 f \sqrt{z}\right)^2}{f}} \, f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + i b + 2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) \, /; \, n \in \mathbb{N}$$

Involving $z^n \sin(b z^r + d z) \sinh(c z^r + f z)$

01.19.21.0937.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8} i \left(\frac{1}{\sqrt{c + i b}} \left(e^{-\frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-f - i d)^{n-q} (f + i d + 2 c z + 2 i b z)^{q+1} \left(-\frac{(f + i d + 2 c z + 2 i b z)^2}{c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + i d + 2 c z + 2 i b z)^2}{4 (c + i b)} \right) \right) - \frac{1}{\sqrt{c - i b}} \left(e^{\frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (i d - f)^{n-q} \left(\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c} \right)^{\frac{1}{2}(-q-1)} (f - i d - 2 i b z + 2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)} \right) \right) - \frac{1}{\sqrt{i b - c}} \left(e^{-\frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (f - i d)^{n-q} (i (d + i f + 2 b z + 2 i c z))^{q+1} \left(-\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)} \right) \right) + \frac{1}{\sqrt{-c - i b}} \left(e^{\frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (f + i d)^{n-q} (-f - i d - 2 i b z - 2 c z)^{q+1} \left(\frac{i (d - i f + 2 b z - 2 i c z)^2}{b - i c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - i f + 2 b z - 2 i c z)^2}{4 (b - i c)} \right) \right) \right) /; n \in \mathbb{N}$$

01.19.21.0938.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = i\, 2^{-2n-3} \left(\frac{1}{(d - i f)^2} e^{\frac{i (b - i c)^2}{4 (d - i f)}} (-f - i d)^{-2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c - i b)^{-h-k+2n} \left(\frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right)^2}{d - i f} \right)^{\frac{1}{2}(-h-k-1)} \left(-c - i b - 2 i (d - i f) \sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b - i c) \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right) \Gamma\left(\frac{1}{2} (h + k + 1), \frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right)^2}{4 (d - i f)} \right) - 2 i (d - i f) \right.$$

$$\sqrt{\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{d-i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{4\,(d-i\,f)}\right)\Bigg)-\frac{1}{(d+i\,f)^2}\,e^{\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}$$

$$(f-i\,d)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i\,b)^{-h-k+2\,n}\left(\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}\,(-h-k-1)}\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c-i\,b)\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)+$$

$$2\,(f-i\,d)\sqrt{\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)\Bigg)-$$

$$e^{-\frac{i\,(b-i\,c)^2}{4\,(d-i\,f)}}\,(f+i\,d)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i\,b)^{-h-k+2\,n}\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((c+i\,b)\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)+$$

$$2\sqrt{-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)\Bigg)-$$

$$\frac{1}{(d+i\,f)^2}\,e^{-\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(i\,d-f)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b-c)^{-h-k+2\,n}\left(-c+i\,b\,+2\,(d+i\,f)\,i\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,i\,(d+i\,f)\sqrt{-\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)-$$

Involving $z^n \sin(b z^r + d z + e) \sinh(c z^r + f z)$

01.19.21.0939.01

$$\int z^n \sin(b z^2 + d z + e) \sinh(c z^2 + f z)\, dz = \frac{1}{8} i e^{-i e} \left(\frac{1}{\sqrt{c + i b}} \left(e^{2 i e - \frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-f - i d)^{n-q} (f + i d + 2 c z + 2 i b z)^{q+1} \left(-\frac{(f + i d + 2 c z + 2 i b z)^2}{c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + i d + 2 c z + 2 i b z)^2}{4 (c + i b)} \right) \right) - \frac{1}{\sqrt{c - i b}} \left(e^{\frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (i d - f)^{n-q} \left(\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c} \right)^{\frac{1}{2}(-q-1)} (f - i d - 2 i b z + 2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)} \right) \right) - \frac{1}{\sqrt{i b - c}} \left(e^{2 i e - \frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (f - i d)^{n-q} (i (d + i f + 2 b z + 2 i c z))^{q+1} \left(-\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)} \right) \right) + \frac{1}{\sqrt{-c - i b}} \left(e^{\frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (f + i d)^{n-q} (-f - i d - 2 i b z - 2 c z)^{q+1} \left(\frac{i (d - i f + 2 b z - 2 i c z)^2}{b - i c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - i f + 2 b z - 2 i c z)^2}{4 (b - i c)} \right) \right) \right) /; n \in \mathbb{N}$$

01.19.21.0940.01

$$\int z^n \sin(\sqrt{z}\, b + e + d z) \sinh(\sqrt{z}\, c + f z)\, dz = i\, 2^{-2n-3} e^{-i e} \left(\frac{1}{(d - i f)^2} \left(e^{\frac{i (b - i c)^2}{4 (d - i f)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c - i b)^{-h-k+2n} \left(\frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z} \right) \right)^2}{d - i f} \right)^{\frac{1}{2}(-h-k-1)} \left(-c - i b - 2 i (d - i f) \sqrt{z} \right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b - i c) \left(b - i \left(c + 2 (f + i d) \sqrt{z} \right) \right) \Gamma\left(\frac{1}{2} (h + k + 1), \right.\right.\right.\right.\right.$$

$$\left.\left.\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{4(d-i f)}\right)-2 i (d-i f)\sqrt{\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{d-i f}}\,\Gamma\right($$

$$\left.\left.\left.\left.\frac{1}{2}(h+k+2),\ \frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{4(d-i f)}\right)\right)\right)(-f-i d)^{-2n}\right)-e^{2 i e-\frac{i(b-i c)^2}{4(d-i f)}}(f+i d)^{-2(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i b)^{-h-k+2n}\left(c+i b+2(f+i d)\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c+i b)\left(c+i b+2(f+i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{f+i d}}\,(f+i d)\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)\right)-$$

$$\frac{1}{(d+i f)^2}\left(e^{\frac{i(b+i c)^2}{4(d+i f)}}(f-i d)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i b)^{-h-k+2n}\left(\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(c-i b+2(f-i d)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\left((c-i b)\left(c-i b+2(f-i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)+\right.$$

$$\left.\left.2(f-i d)\sqrt{\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right)-$$

$$\frac{1}{(d+i f)^2}\left(e^{2 i e-\frac{i(b+i c)^2}{4(d+i f)}}(i d-f)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i b-c)^{-h-k+2n}\left(-c+i b+2(d+i f)\,i\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2 i (d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.\left.\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right)\right) /; n\in\mathbb{N}$$

Involving $z^n \sin(d\, z) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.0941.01

$$\int z^n \sin(d z)\sinh\left(c z^2+f z+g\right) dz = $$

$$\frac{1}{8} i \left(e^{\frac{(-f-i d)^2}{4 c}-g}\left(\sum_{j=0}^{n} 2^{j-n}(f+i d)^{n-j}(-f-i d-2 c z)^{j+1}\left(\frac{(-f-i d-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f-i d-2 c z)^2}{4 c}\right)\right)\right.$$

$$(-c)^{-n-1} - e^{\frac{(i d-f)^2}{4 c}-g}$$

$$\left(\sum_{j=0}^{n} 2^{j-n}(f-i d)^{n-j}(-f+i d-2 c z)^{j+1}\left(\frac{(-f+i d-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f+i d-2 c z)^2}{4 c}\right)\right)(-c)^{-n-1} -$$

$$c^{-n-1} e^{-\frac{(f-i d)^2}{4 c}+g}\sum_{j=0}^{n} 2^{j-n}(i d-f)^{n-j}(f-i d+2 c z)^{j+1}\left(-\frac{(f-i d+2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f-i d+2 c z)^2}{4 c}\right)+$$

$$c^{-n-1} e^{-\frac{(f+i d)^2}{4 c}+g}$$

$$\left.\sum_{j=0}^{n} 2^{j-n}(-f-i d)^{n-j}(f+i d+2 c z)^{j+1}\left(-\frac{(f+i d+2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f+i d+2 c z)^2}{4 c}\right)\right) /; n\in\mathbb{N}$$

01.19.21.0942.01

$$\int z^n \sin(d z)\sinh\left(\sqrt{z}\, c+g+f z\right) dz = $$

$$2^{-2 n-3} i \left(-e^{-\frac{c^2}{4(-f-i d)}-g}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (-c)^{-h-j+2 n}\left(2(-f-i d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{-f-i d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\right.\right.$$

$$\binom{n}{j}\left(2(-f-i d)\sqrt{-\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{-f-i d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{4(-f-i d)}\right)-\right.$$

$$\left.\left. c\left(2(-f-i d)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{4(-f-i d)}\right)\right)\right)(-f-i d)^{-2n-2}+$$

$$e^{-\frac{c^2}{4(i d-f)}-g}(i d-f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c)^{-h-j+2n}\left(2(i d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(i d-f)\sqrt{z}-c\right)^2}{i d-f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(i d-f)\sqrt{-\frac{\left(2(i d-f)\sqrt{z}-c\right)^2}{i d-f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d-f)\sqrt{z}-c\right)^2}{4(i d-f)}\right)-\right.$$

$$\left. c\left(2(i d-f)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i d-f)\sqrt{z}-c\right)^2}{4(i d-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f-i d)}+g}(f-i d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f-i d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{f-i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{4(f-i d)}\right)+\right.$$

$$\left. 2\sqrt{-\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{f-i d}}\;(f-i d)\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{4(f-i d)}\right)\right)-$$

$$e^{-\frac{c^2}{4(f+i d)}+g}(f+i d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f+i d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)+\right.$$

$$\sqrt{\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{}}\qquad\left(\frac{1}{}\qquad\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{}\right)\Bigg)\Bigg)$$

Involving $z^n \sin(d\,z+e)\sinh(c\,z^r+f\,z+g)$

01.19.21.0943.01

$$\int z^n \sin(e+d\,z)\sinh(c\,z^2+f\,z+g)\,dz = \frac{1}{8}\,i\left(e^{\frac{(-f+-i\,d)^2}{4c}-g-i\,e}\left(\sum_{j=0}^{n} 2^{j-n}(f+i\,d)^{n-j}(-f-i\,d-2\,c\,z)^{j+1}\left(\frac{(-f-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - e^{\frac{(i\,d-f)^2}{4c}-g+i\,e}\left(\sum_{j=0}^{n} 2^{j-n}(f-i\,d)^{n-j}(-f+i\,d-2\,c\,z)^{j+1}\left(\frac{(-f+i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - c^{-n-1}\,e^{-\frac{(f-i\,d)^2}{4c}+g-i\,e}\sum_{j=0}^{n} 2^{j-n}(i\,d-f)^{n-j}(f-i\,d+2\,c\,z)^{j+1}\left(-\frac{(f-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f-i\,d+2\,c\,z)^2}{4\,c}\right) + c^{-n-1}\,e^{-\frac{(f+i\,d)^2}{4c}+g+i\,e}\sum_{j=0}^{n} 2^{j-n}(-f-i\,d)^{n-j}(f+i\,d+2\,c\,z)^{j+1}\left(-\frac{(f+i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+i\,d+2\,c\,z)^2}{4\,c}\right)\right) /;\ n\in\mathbb{N}$$

01.19.21.0944.01

$$\int z^n \sin(e+d\,z)\sinh(\sqrt{z}\,c+g+f\,z)\,dz = 2^{-2n-3}\,i\left(-e^{-\frac{c^2}{4(-f+-i\,d)}-g-i\,e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(-f-i\,d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(-f-i\,d)\sqrt{-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{4(-f-i\,d)}\right) - c\left(2(-f-i\,d)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{4(-f-i\,d)}\right)\right)\right)(-f-i\,d)^{-2n-2} + e^{-\frac{c^2}{4(i\,d-f)}-g+i\,e}\,(i\,d-f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(i\,d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f)\sqrt{-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)-\right.$$

$$\left.c\left(2\,(i\,d-f)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f-i\,d)}+g-i\,e}\,(f-i\,d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f-i\,d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{4\,(f-i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\;(f-i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{4\,(f-i\,d)}\right)\right)-$$

$$e^{-\frac{c^2}{4(f+i\,d)}+g+i\,e}\,(f+i\,d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+i\,d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sin(b\,z^r)\sinh(c\,z^r+f\,z+g)$

01.19.21.0945.01

$$\int z^n \sin(b z^2) \sinh(c z^2 + f z + g) \, dz = \frac{1}{8} i \left(e^{-\frac{f^2}{4(-c-i b)}-g} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c-i b) z - f)^{j+1} \left(-\frac{(2(-c-i b) z - f)^2}{-c-i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c-i b) z - f)^2}{4(-c-i b)}\right)\right) (-c-i b)^{-n-1} - (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b-c)}-g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{-\frac{f^2}{4(c-i b)}+g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)}\right) + (c + i b)^{-n-1} e^{-\frac{f^2}{4(c+i b)}+g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.0946.01

$$\int z^n \sin(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + g + f z) \, dz = 2^{-2n-3} i f^{-2n-2} \left(-e^{\frac{(-c-i b)^2}{4 f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c-i b)^{-h-j+2n} \left(-c-i b-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-i b-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-c-i b)\left(-c-i b-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-i b-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-i b-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-i b-2 f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{(i b-c)^2}{4 f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c+i b-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+i b-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c+i b-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+i b-2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$2\, f \sqrt{\frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{f}}\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, \frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c - i\, b)^2}{4\, f} + g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c - i\, b)^{-h-j+2\, n} \left(c - i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg((c - i\, b) \left(c - i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) -$$

$$e^{-\frac{(c + i\, b)^2}{4\, f} + g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c + i\, b)^{-h-j+2\, n} \left(c + i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg((c + i\, b) \left(c + i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N}$$

Involving $z^n \sin(b\, z^r + e) \sinh(c\, z^r + f\, z + g)$

01.19.21.0947.01

$$\int z^n \sin\left(b z^2 + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} i \left(e^{-\frac{f^2}{4(-c+-i b)} - g - i e} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c - i b) z - f)^{j+1} \left(-\frac{(2(-c - i b) z - f)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c - i b) z - f)^2}{4(-c - i b)} \right) \right) (-c - i b)^{-n-1} - (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)} - g + i e} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)} \right) - (c - i b)^{-n-1} e^{-\frac{f^2}{4(c - i b)} + g - i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)} \right) + (c + i b)^{-n-1} e^{-\frac{f^2}{4(c + i b)} + g + i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.0948.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} i f^{-2n-2} \left(-e^{\frac{(-c+-i b)^2}{4f} - g - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c - i b)^{-h-j+2n} \left(-c - i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-c - i b)\left(-c - i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4f} \right) - 2 f \sqrt{\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4f} \right) \right) + e^{\frac{(i b - c)^2}{4f} - g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i\,b-c)\left(-c+i\,b-2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-c+i\,b-2\,f\sqrt{z}\right)^2}{4\,f}\right)-\right.$$

$$\left.2\,f\sqrt{\frac{\left(-c+i\,b-2\,f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c+i\,b-2\,f\sqrt{z}\right)^2}{4\,f}\right)\right)+$$

$$e^{-\frac{(c-i\,b)^2}{4\,f}+g-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b+2\,f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c-i\,b+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b+2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c-i\,b+2\,f\sqrt{z}\right)^2}{4\,f}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c-i\,b+2\,f\sqrt{z}\right)^2}{f}}\;f\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c-i\,b+2\,f\sqrt{z}\right)^2}{4\,f}\right)\right)-$$

$$e^{-\frac{(c+i\,b)^2}{4\,f}+g+i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+i\,b)^{-h-j+2\,n}\left(c+i\,b+2\,f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+i\,b+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c+i\,b+2\,f\sqrt{z}\right)^2}{4\,f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+i\,b+2\,f\sqrt{z}\right)^2}{f}}\;f\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+i\,b+2\,f\sqrt{z}\right)^2}{4\,f}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \sin(b\,z^r + d\,z)\sinh(c\,z^r + f\,z + g)$

01.19.21.0949.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} i e^{-g} \left(e^{2g} \left(\frac{1}{\sqrt{c+i b}} \left(e^{-\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (c+i b)^{-n-\frac{1}{2}} (-f-i d)^{n-q} (f+i d+2 c z+2 i b z)^{q+1} \left(-\frac{(f+i d+2 c z+2 i b z)^2}{c+i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+i d+2 c z+2 i b z)^2}{4(c+i b)}\right)\right) - \frac{1}{\sqrt{c-i b}} \left(e^{\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (c-i b)^{-n-\frac{1}{2}} (i d-f)^{n-q} \left(\frac{i(d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} (f-i d-2 i b z+2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+i f+2 b z+2 i c z)^2}{4(b+i c)}\right)\right)\right) - \frac{1}{\sqrt{i b-c}} \left(e^{-\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (i b-c)^{-n-\frac{1}{2}} (f-i d)^{n-q} (i(d+i f+2 b z+2 i c z))^{q+1} \left(-\frac{i(d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+i f+2 b z+2 i c z)^2}{4(b+i c)}\right)\right) + \frac{1}{\sqrt{-c-i b}} \left(e^{\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (-c-i b)^{-n-\frac{1}{2}} (f+i d)^{n-q} (-f-i d-2 i b z-2 c z)^{q+1} \left(\frac{i(d-i f+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d-i f+2 b z-2 i c z)^2}{4(b-i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.0950.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + f z + g\right) dz = i\, 2^{-2n-3} e^{-g} \left(\frac{1}{(d-i f)^2} e^{\frac{i(b-i c)^2}{4(d-i f)}} (-f-i d)^{-2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c-i b)^{-h-k+2n} \left(\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c-i b-2 i (d-i f)\sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b-i c)\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{4(d-i f)}\right) - \right.\right.$$

$$2\,i\,(d-i\,f)\sqrt{\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{d-i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{4\,(d-i\,f)}\right)\Bigg)\Bigg)-$$

$$e^{2g}\left(\frac{1}{(d+i\,f)^2}\,e^{\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(f-i\,d)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i\,b)^{-h-k+2n}\left(\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(c-i\,b+2\,(f-i\,d)\,\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left((c-i\,b)\left(c-i\,b+2\,(f-i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)+2\,(f-i\,d)\sqrt{\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}}\;\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)\right)+e^{-\frac{i\,(b-i\,c)^2}{4\,(d-i\,f)}}\,(f+i\,d)^{-2\,(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i\,b)^{-h-k+2n}\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c+i\,b)\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(c+i\,b+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)\right)\right)-$$

$$\frac{1}{(d+i\,f)^2}\,e^{-\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(i\,d-f)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b-c)^{-h-k+2n}\left(-c+i\,b+2\,(d+i\,f)\,i\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2 i (d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin\left(b z^r + d z + e\right) \sinh\left(c z^r + f z + g\right)$

01.19.21.0951.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} i e^{-g-i e} \left(e^{2 g} \left(\frac{1}{\sqrt{c + i b}} \left(e^{2 i e - \frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-f - i d)^{n-q} (f + i d + 2 c z + 2 i b z)^{q+1} \left(-\frac{(f + i d + 2 c z + 2 i b z)^2}{c + i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + i d + 2 c z + 2 i b z)^2}{4(c + i b)}\right)\right) - \frac{1}{\sqrt{c - i b}} \left(e^{\frac{i (d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (i d - f)^{n-q} \left(\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} (f - i d - 2 i b z + 2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 b z + 2 i c z)^2}{4(b + i c)}\right)\right)\right) - \frac{1}{\sqrt{i b - c}} \left(e^{2 i e - \frac{i (d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (f - i d)^{n-q} (i (d + i f + 2 b z + 2 i c z))^{q+1} \left(-\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + i f + 2 b z + 2 i c z)^2}{4(b + i c)}\right)\right) + \frac{1}{\sqrt{-c - i b}} \left(e^{\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (f + i d)^{n-q} (-f - i d - 2 i b z - 2 c z)^{q+1} \left(\frac{i (d - i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - i f + 2 b z - 2 i c z)^2}{4(b - i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.0952.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + f z + g\right) dz = i\, 2^{-2n-3} e^{-g-i e} \left(\frac{1}{(d - i f)^2} e^{\frac{i (b-i c)^2}{4(d-i f)}} (-f - i d)^{-2n} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c - i b)^{-h-k+2n} \left(\frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c - i b - 2 i (d - i f) \sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b - i c) \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right) \Gamma\left(\frac{1}{2}(h + k + 1), \frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right)^2}{4(d - i f)}\right) - \right.\right.$$

$$2\,i\,(d-i\,f)\sqrt{\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{d-i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\right)\right)^2}{4\,(d-i\,f)}\right)\Bigg)\Bigg)-$$

$$e^{2\,g}\left(\frac{1}{(d+i\,f)^2}\,e^{\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(f-i\,d)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i\,b)^{-h-k+2\,n}\left(\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}\,(-h-k-1)}\right.$$

$$\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left((c-i\,b)\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)+2\,(f-i\,d)\sqrt{\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}}\;\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)\right)+e^{2\,i\,e-\frac{i\,(b-i\,c)^2}{4\,(d-i\,f)}}\,(f+i\,d)^{-2\,(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i\,b)^{-h-k+2\,n}\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((c+i\,b)\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)\right)\right)-$$

$$\frac{1}{(d+i\,f)^2}\,e^{2\,i\,e-\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(i\,d-f)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i\,b-c)^{-h-k+2\,n}\left(-c+i\,b\,+2\,(d+i\,f)\,i\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2 i(d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\ \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\Bigg) /; n \in \mathbb{N}$$

Involving powers of sin and power

Involving $z^{\alpha-1}\sin^{\mu}(c\,z)\sinh(a\,z)$

01.19.21.0953.01

$$\int z^{\alpha-1}\sin^m(c z)\sinh(a z)\,dz = -2^{-m-1} z^{\alpha}\binom{m}{\frac{m}{2}}\left((-a z)^{-\alpha}\,\Gamma(\alpha, -a z)-(a z)^{-\alpha}\,\Gamma(\alpha, a z)\right)(1-m \bmod 2)-$$

$$i^{-m}\,2^{-m-1} z^{\alpha}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big((-1)^m\,\Gamma(\alpha, (-a-2 i c k+i c m) z)\left((-a-2 i c k+i c m) z\right)^{-\alpha}+$$

$$(-1)^{m+1}\left((a-2 i c k+i c m) z\right)^{-\alpha}\,\Gamma(\alpha, (a-2 i c k+i c m) z)+\left((-a+2 i c k-i c m) z\right)^{-\alpha}$$

$$\Gamma(\alpha, (-a+2 i c k-i c m) z)-\left((a+2 i c k-i c m) z\right)^{-\alpha}\,\Gamma(\alpha, (a+2 i c k-i c m) z)\Big) /; m \in \mathbb{N}^{+}$$

01.19.21.0954.01

$$\int z^n \sin^{\mu}(c z)\sinh(a z)\,dz = \frac{n!}{2}\sin^{\mu}(c z)\left(1-e^{2 i c z}\right)^{-\mu}$$

$$\left(e^{a z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(a-i c \mu)^{p+1}}\ {}_{p+2}F_{p+1}\left(-\frac{i a+c \mu}{2 c}, \ldots, -\frac{i a+c \mu}{2 c}, -\mu; 1-\frac{i a+c \mu}{2 c}, \ldots, 1-\frac{i a+c \mu}{2 c}; e^{2 i c z}\right)-\right.$$

$$\left.e^{-a z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(-a-i c \mu)^{p+1}}\ {}_{p+2}F_{p+1}\left(\frac{i a-c \mu}{2 c}, \ldots, \frac{i a-c \mu}{2 c}, -\mu; 1+\frac{i a-c \mu}{2 c}, \ldots, 1+\frac{i a-c \mu}{2 c}; e^{2 i c z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1}\sin^{\mu}(c\,z+d)\sinh(a\,z)$

01.19.21.0955.01

$$\int z^{\alpha-1}\sin^m(d+c\,z)\sinh(a\,z)\,dz = 2^{-m-1}z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-2\,d\,i\,k-i\,d\,m-\frac{i\,m\,\pi}{2}}\binom{m}{k}\Big(e^{4\,i\,d\,k+i\,m\,\pi}\,\Gamma(\alpha,(a-2\,i\,c\,k+i\,c\,m)\,z)\,((a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+\Big(-e^{4\,i\,d\,k+i\,m\,\pi}\,\Gamma(\alpha,(-a-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}-e^{2\,i\,d\,m}\,((-a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(-a+2\,i\,c\,k-i\,c\,m)\,z)\Big)+e^{2\,i\,d\,m}\,((a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(a+2\,i\,c\,k-i\,c\,m)\,z)\Big)-2^{-m-1}z^\alpha\binom{m}{\frac{m}{2}}\left((-a\,z)^{-\alpha}\,\Gamma(\alpha,-a\,z)-(a\,z)^{-\alpha}\,\Gamma(\alpha,a\,z)\right)(1-m\bmod 2)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0956.01

$$\int z^n\sin^\mu(d+c\,z)\sinh(a\,z)\,dz = \frac{1}{2}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}n!\,\sin^\mu(d+c\,z)\left(e^{a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i\,a+c\,\mu}{2\,c},\ldots,-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a+c\,\mu}{2\,c},\ldots,1-\frac{i\,a+c\,\mu}{2\,c};e^{2\,i\,(d+c\,z)}\right)-e^{-a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\,\mu-i\,a}{2\,c},\ldots,-\frac{c\,\mu-i\,a}{2\,c},-\mu;1-\frac{c\,\mu-i\,a}{2\,c},\ldots,1-\frac{c\,\mu-i\,a}{2\,c};e^{2\,i\,(d+c\,z)}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin^\mu(c\,z)\sinh(a\,z+b)$

01.19.21.0957.01

$$\int z^{\alpha-1}\sin^m(c\,z)\sinh(b+a\,z)\,dz = 2^{-m-1}z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-b-\frac{i\,m\,\pi}{2}}\binom{m}{k}\Big(e^{i\,m\,\pi}\,\Gamma(\alpha,(a-2\,i\,c\,k+i\,c\,m)\,z)\,((a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+e^{2\,b}\Big(-e^{i\,m\,\pi}\,\Gamma(\alpha,(-a-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}-((-a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(-a+2\,i\,c\,k-i\,c\,m)\,z)\Big)+((a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(a+2\,i\,c\,k-i\,c\,m)\,z)\Big)-2^{-m-1}e^{-b}z^\alpha\binom{m}{\frac{m}{2}}\left(e^{2\,b}(-a\,z)^{-\alpha}\,\Gamma(\alpha,-a\,z)-(a\,z)^{-\alpha}\,\Gamma(\alpha,a\,z)\right)(1-m\bmod 2)\;/;\;m\in\mathbb{N}^+$$

01.19.21.0958.01

$$\int z^n \sin^\mu(c z) \sinh(b + a z) \, dz = \frac{1}{2} \left(1 - e^{2 i c z}\right)^{-\mu} n! \sin^\mu(c z) \left(e^{b+a z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i a + c \mu}{2 c}, \ldots, -\frac{i a + c \mu}{2 c}, -\mu; 1 - \frac{i a + c \mu}{2 c}, \ldots, 1 - \frac{i a + c \mu}{2 c}; e^{2 i c z}\right) - e^{-b-a z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (-a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c \mu - i a}{2 c}, \ldots, -\frac{c \mu - i a}{2 c}, -\mu; 1 - \frac{c \mu - i a}{2 c}, \ldots, 1 - \frac{c \mu - i a}{2 c}; e^{2 i c z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin^\mu(c z + d) \sinh(a z + b)$

01.19.21.0959.01

$$\int z^{\alpha-1} \sin^m(d + c z) \sinh(b + a z) \, dz = 2^{-m-1} z^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-b-2 i d k - i d m - \frac{i m \pi}{2}} \binom{m}{k} \left(e^{4 i d k + i m \pi} \Gamma(\alpha, (a - 2 i c k + i c m) z) ((a - 2 i c k + i c m) z)^{-\alpha} + e^{2 b} \left(-e^{4 i d k + i m \pi} \Gamma(\alpha, (-a - 2 i c k + i c m) z) ((-a - 2 i c k + i c m) z)^{-\alpha} - e^{2 i d m} ((-a + 2 i c k - i c m) z)^{-\alpha} \Gamma(\alpha, (-a + 2 i c k - i c m) z)\right) + e^{2 i d m} ((a + 2 i c k - i c m) z)^{-\alpha} \Gamma(\alpha, (a + 2 i c k - i c m) z)\right) - 2^{-m-1} e^{-b} z^\alpha \binom{m}{\frac{m}{2}} \left(e^{2 b} (-a z)^{-\alpha} \Gamma(\alpha, -a z) - (a z)^{-\alpha} \Gamma(\alpha, a z)\right) (1 - m \bmod 2) /; m \in \mathbb{N}^+$$

01.19.21.0960.01

$$\int z^n \sin^\mu(d + c z) \sinh(b + a z) \, dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \left(e^{b+a z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i a + c \mu}{2 c}, \ldots, -\frac{i a + c \mu}{2 c}, -\mu; 1 - \frac{i a + c \mu}{2 c}, \ldots, 1 - \frac{i a + c \mu}{2 c}; e^{2 i (d + c z)}\right) - e^{-b-a z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (-a - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c \mu - i a}{2 c}, \ldots, -\frac{c \mu - i a}{2 c}, -\mu; 1 - \frac{c \mu - i a}{2 c}, \ldots, 1 - \frac{c \mu - i a}{2 c}; e^{2 i (d + c z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \sin^m\left(b z^r\right) \sinh(c z)$

01.19.21.0961.01

$$\int z^n \sin^m\left(b z^2\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{i c^2}{4 b (m-2s)} + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-c - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} + e^{-\frac{i c^2}{4 b (m-2s)} + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (c - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} - e^{\frac{i c^2}{4 b (m-2s)} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b (m-2s) z - c)^{j+1} \left(\frac{i (2 i b (m-2s) z - c)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - c)^2}{4 b (m-2s)}\right) + e^{\frac{i c^2}{4 b (m-2s)} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 b i (m-2s) z)^{j+1} \left(\frac{i (c + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0962.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right) (1 - m \bmod 2)\, c^{-n-1} + 2^{-m-2n-2} c^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{b^2 (m-2s)^2}{4c} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2s))^{-h-j+2n} \left(-2 \sqrt{z}\, c - i b (m-2s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, c - i b (m-2s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i b (m-2s) \left(-2 \sqrt{z}\, c - i b (m-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, c - i b (m-2s)\right)^2}{4c}\right) -$$

$$2\,c\,\sqrt{\frac{\left(-2\,\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\,\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)-e^{-\frac{b^2\,(m-2\,s)^2}{4\,c}-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)-$$

$$2\,c\,\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}+\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,c\,\sqrt{-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)+$$

$$2\,\sqrt{-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\,\sin^m\!\left(b\,z^r+e\right)\sinh(c\,z)$

01.19.21.0963.01

$$\int z^n \sin^m\left(b z^2+e\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1,-c z)+\Gamma(n+1,c z)\right)(1-m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{i c^2}{4 b (m-2 s)}-i e (m-2 s)+\frac{i m \pi}{2}} \left(\sum_{j=0}^n 2^{j-n} c^{n-j} (-c-2 i b (m-2 s) z)^{j+1} \left(-\frac{i (-c-2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c-2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} + e^{-\frac{i c^2}{4 b (m-2 s)}-i e (m-2 s)+\frac{i m \pi}{2}} \left(\sum_{j=0}^n 2^{j-n} (-c)^{n-j} (c-2 i b (m-2 s) z)^{j+1} \left(-\frac{i (c-2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c-2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} - e^{\frac{i c^2}{4 b (m-2 s)}+e i (m-2 s)-\frac{i m \pi}{2}} (i b (m-2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} c^{n-j} (2 i b (m-2 s) z-c)^{j+1} \left(\frac{i (2 i b (m-2 s) z-c)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2 s) z-c)^2}{4 b (m-2 s)}\right) + e^{\frac{i c^2}{4 b (m-2 s)}+e i (m-2 s)-\frac{i m \pi}{2}} (i b (m-2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-c)^{n-j} (c+2 b i (m-2 s) z)^{j+1} \left(\frac{i (c+2 b i (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c+2 b i (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0964.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1,-c z)+\Gamma(n+1,c z)\right)(1-m \bmod 2)\, c^{-n-1} + 2^{-m-2 n-2} c^{-2 (n+1)} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{b^2 (m-2 s)^2}{4 c}-i e (m-2 s)+\frac{i m \pi}{2}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n} \left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b (m-2 s) \left(-2 \sqrt{z}\, c-i b (m-2 s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^2}{4 c}\right) - \right.\right.$$

$$2\,c\,\sqrt{\frac{\left(-2\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)-$$

$$e^{-\frac{b^2\,(m-2\,s)^2}{4\,c}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)-$$

$$2\,c\,\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\,\sqrt{z}\right)^2}{4\,c}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}-i\,e\,(m-2\,s)+\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,c\,\sqrt{-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)+$$

$$2\,\sqrt{-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z) \sinh(c z)$

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$$\int z^n \sin^m(b z^2 + d z) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} ((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)) (1 - m \bmod 2) c^{-n-1} + 2^{-m-2} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{i(-c - i d (m-2s))^2}{4 b (m-2s)} + \frac{1}{2} i (m-1)\pi} \Bigg(\sum_{j=0}^{n} 2^{j-n} (c + d i (m-2s))^{n-j} (-c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + e^{-\frac{i(c - i d (m-2s))^2}{4 b (m-2s)} + \frac{1}{2} i (m+1)\pi} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c)^{n-j} (c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + e^{\frac{i(i d (m-2s) - c)^2}{4 b (m-2s)} - \frac{1}{2} i (m+1)\pi} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c - i d (m-2s))^{n-j} (-c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(-c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)} \right) + e^{\frac{i(c + d i (m-2s))^2}{4 b (m-2s)} + \frac{1}{2} i (1-m)\pi} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c - i d (m-2s))^{n-j} (c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh(c\, z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c\, z) + \Gamma(n+1, c\, z)\right) (1 - m \bmod 2) -$$

$$i\, 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{\frac{b^2 (m-2s)^2}{4 (i\, d (m-2s)-c)} - \frac{1}{2} i (m+1) \pi} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2s))^{-h-j+2n} \right.\right.$$

$$\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right)^{h+j} \left(-\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right)^2}{i\, d\, (m-2s) - c} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2s) \left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \right.\right.$$

$$\left. -\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right)^2}{4\, (i\, d\, (m-2s) - c)} \right) + 2 \sqrt{ -\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right)^2}{i\, d\, (m-2s) - c} }$$

$$\left.\left.\left. (i\, d\, (m-2s) - c)\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s) - c) \sqrt{z}\right)^2}{4\, (i\, d\, (m-2s) - c)} \right) \right) \right) \right)$$

$$(i\, d\, (m-2s) - c)^{-2(n+1)} + e^{\frac{b^2 (m-2s)^2}{4 (c + d\, i\, (m-2s))} + \frac{1}{2} i (1-m) \pi} (c + d\, i\, (m-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2s))^{-h-j+2n} \left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s)) \sqrt{z}\right)^2}{c + d\, i\, (m-2s)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b\, i\, (m-2s) \left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \right.\right.$$

$$\left. -\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s)) \sqrt{z}\right)^2}{4\, (c + d\, i\, (m-2s))} \right) + 2 \sqrt{ -\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s)) \sqrt{z}\right)^2}{c + d\, i\, (m-2s)} }$$

$$(c + d\,i\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(b\,i\,(m-2s) + 2\,(c + d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(c + d\,i\,(m-2s))}\right)\Bigg) +$$

$$e^{\frac{b^2 (m-2s)^2}{4(-c-i\,d\,(m-2s))} + \frac{1}{2} i\,(m-1)\pi}\,(-c - i\,d\,(m-2s))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2s))^{-h-j+2n}$$

$$\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^{h+j} \left(-\frac{\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{-c - i\,d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c - i\,d\,(m-2s))\sqrt{-\frac{\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{-c - i\,d\,(m-2s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{4\,(-c - i\,d\,(m-2s))}\right) - i\,b\,(m-2s)\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} -\right.$$

$$\left.\left. i\,b\,(m-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(2\,(-c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{4\,(-c - i\,d\,(m-2s))}\right)\right) +$$

$$e^{\frac{b^2 (m-2s)^2}{4(c-i\,d\,(m-2s))} + \frac{1}{2} i\,(m+1)\pi}\,(c - i\,d\,(m-2s))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2s))^{-h-j+2n}$$

$$\left(2\,(c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^{h+j} \left(-\frac{\left(2\,(c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{c - i\,d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c - i\,d\,(m-2s))\sqrt{-\frac{\left(2\,(c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{c - i\,d\,(m-2s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{4\,(c - i\,d\,(m-2s))}\right) - i\,b\,(m-2s)\left(2\,(c - i\,d\,(m-2s))\sqrt{z} -\right.$$

$$\left.\left. i\,b\,(m-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(2\,(c - i\,d\,(m-2s))\sqrt{z} - i\,b\,(m-2s)\right)^2}{4\,(c - i\,d\,(m-2s))}\right)\right)\Bigg)\Bigg) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z + e) \sinh(c z)$

01.19.21.0967.01

$$\int z^n \sin^m(b z^2 + d z + e) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} ((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)) (1 - m \bmod 2)\, c^{-n-1} + 2^{-m-2}\, i \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{i(-c - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s) + \frac{1}{2} i (m-1)\pi} \Bigg(\sum_{j=0}^{n} 2^{j-n} (c + d\, i (m-2s))^{n-j} (-c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + e^{-\frac{i(c - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s) + \frac{1}{2} i (m+1)\pi} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c)^{n-j} (c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + e^{\frac{i(i d (m-2s) - c)^2}{4 b (m-2s)} + e\, i (m-2s) - \frac{1}{2} i (m+1)\pi} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c - i d (m-2s))^{n-j} (-c + d\, i (m-2s) + 2 b\, i (m-2s) z)^{j+1} \left(\frac{i(-c + d\, i (m-2s) + 2 b\, i (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + d\, i (m-2s) + 2 b\, i (m-2s) z)^2}{4 b (m-2s)} \right) + e^{\frac{i(c + d\, i (m-2s))^2}{4 b (m-2s)} + e\, i (m-2s) + \frac{1}{2} i (1-m)\pi} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c - i d (m-2s))^{n-j} (c + d\, i (m-2s) + 2 b\, i (m-2s) z)^{j+1} \left(\frac{i(c + d\, i (m-2s) + 2 b\, i (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + d\, i (m-2s) + 2 b\, i (m-2s) z)^2}{4 b (m-2s)} \right) \Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0968.01

$$\int z^n \sin^m(\sqrt{z}\, b + e + d z) \sinh(c z)\, dz =$$

$$2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} ((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)) (1 - m \bmod 2) - i\, 2^{-m-2n-2} \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^s \binom{m}{s}$$

$$\left(e^{\frac{b^2 (m-2 s)^2}{4 (i d (m-2 s)-c)}+e i (m-2 s)-\frac{1}{2} i (m+1) \pi} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n} \left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right)^2}{i d (m-2 s)-c}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b i (m-2 s) \left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1),\right.\right.$$

$$\left.-\frac{\left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right)^2}{4 (i d (m-2 s)-c)}\right)+2 \sqrt{-\frac{\left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right)^2}{i d (m-2 s)-c}}$$

$$\left.\left.\left.(i d (m-2 s)-c) \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(b i (m-2 s)+2 (i d (m-2 s)-c) \sqrt{z}\right)^2}{4 (i d (m-2 s)-c)}\right)\right)\right)\right)$$

$$(i d (m-2 s)-c)^{-2 (n+1)}+e^{\frac{b^2 (m-2 s)^2}{4 (c+d i (m-2 s))}+e i (m-2 s)+\frac{1}{2} i (1-m) \pi} (c+d i (m-2 s))^{-2 (n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n} \left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right)^2}{c+d i (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b i (m-2 s) \left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1),\right.\right.$$

$$\left.-\frac{\left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right)^2}{4 (c+d i (m-2 s))}\right)+2 \sqrt{-\frac{\left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right)^2}{c+d i (m-2 s)}}$$

$$\left.(c+d i (m-2 s)) \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(b i (m-2 s)+2 (c+d i (m-2 s)) \sqrt{z}\right)^2}{4 (c+d i (m-2 s))}\right)\right)+$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (-c-i d (m-2 s))}-i e (m-2 s)+\frac{1}{2} i (m-1) \pi} (-c-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 (-c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (-c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{-c-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (-c-i d (m-2 s)) \sqrt{-\frac{\left(2 (-c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{-c-i d (m-2 s)}} \, \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (-c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (-c-i d (m-2 s))}\right)-i b (m-2 s) \left(2 (-c-i d (m-2 s)) \sqrt{z}-\right.$$

$$\left.\left.i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),-\frac{\left(2 (-c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (-c-i d (m-2 s))}\right)\right)+$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (c-i d (m-2 s))}-i e (m-2 s)+\frac{1}{2} i (m+1) \pi} (c-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 (c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{c-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (c-i d (m-2 s)) \sqrt{-\frac{\left(2 (c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{c-i d (m-2 s)}} \, \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (c-i d (m-2 s))}\right)-i b (m-2 s) \left(2 (c-i d (m-2 s)) \sqrt{z}-\right.$$

$$\left.\left.\left.i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),-\frac{\left(2 (c-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (c-i d (m-2 s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r) \sinh(f z + g)$

01.19.21.0969.01

$$\int z^n \sin^m\left(b z^2\right) \sinh(g + f z)\, dz = (-1)^n\, 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1}\, \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1}\, \Gamma(n+1, f z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{i f^2}{4 b (m-2 s)} - g + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-f - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} + e^{-\frac{i f^2}{4 b (m-2 s)} + g + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (f - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} - e^{\frac{i f^2}{4 b (m-2 s)} - g - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b (m-2s) z - f)^{j+1} \left(\frac{i (2 i b (m-2s) z - f)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - f)^2}{4 b (m-2s)}\right) + e^{\frac{i f^2}{4 b (m-2 s)} + g - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 b i (m-2s) z)^{j+1} \left(\frac{i (f + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0970.01

$$\int z^n \sin^m\left(\sqrt{z}\, b\right) \sinh(g + f z)\, dz = 2^{-m-2n-2} \Bigg(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{b^2 (m-2s)^2}{4 f} - g + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j (-i b (m-2s))^{-h-j+2n} \left(-2 \sqrt{z}\, f - i b (m-2s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, f - i b (m-2s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i b (m-2s) \left(-2 \sqrt{z}\, f - i b (m-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, f - i b (m-2s)\right)^2}{4 f}\right) - 2 f$$

$$\sqrt{\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)-e^{-\frac{b^2\,(m-2\,s)^2}{4\,f}-g-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)-2\,f$$

$$\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,f}+g+\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,f\sqrt{-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)-i\,b$$

$$(m-2\,s)\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,f}+g-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ -\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{4\,f}\right)+2$$

$$\sqrt{-\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{f}}\ f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\ -\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$f^{-2(n+1)} + (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right) (1 - m \bmod 2) \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + e) \sinh(f z + g)$

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$$\int z^n \sin^m(b z^2 + e) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right)(1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{i f^2}{4 b (m-2s)} - g - i e (m-2s) + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-f - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} + e^{-\frac{i f^2}{4 b (m-2s)} + g - i e (m-2s) + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (f - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{i (f - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) (-i b (m-2s))^{-n-1} - e^{\frac{i f^2}{4 b (m-2s)} - g + e i (m-2s) - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b (m-2s) z - f)^{j+1} \left(\frac{i (2 i b (m-2s) z - f)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - f)^2}{4 b (m-2s)}\right) + e^{\frac{i f^2}{4 b (m-2s)} + g + e i (m-2s) - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 b i (m-2s) z)^{j+1} \left(\frac{i (f + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i (f + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \sin^m(\sqrt{z}\, b + e) \sinh(g + f z)\, dz = 2^{-m-2n-2} \Bigg(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{b^2 (m-2s)^2}{4 f} - i e (m-2s) - g + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2s))^{-h-j+2n} \left(-2 \sqrt{z}\, f - i b (m-2s)\right)^{h+j}$$

$$\left(\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2s)\left(-2\sqrt{z}\ f-i\,b\,(m-2s)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2s)\right)^2}{4f}\right)-2f\sqrt{\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2s)\right)^2}{f}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2s)\right)^2}{4f}\right)\right)\right)-e^{-\frac{b^2(m-2s)^2}{4f}+e\,i\,(m-2s)-g-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s))^{-h-j+2n}\left(i\,b\,(m-2s)-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2s)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(i\,b\,(m-2s)\left(i\,b\,(m-2s)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(i\,b\,(m-2s)-2f\sqrt{z}\right)^2}{4f}\right)-2\right.$$

$$\left.f\sqrt{\frac{\left(i\,b\,(m-2s)-2f\sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(i\,b\,(m-2s)-2f\sqrt{z}\right)^2}{4f}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4f}-i\,e\,(m-2s)+g+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(2f\sqrt{z}-i\,b\,(m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2f\sqrt{z}-i\,b\,(m-2s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2f\sqrt{-\frac{\left(2f\sqrt{z}-i\,b\,(m-2s)\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2f\sqrt{z}-i\,b\,(m-2s)\right)^2}{4f}\right)-i\,b\,(m-2s)\right.$$

$$\left.\left(2f\sqrt{z}-i\,b\,(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2f\sqrt{z}-i\,b\,(m-2s)\right)^2}{4f}\right)\right)+e^{\frac{b^2(m-2s)^2}{4f}+e\,i\,(m-2s)+g-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{4\,f}\right)+2\right.$$

$$\left.\left.\left.\sqrt{-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{4\,f}\right)\right)\right)\right)$$

$$f^{-2\,(n+1)}+(-1)^{n}\,2^{-m-1}\binom{m}{\frac{m}{2}}\left(e^{g}\,f^{-n-1}\,\Gamma(n+1,\,-f\,z)-e^{-g}\,(-f)^{-n-1}\,\Gamma(n+1,\,f\,z)\right)$$

$$(1-m \bmod 2)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^{+}$$

Involving $z^n \sin^m\left(b\,z^r+d\,z\right)\sinh(f\,z+g)$

01.19.21.0973.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \sinh(g + f z)\, dz = (-1)^n\, 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g\, f^{-n-1}\, \Gamma(n+1, -f z) - e^{-g}\, (-f)^{-n-1}\, \Gamma(n+1, f z)\right) (1 - m \bmod 2) + 2^{-m-2}\, i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{i (-f - i d (m-2s))^2}{4 b (m-2s)} - g + \frac{1}{2} i (m-1) \pi} \left(\sum_{j=0}^{n} 2^{j-n}\, (f + d\, i\, (m-2s))^{n-j} (-f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^{j+1} \left(-\frac{i (-f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) (-i\, b\, (m-2s))^{-n-1} + e^{-\frac{i (f - i d (m-2s))^2}{4 b (m-2s)} + g + \frac{1}{2} i (m+1) \pi} \left(\sum_{j=0}^{n} 2^{j-n}\, (i\, d\, (m-2s) - f)^{n-j} (f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^{j+1} \left(-\frac{i (f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - i\, d\, (m-2s) - 2\, i\, b\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) (-i\, b\, (m-2s))^{-n-1} + e^{\frac{i (i d (m-2s) - f)^2}{4 b (m-2s)} - g - \frac{1}{2} i (m+1) \pi} (i\, b\, (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (f - i\, d\, (m-2s))^{n-j} (-f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^{j+1} \left(\frac{i (-f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (-f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right) + e^{\frac{i (f + d i (m-2s))^2}{4 b (m-2s)} + g + \frac{1}{2} i (1-m) \pi} (i\, b\, (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-f - i\, d\, (m-2s))^{n-j} (f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^{j+1} \left(\frac{i (f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + d\, i\, (m-2s) + 2\, b\, i\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0974.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \sinh(g + f z)\, dz = (-1)^n\, 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g\, f^{-n-1}\, \Gamma(n+1, -f z) - e^{-g}\, (-f)^{-n-1}\, \Gamma(n+1, f z)\right) (1 - m \bmod 2) - i\, 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s}$$

$$\left(e^{\frac{b^2 (m-2s)^2}{4(i d (m-2s)-f)}-g-\frac{1}{2} i (m+1)\pi} \left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n} \left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)^2}{i d (m-2s)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b i (m-2s)\left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)^2}{4(i d (m-2s)-f)}\right)+2\sqrt{-\frac{\left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)^2}{i d (m-2s)-f}}$$

$$\left.\left.\left.(i d (m-2s)-f)\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b i (m-2s)+2(i d (m-2s)-f)\sqrt{z}\right)^2}{4(i d (m-2s)-f)}\right)\right)\right)\right)$$

$$(i d (m-2s)-f)^{-2(n+1)} + e^{\frac{b^2 (m-2s)^2}{4(f+d i (m-2s))}+g+\frac{1}{2} i (1-m)\pi} (f+d i (m-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n} \left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)^2}{f+d i (m-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b i (m-2s)\left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)^2}{4(f+d i (m-2s))}\right)+2\sqrt{-\frac{\left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)^2}{f+d i (m-2s)}}$$

$$\left.\left.(f+d i (m-2s))\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b i (m-2s)+2(f+d i (m-2s))\sqrt{z}\right)^2}{4(f+d i (m-2s))}\right)\right)\right)+$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (-f-i d (m-2 s))}-g+\frac{1}{2} i (m-1) \pi} (-f-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 (-f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{-f-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (-f-i d (m-2 s)) \sqrt{-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{-f-i d (m-2 s)}}\ \Gamma\left(\frac{1}{2} (h+j+2), \right.\right.$$

$$\left. -\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{4 (-f-i d (m-2 s))}\right) - i b (m-2 s) \left(2 (-f-i d (m-2 s)) \sqrt{z} - \right.$$

$$\left.\left. i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{4 (-f-i d (m-2 s))}\right)\right) +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (f-i d (m-2 s))}+g+\frac{1}{2} i (m+1) \pi} (f-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 (f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{f-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (f-i d (m-2 s)) \sqrt{-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{f-i d (m-2 s)}}\ \Gamma\left(\frac{1}{2} (h+j+2), \right.\right.$$

$$\left. -\frac{\left(2 (f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{4 (f-i d (m-2 s))}\right) - i b (m-2 s) \left(2 (f-i d (m-2 s)) \sqrt{z} - \right.$$

$$\left.\left.\left. i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (f-i d (m-2 s)) \sqrt{z} - i b (m-2 s)\right)^2}{4 (f-i d (m-2 s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z + e\right) \sinh(f z + g)$

01.19.21.0975.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1}\, \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1}\, \Gamma(n+1, f z)\right) (1 - m \bmod 2) +$$

$$2^{-m-2}\, i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{i(-f - i d (m-2s))^2}{4 b (m-2s)} - g - i e (m-2s) + \frac{1}{2} i (m-1) \pi} \left(\sum_{j=0}^{n} 2^{j-n} (f + d i (m-2s))^{n-j} \right.\right.$$

$$(-f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} +$$

$$e^{-\frac{i(f - i d (m-2s))^2}{4 b (m-2s)} + g - i e (m-2s) + \frac{1}{2} i (m+1) \pi} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f)^{n-j} (f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \right.$$

$$\left. \left(-\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right)$$

$$(-i b (m-2s))^{-n-1} + e^{\frac{i(i d (m-2s) - f)^2}{4 b (m-2s)} - g + e i (m-2s) - \frac{1}{2} i (m+1) \pi} (i b (m-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (f - i d (m-2s))^{n-j} (-f + d i (m-2s) + 2 b i (m-2s) z)^{j+1}$$

$$\left(\frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) +$$

$$e^{\frac{i(f + d i (m-2s))^2}{4 b (m-2s)} + g + e i (m-2s) + \frac{1}{2} i (1-m) \pi} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2s))^{n-j}$$

$$(f + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0976.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + e + d z\right) \sinh(g + f z)\, dz =$$

$$(-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1}\, \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1}\, \Gamma(n+1, f z)\right) (1 - m \bmod 2) -$$

$$i\, 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{\frac{b^2 (m-2s)^2}{4 (i d (m-2s)-f)} + e\, i (m-2s) - g - \frac{1}{2} i (m+1) \pi} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b (m-2s))^{-h-j+2n}$$

$$\left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right)^{h+j} \left(-\frac{\left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right)^2}{i\, d (m-2s) - f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg(b\, i (m-2s) \left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right) \Gamma\Bigg(\frac{1}{2} (h+j+1),$$

$$-\frac{\left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right)^2}{4 (i\, d (m-2s) - f)} \Bigg) + 2 \sqrt{-\frac{\left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right)^2}{i\, d (m-2s) - f}}$$

$$(i\, d (m-2s) - f)\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(b\, i (m-2s) + 2 (i\, d (m-2s) - f) \sqrt{z}\right)^2}{4 (i\, d (m-2s) - f)} \right) \Bigg) \Bigg) \Bigg)$$

$$(i\, d (m-2s) - f)^{-2(n+1)} + e^{\frac{b^2 (m-2s)^2}{4 (f + d\, i (m-2s))} + e\, i (m-2s) + g + \frac{1}{2} i (1-m) \pi} (f + d\, i (m-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b (m-2s))^{-h-j+2n} \left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right)^2}{f + d\, i (m-2s)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg(b\, i (m-2s) \left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right) \Gamma\Bigg(\frac{1}{2} (h+j+1),$$

$$-\frac{\left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right)^2}{4 (f + d\, i (m-2s))} \Bigg) + 2 \sqrt{-\frac{\left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right)^2}{f + d\, i (m-2s)}}$$

$$(f + d\, i (m-2s))\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(b\, i (m-2s) + 2 (f + d\, i (m-2s)) \sqrt{z}\right)^2}{4 (f + d\, i (m-2s))} \right) \Bigg) +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (-f-i d (m-2 s))}-i e (m-2 s)-g+\frac{1}{2} i (m-1) \pi} (-f-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$
$$\left(2 (-f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{-f-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$
$$\binom{j}{h} \binom{n}{j} \left(2 (-f-i d (m-2 s)) \sqrt{-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{-f-i d (m-2 s)}}\ \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$
$$\left.-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (-f-i d (m-2 s))}\right)-i b (m-2 s) \left(2 (-f-i d (m-2 s)) \sqrt{z}-\right.$$
$$\left.\left.i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),-\frac{\left(2 (-f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (-f-i d (m-2 s))}\right)\right)+$$
$$e^{\frac{b^2 (m-2 s)^2}{4 (f-i d (m-2 s))}-i e (m-2 s)+g+\frac{1}{2} i (m+1) \pi} (f-i d (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$
$$\left(2 (f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{f-i d (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$
$$\binom{j}{h} \binom{n}{j} \left(2 (f-i d (m-2 s)) \sqrt{-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{f-i d (m-2 s)}}\ \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$
$$\left.-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (f-i d (m-2 s))}\right)-i b (m-2 s) \left(2 (f-i d (m-2 s)) \sqrt{z}-\right.$$
$$\left.\left.\left.i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),-\frac{\left(2 (f-i d (m-2 s)) \sqrt{z}-i b (m-2 s)\right)^2}{4 (f-i d (m-2 s))}\right)\right)\right) /;\ n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z) \sinh\left(c z^r\right)$

01.19.21.0977.01

$$\int z^n \sin^m(b z) \sinh(c z^2)\, dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left((c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - (-c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right) \right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{b^2 (m-2k)^2}{4c} - \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (i b (m-2k) - 2 c z)^{j+1} \left(\frac{(i b (m-2k) - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i b (m-2k) - 2 c z)^2}{4c} \right) \right) (-c)^{-n-1} - (-c)^{-n-1} e^{-\frac{b^2 (m-2k)^2}{4c} + \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (-i b (m-2k) - 2 c z)^{j+1} \left(\frac{(-i b (m-2k) - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i b (m-2k) - 2 c z)^2}{4c} \right) + c^{-n-1} e^{\frac{b^2 (m-2k)^2}{4c} + \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (2 c z - i b (m-2k))^{j+1} \left(-\frac{(2 c z - i b (m-2k))^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c z - i b (m-2k))^2}{4c} \right) + c^{-n-1} e^{\frac{b^2 (m-2k)^2}{4c} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (b i (m-2k) + 2 c z)^{j+1} \left(-\frac{(b i (m-2k) + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (m-2k) + 2 c z)^2}{4c} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0978.01

$$\int z^n \sin^m(b z) \sinh(\sqrt{z}\, c)\, dz = 2^{-m} \binom{m}{\frac{m}{2}} \left(\Gamma(2(n+1), c\sqrt{z}) - \Gamma(2(n+1), -c\sqrt{z}) \right) (1 - m \bmod 2)\, c^{-2(n+1)} + 2^{-m-2n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (i b (m-2k))^{-2(n+1)} \left(-e^{\frac{i c^2}{4 b (m-2k)} - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 i b (m-2k) \sqrt{z} - c \right)^{h+j} \left(\frac{i \left(2 i b (m-2k) \sqrt{z} - c \right)^2}{b (m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i b (m-2k) \sqrt{\frac{i \left(2 i b (m-2k) \sqrt{z} - c \right)^2}{b (m-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2 i b (m-2k) \sqrt{z} - c \right)^2}{4 b (m-2k)} \right) - c \left(2 i b (m-2k) \sqrt{z} - c \right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(2 i b (m-2k) \sqrt{z} - c \right)^2}{4 b (m-2k)} \right) \right) + \right.$$

$$e^{\frac{i c^2}{4 b (m-2 k)}-\frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2 n} \left(c+2 b i (m-2 k) \sqrt{z}\right)^{h+j} \left(\frac{i \left(c+2 b i (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j} \left(c \left(c+2 b i (m-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(c+2 b i (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)+\right.$$
$$\left.2 b i (m-2 k) \sqrt{\frac{i \left(c+2 b i (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c+2 b i (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)\right)-$$
$$e^{-\frac{i c^2}{4 b (m-2 k)}+\frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 i b (m-2 k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-c-2 i b (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j} \left(-c \left(-c-2 i b (m-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-c-2 i b (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)-\right.$$
$$\left.2 i b (m-2 k) \sqrt{-\frac{i \left(-c-2 i b (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(-c-2 i b (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)\right)+$$
$$e^{-\frac{i c^2}{4 b (m-2 k)}+\frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2 n} \left(c-2 i b (m-2 k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(c-2 i b (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j} \left(c \left(c-2 i b (m-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(c-2 i b (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)-2 i b (m-2 k)\right.$$
$$\left.\left.\sqrt{-\frac{i \left(c-2 i b (m-2 k) \sqrt{z}\right)^2}{b (m-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(c-2 i b (m-2 k) \sqrt{z}\right)^2}{4 b (m-2 k)}\right)\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(d z + e) \sinh(c z^r)$

01.19.21.0979.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(c\,z^2\right)dz = 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left(\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},c\,z^2\right)-\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},-c\,z^2\right)\right)(1-m \bmod 2)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(-e^{-\frac{d^2(m-2k)^2}{4c}+e\,i(m-2k)-\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k))^{n-j}(i\,d(m-2k)-2\,c\,z)^{j+1}\left(\frac{(i\,d(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\right.\right.$$

$$\left.\Gamma\left(\frac{j+1}{2},\frac{(i\,d(m-2k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}e^{-\frac{d^2(m-2k)^2}{4c}-i\,e(m-2k)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(i\,d(m-2k))^{n-j}$$

$$(-i\,d(m-2k)-2\,c\,z)^{j+1}\left(\frac{(-i\,d(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-i\,d(m-2k)-2\,c\,z)^2}{4\,c}\right)+$$

$$c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}-i\,e(m-2k)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(i\,d(m-2k))^{n-j}(2\,c\,z-i\,d(m-2k))^{j+1}$$

$$\left(-\frac{(2\,c\,z-i\,d(m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2\,c\,z-i\,d(m-2k))^2}{4\,c}\right)+$$

$$c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}+e\,i(m-2k)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k))^{n-j}(d\,i(m-2k)+2\,c\,z)^{j+1}$$

$$\left.\left(-\frac{(d\,i(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(m-2k)+2\,c\,z)^2}{4\,c}\right)\right)/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.0980.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(\sqrt{z}\;c\right)dz = 2^{-m}\binom{m}{\frac{m}{2}}\left(-\Gamma\left(2(n+1),-c\sqrt{z}\right)+\Gamma\left(2(n+1),c\sqrt{z}\right)\right)(1-m \bmod 2)\,c^{-2(n+1)}+$$

$$2^{-m-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}(i\,d(m-2k))^{-2(n+1)}\left(-e^{\frac{i\,c^2}{4d(m-2k)}+e\,i(m-2k)-\frac{i\,m\,\pi}{2}}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c)^{-h-j+2n}\left(2\,i\,d(m-2k)\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,d(m-2k)\sqrt{z}-c\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,d(m-2k)\sqrt{\frac{i\left(2\,i\,d(m-2k)\sqrt{z}-c\right)^2}{d(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(2\,i\,d(m-2k)\sqrt{z}-c\right)^2}{4\,d(m-2k)}\right)-\right.$$

$$c\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ \frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2}{4\,d\,(m-2\,k)}+e\,i\,(m-2\,k)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ \frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)+$$

$$2\,d\,i\,(m-2\,k)\sqrt{\frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\ \frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)-$$

$$e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}-i\,e\,(m-2\,k)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\Bigg)-2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\ -\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)+e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}-i\,e\,(m-2\,k)+\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ -\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-2\,i\,d\,(m-2\,k)$$

$$\sqrt{-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\ -\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b z^r)\sinh(c z^r)$

01.19.21.0981.01

$$\int z^{\alpha-1}\sin^m(b z^r)\sinh(c z^r)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}}\left((c z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, c z^r\right)-(-c z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -c z^r\right)\right)(1-m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,\Gamma\left(\frac{\alpha}{r}, (-c-2\,i\,b\,k+i\,b\,m)\,z^r\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}} + (-1)^{m+1}((c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (c-2\,i\,b\,k+i\,b\,m)\,z^r\right) + ((-c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (-c+2\,i\,b\,k-i\,b\,m)\,z^r\right) - ((c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (c+2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)\;/;\; m\in\mathbb{N}^+$$

01.19.21.0982.01

$$\int z^n \sin^m(b z^2)\sinh(c z^2)\,dz = (-1)^m 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left((c z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c z^2\right)-(-c z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -c z^2\right)\right)(1-m \bmod 2) - i^{-m} 2^{-m-2} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,\Gamma\left(\frac{n+1}{2}, (-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^2)^{\frac{1}{2}(-n-1)} + (-1)^{m+1}((c-2\,i\,b\,k+i\,b\,m)\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (c-2\,i\,b\,k+i\,b\,m)\,z^2\right) + ((-c+2\,i\,b\,k-i\,b\,m)\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (-c+2\,i\,b\,k-i\,b\,m)\,z^2\right) - ((c+2\,i\,b\,k-i\,b\,m)\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (c+2\,i\,b\,k-i\,b\,m)\,z^2\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.0983.01

$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c\right)dz = (-1)^m 2^{-m} c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(\Gamma\left(2(n+1), c\sqrt{z}\right)-\Gamma\left(2(n+1), -c\sqrt{z}\right)\right)(1-m \bmod 2) - (2\,i)^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,\Gamma\left(2(n+1), (-c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right)(-c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)} + (-1)^{m+1}(c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1), (c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right) + (-c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1), (-c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right) - (c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1), (c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b z^r+e)\sinh(c z^r)$

01.19.21.0984.01

$$\int z^{\alpha-1} \sin^m(b z^r + e) \sinh(c z^r)\, dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}} \left((c z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, c z^r\right) - (-c z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, -c z^r\right)\right)(1 - m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(\frac{\alpha}{r}, (-c - 2 i b k + i b m) z^r\right)((-c - 2 i b k + i b m) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+1} e^{2 i e k - i e m} ((c - 2 i b k + i b m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c - 2 i b k + i b m) z^r\right) + e^{-2 i e k + i e m} ((-c + 2 i b k - i b m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-c + 2 i b k - i b m) z^r\right) - e^{-2 i e k + i e m} ((c + 2 i b k - i b m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c + 2 i b k - i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.0985.01

$$\int z^n \sin^m(b z^2 + e) \sinh(c z^2)\, dz = (-1)^m 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left((c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - (-c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right)(1 - m \bmod 2) - i^{-m} 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (-c - 2 i b k + i b m) z^2\right)((-c - 2 i b k + i b m) z^2)^{\frac{1}{2}(-n-1)} + (-1)^{m+1} e^{2 i e k - i e m} ((c - 2 i b k + i b m) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - 2 i b k + i b m) z^2\right) + e^{-2 i e k + i e m} ((-c + 2 i b k - i b m) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c + 2 i b k - i b m) z^2\right) - e^{-2 i e k + i e m} ((c + 2 i b k - i b m) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c + 2 i b k - i b m) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0986.01

$$\int z^n \sin^m(\sqrt{z}\, b + e) \sinh(\sqrt{z}\, c)\, dz = (-1)^m 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma(2(n+1), c\sqrt{z}) - \Gamma(2(n+1), -c\sqrt{z})\right)(1 - m \bmod 2) - (2 i)^{-m} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(2(n+1), (-c - 2 i b k + i b m)\sqrt{z}\right)(-c - 2 i b k + i b m)^{-2(n+1)} + (-1)^{m+1} e^{2 i e k - i e m} (c - 2 i b k + i b m)^{-2(n+1)} \Gamma\left(2(n+1), (c - 2 i b k + i b m)\sqrt{z}\right) + e^{-2 i e k + i e m} (-c + 2 i b k - i b m)^{-2(n+1)} \Gamma\left(2(n+1), (-c + 2 i b k - i b m)\sqrt{z}\right) - e^{-2 i e k + i e m} (c + 2 i b k - i b m)^{-2(n+1)} \Gamma\left(2(n+1), (c + 2 i b k - i b m)\sqrt{z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z) \sinh(c z^r)$

01.19.21.0987.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \sinh\left(c z^2\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4 (i b (2k-m) - c)} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4 (c + b i (2k-m))} + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4 (i b (m-2k) - c)} - \frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4 (c + b i (m-2k))} - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0988.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), c \sqrt{z}\right) - \Gamma\left(2(n+1), -c \sqrt{z}\right)\right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n} \left(-c + b i (2s-m) + \right.\right.$$

$$2\, d\, i\, (2\, s - m) \sqrt{z}\Big)^{h+j} \left(\frac{i \left(-c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{d\, (2\, s - m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i\, b\, (2\, s - m) - c) \left(-c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right) \Gamma\Bigg(\frac{1}{2}\, (h + j + 1),$$

$$\frac{i \left(-c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{4\, d\, (2\, s - m)}\Bigg) + 2\, d\, i\, (2\, s - m)\, \Gamma\Bigg(\frac{1}{2}\, (h + j + 2),$$

$$\frac{i \left(-c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{4\, d\, (2\, s - m)}\Bigg) \sqrt{\frac{i \left(-c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{d\, (2\, s - m)}}\Bigg) +$$

$$e^{\frac{i (c + b\, i\, (2\, s - m))^2}{4\, d\, (2\, s - m)} + \frac{i\, m\, \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c + b\, i\, (2\, s - m))^{-h-j+2\, n} \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{i \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{d\, (2\, s - m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((c + b\, i\, (2\, s - m)) \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right) \Gamma\Bigg(\frac{1}{2}\, (h + j + 1),$$

$$\frac{i \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{4\, d\, (2\, s - m)}\Bigg) + 2\, d\, i\, (2\, s - m)\, \Gamma\Bigg(\frac{1}{2}\, (h + j + 2),$$

$$\frac{i \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{4\, d\, (2\, s - m)}\Bigg) \sqrt{\frac{i \left(c + b\, i\, (2\, s - m) + 2\, d\, i\, (2\, s - m) \sqrt{z}\right)^2}{d\, (2\, s - m)}}\Bigg) -$$

$$e^{\frac{i (i\, b\, (m - 2\, s) - c)^2}{4\, d\, (m - 2\, s)} - \frac{i\, m\, \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m - 2\, s) - c)^{-h-j+2\, n} \left(-c + b\, i\, (m - 2\, s) + 2\, d\, i\, (m - 2\, s) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{i \left(-c + b\, i\, (m - 2\, s) + 2\, d\, i\, (m - 2\, s) \sqrt{z}\right)^2}{d\, (m - 2\, s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i\, b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+2\,d\,i\,(m-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+d\,z+e)\sinh(c\,z^r)$

01.19.21.0989.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4(i b (2k-m)-c)} + e i (2k-m) + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4(c + b i (2k-m))} + e i (2k-m) + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4(i b (m-2k)-c)} + e i (m-2k) - \frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4(c + b i (m-2k))} + e i (m-2k) - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0990.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), c\sqrt{z}\right) - \Gamma\left(2(n+1), -c\sqrt{z}\right)\right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} + e i (2s-m) + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n} \right.$$

$$\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i\,b\,(2\,s-m)-c)\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(2\,s-m))^2}{4\,d\,(2\,s-m)}+e\,i\,(2\,s-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)-$$

$$e^{\frac{i\,(i\,b\,(m-2\,s)-c)^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(m-2\,s))\right.$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)\right)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\sinh(c\,z^r+g)$

01.19.21.0991.01

$$\int z^n \sin^m(d z) \sinh\left(c z^2+g\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g} \left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - e^g \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1-m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{d^2 (m-2k)^2}{4c} - g - \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (i d (m-2k) - 2 c z)^{j+1} \left(\frac{(i d (m-2k) - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i d (m-2k) - 2 c z)^2}{4c}\right)\right) (-c)^{-n-1} - (-c)^{-n-1} e^{-\frac{d^2 (m-2k)^2}{4c} - g + \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 c z)^{j+1} \left(\frac{(-i d (m-2k) - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i d (m-2k) - 2 c z)^2}{4c}\right) + c^{-n-1} e^{\frac{d^2 (m-2k)^2}{4c} + g + \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (2 c z - i d (m-2k))^{j+1} \left(-\frac{(2 c z - i d (m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c z - i d (m-2k))^2}{4c}\right) + c^{-n-1} e^{\frac{d^2 (m-2k)^2}{4c} + g - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 c z)^{j+1} \left(-\frac{(d i (m-2k) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 c z)^2}{4c}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.0992.01

$$\int z^n \sin^m(d z) \sinh\left(\sqrt{z}\, c + g\right) dz = 2^{-m} \binom{m}{\frac{m}{2}} \left(e^{-g} \Gamma\left(2(n+1), c \sqrt{z}\right) - e^g \Gamma\left(2(n+1), -c \sqrt{z}\right)\right) (1-m \bmod 2) c^{-2(n+1)} + 2^{-m-2n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (i d (m-2k))^{-2(n+1)} \left(-e^{\frac{i c^2}{4 d (m-2k)} - g - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 i d (m-2k) \sqrt{z} - c\right)^{h+j} \left(\frac{i \left(2 i d (m-2k) \sqrt{z} - c\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i d (m-2k) \sqrt{\frac{i \left(2 i d (m-2k) \sqrt{z} - c\right)^2}{d (m-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2 i d (m-2k) \sqrt{z} - c\right)^2}{4 d (m-2k)}\right) - \right.\right.$$

$$c\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ \frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)+$$

$$e^{\frac{i\,c^2}{4\,d\,(m-2\,k)}+g-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ \frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)+2\,d\,i\,(m-2\,k)\right.$$

$$\left.\sqrt{\frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\ \frac{i\left(c+2\,d\,i\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)-e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}-g+\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-c\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ -\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$\left.2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\ -\frac{i\left(-c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)+$$

$$e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}+g+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\ -\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-2\,i\,d\,(m-2\,k)\right.$$

$$\left.\sqrt{-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\ -\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh(c\,z^r+g)$

01.19.21.0993.01

$$\int z^n \sin^m(e+d\,z)\sinh(c\,z^2+g)\,dz = 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left(e^{-g}\,(c\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,c\,z^2\right)-e^g\,(-c\,z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,-c\,z^2\right)\right)(1-m \bmod 2)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{-\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)-g-\frac{i\,m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(i\,d\,(m-2k)-2\,c\,z)^{j+1}\left(\frac{(i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d\,(m-2k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}\,e^{-\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)-g+\frac{i\,m\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,c\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{4\,c}\right)+c^{-n-1}\,e^{\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)+g+\frac{i\,m\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(2\,c\,z-i\,d\,(m-2k))^{j+1}\left(-\frac{(2\,c\,z-i\,d\,(m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(2\,c\,z-i\,d\,(m-2k))^2}{4\,c}\right)+c^{-n-1}\,e^{\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)+g-\frac{i\,m\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,c\,z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{4\,c}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.0994.01

$$\int z^n \sin^m(e+d\,z)\sinh(\sqrt{z}\,c+g)\,dz = 2^{-m}\binom{m}{\frac{m}{2}}\left(-e^g\,\Gamma\left(2\,(n+1),\,-c\sqrt{z}\right)+e^{-g}\,\Gamma\left(2\,(n+1),\,c\sqrt{z}\right)\right)(1-m \bmod 2)\,c^{-2(n+1)}+2^{-m-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}(i\,d\,(m-2k))^{-2(n+1)}\left(-e^{\frac{i\,c^2}{4\,d\,(m-2k)}-g+e\,i\,(m-2k)-\frac{i\,m\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\right.$$

$$\left(2\,i\,d\,(m-2k)\sqrt{\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{4\,d\,(m-2k)}\right)-\right.$$

$$\left.c\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{4\,d\,(m-2k)}\right)\right)+e^{\frac{i c^2}{4d(m-2k)}+g+e\,i\,(m-2k)-\frac{i m \pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)+\right.$$

$$\left.2\,d\,i\,(m-2k)\sqrt{\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)\right)-$$

$$e^{-\frac{i c^2}{4d(m-2k)}-g-i\,e\,(m-2k)+\frac{i m \pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)-2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+2),-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)\right)+e^{-\frac{i c^2}{4d(m-2k)}+g-i\,e\,(m-2k)+\frac{i m \pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-2\,i\,d\,(m-2\,k)\right.$$

$$\left.\sqrt{-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\sinh(c\,z^r+g)$

01.19.21.0995.01

$$\int z^{\alpha-1}\sin^m(b\,z^r)\sinh(c\,z^r+g)\,dz=-\frac{\left(-\frac{1}{2}\right)^{m+1}z^\alpha\binom{m}{\frac{m}{2}}\left(e^{-g}\,(c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,c\,z^r\right)-e^g\,(-c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-c\,z^r\right)\right)(1-m\bmod 2)}{r}-$$

$$\frac{i^{-m}\,2^{-m-1}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,e^g\,\Gamma\left(\frac{\alpha}{r},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^r\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$(-1)^{m+1}\,e^{-g}\,((c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(c-2\,i\,b\,k+i\,b\,m)\,z^r\right)+e^g\,((-c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}$$

$$\left.\Gamma\left(\frac{\alpha}{r},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^r\right)-e^{-g}\,((c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(c+2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)/;\,m\in\mathbb{N}^+$$

01.19.21.0996.01

$$\int z^n\sin^m\left(b\,z^2\right)\sinh\left(c\,z^2+g\right)dz=$$

$$(-1)^m\,2^{-m-2}\,z^{n+1}\binom{m}{\frac{m}{2}}\left(e^{-g}\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,c\,z^2\right)-e^g\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,-c\,z^2\right)\right)(1-m\bmod 2)-$$

$$i^{-m}\,2^{-m-2}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,e^g\,\Gamma\left(\frac{n+1}{2},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)\left((-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$(-1)^{m+1}\,e^{-g}\left((c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(c-2\,i\,b\,k+i\,b\,m)\,z^2\right)+$$

$$e^g\left((-c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^2\right)-$$

$$\left.e^{-g}\left((c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(c+2\,i\,b\,k-i\,b\,m)\,z^2\right)\right)/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

01.19.21.0997.01

$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\, c+g\right)dz = (-1)^m 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g}\,\Gamma\left(2(n+1),\, c\sqrt{z}\right) - e^g\,\Gamma\left(2(n+1),\, -c\sqrt{z}\right)\right)(1-m \bmod 2) - (2i)^{-m} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^g\,\Gamma\left(2(n+1),\, (-c-2ibk+ibm)\sqrt{z}\right)(-c-2ibk+ibm)^{-2(n+1)} + (-1)^{m+1} e^{-g} (c-2ibk+ibm)^{-2(n+1)}\,\Gamma\left(2(n+1),\, (c-2ibk+ibm)\sqrt{z}\right) + e^g (-c+2ibk-ibm)^{-2(n+1)}\,\Gamma\left(2(n+1),\, (-c+2ibk-ibm)\sqrt{z}\right) - e^{-g} (c+2ibk-ibm)^{-2(n+1)}\,\Gamma\left(2(n+1),\, (c+2ibk-ibm)\sqrt{z}\right)\right) /;\; n\in\mathbb{N} \land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b z^r+e)\sinh(c z^r+g)$

01.19.21.0998.01

$$\int z^{\alpha-1}\sin^m(b z^r+e)\sinh(c z^r+g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}} \left(e^{-g}(c z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\, c z^r\right) - e^g(-c z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\, -c z^r\right)\right)(1-m \bmod 2)}{r} - \frac{i^{-m} 2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{g+2iek-iem}\,\Gamma\left(\frac{\alpha}{r},\, (-c-2ibk+ibm) z^r\right)((-c-2ibk+ibm) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+1} e^{-g+2iek-iem} ((c-2ibk+ibm) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\, (c-2ibk+ibm) z^r\right) + e^{g-2iek+iem} ((-c+2ibk-ibm) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\, (-c+2ibk-ibm) z^r\right) - e^{-g-2iek+iem} ((c+2ibk-ibm) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\, (c+2ibk-ibm) z^r\right)\right) /;\; m\in\mathbb{N}^+$$

01.19.21.0999.01

$$\int z^n \sin^m\left(b z^2+e\right)\sinh\left(c z^2+g\right)dz = (-1)^m 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g}\left(c z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\, c z^2\right) - e^g\left(-c z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\, -c z^2\right)\right)(1-m \bmod 2) - i^{-m} 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{g+2iek-iem}\,\Gamma\left(\frac{n+1}{2},\, (-c-2ibk+ibm) z^2\right)\left((-c-2ibk+ibm) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{m+1} e^{-g+2iek-iem} \left((c-2ibk+ibm) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\, (c-2ibk+ibm) z^2\right) + e^{g-2iek+iem} \left((-c+2ibk-ibm) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\, (-c+2ibk-ibm) z^2\right) - e^{-g-2iek+iem} \left((c+2ibk-ibm) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\, (c+2ibk-ibm) z^2\right)\right) /;\; n\in\mathbb{N} \land m\in\mathbb{N}^+$$

01.19.21.1000.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g\right) dz = (-1)^m 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g}\, \Gamma\left(2(n+1),\, c\sqrt{z}\right) - e^g\, \Gamma\left(2(n+1),\, -c\sqrt{z}\right)\right)(1 - m \bmod 2) - (2\,i)^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{g+2\,i\,e\,k-i\,e\,m}\, \Gamma\left(2(n+1),\, (-c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right)(-c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)} + (-1)^{m+1} e^{-g+2\,i\,e\,k-i\,e\,m} (c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)}\, \Gamma\left(2(n+1),\, (c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right) + e^{g-2\,i\,e\,k+i\,e\,m} (-c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\, \Gamma\left(2(n+1),\, (-c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right) - e^{-g-2\,i\,e\,k+i\,e\,m} (c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\, \Gamma\left(2(n+1),\, (c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b\, z^r + d\, z\right) \sinh\left(c\, z^r + g\right)$

01.19.21.1001.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \sinh\left(c z^2 + g\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g} \left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - e^g \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4(i b (2k-m)-c)} - g + \frac{i m \pi}{2}} \left(\sum_{j=0}^n 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4(c + b i (2k-m))} + g + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^n 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4(i b (m-2k)-c)} - g - \frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^n 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4(c + b i (m-2k))} + g - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^n 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1002.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g} \Gamma\left(2(n+1), c\sqrt{z}\right) - e^g \Gamma\left(2(n+1), -c\sqrt{z}\right)\right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} - g + \frac{i m \pi}{2}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n} \left(-c + b i (2s-m) + \right.\right.$$

$$2\,d\,i\,(2\,s-m)\,\sqrt{z}\Big)^{h+j}\left(\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(2\,s-m)-c)\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(2\,s-m))^2}{4\,d\,(2\,s-m)}+g+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)-$$

$$e^{\frac{i\,(i\,b\,(m-2\,s)-c)^2}{4\,d\,(m-2\,s)}-g-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+g-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(m-2\,s))\right.$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+g\right)$

01.19.21.1003.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz ==$$

$$2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g} \left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - e^g \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) -$$

$$2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4 (i b (2k-m) - c)} + e i (2k-m) - g + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right)$$

$$(i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4 (c + b i (2k-m))} + e i (2k-m) + g + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j}$$

$$(d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4 (i b (m-2k) - c)} + e i (m-2k) - g - \frac{i m \pi}{2}}$$

$$(i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1}$$

$$\left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) +$$

$$e^{\frac{d^2 (m-2k)^2}{4 (c + b i (m-2k))} + e i (m-2k) + g - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j}$$

$$(d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1004.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + g\right) dz ==$$

$$2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g} \Gamma\left(2 (n+1), c \sqrt{z}\right) - e^g \Gamma\left(2 (n+1), -c \sqrt{z}\right)\right) (1 - m \bmod 2) -$$

$$2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} - g + e i (2s-m) + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n}\right.$$

$$\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(\left(i\,b\,(2s-m)-c\right)\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)+2\,d\,i\,(2s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)\sqrt{\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(2s-m))^2}{4\,d\,(2s-m)}+g+e\,i\,(2s-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2s-m))^{-h-j+2n}\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c+b\,i\,(2s-m))\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)+2\,d\,i\,(2s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)\sqrt{\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\right)-$$

$$e^{\frac{i\,(i\,b\,(m-2s)-c)^2}{4\,d\,(m-2s)}-g+e\,i\,(m-2s)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c)^{-h-j+2n}\left(-c+b\,i\,(m-2s)+2\,d\,i\,(m-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2s)+2\,d\,i\,(m-2s)\sqrt{z}\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\, (m-2\, s)-c)\left(-c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$
$$\left.\frac{i\left(-c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{4\, d\, (m-2\, s)}\right)+2\, d\, i\, (m-2\, s)\, \Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$
$$\left.\left.\frac{i\left(-c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{4\, d\, (m-2\, s)}\right)\sqrt{\frac{i\left(-c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{d\, (m-2\, s)}}\right)+$$
$$e^{\frac{i\,(c+b\, i\,(m-2\, s))^2}{4\, d\,(m-2\, s)}+g+e\, i\,(m-2\, s)-\frac{i\, m\, \pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(c+b\, i\,(m-2\, s))^{-h-j+2\, n}\left(c+b\, i\,(m-2\, s)+2\, d\, i\,(m-2\, s)\, \sqrt{z}\right)^{h+j}$$
$$\left(\frac{i\left(c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{d\, (m-2\, s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((c+b\, i\, (m-2\, s))\right.$$
$$\left(c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{i\left(c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{4\, d\, (m-2\, s)}\right)+$$
$$2\, d\, i\, (m-2\, s)\, \Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{i\left(c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{4\, d\, (m-2\, s)}\right)$$
$$\left.\left.\sqrt{\frac{i\left(c+b\, i\, (m-2\, s)+2\, d\, i\, (m-2\, s)\, \sqrt{z}\right)^2}{d\, (m-2\, s)}}\right)\right)\, /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\, z) \sinh\left(c\, z^r + f\, z\right)$

01.19.21.1005.01

$$\int z^n \sin^m(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f-2\,c\,z)^{j+1} \left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2\,c\,z)^2}{4\,c}\right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f+2\,c\,z)^{j+1} \left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2\,c\,z)^2}{4\,c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{(i\,d\,(m-2k)-f)^2}{4c}-\frac{i\,m\,\pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f-i\,d\,(m-2\,k))^{n-j} (-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1} \left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1} e^{\frac{(i\,d\,(2k-m)-f)^2}{4c}+\frac{i\,m\,\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (f-i\,d\,(2\,k-m))^{n-j} (-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1} \left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right) + c^{-n-1} e^{-\frac{(f+d\,i\,(2k-m))^2}{4c}+\frac{i\,m\,\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-f-i\,d\,(2\,k-m))^{n-j} (f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1} \left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right) + c^{-n-1} e^{-\frac{(f+d\,i\,(m-2k))^2}{4c}-\frac{i\,m\,\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-f-i\,d\,(m-2\,k))^{n-j} (f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1} \left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1006.01

$$\int z^n \sin^m(d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2\,n} \left(c+2\,f\,\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c\left(c+2\,f\,\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}} \; f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}} \; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2}+2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{-\frac{c^2}{4 (i d (2 s-m)-f)}+\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2 n} \left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{i d (2 s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2 (i d (2 s-m)-f)$$

$$\sqrt{-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{i d (2 s-m)-f}} \; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{4 (i d (2 s-m)-f)}\right)-c$$

$$\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{4 (i d (2 s-m)-f)}\right)\Bigg)\Bigg)$$

$$(i d (2 s-m)-f)^{-2 n-2}+e^{-\frac{c^2}{4 (f+d i (2 s-m))}+\frac{i m \pi}{2}} (f+d i (2 s-m))^{-2 n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2 n} \left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^2}{f+d i (2 s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(c\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^2}{4 (f+d i (2 s-m))}\right)+$$

$$2 \sqrt{-\frac{\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^2}{f+d i (2 s-m)}} \; (f+d i (2 s-m))\, \Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)\right)-$$

$$e^{-\frac{c^2}{4\,(i\,d\,(m-2\,s)-f)}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d\,(m-2\,s)-f)\right.$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$\left.c\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4\,(f+d\,i\,(m-2\,s))}-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\right($$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+2\,\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$\left.\left.(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1007.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1} e^{\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2\,c\,z)^2}{4\,c}\right)-c^{-n-1} e^{-\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{\frac{(i\,d\,(m-2\,k)-f)^2}{4\,c}+e\,i\,(m-2\,k)-\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n} 2^{j-n}(f-i\,d\,(m-2\,k))^{n-j}(-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1} e^{\frac{(i\,d\,(2\,k-m)-f)^2}{4\,c}+e\,i\,(2\,k-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n} 2^{j-n}(f-i\,d\,(2\,k-m))^{n-j}(-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right)+c^{-n-1} e^{-\frac{(f+d\,i\,(2\,k-m))^2}{4\,c}+e\,i\,(2\,k-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n} 2^{j-n}(-f-i\,d\,(2\,k-m))^{n-j}(f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+c^{-n-1} e^{-\frac{(f+d\,i\,(m-2\,k))^2}{4\,c}+e\,i\,(m-2\,k)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n} 2^{j-n}(-f-i\,d\,(m-2\,k))^{n-j}(f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1008.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(e^{-\frac{c^2}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)-$$

$$e^{\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(-c\left(-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)-\right.$$

$$\left.2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\right)\Bigg)f^{-2n-2}+$$

$$2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(-e^{-\frac{c^2}{4(i d(2s-m)-f)}+e\,i(2s-m)+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{i d(2s-m)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2(i d(2s-m)-f)$$

$$\sqrt{-\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{i d(2s-m)-f}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i d(2s-m)-f)}\right)-c$$

$$\left(2(i d(2s-m)-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i d(2s-m)-f)}\right)\Bigg)\Bigg)$$

$$(i d(2s-m)-f)^{-2n-2}+e^{-\frac{c^2}{4(f+d\,i(2s-m))}+e\,i(2s-m)+\frac{i m\pi}{2}}\,(f+d\,i(2s-m))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{f+d\,i(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{4(f+d\,i(2s-m))}\right)+\right.$$

$$2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\;(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)\right)-e^{-\frac{c^2}{4\,(i\,d\,(m-2\,s)-f)}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}$$

$$(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d\,(m-2\,s)-f)\right.$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$\left.\left.c\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\right)\right)+$$

$$e^{-\frac{c^2}{4\,(f+d\,i\,(m-2\,s))}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$\left.\left.\left.(f+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r)\sinh(c\,z^r+f\,z)$

01.19.21.1009.01

$$\int z^n \sin^m(b z^2) \sinh(c z^2 + f z)\, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c} \right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{i m \pi}{2} - \frac{f^2}{4(i b(2k-m)-c)}} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(2k-m)-c) z - f)^{j+1} \left(-\frac{(2(i b(2k-m)-c)z - f)^2}{i b(2k-m)-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)} \right) \right) (i b(2k-m)-c)^{-n-1} + e^{\frac{i m \pi}{2} - \frac{f^2}{4(c+b i(2k-m))}} (c + b i(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + b i(2k-m)) z)^{j+1} \left(-\frac{(f + 2(c+b i(2k-m))z)^2}{c + b i(2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))} \right) - e^{-\frac{f^2}{4(i b(m-2k)-c)} - \frac{i m \pi}{2}} (i b(m-2k)-c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(m-2k)-c)z - f)^{j+1} \left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)} \right) + e^{-\frac{f^2}{4(c+b i(m-2k))} - \frac{i m \pi}{2}} (c + b i(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c+b i(m-2k))z)^{j+1} \left(-\frac{(f+2(c+b i(m-2k))z)^2}{c+b i(m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1010.01

$$\int z^n \sin^m(b\sqrt{z}) \sinh(\sqrt{z}\, c + f z)\, dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 f\sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z} \right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)-2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2}+2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(-e^{\frac{(i\,b\,(2s-m)-c)^2}{4f}+\frac{i\,m\,\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2s-m)-c)^{-h-j+2n}$$

$$\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(2s-m)-c)\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right)-2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)(-f)^{-2n-2}-$$

$$e^{\frac{(i\,b\,(m-2s)-c)^2}{4f}-\frac{i\,m\,\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c)^{-h-j+2n}\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2s)-c)\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{4f}\right)-2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}-\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\,\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+e)\sinh(c\,z^r+f\,z)$

01.19.21.1011.01

$$\int z^n \sin^m\left(b z^2+e\right)\sinh\left(c z^2+f z\right) dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1} e^{\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(-f-2cz)^{j+1}\left(\frac{(-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2cz)^2}{4c}\right)-\right.$$
$$\left.c^{-n-1} e^{-\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2cz)^{j+1}\left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2cz)^2}{4c}\right)\right)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k$$
$$\binom{m}{k}\left(-e^{-\frac{f^2}{4(i b(2k-m)-c)}+e i(2k-m)+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j}(2(i b(2k-m)-c)z-f)^{j+1}\left(-\frac{(2(i b(2k-m)-c)z-f)^2}{i b(2k-m)-c}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)}\right)\right)(i b(2k-m)-c)^{-n-1}+$$
$$e^{-\frac{f^2}{4(c+b i(2k-m))}+e i(2k-m)+\frac{i m\pi}{2}}(c+b i(2k-m))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2(c+b i(2k-m))z)^{j+1}$$
$$\left(-\frac{(f+2(c+b i(2k-m))z)^2}{c+b i(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))}\right)-$$
$$e^{-\frac{f^2}{4(i b(m-2k)-c)}+e i(m-2k)-\frac{i m\pi}{2}}(i b(m-2k)-c)^{-n-1}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(2(i b(m-2k)-c)z-f)^{j+1}$$
$$\left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)}\right)+$$
$$e^{-\frac{f^2}{4(c+b i(m-2k))}+e i(m-2k)-\frac{i m\pi}{2}}(c+b i(m-2k))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2(c+b i(m-2k))z)^{j+1}$$
$$\left.\left(-\frac{(f+2(c+b i(m-2k))z)^2}{c+b i(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))}\right)\right)\text{/; } n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1012.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right)\sinh\left(\sqrt{z}\, c+f z\right) dz = 2^{-m-2n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\left(e^{-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j c^{-h-j+2n}\left(c+2f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\ f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2} + 2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{\frac{(i b (2 s-m)-c)^2}{4 f} + e\, i (2 s-m) + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2 s-m)-c)^{-h-j+2 n}$$

$$\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c)\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f$$

$$\sqrt{\frac{\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b\, i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)(-f)^{-2 n-2} -$$

$$e^{\frac{(i b (m-2 s)-c)^2}{4 f} + e\, i (m-2 s) - \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s)-c)^{-h-j+2 n} \left(-c+b\, i (m-2 s)-2 f \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b\, i (m-2 s)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (m-2 s)-c)\left(-c+b\, i (m-2 s)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\, i (m-2 s)-2 f \sqrt{z}\right)^2}{4 f}\right) - 2$$

$$f\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)$$

$$(-f)^{-2\,n-2}+e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+e\,i\,(2\,s-m)+\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1013.01

$$\int z^n\sin^m\left(b\,z^2+d\,z\right)\sinh\left(c\,z^2+f\,z\right)dz=$$

$$2^{-m-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\Bigg((-c)^{-n-1}\,e^{\frac{f^2}{4\,c}}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-f-2\,c\,z)^2}{4\,c}\right)-$$

$$c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f+2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\Bigg) -$$

$$2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \Bigg(-e^{-\frac{(i d (2k-m)-f)^2}{4(i b(2k-m)-c)}+\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (f - i d (2k-m))^{n-j} (-f + d i (2k-m) + 2(i b (2k-m) - c) z)^{j+1}$$

$$\left(-\frac{(-f + d i (2k-m) + 2(i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (2k-m) + 2(i b(2k-m) - c) z)^2}{4(i b (2k-m) - c)}\right)\Bigg) (i b (2k-m) - c)^{-n-1} +$$

$$e^{-\frac{(f+d i (2k-m))^2}{4(c+b i (2k-m))}+\frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k-m))^{n-j}$$

$$(f + d i (2k-m) + 2(c + b i (2k-m)) z)^{j+1} \left(-\frac{(f + d i (2k-m) + 2(c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2k-m) + 2(c + b i (2k-m)) z)^2}{4(c + b i (2k-m))}\right) -$$

$$e^{-\frac{(i d (m-2k)-f)^2}{4(i b (m-2k)-c)}-\frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2k))^{n-j} (-f + d i (m-2k) + 2(i b (m-2k) - c) z)^{j+1}$$

$$\left(-\frac{(-f + d i (m-2k) + 2(i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (m-2k) + 2(i b (m-2k) - c) z)^2}{4(i b (m-2k) - c)}\right) +$$

$$e^{-\frac{(f+d i (m-2k))^2}{4(c+b i (m-2k))}-\frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2k))^{n-j}$$

$$(f + d i (m-2k) + 2(c + b i (m-2k)) z)^{j+1} \left(-\frac{(f + d i (m-2k) + 2(c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m-2k) + 2(c + b i (m-2k)) z)^2}{4(c + b i (m-2k))}\right)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1014.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c + 2 f \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c\left(-c - 2 f \sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)$$

$$f^{-2n-2} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{(i b (2s-m) - c)^2}{4 (i d (2s-m) - f)} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2s-m) - c)^{-h-j+2n} \left(-c + b\, i (2s-m) + \right.\right.\right.$$

$$\left. 2 (i d (2s-m) - f) \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{i d (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((i b (2s-m) - c)\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right) + 2$$

$$(i d (2s-m) - f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\right)\right)(i\,d\,(2\,s-m)-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}+\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\right)-e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\left.\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\right)+e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+\right.$$

$$\left.2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\sin^m(b\,z^r+d\,z+e)\sinh(c\,z^r+f\,z)$

01.19.21.1015.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 c z)^{j+1} \left(\frac{(-f - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f - 2 c z)^2}{4c}\right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 c z)^{j+1} \left(-\frac{(f + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 c z)^2}{4c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{(i d (2k-m) - f)^2}{4 (i b (2k-m) - c)} + e i (2k-m) + \frac{i m \pi}{2}} (i b (2k-m) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (2k-m))^{n-j} (-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right) + e^{-\frac{(f + d i (2k-m))^2}{4 (c + b i (2k-m))} + e i (2k-m) + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k-m))^{n-j} (f + d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(f + d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{-\frac{(i d (m-2k) - f)^2}{4 (i b (m-2k) - c)} + e i (m-2k) - \frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2k))^{n-j} (-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{-\frac{(f + d i (m-2k))^2}{4 (c + b i (m-2k))} + e i (m-2k) - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2k))^{n-j} (f + d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(f + d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1016.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, f^{-2n-2}$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4f}\right)\right) -$$

$$e^{\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 f \sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4f}\right)\right)\right) +$$

$$2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{(i b (2s-m) - c)^2}{4 (i d (2s-m) - f)} + e\, i (2s-m) + \frac{i m \pi}{2}} (i d (2s-m) - f)^{-2n-2}\right.$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2s-m) - c)^{-h-j+2n} \left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{i d (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i b (2s-m) - c) \left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right) +$$

$$2 (i d (2s-m) - f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right)$$

$$\left.\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\right)+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}+e\,i\,(2\,s-m)+\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\right)-$$

$$e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}$$

$$\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\right)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\right($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\sin^m(d\,z)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1017.01

$$\int z^n \sin^m(d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1}e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}f^{n-j}(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2\,c\,z)^2}{4\,c}\right)-\right.$$

$$\left.c^{-n-1}e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}(-f)^{n-j}(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)-$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{\frac{(i\,d\,(m-2k)-f)^2}{4c}-g-\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(m-2\,k))^{n-j}(-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$

$$(-c)^{-n-1}e^{\frac{(i\,d\,(2k-m)-f)^2}{4c}-g+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(2\,k-m))^{n-j}(-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1}$$

$$\left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right)+$$

$$c^{-n-1}e^{-\frac{(f+d\,i\,(2k-m))^2}{4c}+g+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(2\,k-m))^{n-j}(f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1}$$

$$\left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+$$

$$c^{-n-1}e^{-\frac{(f+d\,i\,(m-2k))^2}{4c}+g-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(m-2\,k))^{n-j}(f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1}$$

$$\left.\left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\right)/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1018.01

$$\int z^n \sin^m(d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\,\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\ f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4f}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)-2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2}+2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(-e^{-\frac{c^2}{4(i\,d(2s-m)-f)}-g+\frac{i\,m\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)^{h+j}$$

$$\left(-\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)^2}{i\,d(2s-m)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2(i\,d(2s-m)-f)$$

$$\sqrt{-\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)^2}{i\,d(2s-m)-f}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)^2}{4(i\,d(2s-m)-f)}\right)-c$$

$$\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}\ -c\right)^2}{4(i\,d(2s-m)-f)}\right)\Bigg)\Bigg)$$

$$(i\,d(2s-m)-f)^{-2n-2}+e^{-\frac{c^2}{4(f+d\,i(2s-m))}+g+\frac{i\,m\pi}{2}}\,(f+d\,i(2s-m))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{f+d\,i(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{4(f+d\,i(2s-m))}\right)+$$

$$2\sqrt{-\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{f+d\,i(2s-m)}}\ (f+d\,i(2s-m))\,\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+2),\, -\frac{\left(c+2\left(f+d\,i\,(2\,s-m)\right)\sqrt{z}\right)^2}{4\left(f+d\,i\,(2\,s-m)\right)}\right)\right)-$$

$$e^{-\frac{c^2}{4(i\,d\,(m-2\,s)-f)}-g-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d\,(m-2\,s)-f)\right.$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$\left.c\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f+d\,i\,(m-2\,s))}+g-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)\Gamma\right.\!\Bigg($$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$\left.\left.(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1019.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1}e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}f^{n-j}(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2\,c\,z)^2}{4\,c}\right)-c^{-n-1}e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}(-f)^{n-j}(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{\frac{(i\,d\,(m-2k)-f)^2}{4c}-g+e\,i\,(m-2k)-\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(m-2\,k))^{n-j}(-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}e^{\frac{(i\,d\,(2k-m)-f)^2}{4c}-g+e\,i\,(2k-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(2\,k-m))^{n-j}(-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right)+c^{-n-1}e^{-\frac{(f+d\,i\,(2k-m))^2}{4c}+g+e\,i\,(2k-m)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(2\,k-m))^{n-j}(f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+c^{-n-1}e^{-\frac{(f+d\,i\,(m-2k))^2}{4c}+g+e\,i\,(m-2k)-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(m-2\,k))^{n-j}(f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1020.01

$$\int z^n \sin^m(e+d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\, f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg) -$$

$$e^{\frac{c^2}{4f}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(-c\left(-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right) -$$

$$2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)f^{-2n-2} +$$

$$2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(-e^{-\frac{c^2}{4(i d(2s-m)-f)}-g+e\,i(2s-m)+\frac{i m\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{i d(2s-m)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2(i d(2s-m)-f)$$

$$\sqrt{-\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{i d(2s-m)-f}}\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i d(2s-m)-f)}\right) - c$$

$$\left(2(i d(2s-m)-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i d(2s-m)-f)}\right)\Bigg)\Bigg)$$

$$(i d(2s-m)-f)^{-2n-2} + e^{-\frac{c^2}{4(f+d\,i(2s-m))}+g+e\,i(2s-m)+\frac{i m\pi}{2}}\,(f+d\,i(2s-m))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{f+d\,i(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{4(f+d\,i(2s-m))}\right) +$$

$$2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\,(f+d\,i\,(2\,s-m))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)\right)-e^{-\frac{c^2}{4\,(i\,d\,(m-2\,s)-f)}-g+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}$$

$$(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d\,(m-2\,s)-f)\right.$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$\left.c\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4\,(f+d\,i\,(m-2\,s))}+g+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)\Gamma\!\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$\left.\left.(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r)\sinh(c\,z^r+f\,z+g)$

01.19.21.1021.01

$$\int z^n \sin^m(b z^2)\sinh(c z^2 + f z + g)\, dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\left((-c)^{-n-1} e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(-f-2cz)^{j+1}\left(\frac{(-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c}\right) - c^{-n-1} e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2cz)^{j+1}\left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\right) - 2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{-\frac{f^2}{4(i b(2k-m)-c)}-g+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j}(2(i b(2k-m)-c)z-f)^{j+1}\left(-\frac{(2(i b(2k-m)-c)z-f)^2}{i b(2k-m)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)}\right)\right)(i b(2k-m)-c)^{-n-1} + e^{-\frac{f^2}{4(c+b i(2k-m))}+g+\frac{i m\pi}{2}}(c+b i(2k-m))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2(c+b i(2k-m))z)^{j+1}\left(-\frac{(f+2(c+b i(2k-m))z)^2}{c+b i(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))}\right) - e^{-\frac{f^2}{4(i b(m-2k)-c)}-g-\frac{i m\pi}{2}}(i b(m-2k)-c)^{-n-1}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(2(i b(m-2k)-c)z-f)^{j+1}\left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)}\right) + e^{-\frac{f^2}{4(c+b i(m-2k))}+g-\frac{i m\pi}{2}}(c+b i(m-2k))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2(c+b i(m-2k))z)^{j+1}\left(-\frac{(f+2(c+b i(m-2k))z)^2}{c+b i(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))}\right)\right) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

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$$\int z^n \sin^m(b\sqrt{z})\sinh(\sqrt{z}\, c + g + f z)\, dz = 2^{-m-2n-2}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)$$

$$\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j c^{-h-j+2n}\left(c+2f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4 f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2}+2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{\frac{(i b (2 s-m)-c)^2}{4 f}-g+\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2 s-m)-c)^{-h-j+2 n}$$

$$\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c)\left(-c+b i (2 s-m)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)(-f)^{-2 n-2}-$$

$$e^{\frac{(i b (m-2 s)-c)^2}{4 f}-g-\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (m-2 s)-c)^{-h-j+2 n} \left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (m-2 s)-c)\left(-c+b i (m-2 s)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+g+\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+g-\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\,\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+e\right)\sinh\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin^m\left(b z^2 + e\right) \sinh\left(c z^2 + f z + g\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c} - g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c} \right) - c^{-n-1} e^{g - \frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{f^2}{4(i b(2k-m)-c)} - g + e i (2k-m) + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 (i b (2k-m) - c) z - f)^{j+1} \left(-\frac{(2 (i b (2k-m) - c) z - f)^2}{i b (2k-m) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (i b (2k-m) - c) z - f)^2}{4 (i b (2k-m) - c)} \right) \right) (i b (2k-m) - c)^{-n-1} + e^{-\frac{f^2}{4(c + b i (2k-m))} + g + e i (2k-m) + \frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(f + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))} \right) - e^{-\frac{f^2}{4(i b (m-2k) - c)} - g + e i (m-2k) - \frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 (i b (m-2k) - c) z - f)^{j+1} \left(-\frac{(2 (i b (m-2k) - c) z - f)^2}{i b (m-2k) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (i b (m-2k) - c) z - f)^2}{4 (i b (m-2k) - c)} \right) + e^{-\frac{f^2}{4(c + b i (m-2k))} + g + e i (m-2k) - \frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(f + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1024.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(e^{g - \frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}} \, f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4 f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2} + 2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(-e^{\frac{(i b (2 s-m)-c)^2}{4 f}-g+e i (2 s-m)+\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2 s-m)-c)^{-h-j+2 n}$$

$$\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c) \left(-c+b i (2 s-m)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f$$

$$\sqrt{\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)(-f)^{-2 n-2} -$$

$$e^{\frac{(i b (m-2 s)-c)^2}{4 f}-g+e i (m-2 s)-\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s)-c)^{-h-j+2 n} \left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (m-2 s)-c) \left(-c+b i (m-2 s)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{4 f}\right) - 2$$

$$f\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)$$

$$(-f)^{-2\,n-2}+e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+g+e\,i\,(2\,s-m)+\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+g+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+d\,z\right)\sinh\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\sin^m\left(b\,z^2+d\,z\right)\sinh\left(c\,z^2+f\,z+g\right)dz=$$

$$2^{-m-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\Bigg((-c)^{-n-1}\,e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}\,(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f-2\,c\,z)^2}{4\,c}\right)-$$

$$c^{-n-1}\, e^{g-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f+2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\Bigg) -$$

$$2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(-e^{-\frac{(i d (2k-m)-f)^2}{4(i b (2k-m)-c)}-g+\frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (f - i d (2k-m))^{n-j} (-f + d i (2k-m) + 2(i b (2k-m) - c) z)^{j+1}$$

$$\left(-\frac{(-f + d i (2k-m) + 2(i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(-f + d i (2k-m) + 2(i b (2k-m) - c) z)^2}{4(i b (2k-m) - c)}\right)\Bigg) (i b (2k-m) - c)^{-n-1} +$$

$$e^{-\frac{(f + d i (2k-m))^2}{4(c + b i (2k-m))}+g+\frac{i m \pi}{2}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k-m))^{n-j}$$

$$(f + d i (2k-m) + 2(c + b i (2k-m)) z)^{j+1} \left(-\frac{(f + d i (2k-m) + 2(c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f + d i (2k-m) + 2(c + b i (2k-m)) z)^2}{4(c + b i (2k-m))}\right) -$$

$$e^{-\frac{(i d (m-2k)-f)^2}{4(i b (m-2k)-c)}-g-\frac{i m \pi}{2}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2k))^{n-j}$$

$$(-f + d i (m-2k) + 2(i b (m-2k) - c) z)^{j+1} \left(-\frac{(-f + d i (m-2k) + 2(i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-f + d i (m-2k) + 2(i b (m-2k) - c) z)^2}{4(i b (m-2k) - c)}\right) +$$

$$e^{-\frac{(f + d i (m-2k))^2}{4(c + b i (m-2k))}+g-\frac{i m \pi}{2}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2k))^{n-j}$$

$$(f + d i (m-2k) + 2(c + b i (m-2k)) z)^{j+1} \left(-\frac{(f + d i (m-2k) + 2(c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f + d i (m-2k) + 2(c + b i (m-2k)) z)^2}{4(c + b i (m-2k))}\right)\Bigg) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{g-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{c^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 f \sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right)$$

$$f^{-2n-2} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{(i b (2s-m) - c)^2}{4 (i d (2s-m) - f)} - g + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2s-m) - c)^{-h-j+2n} \left(-c + b\, i (2s-m) + \right.\right.\right.$$

$$\left. 2 (i d (2s-m) - f) \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{i d (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((i b (2s-m) - c) \left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right) + 2$$

$$(i d (2s-m) - f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\right)\right)(i\,d\,(2\,s-m)-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}+g+\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\right)-e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}-g-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\;\Bigg)+e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}+g-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\Big(c+b\,i\,(m-2\,s)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\;\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\!\left(b\,z^r+d\,z+e\right)\sinh\!\left(c\,z^r+f\,z+g\right)$

01.19.21.1027.01

$$\int z^n \sin^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c} - g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 c z)^{j+1} \left(\frac{(-f - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f - 2 c z)^2}{4 c} \right) - c^{-n-1} e^{g - \frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 c z)^{j+1} \left(-\frac{(f + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 c z)^2}{4 c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{(i d (2k-m) - f)^2}{4 (i b (2k-m) - c)} - g + e i (2k-m) + \frac{i m \pi}{2}} (i b (2k - m) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (2k - m))^{n-j} (-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^{j+1} \left(-\frac{(-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^2}{i b (2k - m) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^2}{4 (i b (2k - m) - c)} \right) + e^{-\frac{(f + d i (2k-m))^2}{4 (c + b i (2k-m))} + g + e i (2k-m) + \frac{i m \pi}{2}} (c + b i (2k - m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k - m))^{n-j} (f + d i (2k - m) + 2 (c + b i (2k - m)) z)^{j+1} \left(-\frac{(f + d i (2k - m) + 2 (c + b i (2k - m)) z)^2}{c + b i (2k - m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2k - m) + 2 (c + b i (2k - m)) z)^2}{4 (c + b i (2k - m))} \right) - e^{-\frac{(i d (m-2k) - f)^2}{4 (i b (m-2k) - c)} - g + e i (m-2k) - \frac{i m \pi}{2}} (i b (m - 2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m - 2k))^{n-j} (-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^{j+1} \left(-\frac{(-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^2}{i b (m - 2k) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^2}{4 (i b (m - 2k) - c)} \right) + e^{-\frac{(f + d i (m-2k))^2}{4 (c + b i (m-2k))} + g + e i (m-2k) - \frac{i m \pi}{2}} (c + b i (m - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m - 2k))^{n-j} (f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^{j+1} \left(-\frac{(f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^2}{c + b i (m - 2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^2}{4 (c + b i (m - 2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1028.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh\left(\sqrt{z}\, c + f\, z + g\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, f^{-2n-2} \left(e^{g-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) - e^{\frac{c^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(-e^{-\frac{(i b (2s-m)-c)^2}{4 (i d (2s-m)-f)} - g + e\, i (2s-m) + \frac{i m \pi}{2}} (i\, d\, (2s-m) - f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (2s-m) - c)^{-h-j+2n} \left(-c + b\, i\, (2s-m) + 2 (i\, d\, (2s-m) - f) \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c + b\, i\, (2s-m) + 2 (i\, d\, (2s-m) - f) \sqrt{z}\right)^2}{i\, d\, (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i\, b\, (2s-m) - c) \left(-c + b\, i\, (2s-m) + 2 (i\, d\, (2s-m) - f) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + b\, i\, (2s-m) + 2 (i\, d\, (2s-m) - f) \sqrt{z}\right)^2}{4 (i\, d\, (2s-m) - f)}\right) + 2 (i\, d\, (2s-m) - f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c + b\, i\, (2s-m) + 2 (i\, d\, (2s-m) - f) \sqrt{z}\right)^2}{4 (i\, d\, (2s-m) - f)}\right)\right.$$

$$\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}+g+e\,i\,(2\,s-m)+\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\Bigg)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\Bigg)-$$

$$e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}-g+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}$$

$$\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\Bigg)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\,\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}+g+e\,i\,(m-2\,s)-\frac{i\,m\,\pi}{2}}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\Bigg)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\,\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving cos and power

Involving $z^{\alpha-1}\cos(c\,z)\sinh(a\,z)$

01.19.21.1029.01

$$\int z^{\alpha-1}\cos(c\,z)\sinh(a\,z)\,dz = \frac{1}{4}\,z^{\alpha}\,(-\Gamma(\alpha,\,-(a+i\,c)\,z)\,(-(a+i\,c)\,z)^{-\alpha}+$$
$$((a+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a+i\,c)\,z)-(-(a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a-i\,c)\,z)+((a-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-i\,c)\,z))$$

01.19.21.1030.01

$$\int z^n \cos(c z) \sinh(a z) \, dz = \frac{1}{4} n! \left(-(-a - i c)^{-n-1} e^{(a+i c) z} \sum_{k=0}^{n} \frac{(-(a + i c) z)^k}{k!} + (a + i c)^{-n-1} e^{-(a+i c) z} \sum_{k=0}^{n} \frac{((a + i c) z)^k}{k!} - (i c - a)^{-n-1} e^{(a-i c) z} \sum_{k=0}^{n} \frac{(-(a - i c) z)^k}{k!} + (a - i c)^{-n-1} e^{i c z - a z} \sum_{k=0}^{n} \frac{((a - i c) z)^k}{k!} \right) /; n \in \mathbb{N}$$

01.19.21.1031.01

$$\int z^{-n} \cos(c z) \sinh(a z) \, dz = \frac{1}{4 \left(-c^2 - a^2\right) (n-1)!} \left(e^{(a-i c) z} \left(-(i c - a) e^{2 i c z} (n-1)! (-a - i c)^n \sum_{k=1}^{n-1} \frac{(-a - i c)^{k-n} z^{k-n}}{(1-n)_k} + (-1)^n e^{(i c-a) z} ((-a - i c)^n (i c - a) \operatorname{Ei}((a + i c) z) - (i c - a)^n (a + i c) \operatorname{Ei}((a - i c) z)) + (i c - a)^n (a + i c) (n-1)! \sum_{k=1}^{n-1} \frac{(i c - a)^{k-n} z^{k-n}}{(1-n)_k} \right) + e^{(-a-2 i c) z} \left((a + i c) e^{3 i c z} (n-1)! (a - i c)^n \sum_{k=1}^{n-1} \frac{(a - i c)^{k-n} z^{k-n}}{(1-n)_k} + (-1)^n e^{(a+2 i c) z} ((i c - a) (a + i c)^n \operatorname{Ei}((-a - i c) z) - (a - i c)^n (a + i c) \operatorname{Ei}((i c - a) z)) - (i c - a) (a + i c)^n e^{i c z} (n-1)! \sum_{k=1}^{n-1} \frac{(a + i c)^{k-n} z^{k-n}}{(1-n)_k} \right) \right) /; n \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos(c z + d) \sinh(a z)$

01.19.21.1032.01

$$\int z^{\alpha-1} \cos(d + c z) \sinh(a z) \, dz = \frac{1}{4} e^{-i d} z^\alpha \left(-e^{2 i d} \Gamma(\alpha, -(a + i c) z) (-(a + i c) z)^{-\alpha} + ((a + i c) z)^{-\alpha} \Gamma(\alpha, (a + i c) z) - (-(a - i c) z)^{-\alpha} \Gamma(\alpha, -(a - i c) z) + e^{2 i d} ((a - i c) z)^{-\alpha} \Gamma(\alpha, (a - i c) z) \right)$$

Involving $z^{\alpha-1} \cos(c z) \sinh(a z + b)$

01.19.21.1033.01

$$\int z^{\alpha-1} \cos(c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b} z^\alpha \left(-e^{2 b} \Gamma(\alpha, -(a + i c) z) (-(a + i c) z)^{-\alpha} + ((a + i c) z)^{-\alpha} \Gamma(\alpha, (a + i c) z) - e^{2 b} (-(a - i c) z)^{-\alpha} \Gamma(\alpha, -(a - i c) z) + ((a - i c) z)^{-\alpha} \Gamma(\alpha, (a - i c) z) \right)$$

Involving $z^{\alpha-1} \cos(c z + d) \sinh(a z + b)$

01.19.21.1034.01

$$\int z^{\alpha-1} \cos(d + c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b-i d} z^\alpha \left(-e^{2 b+2 i d} \Gamma(\alpha, -(a + i c) z) (-(a + i c) z)^{-\alpha} + ((a + i c) z)^{-\alpha} \Gamma(\alpha, (a + i c) z) - e^{2 b} (-(a - i c) z)^{-\alpha} \Gamma(\alpha, -(a - i c) z) + e^{2 i d} ((a - i c) z)^{-\alpha} \Gamma(\alpha, (a - i c) z) \right)$$

Involving $z^n \cos\left(b z^r\right) \sinh(c z)$

01.19.21.1035.01

$$\int z^n \cos\left(b z^2\right) \sinh(c z) \, dz = \frac{1}{8}\left(e^{-\frac{i c^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b z)^{j+1} \left(-\frac{i (-c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} - e^{-\frac{i c^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b z)^{j+1} \left(-\frac{i (c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b z - c)^{j+1} \left(\frac{i (2 i b z - c)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - c)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i c^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 i b z)^{j+1} \left(\frac{i (c + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1036.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \sinh(c\, z)\, dz = 2^{-2n-3}\, c^{-2(n+1)}$$

$$\left(-e^{-\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-2\sqrt{z}\, c - i\, b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\left(-2\sqrt{z}\, c - i\, b\right)\right.\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right)\right)\right) -$$

$$e^{-\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b - 2c\sqrt{z}\right)^{h+j} \left(\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i\, b\left(i\, b - 2c\sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right)\right) +$$

$$e^{\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(2c\sqrt{z} - i\, b\right)^{h+j} \left(-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2c\sqrt{-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}}\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right) - i\, b\left(2c\sqrt{z} - i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right)\right) +$$

$$e^{\frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(2\sqrt{z}\, c + i\, b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b\, i\left(2\sqrt{z}\, c + i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right) +\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}}\; c\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \cos\left(b\, z^r + e\right) \sinh(c\, z)$

01.19.21.1037.01

$$\int z^n \cos\left(b z^2 + e\right) \sinh(c z) \, dz = \frac{1}{8}\left(e^{-\frac{i c^2}{4 b} - i e}\left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b z)^{j+1} \left(-\frac{i (-c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i c^2}{4 b} - i e}\left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b z)^{j+1} \left(-\frac{i (c - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i c^2}{4 b} + i e} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b z - c)^{j+1} \left(\frac{i (2 i b z - c)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - c)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i c^2}{4 b} + i e} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 i b z)^{j+1} \left(\frac{i (c + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1038.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh(c\, z)\, dz = 2^{-2n-3}\, c^{-2(n+1)} \left(-e^{-\frac{b^2}{4c} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-2\sqrt{z}\, c - i\, b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b \left(-2\sqrt{z}\, c - i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, c - i\, b\right)^2}{4c}\right)\right) - e^{i e - \frac{b^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b - 2c\sqrt{z}\right)^{h+j} \left(\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i\, b \left(i\, b - 2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(i\, b - 2c\sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i\, b - 2c\sqrt{z}\right)^2}{4c}\right)\right) + e^{\frac{b^2}{4c} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(2c\sqrt{z} - i\, b\right)^{h+j} \left(-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2c\sqrt{-\frac{\left(2c\sqrt{z} - i\, b\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right) - i\, b \left(2c\sqrt{z} - i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2c\sqrt{z} - i\, b\right)^2}{4c}\right)\right) + e^{\frac{b^2}{4c} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(2\sqrt{z}\, c + i\, b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(2\sqrt{z}\, c + i\, b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{c}}\; c\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, c + i\, b\right)^2}{4c}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \cos\left(b\, z^r + d\, z\right) \sinh(c\, z)$

01.19.21.1039.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh(c z)\, dz = \frac{1}{8}\left(e^{-\frac{i(-c-i d)^2}{4b}}\left(\sum_{j=0}^{n} 2^{j-n} (c+i d)^{n-j} (-c-i d-2 i b z)^{j+1} \left(-\frac{i(-c-i d-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c-i d-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i(c-i d)^2}{4b}}\left(\sum_{j=0}^{n} 2^{j-n} (i d-c)^{n-j} (c-i d-2 i b z)^{j+1} \left(-\frac{i(c-i d-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c-i d-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i(i d-c)^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (c-i d)^{n-j} (-c+i d+2 i b z)^{j+1} \left(\frac{i(-c+i d+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c+i d+2 i b z)^2}{4b}\right) - (i b)^{-n-1} e^{\frac{i(c+i d)^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-c-i d)^{n-j} (c+i d+2 i b z)^{j+1} \left(\frac{i(c+i d+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c+i d+2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1040.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh(c z)\, dz = 2^{-2n-3}\left(-e^{\frac{b^2}{4(i d-c)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\,(i d-c)+i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(i d-c)+i b\right)^2}{i d-c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(b\, i\left(2\sqrt{z}\,(i d-c)+i b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(i d-c)+i b\right)^2}{4(i d-c)}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\,(i d-c)+i b\right)^2}{i d-c}}\,(i d-c)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(i d-c)+i b\right)^2}{4(i d-c)}\right)\right)\right)(i d-c)^{-2(n+1)} + (c+i d)^{-2(n+1)} e^{\frac{b^2}{4(c+i d)}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\,(c+i d)+i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(c+i d)+i b\right)^2}{c+i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{c+i\,d}}\,(c+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)\right)-$$

$$(c+i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(-c-i\,d)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c-i\,d)\sqrt{-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)\right)+$$

$$(c-i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(c-i\,d)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c-i\,d)\sqrt{-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)-\right.$$

$$\left.\left.i\,b\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos\left(b\,z^r+d\,z+e\right)\sinh(c\,z)$

01.19.21.1041.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh(c z)\, dz = \frac{1}{8}\left(e^{-\frac{i(-c-i d)^2}{4b} - i e}\left(\sum_{j=0}^{n} 2^{j-n} (c + i d)^{n-j} (-c - i d - 2 i b z)^{j+1} \left(-\frac{i(-c - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d - 2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i(c-i d)^2}{4b} - i e}\left(\sum_{j=0}^{n} 2^{j-n} (i d - c)^{n-j} (c - i d - 2 i b z)^{j+1} \left(-\frac{i(c - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d - 2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i(i d - c)^2}{4b} + i e} \sum_{j=0}^{n} 2^{j-n} (c - i d)^{n-j} (-c + i d + 2 i b z)^{j+1} \left(\frac{i(-c + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + i d + 2 i b z)^2}{4b}\right) - (i b)^{-n-1} e^{\frac{i(c+i d)^2}{4b} + i e} \sum_{j=0}^{n} 2^{j-n} (-c - i d)^{n-j} (c + i d + 2 i b z)^{j+1} \left(\frac{i(c + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + i d + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1042.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = 2^{-2n-3}\left(-e^{\frac{b^2}{4(i d - c)} + i e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\,(i d - c) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(i d - c) + i b\right)^2}{i d - c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(b\, i\left(2\sqrt{z}\,(i d - c) + i b\right)\Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2\sqrt{z}\,(i d - c) + i b\right)^2}{4(i d - c)}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\,(i d - c) + i b\right)^2}{i d - c}}\,(i d - c)\,\Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2\sqrt{z}\,(i d - c) + i b\right)^2}{4(i d - c)}\right)\right)\right)(i d - c)^{-2(n+1)} + (c + i d)^{-2(n+1)} e^{\frac{b^2}{4(c + i d)} + i e} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\,(c + i d) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(c + i d) + i b\right)^2}{c + i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{c+i\,d}}\,(c+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\sqrt{z}\,(c+i\,d)+i\,b\right)^2}{4\,(c+i\,d)}\right)\right)\right)-(c+i\,d)^{-2\,(n+1)}$$

$$e^{\frac{b^2}{4\,(-c-i\,d)}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c-i\,d)\sqrt{-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{-c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)-\right.$$

$$\left.\left.i\,b\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(-c-i\,d)}\right)\right)\right)+$$

$$(c-i\,d)^{-2\,(n+1)}\,e^{\frac{b^2}{4\,(c-i\,d)}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c-i\,d)\sqrt{-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{c-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)-\right.$$

$$\left.\left.\left.i\,b\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(c-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(c-i\,d)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos\left(b\,z^r\right)\sinh(f\,z+g)$

01.19.21.1043.01

$$\int z^n \cos\left(b z^2\right) \sinh(g + f z)\, dz = \frac{1}{8}\left(e^{-\frac{i f^2}{4 b}-g}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b z)^{j+1} \left(-\frac{i (-f - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i f^2}{4 b}+g}\left(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b z)^{j+1} \left(-\frac{i (f - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - 2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i f^2}{4 b}-g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b z - f)^{j+1} \left(\frac{i (2 i b z - f)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z - f)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i f^2}{4 b}+g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 i b z)^{j+1} \left(\frac{i (f + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1044.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \sinh(g + f z)\, dz = 2^{-2n-3} f^{-2(n+1)}$$

$$\left(-e^{-\frac{b^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-2\sqrt{z}\, f - i b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-2\sqrt{z}\, f - i b\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right)\right) -$$

$$e^{-\frac{b^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(i b - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(i b \left(i b - 2 f \sqrt{z}\right)\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i b - 2 f \sqrt{z}\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(i b - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i b - 2 f \sqrt{z}\right)^2}{4f}\right)\right) + e^{\frac{b^2}{4f}+g}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2 f \sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 f \sqrt{-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}}\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4f}\right) - i b \left(2 f \sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4f}\right)\right) +$$

$$e^{\frac{b^2}{4f}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\, f + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, f + i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b\, i \left(2\sqrt{z}\, f + i b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, f + i b\right)^2}{4f}\right) +\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\, f + i b\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, f + i b\right)^2}{4f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \cos\left(b z^r + e\right) \sinh(f z + g)$

01.19.21.1045.01

$$\int z^n \cos\left(b z^2 + e\right) \sinh(g + f z)\, dz = \frac{1}{8}\left(e^{-\frac{i f^2}{4b}-g-i e}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b z)^{j+1} \left(-\frac{i(-f-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i f^2}{4b}+g-i e}\left(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b z)^{j+1} \left(-\frac{i(f-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i f^2}{4b}-g+i e} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b z - f)^{j+1} \left(\frac{i(2 i b z - f)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - f)^2}{4b}\right) - (i b)^{-n-1} e^{\frac{i f^2}{4b}+g+i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 i b z)^{j+1} \left(\frac{i(f+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f+2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1046.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh(g + f z)\, dz = 2^{-2n-3} f^{-2(n+1)} \left(-e^{-\frac{b^2}{4f}-g-i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-2\sqrt{z}\, f - i b\right)^{h+j} \left(\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i b\left(-2\sqrt{z}\, f - i b\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(-2\sqrt{z}\, f - i b\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, f - i b\right)^2}{4f}\right)\right) - e^{-\frac{b^2}{4f}-g+i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b - 2 f\sqrt{z}\right)^{h+j} \left(\frac{\left(i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(i b\left(i b - 2 f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i b - 2 f\sqrt{z}\right)^2}{4f}\right) - 2 f \sqrt{\frac{\left(i b - 2 f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i b - 2 f\sqrt{z}\right)^2}{4f}\right)\right) + \right.$$

$$e^{\frac{b^2}{4f}+g-i e} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2 f \sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$
$$\left(2 f \sqrt{-\frac{\left(2 f \sqrt{z} - i b\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4 f}\right) - \right.$$
$$\left.\left. i b \left(2 f \sqrt{z} - i b\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2 f \sqrt{z} - i b\right)^2}{4 f}\right)\right)\right) +$$
$$e^{\frac{b^2}{4f}+g+i e} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2 \sqrt{z}\; f + i b\right)^{h+j} \left(-\frac{\left(2 \sqrt{z}\; f + i b\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$
$$\binom{n}{j}\left(b\, i \left(2 \sqrt{z}\; f + i b\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2 \sqrt{z}\; f + i b\right)^2}{4 f}\right) + \right.$$
$$\left.\left.\left. 2 \sqrt{-\frac{\left(2 \sqrt{z}\; f + i b\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2 \sqrt{z}\; f + i b\right)^2}{4 f}\right)\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \cos\left(b z^r + d z\right) \sinh(f z + g)$

01.19.21.1047.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh(g + f z)\, dz = \frac{1}{8}\left(e^{-\frac{i(-f-i d)^2}{4b}-g}\left(\sum_{j=0}^{n} 2^{j-n} (f + i d)^{n-j} (-f - i d - 2 i b z)^{j+1} \left(-\frac{i(-f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d - 2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i(f-i d)^2}{4b}+g} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f)^{n-j} (f - i d - 2 i b z)^{j+1} \left(-\frac{i(f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i(i d - f)^2}{4b}-g} \sum_{j=0}^{n} 2^{j-n} (f - i d)^{n-j} (-f + i d + 2 i b z)^{j+1} \left(\frac{i(-f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + i d + 2 i b z)^2}{4b}\right) - (i b)^{-n-1} e^{\frac{i(f+i d)^2}{4b}+g} \sum_{j=0}^{n} 2^{j-n} (-f - i d)^{n-j} (f + i d + 2 i b z)^{j+1} \left(\frac{i(f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + i d + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1048.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh(g + f z)\, dz = 2^{-2n-3}\left(-e^{\frac{b^2}{4(-f-i d)}-g}\left(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2(-f - i d)\sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2(-f - i d)\sqrt{-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}}\; \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right) - i b\left(2(-f - i d)\sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right)\right)\right)(-f - i d)^{-2(n+1)} - e^{\frac{b^2}{4(i d - f)}-g} (i d - f)^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}\, (i d - f) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, (i d - f) + i b\right)^2}{i d - f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{i\,d-f}}\,(i\,d-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)\right)+$$

$$e^{\frac{b^2}{4(f-i\,d)}+g}\,(f-i\,d)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(f-i\,d)\sqrt{-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)\right)+$$

$$e^{\frac{b^2}{4(f+i\,d)}+g}\,(f+i\,d)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos\left(b\,z^r+d\,z+e\right)\sinh(f\,z+g)$

01.19.21.1049.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz = \frac{1}{8}\Bigg(e^{-\frac{i(-f+-i d)^2}{4b} - g - i e}\left(\sum_{j=0}^{n} 2^{j-n} (f + i d)^{n-j} (-f - i d - 2 i b z)^{j+1} \left(-\frac{i(-f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d - 2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1} - e^{-\frac{i(f - i d)^2}{4b} + g - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f)^{n-j} (f - i d - 2 i b z)^{j+1} \left(-\frac{i(f - i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i(i d - f)^2}{4b} - g + i e} \sum_{j=0}^{n} 2^{j-n} (f - i d)^{n-j} (-f + i d + 2 i b z)^{j+1} \left(\frac{i(-f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + i d + 2 i b z)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i(f + i d)^2}{4b} + g + i e} \sum_{j=0}^{n} 2^{j-n} (-f - i d)^{n-j} (f + i d + 2 i b z)^{j+1} \left(\frac{i(f + i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + i d + 2 i b z)^2}{4 b}\right)\Bigg) /; n \in \mathbb{N}$$

01.19.21.1050.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d z\right) \sinh(g + f z)\, dz = 2^{-2n-3}\Bigg(-e^{\frac{b^2}{4(-i d - f)} - i e - g}\Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(2(-f - i d)\sqrt{z} - i b\right)^{h+j} \left(-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2(-f - i d)\sqrt{-\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{-f - i d}}\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right) - i b \left(2(-f - i d)\sqrt{z} - i b\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2(-f - i d)\sqrt{z} - i b\right)^2}{4(-f - i d)}\right)\Bigg)\Bigg)(-f - i d)^{-2(n+1)} - e^{\frac{b^2}{4(i d - f)} - g + i e} (i d - f)^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(2\sqrt{z}(i d - f) + i b\right)^{h+j} \left(-\frac{\left(2\sqrt{z}(i d - f) + i b\right)^2}{i d - f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{i\,d-f}}\,(i\,d-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(i\,d-f)+i\,b\right)^2}{4\,(i\,d-f)}\right)\right)+$$

$$e^{\frac{b^2}{4\,(f-i\,d)}+g-i\,e}\,(f-i\,d)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^{h+j}\left(-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(f-i\,d)\sqrt{-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{f-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)-\right.$$

$$\left.i\,b\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(f-i\,d)\sqrt{z}-i\,b\right)^2}{4\,(f-i\,d)}\right)\right)+e^{\frac{b^2}{4\,(f+i\,d)}+g+i\,e}\,(f+i\,d)^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(b\,i\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(f+i\,d)+i\,b\right)^2}{4\,(f+i\,d)}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos(b\,z)\sinh(c\,z^r)$

01.19.21.1051.01

$$\int z^n \cos(b\,z)\sinh\left(c\,z^2\right) dz = \frac{1}{8}\left(e^{-\frac{b^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(i\,b)^{n-j}(-i\,b-2\,c\,z)^{j+1}\left(\frac{(-i\,b-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-i\,b-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+ e^{-\frac{b^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(-i\,b)^{n-j}(i\,b-2\,c\,z)^{j+1}\left(\frac{(i\,b-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(i\,b-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}- c^{-n-1}e^{\frac{b^2}{4c}}\sum_{j=0}^{n}2^{j-n}(i\,b)^{n-j}(-i\,b+2\,c\,z)^{j+1}\left(-\frac{(-i\,b+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,b+2\,c\,z)^2}{4\,c}\right)- c^{-n-1}e^{\frac{b^2}{4c}}\sum_{j=0}^{n}2^{j-n}(-i\,b)^{n-j}(i\,b+2\,c\,z)^{j+1}\left(-\frac{(i\,b+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(i\,b+2\,c\,z)^2}{4\,c}\right)\right)\;/;\; n\in\mathbb{N}$$

01.19.21.1052.01

$$\int z^n \cos(b\,z)\sinh\left(\sqrt{z}\;c\right) dz = 2^{-2n-3}(i\,b)^{-2(n+1)} \left(-e^{\frac{i\,c^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,i\,b\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,b\sqrt{z}-c\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,b\sqrt{\frac{i\left(2\,i\,b\sqrt{z}-c\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(2\,i\,b\sqrt{z}-c\right)^2}{4\,b}\right)-c\left(2\,i\,b\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(2\,i\,b\sqrt{z}-c\right)^2}{4\,b}\right)\right)+ e^{\frac{i\,c^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,i\,b\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(c+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)+2\sqrt{\frac{i\left(c+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(c+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)- e^{-\frac{i\,c^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\right.$$

$$\left(-c\left(-c-2\,i\,b\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.2\,i\,b\sqrt{-\frac{i\left(-c-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)\right)+$$

$$e^{-\frac{i\,c^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,b\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2\,i\,b\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.2\,i\,b\sqrt{-\frac{i\left(c-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos(d\,z+e)\sinh(c\,z^r)$

01.19.21.1053.01

$$\int z^n\cos(e+d\,z)\sinh\left(c\,z^2\right)dz=$$

$$\frac{1}{8}\left(e^{-\frac{d^2}{4c}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d-2\,c\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+\right.$$

$$e^{-\frac{d^2}{4c}+i\,e}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d-2\,c\,z)^{j+1}\left(\frac{(i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$

$$c^{-n-1}\,e^{\frac{d^2}{4c}-i\,e}\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d+2\,c\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,z)^2}{4\,c}\right)-$$

$$\left.c^{-n-1}\,e^{\frac{d^2}{4c}+i\,e}\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d+2\,c\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1054.01

$$\int z^n \cos(e+d\,z)\sinh\left(\sqrt{z}\;c\right)dz = 2^{-2n-3}\,(i\,d)^{-2(n+1)}$$
$$\left(-e^{\frac{i\,c^2}{4d}+i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,i\,d\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\sqrt{\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{d}}\right.\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{4\,d}\right)-c\left(2\,i\,d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)+$$
$$e^{\frac{i\,c^2}{4d}+i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,i\,d\sqrt{z}\right)\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+2\sqrt{\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)-$$
$$e^{-\frac{i\,c^2}{4d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$
$$\binom{n}{j}\left(-c\left(-c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$
$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$
$$e^{-\frac{i\,c^2}{4d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left(c\left(c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$
$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos(b\,z^r)\sinh(c\,z^r)$

01.19.21.1055.01

$$\int z^{\alpha-1}\cos(b\,z^r)\sinh(c\,z^r)\,dz = -\frac{1}{4\,r}\left(z^\alpha\left(\Gamma\left(\frac{\alpha}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-\frac{\alpha}{r}}+((i\,b-c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b-c)\,z^r\right)-((c-i\,b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-i\,b)\,z^r\right)-((c+i\,b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.1056.01

$$\int z^n\cos(b\,z^2)\sinh(c\,z^2)\,dz = -\frac{1}{8}\,z^{n+1}\left(\Gamma\left(\frac{n+1}{2},(-c-i\,b)\,z^2\right)\left((-c-i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}+\left((i\,b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(i\,b-c)\,z^2\right)-\left((c-i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(c-i\,b)\,z^2\right)-\left((c+i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(c+i\,b)\,z^2\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.1057.01

$$\int z^n\cos\left(\sqrt{z}\,b\right)\sinh\left(\sqrt{z}\,c\right)dz = \frac{1}{2}\left(-(-c-i\,b)^{-2(n+1)}\,\Gamma\left(2(n+1),(-c-i\,b)\sqrt{z}\right)-(i\,b-c)^{-2(n+1)}\,\Gamma\left(2(n+1),(i\,b-c)\sqrt{z}\right)+(c-i\,b)^{-2(n+1)}\,\Gamma\left(2(n+1),(c-i\,b)\sqrt{z}\right)+(c+i\,b)^{-2(n+1)}\,\Gamma\left(2(n+1),(c+i\,b)\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos(b\,z^r+e)\sinh(c\,z^r)$

01.19.21.1058.01

$$\int z^{\alpha-1}\cos(b\,z^r+e)\sinh(c\,z^r)\,dz = -\frac{1}{4\,r}\left(z^\alpha\left(e^{i\,e}\,\Gamma\left(\frac{\alpha}{r},(-c-i\,b)\,z^r\right)((-c-i\,b)\,z^r)^{-\frac{\alpha}{r}}+e^{-i\,e}\,((i\,b-c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i\,b-c)\,z^r\right)-e^{i\,e}\,((c-i\,b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-i\,b)\,z^r\right)-e^{-i\,e}\,((c+i\,b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c+i\,b)\,z^r\right)\right)\right)$$

01.19.21.1059.01

$$\int z^n\cos(b\,z^2+e)\sinh(c\,z^2)\,dz = -\frac{1}{8}\,z^{n+1}\left(e^{i\,e}\,\Gamma\left(\frac{n+1}{2},(-c-i\,b)\,z^2\right)\left((-c-i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i\,e}\left((i\,b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(i\,b-c)\,z^2\right)-e^{i\,e}\left((c-i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(c-i\,b)\,z^2\right)-e^{-i\,e}\left((c+i\,b)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(c+i\,b)\,z^2\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.1060.01

$$\int z^n\cos\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c\right)dz = \frac{1}{2}\left(-(-c-i\,b)^{-2(n+1)}\,e^{i\,e}\,\Gamma\left(2(n+1),(-c-i\,b)\sqrt{z}\right)-(i\,b-c)^{-2(n+1)}\,e^{-i\,e}\,\Gamma\left(2(n+1),(i\,b-c)\sqrt{z}\right)+(c-i\,b)^{-2(n+1)}\,e^{i\,e}\,\Gamma\left(2(n+1),(c-i\,b)\sqrt{z}\right)+(c+i\,b)^{-2(n+1)}\,e^{-i\,e}\,\Gamma\left(2(n+1),(c+i\,b)\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n \cos(b z^r + d z) \sinh(c z^r)$

01.19.21.1061.01

$$\int z^n \cos(b z^2 + d z) \sinh(c z^2) \, dz = \frac{1}{8}\left(e^{\frac{d^2}{4(-c-i b)}}\left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)}\right)\right)(-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1062.01

$$\int z^n \cos(\sqrt{z}\, b + d z) \sinh(\sqrt{z}\, c) \, dz = -(-1)^n 2^{-2n-3} d^{-2n-2} \left(-e^{\frac{i(i b - c)^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4d}\right)\right) + \right.$$

$$e^{\frac{i(c+ib)^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+i\,b)^{-h-j+2n}\left(c+i\,b+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{-\frac{i(-c-ib)^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b)^{-h-j+2n}\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i\,b)\left(-c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{-\frac{i(c-ib)^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2n}\left(c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \cos\left(b\,z^r + d\,z + e\right)\sinh\left(c\,z^r\right)$

01.19.21.1063.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh\left(c z^2\right) dz = \frac{1}{8}\left(e^{\frac{d^2}{4(-c-i b)} - i e}\left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)}\right)\right)(-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)} + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)} + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1064.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d z\right) \sinh\left(\sqrt{z}\, c\right) dz = -(-1)^n 2^{-2n-3} d^{-2n-2} \left(-e^{\frac{i(i b - c)^2}{4 d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right)\right) + e^{\frac{i(c + i b)^2}{4 d} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c + i b)^{-h-j+2n} \left(c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)-$$

$$e^{-\frac{i(-c-i\,b)^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b)^{-h-j+2\,n}\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i\,b)\left(-c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(c-i\,b)^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\cos(d\,z)\sinh\left(c\,z^r+g\right)$

01.19.21.1065.01

$$\int z^n \cos(d z) \sinh\left(c z^2 + g\right) dz = \frac{1}{8}\left(e^{-\frac{d^2}{4c}-g}\left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 c z)^{j+1} \left(\frac{(-i d - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i d - 2 c z)^2}{4 c}\right)\right)(-c)^{-n-1} + e^{-\frac{d^2}{4c}-g}\left(\sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d - 2 c z)^{j+1} \left(\frac{(i d - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i d - 2 c z)^2}{4 c}\right)\right)(-c)^{-n-1} - c^{-n-1} e^{\frac{d^2}{4c}+g} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 c z)^{j+1} \left(-\frac{(-i d + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 c z)^2}{4 c}\right) - c^{-n-1} e^{\frac{d^2}{4c}+g} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 c z)^{j+1} \left(-\frac{(i d + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 c z)^2}{4 c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1066.01

$$\int z^n \cos(d z) \sinh\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-3} (i d)^{-2(n+1)} \left(-e^{\frac{i c^2}{4 d}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 i d \sqrt{z} - c\right)^{h+j} \left(\frac{i \left(2 i d \sqrt{z} - c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i d \sqrt{\frac{i\left(2 i d \sqrt{z} - c\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2 i d \sqrt{z} - c\right)^2}{4 d}\right) - c\left(2 i d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(2 i d \sqrt{z} - c\right)^2}{4 d}\right)\right) + e^{\frac{i c^2}{4 d}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(c + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c + 2 i d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i\left(c + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c + 2 i d \sqrt{z}\right)^2}{4 d}\right)\right) - e^{-\frac{i c^2}{4 d}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(-c - 2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c - 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(-c\left(-c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$e^{-\frac{i\,c^2}{4\,d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^n\cos(d\,z+e)\sinh\left(c\,z^r+g\right)$

01.19.21.1067.01

$$\int z^n\cos(e+d\,z)\sinh\left(c\,z^2+g\right)dz=$$

$$\frac{1}{8}\left(e^{-\frac{d^2}{4c}-i\,e-g}\left(\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d-2\,c\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+\right.$$

$$e^{-\frac{d^2}{4c}-g+i\,e}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d-2\,c\,z)^{j+1}\left(\frac{(i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-$$

$$c^{-n-1}\,e^{\frac{d^2}{4c}-i\,e+g}\sum_{j=0}^{n}2^{j-n}(i\,d)^{n-j}(-i\,d+2\,c\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,z)^2}{4\,c}\right)-$$

$$\left.c^{-n-1}\,e^{\frac{d^2}{4c}+g+i\,e}\sum_{j=0}^{n}2^{j-n}(-i\,d)^{n-j}(i\,d+2\,c\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,z)^2}{4\,c}\right)\right)/;\,n\in\mathbb{N}$$

01.19.21.1068.01

$$\int z^n \cos(e + d\,z) \sinh\left(\sqrt{z}\, c + g\right) dz ==$$

$$2^{-2n-3} (i\, d)^{-2(n+1)} \left(-e^{\frac{i c^2}{4 d} - g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2\, i\, d \sqrt{z} - c\right)^{h+j} \left(\frac{i \left(2\, i\, d \sqrt{z} - c\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2\, i\, d \sqrt{\frac{i \left(2\, i\, d \sqrt{z} - c\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2\, i\, d \sqrt{z} - c\right)^2}{4 d} \right) - c \left(2\, i\, d \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(2\, i\, d \sqrt{z} - c\right)^2}{4 d} \right) \right) + \right.$$

$$e^{\frac{i c^2}{4 d} + g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2\, i\, d \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + 2\, i\, d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(c + 2\, i\, d \sqrt{z}\right)^2}{4 d} \right) + 2 \sqrt{\frac{i \left(c + 2\, i\, d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c + 2\, i\, d \sqrt{z}\right)^2}{4 d} \right) \right) -$$

$$e^{-\frac{i c^2}{4 d} - i e - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2\, i\, d \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-c - 2\, i\, d \sqrt{z}\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-c - 2\, i\, d \sqrt{z}\right)^2}{4 d} \right) - 2\, i\, d \sqrt{-\frac{i \left(-c - 2\, i\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(-c - 2\, i\, d \sqrt{z}\right)^2}{4 d} \right) \right) +$$

$$e^{-\frac{i c^2}{4 d}-i e+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c-2 i d \sqrt{z}\right)^{h+j} \left(-\frac{i \left(c-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$
$$\left(c \left(c-2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(c-2 i d \sqrt{z}\right)^2}{4 d}\right) - \right.$$
$$\left.\left. 2 i d \sqrt{-\frac{i \left(c-2 i d \sqrt{z}\right)^2}{d}} \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(c-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(b z^r) \sinh(c z^r + g)$

01.19.21.1069.01

$$\int z^{\alpha-1} \cos(b z^r) \sinh(c z^r + g) \, dz ==$$
$$-\frac{1}{4 r} \left(z^\alpha \left(e^g \Gamma\left(\frac{\alpha}{r}, (-c-i b) z^r\right) ((-c-i b) z^r)^{-\frac{\alpha}{r}} + e^g ((i b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b-c) z^r\right) - e^{-g} ((c-i b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-i b) z^r\right) - \right.\right.$$
$$\left.\left. e^{-g} ((c+i b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c+i b) z^r\right)\right)\right)$$

01.19.21.1070.01

$$\int z^n \cos\left(b z^2\right) \sinh\left(c z^2 + g\right) dz ==$$
$$-\frac{1}{8} z^{n+1} \left(e^g \Gamma\left(\frac{n+1}{2}, (-c-i b) z^2\right) \left((-c-i b) z^2\right)^{\frac{1}{2}(-n-1)} + e^g \left((i b-c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b-c) z^2\right) - \right.$$
$$\left. e^{-g} \left((c-i b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-i b) z^2\right) - e^{-g} \left((c+i b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c+i b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.1071.01

$$\int z^n \cos\left(\sqrt{z}\, b\right) \sinh\left(\sqrt{z}\, c + g\right) dz ==$$
$$\frac{1}{2} \left(-(-c-i b)^{-2(n+1)} e^g \Gamma\left(2(n+1), (-c-i b) \sqrt{z}\right) - (i b-c)^{-2(n+1)} e^g \Gamma\left(2(n+1), (i b-c) \sqrt{z}\right) + \right.$$
$$\left. (c-i b)^{-2(n+1)} e^{-g} \Gamma\left(2(n+1), (c-i b) \sqrt{z}\right) + (c+i b)^{-2(n+1)} e^{-g} \Gamma\left(2(n+1), (c+i b) \sqrt{z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(b z^r + e) \sinh(c z^r + g)$

01.19.21.1072.01

$$\int z^{\alpha-1} \cos(b z^r + e) \sinh(c z^r + g) \, dz ==$$
$$-\frac{1}{4 r} \left(z^\alpha \left(e^{g+i e} \Gamma\left(\frac{\alpha}{r}, (-c-i b) z^r\right) ((-c-i b) z^r)^{-\frac{\alpha}{r}} + e^{g-i e} ((i b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b-c) z^r\right) - \right.\right.$$
$$\left.\left. e^{i e-g} ((c-i b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-i b) z^r\right) - e^{-g-i e} ((c+i b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c+i b) z^r\right)\right)\right)$$

01.19.21.1073.01

$$\int z^n \cos(b z^2 + e) \sinh(c z^2 + g)\, dz = -\frac{1}{8} z^{n+1} \left(e^{g+i e}\, \Gamma\left(\frac{n+1}{2}, (-c - i b) z^2\right) \left((-c - i b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{g-i e} \left((i b - c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - c) z^2\right) - e^{i e-g} \left((c - i b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - i b) z^2\right) - e^{-g-i e} \left((c + i b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c + i b) z^2\right)\right) /; n \in \mathbb{N}$$

01.19.21.1074.01

$$\int z^n \cos(\sqrt{z}\, b + e) \sinh(\sqrt{z}\, c + g)\, dz = \frac{1}{2} \left(-(-c - i b)^{-2(n+1)} e^{g+i e}\, \Gamma\left(2(n+1), (-c - i b) \sqrt{z}\right) - (i b - c)^{-2(n+1)} e^{g-i e}\, \Gamma\left(2(n+1), (i b - c) \sqrt{z}\right) + (c - i b)^{-2(n+1)} e^{i e-g}\, \Gamma\left(2(n+1), (c - i b) \sqrt{z}\right) + (c + i b)^{-2(n+1)} e^{-g-i e}\, \Gamma\left(2(n+1), (c + i b) \sqrt{z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos(b z^r + d z) \sinh(c z^r + g)$

01.19.21.1075.01

$$\int z^n \cos(b z^2 + d z) \sinh(c z^2 + g)\, dz = \frac{1}{8} \left(e^{\frac{d^2}{4(-c-i b)}-g} \left(\sum_{j=0}^n 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)}\right)\right) (-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{\frac{d^2}{4(i b-c)}-g} \sum_{j=0}^n 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c-i b)}+g} \sum_{j=0}^n 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{\frac{d^2}{4(c+i b)}+g} \sum_{j=0}^n 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1076.01

$$\int z^n \cos(\sqrt{z}\, b + d z) \sinh(\sqrt{z}\, c + g)\, dz = -(-1)^n 2^{-2n-3} d^{-2n-2}$$

$$\left(-e^{\frac{i(i b-c)^2}{4d}-g} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left((i\,b-c)\left(-c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(-c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(-c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i(c+i\,b)^2}{4\,d}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+i\,b)^{-h-j+2\,n}\left(c+i\,b+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+i\,b)\left(c+i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)-$$

$$e^{-\frac{i(-c-i\,b)^2}{4\,d}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b)^{-h-j+2\,n}\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i\,b)\left(-c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{g-\frac{i(c-i\,b)^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b)^{-h-j+2\,n}\left(c-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-i\,b)\left(c-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

Involving $z^n \cos(b z^r + d z + e) \sinh(c z^r + g)$

01.19.21.1077.01

$$\int z^n \cos(b z^2 + d z + e) \sinh(c z^2 + g)\, dz = \frac{1}{8}\left(e^{\frac{d^2}{4(-c-i b)} - i e - g}\left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-c - i b) z)^{j+1} \left(-\frac{(-i d + 2(-c - i b) z)^2}{-c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-c - i b) z)^2}{4(-c - i b)}\right)\right)(-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{\frac{d^2}{4(i b - c)} - g + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c) z)^{j+1} \left(-\frac{(i d + 2(i b - c) z)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c) z)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{\frac{d^2}{4(c - i b)} - i e + g} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(c - i b) z)^{j+1} \left(-\frac{(-i d + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{\frac{d^2}{4(c + i b)} + g + i e} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(c + i b) z)^{j+1} \left(-\frac{(i d + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1078.01

$$\int z^n \cos(\sqrt{z}\, b + e + d z) \sinh(\sqrt{z}\, c + g)\, dz = -(-1)^n 2^{-2n-3} d^{-2n-2} \left(-e^{\frac{i(i b - c)^2}{4 d} - g + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 i d \sqrt{z}\right)^{h+j} \left(\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c)\left(-c + i b + 2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(-c + i b + 2 i d \sqrt{z}\right)^2}{4 d}\right)\right) + \right.$$

$$e^{\frac{i(c+ib)^2}{4d}+g+ie} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c+ib)^{-h-j+2n} \left(c+ib+2id\sqrt{z}\right)^{h+j} \left(\frac{i\left(c+ib+2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+ib)\left(c+ib+2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(c+ib+2id\sqrt{z}\right)^2}{4d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+ib+2id\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(c+ib+2id\sqrt{z}\right)^2}{4d}\right)\right)-$$

$$e^{-\frac{i(-c-ib)^2}{4d}-ie-g} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-c-ib)^{-h-j+2n} \left(-c-ib-2id\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c-ib-2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-c-ib)\left(-c-ib-2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-c-ib-2id\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2id\sqrt{-\frac{i\left(-c-ib-2id\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-c-ib-2id\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$e^{-\frac{i(c-ib)^2}{4d}-ie+g} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c-ib)^{-h-j+2n} \left(c-ib-2id\sqrt{z}\right)^{h+j} \left(-\frac{i\left(c-ib-2id\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-ib)\left(c-ib-2id\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c-ib-2id\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.\left.2id\sqrt{-\frac{i\left(c-ib-2id\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c-ib-2id\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\; n \in \mathbb{N}$$

Involving $z^n \cos(d\, z) \sinh\left(c\, z^r + f\, z\right)$

01.19.21.1079.01

$$\int z^n \cos(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{8}\left(e^{\frac{(-f-i\,d)^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(f+i\,d)^{n-j}(-f-i\,d-2\,c\,z)^{j+1}\left(\frac{(-f-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-i\,d-2\,c\,z)^2}{4c}\right)\right)(-c)^{-n-1}+e^{\frac{(i\,d-f)^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(f-i\,d)^{n-j}(-f+i\,d-2\,c\,z)^{j+1}\left(\frac{(-f+i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+i\,d-2\,c\,z)^2}{4c}\right)\right)(-c)^{-n-1}-c^{-n-1}e^{-\frac{(f-i\,d)^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(i\,d-f)^{n-j}(f-i\,d+2\,c\,z)^{j+1}\left(-\frac{(f-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f-i\,d+2\,c\,z)^2}{4c}\right)-c^{-n-1}e^{-\frac{(f+i\,d)^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-f-i\,d)^{n-j}(f+i\,d+2\,c\,z)^{j+1}\left(-\frac{(f+i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+i\,d+2\,c\,z)^2}{4c}\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1080.01

$$\int z^n \cos(d\,z)\sinh\left(\sqrt{z}\,c+f\,z\right)dz = 2^{-2n-3}\left(-e^{-\frac{c^2}{4(i\,d-f)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f)\sqrt{-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)-c\left(2\,(i\,d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)\right)\right)(i\,d-f)^{-2n-2}-e^{-\frac{c^2}{4(-f-i\,d)}}(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(-f-i\,d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-f-i\,d)\sqrt{-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{4\,(-f-i\,d)}\right)-\right.$$

$$c\left(2(-f-i\,d)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{4(-f-i\,d)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-i\,d)}}(f-i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\,(f-i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f+i\,d)}}(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}}\,(f+i\,d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)\right)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \cos(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1081.01

$$\int z^n \cos(e + d\,z)\sinh\left(c\,z^2 + f\,z\right) dz = \frac{1}{8}\left(e^{\frac{(-f+-i\,d)^2}{4c} - i\,e}\left(\sum_{j=0}^{n} 2^{j-n}\,(f + i\,d)^{n-j}\,(-f - i\,d - 2\,c\,z)^{j+1}\left(\frac{(-f - i\,d - 2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f - i\,d - 2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} + e^{\frac{(i\,d-f)^2}{4c} + i\,e}\left(\sum_{j=0}^{n} 2^{j-n}\,(f - i\,d)^{n-j}\,(-f + i\,d - 2\,c\,z)^{j+1}\left(\frac{(-f + i\,d - 2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f + i\,d - 2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - c^{-n-1}\,e^{-\frac{(f-i\,d)^2}{4c} - i\,e}\sum_{j=0}^{n} 2^{j-n}\,(i\,d - f)^{n-j}\,(f - i\,d + 2\,c\,z)^{j+1}\left(-\frac{(f - i\,d + 2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f - i\,d + 2\,c\,z)^2}{4\,c}\right) - c^{-n-1}\,e^{-\frac{(f+i\,d)^2}{4c} + i\,e}\sum_{j=0}^{n} 2^{j-n}\,(-f - i\,d)^{n-j}\,(f + i\,d + 2\,c\,z)^{j+1}\left(-\frac{(f + i\,d + 2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f + i\,d + 2\,c\,z)^2}{4\,c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1082.01

$$\int z^n \cos(e + d\,z)\sinh\left(\sqrt{z}\;c + f\,z\right) dz = 2^{-2n-3}\left(-e^{-\frac{c^2}{4(i\,d-f)} + i\,e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d - f)\sqrt{z} - c\right)^{h+j}\left(-\frac{\left(2\,(i\,d - f)\sqrt{z} - c\right)^2}{i\,d - f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d - f)\sqrt{-\frac{\left(2\,(i\,d - f)\sqrt{z} - c\right)^2}{i\,d - f}}\;\Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(2\,(i\,d - f)\sqrt{z} - c\right)^2}{4\,(i\,d - f)}\right) - c\left(2\,(i\,d - f)\sqrt{z} - c\right)\Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(2\,(i\,d - f)\sqrt{z} - c\right)^2}{4\,(i\,d - f)}\right)\right)\right)(i\,d - f)^{-2n-2} - e^{-\frac{c^2}{4(-f+-i\,d)} - i\,e}\,(f + i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(-f - i\,d)\sqrt{z} - c\right)^{h+j}\left(-\frac{\left(2\,(-f - i\,d)\sqrt{z} - c\right)^2}{-f - i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-f-i\,d)\sqrt{-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{4(-f-i\,d)}\right)-\right.$$

$$\left.c\left(2(-f-i\,d)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-f-i\,d)\sqrt{z}-c\right)^2}{4(-f-i\,d)}\right)\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-i d)}-i\,e}\,(f-i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i\,d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\;(f-i\,d)\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-i\,d)\sqrt{z}\right)^2}{4(f-i\,d)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f+i d)}+i\,e}\,(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i\,d)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f+i\,d)\sqrt{z}\right)^2}{4(f+i\,d)}\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \cos(b\,z^r)\sinh(c\,z^r+f\,z)$

01.19.21.1083.01

$$\int z^n \cos(b z^2) \sinh(c z^2 + f z)\, dz = \frac{1}{8}\left(e^{-\frac{f^2}{4(-c-i b)}}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c-i b) z - f)^{j+1}\left(-\frac{(2(-c-i b) z - f)^2}{-c-i b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(-c-i b) z - f)^2}{4(-c-i b)}\right)\right)(-c-i b)^{-n-1} + (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1}\left(-\frac{(2(i b - c) z - f)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)}\right) - (c - i b)^{-n-1} e^{-\frac{f^2}{4(c-i b)}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1}\left(-\frac{(f + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{-\frac{f^2}{4(c+i b)}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1}\left(-\frac{(f + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1084.01

$$\int z^n \cos(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + f z)\, dz = 2^{-2n-3} f^{-2n-2}\left(-e^{\frac{(-c-i b)^2}{4 f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c-i b)^{-h-j+2n}\left(-c-i b - 2 f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-c-i b)\left(-c-i b - 2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{4 f}\right) - 2 f\sqrt{\frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{f}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{4 f}\right)\right) - e^{\frac{(i b - c)^2}{4 f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n}\left(-c+i b - 2 f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c+i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i b - c)\left(-c+i b - 2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+i b - 2 f\sqrt{z}\right)^2}{4 f}\right) - \right.\right.$$

$$2\, f \sqrt{\frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h + j + 2),\, \frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) +$$

$$e^{-\frac{(c - i\, b)^2}{4\, f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c - i\, b)^{-h-j+2\, n} \left(c - i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((c - i\, b) \left(c - i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +\right.$$

$$\left. 2 \sqrt{-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\right)\Bigg) +$$

$$e^{-\frac{(c + i\, b)^2}{4\, f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c + i\, b)^{-h-j+2\, n} \left(c + i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((c + i\, b) \left(c + i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +\right.$$

$$\left. 2 \sqrt{-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\right)\Bigg)\Bigg) \;/;\; n \in \mathbb{N}$$

Involving $z^n \cos(b\, z^r + e) \sinh(c\, z^r + f\, z)$

01.19.21.1085.01

$$\int z^n \cos(b z^2 + e) \sinh(c z^2 + f z) \, dz = \frac{1}{8} \Bigg(e^{-\frac{f^2}{4(-c+-i b)} - i e} \Bigg(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c - i b) z - f)^{j+1} \left(-\frac{(2(-c - i b) z - f)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c - i b) z - f)^2}{4(-c - i b)} \right) \Bigg)$$

$$(-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)} + i e} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)} \right) -$$

$$(c - i b)^{-n-1} e^{-\frac{f^2}{4(c - i b)} - i e} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)} \right) - (c + i b)^{-n-1} e^{-\frac{f^2}{4(c + i b)} + i e}$$

$$\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)} \right) \Bigg) /; n \in \mathbb{N}$$

01.19.21.1086.01

$$\int z^n \cos(\sqrt{z}\, b + e) \sinh(\sqrt{z}\, c + f z) \, dz = 2^{-2n-3} f^{-2n-2} \Bigg(-e^{\frac{(-c+-i b)^2}{4 f} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c - i b)^{-h-j+2n} \left(-c - i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg((-c - i b) \left(-c - i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f} \right) -$$

$$2 f \sqrt{\frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{f}} \, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-c - i b - 2 f \sqrt{z}\right)^2}{4 f} \right) \Bigg) -$$

$$e^{\frac{(i b - c)^2}{4 f} + i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg((i b - c) \left(-c + i b - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c + i b - 2 f \sqrt{z}\right)^2}{4 f} \right) -$$

$$2\, f \sqrt{\frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+j+2), \frac{\left(-c + i\, b - 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c - i\, b)^2}{4\, f} - i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c - i\, b)^{-h-j+2\,n} \left(c - i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c - i\, b)\left(c - i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c - i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c + i\, b)^2}{4\, f} + i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c + i\, b)^{-h-j+2\,n} \left(c + i\, b + 2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c + i\, b)\left(c + i\, b + 2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c + i\, b + 2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) /;\ n \in \mathbb{N}$$

Involving $z^n \cos(b\, z^r + d\, z) \sinh(c\, z^r + f\, z)$

01.19.21.1087.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh\left(c z^2 + f z\right) dz ==$$

$$\frac{1}{8}\left(-\frac{1}{\sqrt{c+i b}}\left(e^{-\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (c+i b)^{-n-\frac{1}{2}} (-f-i d)^{n-q} (f+i d+2 c z+2 i b z)^{q+1} \left(-\frac{(f+i d+2 c z+2 i b z)^2}{c+i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+i d+2 c z+2 i b z)^2}{4(c+i b)}\right)\right) - \frac{1}{\sqrt{c-i b}}\left(e^{\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (c-i b)^{-n-\frac{1}{2}} (i d-f)^{n-q} \left(\frac{i(d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} (f-i d-2 i b z+2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d+i f+2 b z+2 i c z)^2}{4(b+i c)}\right)\right) + \frac{1}{\sqrt{i b-c}}\left(e^{-\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (i b-c)^{-n-\frac{1}{2}} (f-i d)^{n-q} (i(d+i f+2 b z+2 i c z))^{q+1} \left(-\frac{i(d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i(d+i f+2 b z+2 i c z)^2}{4(b+i c)}\right)\right) + \frac{1}{\sqrt{-c-i b}}\left(e^{\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (-c-i b)^{-n-\frac{1}{2}} (f+i d)^{n-q} (-f-i d-2 i b z-2 c z)^{q+1} \left(\frac{i(d-i f+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i(d-i f+2 b z-2 i c z)^2}{4(b-i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.1088.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + f z\right) dz ==$$

$$2^{-2n-3}\left(\frac{1}{(d-i f)^2}\left(e^{\frac{i(b-i c)^2}{4(d-i f)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h} 4^k (-c-i b)^{-h-k+2n} \left(\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c-i b-2 i (d-i f)\sqrt{z}\right)^{h+k} \binom{k}{h}\binom{n}{k}\left(-(b-i c)\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.\right.\right.\right.$$

$$\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{4(d-i f)}\Bigg)-2 i (d-i f)\sqrt{\frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{d-i f}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+k+2),\ \frac{i\left(b-i\left(c+2(f+i d)\sqrt{z}\right)\right)^2}{4(d-i f)}\Bigg)\Bigg)\Bigg)(-f-i d)^{-2n}\Bigg)+e^{-\frac{i(b-i c)^2}{4(d-i f)}}(f+i d)^{-2(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i b)^{-h-k+2n}\left(c+i b+2(f+i d)\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((c+i b)\left(c+i b+2(f+i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)+$$

$$2\sqrt{-\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{f+i d}}\;(f+i d)\,\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{\left(c+i b+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(d+i f)^2}\Bigg(e^{\frac{i(b+i c)^2}{4(d+i f)}}(f-i d)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i b)^{-h-k+2n}\left(\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(c-i b+2(f-i d)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((c-i b)\left(c-i b+2(f-i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)+$$

$$2(f-i d)\sqrt{\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{(d+i f)^2}\Bigg(e^{-\frac{i(b+i c)^2}{4(d+i f)}}(i d-f)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i b-c)^{-h-k+2n}\left(-c+i b+2(d+i f)\,i\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2\,i\,(d+i\,f)\sqrt{-\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{d+i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)-\right.$$

$$\left.(b+i\,c)\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(b+i\,c+2\,(d+i\,f)\,\sqrt{z}\right)^2}{4\,(d+i\,f)}\right)\right)\Bigg)\Bigg) /;\, n\in\mathbb{N}$$

Involving $z^n \cos\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1089.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8} e^{-i e} \left(-\frac{1}{\sqrt{c + i b}} \left(e^{2 i e - \frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-f - i d)^{n-q} (f + i d + 2 c z + 2 i b z)^{q+1} \left(-\frac{(f + i d + 2 c z + 2 i b z)^2}{c + i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + i d + 2 c z + 2 i b z)^2}{4 (c + i b)}\right)\right) - \frac{1}{\sqrt{c - i b}} \left(e^{\frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (i d - f)^{n-q} \left(\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} (f - i d - 2 i b z + 2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)}\right)\right) + \frac{1}{\sqrt{i b - c}} \left(e^{2 i e - \frac{i (d + i f)^2}{4 (b + i c)}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (f - i d)^{n-q} (i (d + i f + 2 b z + 2 i c z))^{q+1} \left(-\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + i f + 2 b z + 2 i c z)^2}{4 (b + i c)}\right)\right) + \frac{1}{\sqrt{-c - i b}} \left(e^{\frac{(f + i d)^2}{4 (c + i b)}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (f + i d)^{n-q} (-f - i d - 2 i b z - 2 c z)^{q+1} \left(\frac{i (d - i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - i f + 2 b z - 2 i c z)^2}{4 (b - i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.1090.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2 n-3} e^{-i e} \left(\frac{1}{(d - i f)^2} \left(e^{\frac{i (b - i c)^2}{4 (d - i f)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c - i b)^{-h-k+2 n} \left(\frac{i \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c - i b - 2 i (d - i f) \sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b - i c) \left(b - i \left(c + 2 (f + i d) \sqrt{z}\right)\right) \Gamma\left(\frac{1}{2} (h + k + 1),\right.\right.\right.\right.\right.$$

$$\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{4\left(d-i f\right)}\Bigg)-2 i\left(d-i f\right)\sqrt{\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{d-i f}}\;\Gamma\Bigg($$

$$\frac{1}{2}\left(h+k+2\right),\;\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{4\left(d-i f\right)}\Bigg)\Bigg)\Bigg)\left(-f-i d\right)^{-2n}\Bigg)+e^{2 i e-\frac{i\left(b-i c\right)^2}{4\left(d-i f\right)}}\left(f+i d\right)^{-2\left(n+1\right)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\left(c+i b\right)^{-h-k+2n}\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^{h+k}\left(-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}\left(-h-k-1\right)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(\left(c+i b\right)\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\;-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{4\left(f+i d\right)}\right)+$$

$$2\sqrt{-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{f+i d}}\;\left(f+i d\right)\Gamma\left(\frac{1}{2}\left(h+k+2\right),\;-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{4\left(f+i d\right)}\right)\Bigg)\Bigg)-$$

$$\frac{1}{\left(d+i f\right)^2}\Bigg(e^{\frac{i\left(b+i c\right)^2}{4\left(d+i f\right)}}\left(f-i d\right)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\left(c-i b\right)^{-h-k+2n}\left(\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}\left(-h-k-1\right)}$$

$$\left(c-i b+2\left(f-i d\right)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(\left(c-i b\right)\left(c-i b+2\left(f-i d\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\;\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{4\left(d+i f\right)}\right)+$$

$$2\left(f-i d\right)\sqrt{\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}\left(h+k+2\right),\;\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{4\left(d+i f\right)}\right)\Bigg)\Bigg)+$$

$$\frac{1}{\left(d+i f\right)^2}\Bigg(e^{2 i e-\frac{i\left(b+i c\right)^2}{4\left(d+i f\right)}}\left(i d-f\right)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\left(i b-c\right)^{-h-k+2n}\left(-c+i b+2\left(d+i f\right)i\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(2 i (d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.\left.\left.\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right)\right)\right) /; n\in\mathbb{N}$$

Involving $z^n \cos(d\, z) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.1091.01

$$\int z^n \cos(d z) \sinh\left(c z^2 + f z + g\right) dz =$$

$$\frac{1}{8}\left(e^{\frac{(-f-i d)^2}{4c}-g}\left(\sum_{j=0}^{n} 2^{j-n}(f+i d)^{n-j}(-f-i d-2 c z)^{j+1}\left(\frac{(-f-i d-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f-i d-2 c z)^2}{4c}\right)\right)\right.$$

$$(-c)^{-n-1} + e^{\frac{(i d-f)^2}{4c}-g}$$

$$\left(\sum_{j=0}^{n} 2^{j-n}(f-i d)^{n-j}(-f+i d-2 c z)^{j+1}\left(\frac{(-f+i d-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f+i d-2 c z)^2}{4c}\right)\right)(-c)^{-n-1} -$$

$$c^{-n-1} e^{-\frac{(f-i d)^2}{4c}+g}\sum_{j=0}^{n} 2^{j-n}(i d-f)^{n-j}(f-i d+2 c z)^{j+1}\left(-\frac{(f-i d+2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f-i d+2 c z)^2}{4c}\right)-$$

$$c^{-n-1} e^{-\frac{(f+i d)^2}{4c}+g}$$

$$\left.\sum_{j=0}^{n} 2^{j-n}(-f-i d)^{n-j}(f+i d+2 c z)^{j+1}\left(-\frac{(f+i d+2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f+i d+2 c z)^2}{4c}\right)\right) /; n\in\mathbb{N}$$

01.19.21.1092.01

$$\int z^n \cos(d z) \sinh\left(\sqrt{z}\, c + g + f z\right) dz =$$

$$2^{-2n-3}\left(-e^{-\frac{c^2}{4(i d-f)}-g}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (-c)^{-h-j+2n}\left(2(i d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(i d-f)\sqrt{z}-c\right)^2}{i d-f}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f)\sqrt{-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)-\right.$$

$$\left.\left.c\left(2\,(i\,d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)\right)\right)(i\,d-f)^{-2\,n-2}-$$

$$e^{-\frac{c^2}{4\,(-f-i\,d)}-g}\,(f+i\,d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(-f-i\,d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-f-i\,d)\sqrt{-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{4\,(-f-i\,d)}\right)-\right.$$

$$\left.c\left(2\,(-f-i\,d)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{4\,(-f-i\,d)}\right)\right)+$$

$$e^{-\frac{c^2}{4\,(f-i\,d)}+g}\,(f-i\,d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f-i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f-i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{4\,(f-i\,d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{f-i\,d}}\;(f-i\,d)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+2\,(f-i\,d)\sqrt{z}\right)^2}{4\,(f-i\,d)}\right)\right)+$$

$$e^{-\frac{c^2}{4\,(f+i\,d)}+g}\,(f+i\,d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+i\,d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{f+i\,d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+i\,d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{4\,(f+i\,d)}\right)+\right.$$

$$\sqrt{\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{\cdots}}\quad\left(\frac{1}{\cdots}\quad\frac{\left(c+2\,(f+i\,d)\sqrt{z}\right)^2}{\cdots}\right)\Big)\Big)$$

Involving $z^n \cos(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1093.01

$$\int z^n \cos(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{8}\left(e^{\frac{(-f+-i\,d)^2}{4c}-g-i\,e}\left(\sum_{j=0}^{n}2^{j-n}(f+i\,d)^{n-j}(-f-i\,d-2\,c\,z)^{j+1}\left(\frac{(-f-i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+e^{\frac{(i\,d-f)^2}{4c}-g+i\,e}\left(\sum_{j=0}^{n}2^{j-n}(f-i\,d)^{n-j}(-f+i\,d-2\,c\,z)^{j+1}\left(\frac{(-f+i\,d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+i\,d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-c^{-n-1}e^{-\frac{(f-i\,d)^2}{4c}+g-i\,e}\sum_{j=0}^{n}2^{j-n}(i\,d-f)^{n-j}(f-i\,d+2\,c\,z)^{j+1}\left(-\frac{(f-i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f-i\,d+2\,c\,z)^2}{4\,c}\right)-c^{-n-1}e^{-\frac{(f+i\,d)^2}{4c}+g+i\,e}\sum_{j=0}^{n}2^{j-n}(-f-i\,d)^{n-j}(f+i\,d+2\,c\,z)^{j+1}\left(-\frac{(f+i\,d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+i\,d+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1094.01

$$\int z^n \cos(e+d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = 2^{-2n-3}\left(-e^{-\frac{c^2}{4(i\,d-f)}-g+i\,e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f)\sqrt{-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{i\,d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)-c\left(2\,(i\,d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\,(i\,d-f)\sqrt{z}-c\right)^2}{4\,(i\,d-f)}\right)\right)\right)(i\,d-f)^{-2n-2}-e^{-\frac{c^2}{4(-f+-i\,d)}-g-i\,e}(f+i\,d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(-f-i\,d)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,(-f-i\,d)\sqrt{z}-c\right)^2}{-f-i\,d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-f-i d)\sqrt{-\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{-f-i d}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{4(-f-i d)}\right)-\right.$$

$$\left.c\left(2(-f-i d)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-f-i d)\sqrt{z}-c\right)^2}{4(-f-i d)}\right)\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-i d)}+g-i e}\,(f-i d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f-i d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{f-i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{4(f-i d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{f-i d}}\ (f-i d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(f-i d)\sqrt{z}\right)^2}{4(f-i d)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f+i d)}+g+i e}\,(f+i d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2(f+i d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f+i d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{f+i d}}\ (f+i d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(f+i d)\sqrt{z}\right)^2}{4(f+i d)}\right)\right)\Bigg)\Bigg) /; n\in\mathbb{N}$$

Involving $z^n \cos(b z^r) \sinh(c z^r + f z + g)$

01.19.21.1095.01

$$\int z^n \cos(b z^2) \sinh(c z^2 + f z + g) \, dz = \frac{1}{8} \left(e^{-\frac{f^2}{4(-c - i b)} - g} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c - i b) z - f)^{j+1} \left(-\frac{(2(-c - i b) z - f)^2}{-c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-c - i b) z - f)^2}{4(-c - i b)} \right) \right) (-c - i b)^{-n-1} + (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)} - g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1} \left(-\frac{(2(i b - c) z - f)^2}{i b - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)} \right) - (c - i b)^{-n-1} e^{-\frac{f^2}{4(c - i b)} + g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1} \left(-\frac{(f + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)} \right) - (c + i b)^{-n-1} e^{-\frac{f^2}{4(c + i b)} + g} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1} \left(-\frac{(f + 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.1096.01

$$\int z^n \cos(\sqrt{z}\, b) \sinh(\sqrt{z}\, c + g + f z) \, dz = 2^{-2n-3} f^{-2n-2} \left(-e^{\frac{(-c - i b)^2}{4 f} - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c - i b)^{-h-j+2n} \left(-c - i b - 2 f \sqrt{z} \right)^{h+j} \left(\frac{\left(-c - i b - 2 f \sqrt{z} \right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-c - i b) \left(-c - i b - 2 f \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c - i b - 2 f \sqrt{z} \right)^2}{4 f} \right) - 2 f \sqrt{\frac{\left(-c - i b - 2 f \sqrt{z} \right)^2}{f}} \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-c - i b - 2 f \sqrt{z} \right)^2}{4 f} \right) \right) - e^{\frac{(i b - c)^2}{4 f} - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b - 2 f \sqrt{z} \right)^{h+j} \left(\frac{\left(-c + i b - 2 f \sqrt{z} \right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i b - c) \left(-c + i b - 2 f \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c + i b - 2 f \sqrt{z} \right)^2}{4 f} \right) - \right.$$

$$2\, f \sqrt{\frac{\left(-c+i\, b-2\, f \sqrt{z}\right)^2}{f}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c+i\, b-2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) +$$

$$e^{-\frac{(c-i\, b)^2}{4\, f}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c-i\, b)^{-h-j+2\, n} \left(c-i\, b+2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg((c-i\, b)\left(c-i\, b+2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c+i\, b)^2}{4\, f}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c+i\, b)^{-h-j+2\, n} \left(c+i\, b+2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg((c+i\, b)\left(c+i\, b+2\, f \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right) +$$

$$2 \sqrt{-\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) \;/;\; n \in \mathbb{N}$$

Involving $z^n \cos(b\, z^r + e) \sinh(c\, z^r + f\, z + g)$

01.19.21.1097.01

$$\int z^n \cos\left(b z^2 + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8}\left(e^{-\frac{f^2}{4(-c+-i b)}-g-i e}\left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-c-i b) z - f)^{j+1}\left(-\frac{(2(-c-i b) z - f)^2}{-c-i b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(-c-i b) z - f)^2}{4(-c-i b)}\right)\right)\right.$$

$$(-c-i b)^{-n-1} + (i b - c)^{-n-1} e^{-\frac{f^2}{4(i b - c)}-g+i e}$$

$$\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b - c) z - f)^{j+1}\left(-\frac{(2(i b - c) z - f)^2}{i b - c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c) z - f)^2}{4(i b - c)}\right) -$$

$$(c - i b)^{-n-1} e^{-\frac{f^2}{4(c-i b)}+g-i e}\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c - i b) z)^{j+1}\left(-\frac{(f + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c - i b) z)^2}{4(c - i b)}\right) - (c + i b)^{-n-1} e^{-\frac{f^2}{4(c+i b)}+g+i e}$$

$$\left.\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + i b) z)^{j+1}\left(-\frac{(f + 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c + i b) z)^2}{4(c + i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1098.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} f^{-2n-2}\left(-e^{\frac{(-c+-i b)^2}{4 f}-g-i e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (-c-i b)^{-h-j+2n}\left(-c-i b - 2 f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left((-c-i b)\left(-c-i b - 2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{4 f}\right) -\right.$$

$$\left.2 f\sqrt{\frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{f}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-i b - 2 f\sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{(i b - c)^2}{4 f}-g+i e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i b - c)^{-h-j+2n}\left(-c+i b - 2 f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c+i b - 2 f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i b - c)\left(-c+i b - 2 f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+i b - 2 f\sqrt{z}\right)^2}{4 f}\right) -\right.$$

$$2\, f \sqrt{\frac{\left(-c+i\, b-2\, f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c+i\, b-2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c-i\, b)^2}{4 f}+g-i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c-i\, b)^{-h-j+2 n} \left(c-i\, b+2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c-i\, b)\left(c-i\, b+2\, f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)+$$

$$2 \sqrt{-\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c-i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg) +$$

$$e^{-\frac{(c+i\, b)^2}{4 f}+g+i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c+i\, b)^{-h-j+2 n} \left(c+i\, b+2\, f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+i\, b)\left(c+i\, b+2\, f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)+$$

$$2 \sqrt{-\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c+i\, b+2\, f \sqrt{z}\right)^2}{4\, f}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N}$$

Involving $z^n \cos(b\, z^r + d\, z) \sinh(c\, z^r + f\, z + g)$

01.19.21.1099.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} e^{-g} \left(-e^{2g} \left(\frac{1}{\sqrt{c + i b}} \left(e^{-\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-f - i d)^{n-q} (f + i d + 2 c z + 2 i b z)^{q+1} \left(-\frac{(f + i d + 2 c z + 2 i b z)^2}{c + i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f + i d + 2 c z + 2 i b z)^2}{4(c + i b)}\right)\right) + \frac{1}{\sqrt{c - i b}} \left(e^{\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (i d - f)^{n-q} \left(\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} (f - i d - 2 i b z + 2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d + i f + 2 b z + 2 i c z)^2}{4(b + i c)}\right)\right)\right) + \frac{1}{\sqrt{i b - c}} \left(e^{-\frac{i(d+i f)^2}{4(b+i c)}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (f - i d)^{n-q} (i (d + i f + 2 b z + 2 i c z))^{q+1} \left(-\frac{i (d + i f + 2 b z + 2 i c z)^2}{b + i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d + i f + 2 b z + 2 i c z)^2}{4(b + i c)}\right)\right) + \frac{1}{\sqrt{-c - i b}} \left(e^{\frac{(f+i d)^2}{4(c+i b)}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (f + i d)^{n-q} (-f - i d - 2 i b z - 2 c z)^{q+1} \left(\frac{i (d - i f + 2 b z - 2 i c z)^2}{b - i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d - i f + 2 b z - 2 i c z)^2}{4(b - i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.1100.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} e^{-g} \left(\frac{1}{(d - i f)^2} \left(e^{\frac{i(b-i c)^2}{4(d-i f)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c - i b)^{-h-k+2n} \left(\frac{i\left(b - i\left(c + 2(f + i d)\sqrt{z}\right)\right)^2}{d - i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c - i b - 2 i (d - i f)\sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b - i c)\left(b - i\left(c + 2(f + i d)\sqrt{z}\right)\right) \Gamma\left(\frac{1}{2}(h + k + 1),\right.\right.\right.\right.\right.$$

$$\left.\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{4\left(d-i f\right)}\right)-2 i\left(d-i f\right)\sqrt{\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{d-i f}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\left.\frac{1}{2}\left(h+k+2\right),\,\frac{i\left(b-i\left(c+2\left(f+i d\right)\sqrt{z}\right)\right)^2}{4\left(d-i f\right)}\right)\right)\right)\left(-f-i d\right)^{-2 n}\right)+$$

$$e^{2 g}\left(e^{-\frac{i\left(b-i c\right)^2}{4\left(d-i f\right)}}\left(f+i d\right)^{-2\left(n+1\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}\left(-1\right)^{k-h}\,4^k\left(c+i b\right)^{-h-k+2 n}\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{f+i d}\right)^{\frac{1}{2}\left(-h-k-1\right)}\binom{k}{h}\binom{n}{k}$$

$$\left(\left(c+i b\right)\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{4\left(f+i d\right)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{f+i d}}\left(f+i d\right)\Gamma\left(\frac{1}{2}\left(h+k+2\right),\,-\frac{\left(c+i b+2\left(f+i d\right)\sqrt{z}\right)^2}{4\left(f+i d\right)}\right)\right)\right)-$$

$$\frac{1}{\left(d+i f\right)^2}\left(e^{\frac{i\left(b+i c\right)^2}{4\left(d+i f\right)}}\left(f-i d\right)^{-2 n}\sum_{k=0}^{n}\sum_{h=0}^{k}\left(-1\right)^{k-h}\,4^k\left(c-i b\right)^{-h-k+2 n}\left(\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}\left(-h-k-1\right)}\right.$$

$$\left(c-i b+2\left(f-i d\right)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\left(\left(c-i b\right)\left(c-i b+2\left(f-i d\right)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\left(h+k+1\right),\,\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{4\left(d+i f\right)}\right)+\right.$$

$$\left.\left.\left.2\left(f-i d\right)\sqrt{\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\left(\frac{1}{2}\left(h+k+2\right),\,\frac{i\left(b+i c+2\left(d+i f\right)\sqrt{z}\right)^2}{4\left(d+i f\right)}\right)\right)\right)\right)+$$

$$\frac{1}{(d+i f)^2}\left(e^{-\frac{i(b+i c)^2}{4(d+i f)}}(i d-f)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(i b-c)^{-h-k+2n}\left(-c+i b+2(d+i f)\,i\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2 i (d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right)\Bigg)\Bigg) /;\; n\in\mathbb{N}$$

Involving $z^n\cos\left(b z^r+d z+e\right)\sinh\left(c z^r+f z+g\right)$

01.19.21.1101.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} e^{-g-i e} \left(-e^{2g} \left(\frac{1}{\sqrt{c+i b}} \left(e^{2 i e - \frac{(f+i d)^2}{4 (c+i b)}} \sum_{q=0}^{n} 2^{q-n} (c+i b)^{-n-\frac{1}{2}} (-f-i d)^{n-q} (f+i d+2 c z+2 i b z)^{q+1} \left(-\frac{(f+i d+2 c z+2 i b z)^2}{c+i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f+i d+2 c z+2 i b z)^2}{4 (c+i b)}\right)\right) + \frac{1}{\sqrt{c-i b}} \left(e^{\frac{i (d+i f)^2}{4 (b+i c)}} \sum_{q=0}^{n} 2^{q-n} (c-i b)^{-n-\frac{1}{2}} (i d-f)^{n-q} \left(\frac{i (d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} (f-i d-2 i b z+2 c z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d+i f+2 b z+2 i c z)^2}{4 (b+i c)}\right)\right)\right) + \frac{1}{\sqrt{i b-c}} \left(e^{2 i e - \frac{i (d+i f)^2}{4 (b+i c)}} \sum_{q=0}^{n} 2^{q-n} (i b-c)^{-n-\frac{1}{2}} (f-i d)^{n-q} (i (d+i f+2 b z+2 i c z))^{q+1} \left(-\frac{i (d+i f+2 b z+2 i c z)^2}{b+i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (d+i f+2 b z+2 i c z)^2}{4 (b+i c)}\right)\right) + \frac{1}{\sqrt{-c-i b}} \left(e^{\frac{(f+i d)^2}{4 (c+i b)}} \sum_{q=0}^{n} 2^{q-n} (-c-i b)^{-n-\frac{1}{2}} (f+i d)^{n-q} (-f-i d-2 i b z-2 c z)^{q+1} \left(\frac{i (d-i f+2 b z-2 i c z)^2}{b-i c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (d-i f+2 b z-2 i c z)^2}{4 (b-i c)}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.1102.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + f z + g\right) dz = 2^{-2n-3} e^{-g-i e} \left(\frac{1}{(d-i f)^2} \left(e^{\frac{i (b-i c)^2}{4 (d-i f)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c-i b)^{-h-k+2n} \left(\frac{i \left(b-i \left(c+2 (f+i d) \sqrt{z}\right)\right)^2}{d-i f}\right)^{\frac{1}{2}(-h-k-1)} \left(-c-i b-2 i (d-i f) \sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(-(b-i c) \left(b-i \left(c+2 (f+i d) \sqrt{z}\right)\right) \Gamma\left(\frac{1}{2} (h+k+1),\right.\right.\right.\right.\right.$$

$$\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\,\right)\right)^2}{4\,(d-i\,f)}\Bigg)-2\,i\,(d-i\,f)\,\sqrt{\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\,\right)\right)^2}{d-i\,f}}\;\Gamma\Bigg($$

$$\frac{1}{2}\,(h+k+2),\,\frac{i\left(b-i\left(c+2\,(f+i\,d)\,\sqrt{z}\,\right)\right)^2}{4\,(d-i\,f)}\Bigg)\Bigg)\Bigg)\,(-f-i\,d)^{-2\,n}\Bigg)+$$

$$e^{2\,g}\Bigg(e^{2\,i\,e-\frac{i\,(b-i\,c)^2}{4\,(d-i\,f)}}\,(f+i\,d)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+i\,b)^{-h-k+2\,n}\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)^{h+k}$$

$$\left(-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)^2}{f+i\,d}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((c+i\,b)\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)^2}{4\,(f+i\,d)}\right)+$$

$$2\,\sqrt{-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)^2}{f+i\,d}}\;(f+i\,d)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(c+i\,b\,+2\,(f+i\,d)\,\sqrt{z}\,\right)^2}{4\,(f+i\,d)}\right)\Bigg)\Bigg)-$$

$$\frac{1}{(d+i\,f)^2}\Bigg(e^{\frac{i\,(b+i\,c)^2}{4\,(d+i\,f)}}\,(f-i\,d)^{-2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c-i\,b)^{-h-k+2\,n}\left(\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\,\right)^2}{d+i\,f}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\,\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((c-i\,b)\left(c-i\,b\,+2\,(f-i\,d)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\,\right)^2}{4\,(d+i\,f)}\right)+$$

$$2\,(f-i\,d)\,\sqrt{\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\,\right)^2}{d+i\,f}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(b+i\,c\,+2\,(d+i\,f)\,\sqrt{z}\,\right)^2}{4\,(d+i\,f)}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{(d+i f)^2}\left(e^{2 i e-\frac{i(b+i c)^2}{4(d+i f)}}(i d-f)^{-2n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(i b-c)^{-h-k+2n}\left(-c+i b+2(d+i f)i\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(2 i(d+i f)\sqrt{-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{d+i f}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)-\right.$$

$$\left.\left.(b+i c)\left(b+i c+2(d+i f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),-\frac{i\left(b+i c+2(d+i f)\sqrt{z}\right)^2}{4(d+i f)}\right)\right)\right)\Bigg)\ /;\ n\in\mathbb{N}$$

Involving powers of cos and power

Involving $z^{\alpha-1}\cos^{\mu}(c\,z)\sinh(a\,z)$

01.19.21.1103.01

$$\int z^{\alpha-1}\cos^m(c z)\sinh(a z)\,dz = 2^{-m-1}z^{\alpha}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(\Gamma(\alpha,(a-2 i c k+i c m)z)((a-2 i c k+i c m)z)^{-\alpha}+\left(-\Gamma(\alpha,(-a-2 i c k+i c m)z)((-a-2 i c k+i c m)z)^{-\alpha}-\right.\right.$$
$$\left.\left.((-a+2 i c k-i c m)z)^{-\alpha}\Gamma(\alpha,(-a+2 i c k-i c m)z)\right)+((a+2 i c k-i c m)z)^{-\alpha}\Gamma(\alpha,(a+2 i c k-i c m)z)\right)-$$

$$2^{-m-1}z^{\alpha}\binom{m}{\frac{m}{2}}\left(((-a z)^{-\alpha}\Gamma(\alpha,-a z)-(a z)^{-\alpha}\Gamma(\alpha,a z)\right)(1-m\bmod 2)\ /;\ m\in\mathbb{N}^{+}$$

01.19.21.1104.01

$$\int z^n\cos^{\mu}(c z)\sinh(a z)\,dz = \frac{n!}{2}\cos^{\mu}(c z)\left(1+e^{2 i c z}\right)^{-\mu}$$

$$\left(e^{a z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(a-i c\mu)^{p+1}}\,{}_{p+2}F_{p+1}\!\left(-\frac{i a+c\mu}{2c},\ldots,-\frac{i a+c\mu}{2c},-\mu;1-\frac{i a+c\mu}{2c},\ldots,1-\frac{i a+c\mu}{2c};-e^{2 i c z}\right)-e^{-a z}\right.$$

$$\left.\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}}{(n-p)!\,(-a-i c\mu)^{p+1}}\,{}_{p+2}F_{p+1}\!\left(\frac{i a-c\mu}{2c},\ldots,\frac{i a-c\mu}{2c},-\mu;1+\frac{i a-c\mu}{2c},\ldots,1+\frac{i a-c\mu}{2c};-e^{2 i c z}\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos^{\mu}(c\,z+d)\sinh(a\,z)$

01.19.21.1105.01

$$\int z^{\alpha-1}\cos^m(d+c\,z)\sinh(a\,z)\,dz = 2^{-m-1}z^\alpha \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{-2\,d\,i\,k-i\,d\,m}\binom{m}{k}\Big(e^{4\,i\,d\,k}\,\Gamma(\alpha,(a-2\,i\,c\,k+i\,c\,m)\,z)\,((a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+\Big(-e^{4\,i\,d\,k}\,\Gamma(\alpha,(-a-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}-e^{2\,i\,d\,m}\,((-a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(-a+2\,i\,c\,k-i\,c\,m)\,z)\Big)+e^{2\,i\,d\,m}\,((a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(a+2\,i\,c\,k-i\,c\,m)\,z)\Big)-2^{-m-1}z^\alpha\binom{m}{\frac{m}{2}}((-a\,z)^{-\alpha}\,\Gamma(\alpha,-a\,z)-(a\,z)^{-\alpha}\,\Gamma(\alpha,a\,z))\,(1-m \bmod 2)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1106.01

$$\int z^n\cos^\mu(d+c\,z)\sinh(a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu} n!\cos^\mu(d+c\,z)\left(e^{a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{i\,a+c\,\mu}{2\,c},\ldots,-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a+c\,\mu}{2\,c},\ldots,1-\frac{i\,a+c\,\mu}{2\,c};-e^{2\,i\,(d+c\,z)}\right)-e^{-a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}\,(-a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{c\,\mu-i\,a}{2\,c},\ldots,-\frac{c\,\mu-i\,a}{2\,c},-\mu;1-\frac{c\,\mu-i\,a}{2\,c},\ldots,1-\frac{c\,\mu-i\,a}{2\,c};-e^{2\,i\,(d+c\,z)}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos^\mu(c\,z)\sinh(a\,z+b)$

01.19.21.1107.01

$$\int z^{\alpha-1}\cos^m(c\,z)\sinh(b+a\,z)\,dz = 2^{-m-1}z^\alpha e^{-b}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Big(\Gamma(\alpha,(a-2\,i\,c\,k+i\,c\,m)\,z)\,((a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+e^{2\,b}\Big(-\Gamma(\alpha,(-a-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}-((-a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(-a+2\,i\,c\,k-i\,c\,m)\,z)\Big)+((a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(a+2\,i\,c\,k-i\,c\,m)\,z)\Big)-2^{-m-1}e^{-b}z^\alpha\binom{m}{\frac{m}{2}}\left(e^{2\,b}\,(-a\,z)^{-\alpha}\,\Gamma(\alpha,-a\,z)-(a\,z)^{-\alpha}\,\Gamma(\alpha,a\,z)\right)(1-m \bmod 2)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1108.01

$$\int z^n \cos^\mu(c\,z)\sinh(b+a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,c\,z}\right)^{-\mu} n!\cos^\mu(c\,z)\left(e^{b+a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i\,a+c\,\mu}{2\,c},\ldots,-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a+c\,\mu}{2\,c},\ldots,1-\frac{i\,a+c\,\mu}{2\,c};-e^{2\,i\,c\,z}\right)-e^{-b-a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\,\mu-i\,a}{2\,c},\ldots,-\frac{c\,\mu-i\,a}{2\,c},-\mu;1-\frac{c\,\mu-i\,a}{2\,c},\ldots,1-\frac{c\,\mu-i\,a}{2\,c};-e^{2\,i\,c\,z}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\cos^\mu(c\,z+d)\sinh(a\,z+b)$

01.19.21.1109.01

$$\int z^{\alpha-1}\cos^m(d+c\,z)\sinh(b+a\,z)\,dz = 2^{-m-1} z^\alpha \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{-b-2\,i\,d\,k-i\,d\,m}\binom{m}{k}\Big(e^{4\,i\,d\,k}\,\Gamma(\alpha,(a-2\,i\,c\,k+i\,c\,m)\,z)\,((a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+e^{2\,b}\left(-e^{4\,i\,d\,k}\,\Gamma(\alpha,(-a-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}-e^{2\,i\,d\,m}\,((-a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(-a+2\,i\,c\,k-i\,c\,m)\,z)\right)+e^{2\,i\,d\,m}\,((a+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,(a+2\,i\,c\,k-i\,c\,m)\,z)\Big)-2^{-m-1}e^{-b}z^\alpha\binom{m}{\frac{m}{2}}\left(e^{2\,b}(-a\,z)^{-\alpha}\,\Gamma(\alpha,-a\,z)-(a\,z)^{-\alpha}\,\Gamma(\alpha,a\,z)\right)(1-m\bmod 2)\,/;\,m\in\mathbb{N}^+$$

01.19.21.1110.01

$$\int z^n \cos^\mu(d+c\,z)\sinh(b+a\,z)\,dz = \frac{1}{2}\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu} n!\cos^\mu(d+c\,z)\left(e^{b+a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i\,a+c\,\mu}{2\,c},\ldots,-\frac{i\,a+c\,\mu}{2\,c},-\mu;1-\frac{i\,a+c\,\mu}{2\,c},\ldots,1-\frac{i\,a+c\,\mu}{2\,c};-e^{2\,i\,(d+c\,z)}\right)-e^{-b-a\,z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\,\mu-i\,a}{2\,c},\ldots,-\frac{c\,\mu-i\,a}{2\,c},-\mu;1-\frac{c\,\mu-i\,a}{2\,c},\ldots,1-\frac{c\,\mu-i\,a}{2\,c};-e^{2\,i\,(d+c\,z)}\right)\right)\,/;\,n\in\mathbb{N}$$

Involving $z^n\cos^m\left(b\,z^r\right)\sinh(c\,z)$

01.19.21.1111.01

$$\int z^n \cos^m\left(b z^2\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i c^2}{4 b (m-2 s)}} \left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c - 2 i b (m-2 s) z)^{j+1} \left(-\frac{i (-c - 2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - 2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} + e^{-\frac{i c^2}{4 b (m-2 s)}} \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c - 2 i b (m-2 s) z)^{j+1} \left(-\frac{i (c - 2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - 2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} - e^{\frac{i c^2}{4 b (m-2 s)}} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b (m-2 s) z - c)^{j+1} \left(\frac{i (2 i b (m-2 s) z - c)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2 s) z - c)^2}{4 b (m-2 s)}\right) + e^{\frac{i c^2}{4 b (m-2 s)}} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 b i (m-2 s) z)^{j+1} \left(\frac{i (c + 2 b i (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + 2 b i (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1112.01

$$\int z^n \cos^m\left(\sqrt{z}\, b\right) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right) (1 - m \bmod 2)\, c^{-n-1} + 2^{-m-2 n-2} c^{-2 (n+1)} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{b^2 (m-2 s)^2}{4 c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n} \left(-2 \sqrt{z}\, c - i b (m-2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, c - i b (m-2 s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b (m-2 s) \left(-2 \sqrt{z}\, c - i b (m-2 s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, c - i b (m-2 s)\right)^2}{4 c}\right) - \right.\right.$$

$$2\,c\,\sqrt{\frac{\left(-2\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\;c-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)-$$

$$e^{-\frac{b^2\,(m-2\,s)^2}{4\,c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{4\,c}\right)-$$

$$2\,c\,\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{4\,c}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,c\,\sqrt{-\frac{\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\sqrt{z}\;-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)+$$

$$2\,\sqrt{-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m\!\left(b\,z^r+e\right)\sinh(c\,z)$

01.19.21.1113.01

$$\int z^n \cos^m\left(b z^2+e\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z)+\Gamma(n+1, c z)\right)(1-m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i c^2}{4 b (m-2 s)}-i e (m-2 s)} \left(\sum_{j=0}^{n} 2^{j-n} c^{n-j} (-c-2 i b (m-2 s) z)^{j+1} \left(-\frac{i (-c-2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c-2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} + e^{-\frac{i c^2}{4 b (m-2 s)}-i e (m-2 s)} \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c-2 i b (m-2 s) z)^{j+1} \left(-\frac{i (c-2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c-2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} - e^{\frac{i c^2}{4 b (m-2 s)}+e i (m-2 s)} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 i b (m-2 s) z-c)^{j+1} \left(\frac{i (2 i b (m-2 s) z-c)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2 s) z-c)^2}{4 b (m-2 s)}\right) + e^{\frac{i c^2}{4 b (m-2 s)}+e i (m-2 s)} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c+2 b i (m-2 s) z)^{j+1} \left(\frac{i (c+2 b i (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c+2 b i (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1114.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z)+\Gamma(n+1, c z)\right)(1-m \bmod 2)\, c^{-n-1} + 2^{-m-2 n-2} c^{-2 (n+1)} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{b^2 (m-2 s)^2}{4 c}-i e (m-2 s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n} \left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b (m-2 s) \left(-2 \sqrt{z}\, c-i b (m-2 s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, c-i b (m-2 s)\right)^2}{4 c}\right) - \right.\right.$$

$$2\,c\,\sqrt{\frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\Bigg)\Bigg)-e^{-\frac{b^2\,(m-2\,s)^2}{4\,c}+e\,i\,(m-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{4\,c}\right)-\right.$$

$$\left.2\,c\,\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\sqrt{z}\right)^2}{4\,c}\right)\right)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}-i\,e\,(m-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,c\,\sqrt{-\frac{\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)-\right.$$

$$\left.i\,b\,(m-2\,s)\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c}\right)\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,c}+e\,i\,(m-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)+\right.$$

$$\left.2\,\sqrt{-\frac{\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,c+b\,i\,(m-2\,s)\right)^2}{4\,c}\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+d\,z\right)\sinh(c\,z)$

01.19.21.1115.01

$$\int z^n \cos^m\left(b z^2 + d z\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i(-c - i d (m-2s))^2}{4 b (m-2s)}} \left(\sum_{j=0}^{n} 2^{j-n} (c + d i (m-2s))^{n-j} (-c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} + e^{-\frac{i(c - i d (m-2s))^2}{4 b (m-2s)}} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c)^{n-j} (c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} - e^{\frac{i(i d (m-2s) - c)^2}{4 b (m-2s)}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c - i d (m-2s))^{n-j} (-c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(-c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) + e^{\frac{i(c + d i (m-2s))^2}{4 b (m-2s)}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c - i d (m-2s))^{n-j} (c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1116.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh(c\, z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n\, \Gamma(n+1, -c\, z) + \Gamma(n+1, c\, z)\right) (1 - m \bmod 2)\, c^{-n-1} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{\frac{b^2 (m-2s)^2}{4(i\, d\, (m-2s)-c)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2s))^{-h-j+2n} \left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right)^2}{i\, d\, (m-2s)-c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2s) \left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right)^2}{4\, (i\, d\, (m-2s)-c)}\right) + 2\sqrt{-\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right)^2}{i\, d\, (m-2s)-c}}\, (i\, d\, (m-2s)-c)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\, i\, (m-2s) + 2\, (i\, d\, (m-2s)-c)\sqrt{z}\right)^2}{4\, (i\, d\, (m-2s)-c)}\right)\right)\right) (i\, d\, (m-2s)-c)^{-2(n+1)} + e^{\frac{b^2 (m-2s)^2}{4(c+d\, i\, (m-2s))}} (c + d\, i\, (m-2s))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2s))^{-h-j+2n} \left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right)^2}{c + d\, i\, (m-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2s) \left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right)^2}{4\, (c + d\, i\, (m-2s))}\right) + 2\sqrt{-\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right)^2}{c + d\, i\, (m-2s)}}\, (c + d\, i\, (m-2s))\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\, i\, (m-2s) + 2\, (c + d\, i\, (m-2s))\sqrt{z}\right)^2}{4\, (c + d\, i\, (m-2s))}\right)\right) -$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (-c-i d (m-2 s))}} (-c - i\, d\, (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2 s))^{-h-j+2 n}$$

$$\left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{-c - i\, d\, (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (-c - i\, d\, (m-2 s)) \sqrt{-\frac{\left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{-c - i\, d\, (m-2 s)}}\ \Gamma\!\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{4 (-c - i\, d\, (m-2 s))}\right) - i\, b\, (m-2 s) \left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} -\right.$$

$$\left.\left. i\, b\, (m-2 s)\right) \Gamma\!\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (-c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{4 (-c - i\, d\, (m-2 s))}\right)\right) +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 (c-i d (m-2 s))}} (c - i\, d\, (m-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2 s))^{-h-j+2 n}$$

$$\left(2 (c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^{h+j} \left(-\frac{\left(2 (c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{c - i\, d\, (m-2 s)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 (c - i\, d\, (m-2 s)) \sqrt{-\frac{\left(2 (c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{c - i\, d\, (m-2 s)}}\ \Gamma\!\left(\frac{1}{2} (h+j+2),\right.\right.$$

$$\left.-\frac{\left(2 (c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{4 (c - i\, d\, (m-2 s))}\right) - i\, b\, (m-2 s) \left(2 (c - i\, d\, (m-2 s)) \sqrt{z} -\right.$$

$$\left.\left.\left. i\, b\, (m-2 s)\right) \Gamma\!\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (c - i\, d\, (m-2 s)) \sqrt{z} - i\, b\, (m-2 s)\right)^2}{4 (c - i\, d\, (m-2 s))}\right)\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \cos^m\left(b\, z^r + d\, z + e\right) \sinh(c\, z)$

01.19.21.1117.01

$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh(c z)\, dz = 2^{-m-1} c^{-n-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right)(1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i (-c - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (c + d i (m-2s))^{n-j} (-c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{-\frac{i (c - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c)^{n-j} (c - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (c - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} - e^{\frac{i (i d (m-2s) - c)^2}{4 b (m-2s)} + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c - i d (m-2s))^{n-j} (-c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i (-c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (-c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) + e^{\frac{i (c + d i (m-2s))^2}{4 b (m-2s)} + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c - i d (m-2s))^{n-j} (c + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i (c + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1118.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh(c z)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left((-1)^n \Gamma(n+1, -c z) + \Gamma(n+1, c z)\right)(1 - m \bmod 2)\, c^{-n-1} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{\frac{b^2 (m-2s)^2}{4 (i d (m-2s) - c)} + e i (m-2s)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n}\right.\right.$$

$$\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-c)}\right)+2\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-c}}$$

$$\left.\left.(i\,d\,(m-2\,s)-c)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-c)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-c)}\right)\right)\right)$$

$$(i\,d\,(m-2\,s)-c)^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(c+d\,i\,(m-2\,s))}+e\,i\,(m-2\,s)}\,(c+d\,i\,(m-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{c+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(c+d\,i\,(m-2\,s))}\right)+2\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{c+d\,i\,(m-2\,s)}}$$

$$\left.(c+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2\,s)+2\,(c+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(c+d\,i\,(m-2\,s))}\right)\right)-$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(-c-i\,d\,(m-2\,s))}-i\,e\,(m-2\,s)}\,(-c-i\,d\,(m-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-c-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-c-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-c-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-c-i\,d\,(m-2\,s))\sqrt{-\frac{\left(2\,(-c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-c-i\,d\,(m-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(-c-i\,d\,(m-2\,s))}\right)-i\,b\,(m-2\,s)\left(2\,(-c-i\,d\,(m-2\,s))\sqrt{z}-\right.$$

$$\left.\left.i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(-c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(-c-i\,d\,(m-2\,s))}\right)\right)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(c-i\,d\,(m-2\,s))}-i\,e\,(m-2\,s)}\,(c-i\,d\,(m-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(c-i\,d\,(m-2\,s))\sqrt{-\frac{\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c-i\,d\,(m-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c-i\,d\,(m-2\,s))}\right)-i\,b\,(m-2\,s)\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(c-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c-i\,d\,(m-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r\right)\sinh(f\,z+g)$

01.19.21.1119.01

$$\int z^n \cos^m(b z^2) \sinh(g + f z) \, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i f^2}{4 b (m-2 s)} - g} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b (m-2 s) z)^{j+1} \left(-\frac{i (-f - 2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} + e^{-\frac{i f^2}{4 b (m-2 s)} + g} \left(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b (m-2 s) z)^{j+1} \left(-\frac{i (f - 2 i b (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - 2 i b (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} - e^{\frac{i f^2}{4 b (m-2 s)} - g} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b (m-2 s) z - f)^{j+1} \left(\frac{i (2 i b (m-2 s) z - f)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2 s) z - f)^2}{4 b (m-2 s)}\right) + e^{\frac{i f^2}{4 b (m-2 s)} + g} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 b i (m-2 s) z)^{j+1} \left(\frac{i (f + 2 b i (m-2 s) z)^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + 2 b i (m-2 s) z)^2}{4 b (m-2 s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1120.01

$$\int z^n \cos^m(\sqrt{z}\, b) \sinh(g + f z) \, dz = 2^{-m-2n-2} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{b^2 (m-2 s)^2}{4 f} - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n} \left(-2 \sqrt{z}\, f - i b (m-2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, f - i b (m-2 s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b (m-2 s) \left(-2 \sqrt{z}\, f - i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), \frac{\left(-2 \sqrt{z}\, f - i b (m-2 s)\right)^2}{4 f}\right) - 2 f\right.\right.\right.$$

$$\sqrt{\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)\Bigg)-e^{-\frac{b^2\,(m-2\,s)^2}{4\,f}-g}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)-2$$

$$f\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,f}+g}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,f\sqrt{-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)-i\,b$$

$$(m-2\,s)\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)+e^{\frac{b^2\,(m-2\,s)^2}{4\,f}+g}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ -\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{4\,f}\right)+2$$

$$\sqrt{-\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{f}}\ f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\ -\frac{\left(2\sqrt{z}\ f+b\,i\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$f^{-2(n+1)} + (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right) (1 - m \bmod 2) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \cos^m\left(b z^r + e\right) \sinh(f z + g)$

01.19.21.1121.01

$$\int z^n \cos^m\left(b z^2 + e\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i f^2}{4 b (m-2s)} - g - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-f - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} + e^{-\frac{i f^2}{4 b (m-2s)} + g - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (f - 2 i b (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} - e^{\frac{i f^2}{4 b (m-2s)} - g + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2 i b (m-2s) z - f)^{j+1} \left(\frac{i (2 i b (m-2s) z - f)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - f)^2}{4 b (m-2s)} \right) + e^{\frac{i f^2}{4 b (m-2s)} + g + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 b i (m-2s) z)^{j+1} \left(\frac{i (f + 2 b i (m-2s) z)^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f + 2 b i (m-2s) z)^2}{4 b (m-2s)} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1122.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + e\right) \sinh(g + f z)\, dz =$$

$$2^{-m-2n-2} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{b^2 (m-2s)^2}{4 f} - i e (m-2s) - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2s))^{-h-j+2n} \left(-2 \sqrt{z}\, f - i b (m-2s)\right)^{h+j} \right.\right.$$

$$\left(\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2\,s)\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{4\,f}\right)-2\,f\sqrt{\frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{f}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(-2\sqrt{z}\ f-i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)-e^{-\frac{b^2(m-2\,s)^2}{4\,f}+e\,i\,(m-2\,s)-g}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\,(m-2\,s)\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)-2$$

$$f\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(i\,b\,(m-2\,s)-2\,f\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{\frac{b^2(m-2\,s)^2}{4\,f}-i\,e\,(m-2\,s)+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,f\sqrt{-\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2\,f\sqrt{z}\ -i\,b\,(m-2\,s)\right)^2}{4\,f}\right)\Bigg)+e^{\frac{b^2(m-2\,s)^2}{4\,f}+e\,i\,(m-2\,s)+g}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{4\,f}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\;f+b\,i\,(m-2\,s)\right)^{2}}{4\,f}\right)\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2\,(n+1)}+(-1)^{n}\,2^{-m-1}\binom{m}{\frac{m}{2}}\left(e^{g}\,f^{-n-1}\,\Gamma(n+1,\,-f\,z)-e^{-g}\,(-f)^{-n-1}\,\Gamma(n+1,\,f\,z)\right)$$

$$(1-m\bmod 2)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^{+}$$

Involving $z^n\cos^m\left(b\,z^r+d\,z\right)\sinh(f\,z+g)$

01.19.21.1123.01

$$\int z^n \cos^m\left(b z^2 + d z\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right)(1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i(-f-i d (m-2s))^2}{4 b (m-2s)} - g} \left(\sum_{j=0}^{n} 2^{j-n} (f + d i (m-2s))^{n-j} (-f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{g - \frac{i(f - i d (m-2s))^2}{4 b (m-2s)}} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f)^{n-j} (f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} - e^{\frac{i(i d (m-2s) - f)^2}{4 b (m-2s)} - g} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2s))^{n-j} (-f + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) + e^{\frac{i(f + d i (m-2s))^2}{4 b (m-2s)} + g} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2s))^{n-j} (f + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1124.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d z\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right)(1 - m \bmod 2) + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{\frac{b^2 (m-2s)^2}{4(i d (m-2s) - f)} - g} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n}\right.\right.$$

$$\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\left.-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+2\,\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\right.$$

$$\left.(i\,d\,(m-2\,s)-f)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\right)\Bigg)$$

$$(i\,d\,(m-2\,s)-f)^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(f+d\,i\,(m-2\,s))}+g}\,(f+d\,i\,(m-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\left.-\frac{\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+2\,\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\right.$$

$$\left.(f+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\right)\Bigg)-$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(-f-i\,d\,(m-2\,s))}-g}\,(-f-i\,d\,(m-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-f-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-f-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-f-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-f-i\,d\,(m-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(-f-i\,d\,(m-2\,s)\right)}\right)-i\,b\,(m-2\,s)\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}\,-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(-f-i\,d\,(m-2\,s)\right)}\right)\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(f-i\,d\,(m-2s))}+g}\left(f-i\,d\,(m-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-i\,b\,(m-2\,s)\right)^{-h-j+2n}$$

$$\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f-i\,d\,(m-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(f-i\,d\,(m-2\,s)\right)}\right)-i\,b\,(m-2\,s)\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}\,-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(f-i\,d\,(m-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+d\,z+e\right)\sinh(f\,z+g)$

01.19.21.1125.01

$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right)(1 - m \bmod 2) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{i(-f-i d (m-2s))^2}{4 b (m-2s)} - g - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (f + d i (m-2s))^{n-j} (-f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{-\frac{i(f - i d (m-2s))^2}{4 b (m-2s)} + g - i e (m-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f)^{n-j} (f - i d (m-2s) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f - i d (m-2s) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} - e^{\frac{i(i d (m-2s) - f)^2}{4 b (m-2s)} - g + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2s))^{n-j} (-f + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(-f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right) + e^{\frac{i(f + d i (m-2s))^2}{4 b (m-2s)} + g + e i (m-2s)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2s))^{n-j} (f + d i (m-2s) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f + d i (m-2s) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1126.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh(g + f z)\, dz = (-1)^n 2^{-m-1} \binom{m}{\frac{m}{2}} \left(e^g f^{-n-1} \Gamma(n+1, -f z) - e^{-g} (-f)^{-n-1} \Gamma(n+1, f z)\right)(1 - m \bmod 2) +$$

$$2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(-e^{\frac{b^2(m-2s)^2}{4(i d(m-2s)-f)}+e i(m-2s)-g}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i b(m-2s))^{-h-j+2n}$$

$$\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)^2}{i d(m-2s)-f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b i(m-2s)\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)^2}{4(i d(m-2s)-f)}\Bigg)+2\sqrt{-\frac{\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)^2}{i d(m-2s)-f}}$$

$$(i d(m-2s)-f)\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b i(m-2s)+2(i d(m-2s)-f)\sqrt{z}\right)^2}{4(i d(m-2s)-f)}\right)\Bigg)\Bigg)$$

$$(i d(m-2s)-f)^{-2(n+1)}+e^{\frac{b^2(m-2s)^2}{4(f+d i(m-2s))}+e i(m-2s)+g}(f+d i(m-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i b(m-2s))^{-h-j+2n}$$

$$\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)^2}{f+d i(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b i(m-2s)\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)^2}{4(f+d i(m-2s))}\Bigg)+2\sqrt{-\frac{\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)^2}{f+d i(m-2s)}}$$

$$(f+d i(m-2s))\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b i(m-2s)+2(f+d i(m-2s))\sqrt{z}\right)^2}{4(f+d i(m-2s))}\right)\Bigg)-$$

$$e^{\frac{b^2(m-2s)^2}{4(-f-i d(m-2s))}-g-i e(m-2s)}(-f-i d(m-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i b(m-2s))^{-h-j+2n}$$

$$\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-f-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-f-i\,d\,(m-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(-f-i\,d\,(m-2\,s)\right)}\right)-i\,b\,(m-2\,s)\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-\right.$$

$$\left.\left.i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2\left(-f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(-f-i\,d\,(m-2\,s)\right)}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(f-i\,d\,(m-2s))}-i\,e\,(m-2\,s)+g}\left(f-i\,d\,(m-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-i\,b\,(m-2\,s)\right)^{-h-j+2n}$$

$$\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f-i\,d\,(m-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(f-i\,d\,(m-2\,s)\right)}\right)-i\,b\,(m-2\,s)\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2\left(f-i\,d\,(m-2\,s)\right)\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\left(f-i\,d\,(m-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z)\sinh\left(c\,z^r\right)$

01.19.21.1127.01

$$\int z^n \cos^m(b z) \sinh\left(c z^2\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{-\frac{b^2 (m-2k)^2}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (i b (m-2k) - 2 c z)^{j+1} \left(\frac{(i b (m-2k) - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i b (m-2k) - 2 c z)^2}{4c}\right)\right) (-c)^{-n-1} - (-c)^{-n-1} e^{-\frac{b^2 (m-2k)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (-i b (m-2k) - 2 c z)^{j+1} \left(\frac{(-i b (m-2k) - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i b (m-2k) - 2 c z)^2}{4c}\right) + c^{-n-1} e^{\frac{b^2 (m-2k)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (2 c z - i b (m-2k))^{j+1} \left(-\frac{(2 c z - i b (m-2k))^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c z - i b (m-2k))^2}{4c}\right) + c^{-n-1} e^{\frac{b^2 (m-2k)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (b i (m-2k) + 2 c z)^{j+1} \left(-\frac{(b i (m-2k) + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (m-2k) + 2 c z)^2}{4c}\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1128.01

$$\int z^n \cos^m(b z) \sinh\left(\sqrt{z}\, c\right) dz = 2^{-m} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), c\sqrt{z}\right) - \Gamma\left(2(n+1), -c\sqrt{z}\right)\right) (1 - m \bmod 2)\, c^{-2(n+1)} + 2^{-m-2n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (i b (m-2k))^{-2(n+1)} \left(-e^{\frac{i c^2}{4 b (m-2k)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 i b (m-2k) \sqrt{z} - c\right)^{h+j} \left(\frac{i \left(2 i b (m-2k) \sqrt{z} - c\right)^2}{b (m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 i b (m-2k) \sqrt{\frac{i \left(2 i b (m-2k) \sqrt{z} - c\right)^2}{b (m-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(2 i b (m-2k) \sqrt{z} - c\right)^2}{4 b (m-2k)}\right) - c \left(2 i b (m-2k) \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(2 i b (m-2k) \sqrt{z} - c\right)^2}{4 b (m-2k)}\right)\right) + \right.$$

$$e^{\frac{i c^2}{4 b (m-2k)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 b i (m-2k) \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + 2 b i (m-2k) \sqrt{z}\right)^2}{b (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c \left(c + 2 b i (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(c + 2 b i (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right) + \right.$$

$$\left. 2 b i (m-2k) \sqrt{\frac{i \left(c + 2 b i (m-2k) \sqrt{z}\right)^2}{b (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c + 2 b i (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right)\right) -$$

$$e^{-\frac{i c^2}{4 b (m-2k)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(-c - 2 i b (m-2k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-c - 2 i b (m-2k) \sqrt{z}\right)^2}{b (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 i b (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-c - 2 i b (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right) - \right.$$

$$\left. 2 i b (m-2k) \sqrt{-\frac{i \left(-c - 2 i b (m-2k) \sqrt{z}\right)^2}{b (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(-c - 2 i b (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right)\right) +$$

$$e^{-\frac{i c^2}{4 b (m-2k)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c - 2 i b (m-2k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(c - 2 i b (m-2k) \sqrt{z}\right)^2}{b (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c \left(c - 2 i b (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(c - 2 i b (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right) - 2 i b (m-2k) \right.$$

$$\left.\left.\left. \sqrt{-\frac{i \left(c - 2 i b (m-2k) \sqrt{z}\right)^2}{b (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(c - 2 i b (m-2k) \sqrt{z}\right)^2}{4 b (m-2k)}\right)\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \cos^m(d z + e) \sinh(c z^r)$

01.19.21.1129.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(c\,z^2\right)dz = 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left(\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c\,z^2\right) - \left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -c\,z^2\right)\right)(1-m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{-\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2k))^{n-j}(i\,d\,(m-2k)-2\,c\,z)^{j+1}\left(\frac{(i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(i\,d\,(m-2k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1}e^{-\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)}\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2k))^{n-j} (-i\,d\,(m-2k)-2\,c\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{4\,c}\right) + c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)}\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2k))^{n-j}(2\,c\,z-i\,d\,(m-2k))^{j+1} \left(-\frac{(2\,c\,z-i\,d\,(m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2\,c\,z-i\,d\,(m-2k))^2}{4\,c}\right) + c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)}\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2k))^{n-j}(d\,i\,(m-2k)+2\,c\,z)^{j+1} \left(-\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{4\,c}\right)\right) /; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1130.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(\sqrt{z}\,c\right)dz = 2^{-m}\binom{m}{\frac{m}{2}}\left(-\Gamma\left(2(n+1), -c\sqrt{z}\right)+\Gamma\left(2(n+1), c\sqrt{z}\right)\right)(1-m \bmod 2)\,c^{-2(n+1)} + 2^{-m-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}(i\,d\,(m-2k))^{-2(n+1)} \left(-e^{\frac{i\,c^2}{4\,d\,(m-2k)}+e\,i\,(m-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c)^{-h-j+2n}\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2k)\sqrt{\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{4\,d\,(m-2k)}\right)-\right.\right.$$

$$c\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{4\,d\,(m-2k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2}{4\,d\,(m-2k)}+e\,i\,(m-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)+2\,d\,i\,(m-2k)$$

$$\sqrt{\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+2\,d\,i\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)\Bigg)-e^{-\frac{i\,c^2}{4\,d\,(m-2k)}-i\,e\,(m-2k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)\Bigg)+$$

$$e^{-\frac{i\,c^2}{4\,d\,(m-2k)}-i\,e\,(m-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)-2\,i\,d\,(m-2k)$$

$$\sqrt{-\frac{i\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\,(m-2k)\sqrt{z}\right)^2}{4\,d\,(m-2k)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b z^r)\sinh(c z^r)$

01.19.21.1131.01

$$\int z^{\alpha-1}\cos^m(b z^r)\sinh(c z^r)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}}\left((c z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, c z^r\right)-(-c z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -c z^r\right)\right)(1-m \bmod 2)}{r} - \frac{2^{-m-1} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{\alpha}{r}, (-c-2 i b k+i b m) z^r\right)((-c-2 i b k+i b m) z^r)^{-\frac{\alpha}{r}} - ((c-2 i b k+i b m) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (c-2 i b k+i b m) z^r\right)+((-c+2 i b k-i b m) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-c+2 i b k-i b m) z^r\right)-((c+2 i b k-i b m) z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (c+2 i b k-i b m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.1132.01

$$\int z^n \cos^m(b z^2)\sinh(c z^2)\,dz = (-1)^m 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left((c z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c z^2\right)-(-c z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -c z^2\right)\right)(1-m \bmod 2) - 2^{-m-2} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{n+1}{2}, (-c-2 i b k+i b m) z^2\right)((-c-2 i b k+i b m) z^2)^{\frac{1}{2}(-n-1)} - ((c-2 i b k+i b m) z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (c-2 i b k+i b m) z^2\right)+((-c+2 i b k-i b m) z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-c+2 i b k-i b m) z^2\right)-((c+2 i b k-i b m) z^2)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (c+2 i b k-i b m) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1133.01

$$\int z^n \cos^m(b\sqrt{z})\sinh(\sqrt{z}\,c)\,dz = (-1)^m 2^{-m} c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(\Gamma(2(n+1), c\sqrt{z})-\Gamma(2(n+1), -c\sqrt{z})\right)(1-m \bmod 2) - 2^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(2(n+1), (-c-2 i b k+i b m)\sqrt{z})(-c-2 i b k+i b m)^{-2(n+1)} - (c-2 i b k+i b m)^{-2(n+1)}\Gamma(2(n+1), (c-2 i b k+i b m)\sqrt{z})+(-c+2 i b k-i b m)^{-2(n+1)}\Gamma(2(n+1), (-c+2 i b k-i b m)\sqrt{z})-(c+2 i b k-i b m)^{-2(n+1)}\Gamma(2(n+1), (c+2 i b k-i b m)\sqrt{z})\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b z^r + e)\sinh(c z^r)$

01.19.21.1134.01

$$\int z^{\alpha-1}\cos^m(b\,z^r+e)\sinh(c\,z^r)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}} \left((c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,c\,z^r\right)-(-c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-c\,z^r\right)\right)(1-m \bmod 2)}{r} - \frac{2^{-m-1} z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2 i e k - i e m}\,\Gamma\!\left(\frac{\alpha}{r},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^r\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}} - e^{2 i e k - i e m}\,((c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(c-2\,i\,b\,k+i\,b\,m)\,z^r\right) + e^{i e m - 2 i e k}\,((-c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^r\right) - e^{i e m - 2 i e k}\,((c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(c+2\,i\,b\,k-i\,b\,m)\,z^r\right)\right) /;\ m\in\mathbb{N}^+$$

01.19.21.1135.01

$$\int z^n\cos^m\!\left(b\,z^2+e\right)\sinh\!\left(c\,z^2\right)dz = (-1)^m\,2^{-m-2}\,z^{n+1}\binom{m}{\frac{m}{2}}\left(\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,c\,z^2\right)-\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,-c\,z^2\right)\right)(1-m \bmod 2) - 2^{-m-2}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2 i e k - i e m}\,\Gamma\!\left(\frac{n+1}{2},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)\left((-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)} - e^{2 i e k - i e m}\left((c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(c-2\,i\,b\,k+i\,b\,m)\,z^2\right) + e^{i e m - 2 i e k}\left((-c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^2\right) - e^{i e m - 2 i e k}\left((c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(c+2\,i\,b\,k-i\,b\,m)\,z^2\right)\right) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1136.01

$$\int z^n\cos^m\!\left(\sqrt{z}\,b+e\right)\sinh\!\left(\sqrt{z}\,c\right)dz = (-1)^m\,2^{-m}\,c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(\Gamma\!\left(2(n+1),\,c\sqrt{z}\right)-\Gamma\!\left(2(n+1),\,-c\sqrt{z}\right)\right)(1-m \bmod 2) - 2^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2 i e k - i e m}\,\Gamma\!\left(2(n+1),\,(-c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right)(-c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)} - e^{2 i e k - i e m}\,(c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)}\,\Gamma\!\left(2(n+1),\,(c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right) + e^{-2 i e k + i e m}\,(-c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\!\left(2(n+1),\,(-c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right) - e^{-2 i e k + i e m}\,(c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\!\left(2(n+1),\,(c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m\!\left(b\,z^r+d\,z\right)\sinh\!\left(c\,z^r\right)$

01.19.21.1137.01

$$\int z^n \cos^m(b z^2 + d z) \sinh(c z^2) \, dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left((c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - (-c z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right) \right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4(i b (2k-m)-c)}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2(i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2(i b (2k-m) - c) z)^2}{i b (2k-m) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2(i b (2k-m) - c) z)^2}{4(i b (2k-m) - c)}\right) \right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4(c + b i (2k-m))}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2(c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2(c + b i (2k-m)) z)^2}{c + b i (2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2(c + b i (2k-m)) z)^2}{4(c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4(i b (m-2k)-c)}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2(i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2(i b (m-2k) - c) z)^2}{i b (m-2k) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2(i b (m-2k) - c) z)^2}{4(i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4(c + b i (m-2k))}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2(c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2(c + b i (m-2k)) z)^2}{c + b i (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2(c + b i (m-2k)) z)^2}{4(c + b i (m-2k))}\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1138.01

$$\int z^n \cos^m(\sqrt{z}\, b + d z) \sinh(\sqrt{z}\, c) \, dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma(2(n+1), c\sqrt{z}) - \Gamma(2(n+1), -c\sqrt{z}) \right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (d(m-2s))^{-2n-2}$$

$$\Bigg(-e^{\frac{i(i b(2s-m)-c)^2}{4d(2s-m)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2s-m)-c)^{-h-j+2n}\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(2s-m)-c)\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\Bigg)+2\,d\,i\,(2s-m)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\Bigg)\sqrt{\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\Bigg)+$$

$$e^{\frac{i(c+b i(2s-m))^2}{4d(2s-m)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2s-m))^{-h-j+2n}\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2s-m))\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\Bigg)+2\,d\,i\,(2s-m)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\Bigg)\sqrt{\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\Bigg)-$$

$$e^{\frac{i(i b(m-2s)-c)^2}{4d(m-2s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c)^{-h-j+2n}\left(-c+b\,i\,(m-2s)+2\,d\,i\,(m-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r+d\,z+e)\sinh(c\,z^r)$

01.19.21.1139.01

$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh\left(c z^2\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right)(1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4(i b (2k-m) - c)} + e i (2k-m)} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2(i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2(i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2(i b (2k-m) - c) z)^2}{4(i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4(c + b i (2k-m))} + e i (2k-m)} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2(c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2(c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2(c + b i (2k-m)) z)^2}{4(c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4(i b (m-2k) - c)} + e i (m-2k)} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2(i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2(i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2(i b (m-2k) - c) z)^2}{4(i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4(c + b i (m-2k))} + e i (m-2k)} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2(c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2(c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2(c + b i (m-2k)) z)^2}{4(c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1140.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(\Gamma\left(2(n+1), c\sqrt{z}\right) - \Gamma\left(2(n+1), -c\sqrt{z}\right)\right)(1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (d(m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} + e i (2s-m)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n} \left(-c + b i (2s-m) + 2 d i (2s-m) \sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(2\,s-m)-c)\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)+$$

$$e^{\frac{i(c+b\,i\,(2\,s-m))^2}{4\,d\,(2\,s-m)}+e\,i\,(2\,s-m)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)+2\,d\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{4\,d\,(2\,s-m)}\right)\sqrt{\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{d\,(2\,s-m)}}\right)-$$

$$e^{\frac{i(i\,b\,(m-2\,s)-c)^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\, b\, (m-2s)-c)\left(-c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\ \frac{i\left(-c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{4\, d\, (m-2s)}\right)+2\, d\, i\, (m-2s)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{i\left(-c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{4\, d\, (m-2s)}\right)\sqrt{\frac{i\left(-c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{d\, (m-2s)}}\Bigg)+$$

$$e^{\frac{i\,(c+b\, i\, (m-2s))^2}{4\, d\, (m-2s)}+e\, i\, (m-2s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c+b\, i\, (m-2s))^{-h-j+2n}\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{d\, (m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\, i\, (m-2s))$$

$$\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\ \frac{i\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{4\, d\, (m-2s)}\right)+$$

$$2\, d\, i\, (m-2s)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{i\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{4\, d\, (m-2s)}\right)$$

$$\sqrt{\frac{i\left(c+b\, i\, (m-2s)+2\, d\, i\, (m-2s)\sqrt{z}\right)^2}{d\, (m-2s)}}\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\, z)\sinh(c\, z^r+g)$

01.19.21.1141.01

$$\int z^n \cos^m(d z)\sinh\left(c z^2+g\right)dz = 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\left(e^{-g}\left(c z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c z^2\right)-e^{g}\left(-c z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -c z^2\right)\right)(1-m \bmod 2)- 2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{-\frac{d^2(m-2k)^2}{4c}-g}\left(\sum_{j=0}^{n}2^{j-n}(-i d(m-2k))^{n-j}(i d(m-2k)-2 c z)^{j+1}\left(\frac{(i d(m-2k)-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(i d(m-2k)-2 c z)^2}{4c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}e^{-\frac{d^2(m-2k)^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}(i d(m-2k))^{n-j} (-i d(m-2k)-2 c z)^{j+1}\left(\frac{(-i d(m-2k)-2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-i d(m-2k)-2 c z)^2}{4c}\right)+ c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}(i d(m-2k))^{n-j}(2 c z-i d(m-2k))^{j+1}\left(-\frac{(2 c z-i d(m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c z-i d(m-2k))^2}{4c}\right)+c^{-n-1}e^{\frac{d^2(m-2k)^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}(-i d(m-2k))^{n-j}(d i(m-2k)+2 c z)^{j+1} \left(-\frac{(d i(m-2k)+2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d i(m-2k)+2 c z)^2}{4c}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1142.01

$$\int z^n \cos^m(d z)\sinh\left(\sqrt{z}\, c+g\right)dz = 2^{-m}\binom{m}{\frac{m}{2}}\left(e^{-g}\Gamma\left(2(n+1), c\sqrt{z}\right)-e^{g}\Gamma\left(2(n+1), -c\sqrt{z}\right)\right)(1-m \bmod 2)\, c^{-2(n+1)}+2^{-m-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}(i d(m-2k))^{-2(n+1)} \left(-e^{\frac{i c^2}{4 d(m-2k)}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c)^{-h-j+2n}\left(2 i d(m-2k)\sqrt{z}-c\right)^{h+j}\left(\frac{i\left(2 i d(m-2k)\sqrt{z}-c\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h} \binom{n}{j}\left(2 i d(m-2k)\sqrt{\frac{i\left(2 i d(m-2k)\sqrt{z}-c\right)^2}{d(m-2k)}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2 i d(m-2k)\sqrt{z}-c\right)^2}{4 d(m-2k)}\right)- c\left(2 i d(m-2k)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(2 i d(m-2k)\sqrt{z}-c\right)^2}{4 d(m-2k)}\right)\right)+\right.$$

$$e^{\frac{i c^2}{4 d (m-2k)}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 d i (m-2k) \sqrt{z}\right)^{h+j} \left(\frac{i \left(c + 2 d i (m-2k) \sqrt{z}\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c \left(c + 2 d i (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(c + 2 d i (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) + \right.$$

$$\left. 2 d i (m-2k) \sqrt{\frac{i \left(c + 2 d i (m-2k) \sqrt{z}\right)^2}{d (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(c + 2 d i (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) \right) -$$

$$e^{-\frac{i c^2}{4 d (m-2k)}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(-c - 2 i d (m-2k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-c - 2 i d (m-2k) \sqrt{z}\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 i d (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-c - 2 i d (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) - \right.$$

$$\left. 2 i d (m-2k) \sqrt{-\frac{i \left(-c - 2 i d (m-2k) \sqrt{z}\right)^2}{d (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(-c - 2 i d (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) \right) +$$

$$e^{-\frac{i c^2}{4 d (m-2k)}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c - 2 i d (m-2k) \sqrt{z}\right)^{h+j} \left(-\frac{i \left(c - 2 i d (m-2k) \sqrt{z}\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c \left(c - 2 i d (m-2k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(c - 2 i d (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) - 2 i d (m-2k) \right.$$

$$\left. \left. \sqrt{-\frac{i \left(c - 2 i d (m-2k) \sqrt{z}\right)^2}{d (m-2k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(c - 2 i d (m-2k) \sqrt{z}\right)^2}{4 d (m-2k)}\right) \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \cos^m(d z + e) \sinh(c z^r + g)$

01.19.21.1143.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(c\,z^2+g\right)dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g}\left(c\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c\,z^2\right) - e^{g}\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c\,z^2\right)\right)(1-m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(-e^{-\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)-g} \left(\sum_{j=0}^{n} 2^{j-n} (-i\,d\,(m-2k))^{n-j} (i\,d\,(m-2k)-2\,c\,z)^{j+1} \left(\frac{(i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i\,d\,(m-2k)-2\,c\,z)^2}{4c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1} e^{-\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)-g} \sum_{j=0}^{n} 2^{j-n} (i\,d\,(m-2k))^{n-j} (-i\,d\,(m-2k)-2\,c\,z)^{j+1} \left(\frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i\,d\,(m-2k)-2\,c\,z)^2}{4c}\right) + c^{-n-1} e^{\frac{d^2(m-2k)^2}{4c}-i\,e\,(m-2k)+g} \sum_{j=0}^{n} 2^{j-n} (i\,d\,(m-2k))^{n-j} (2\,c\,z-i\,d\,(m-2k))^{j+1} \left(-\frac{(2\,c\,z-i\,d\,(m-2k))^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2\,c\,z-i\,d\,(m-2k))^2}{4c}\right) + c^{-n-1} e^{\frac{d^2(m-2k)^2}{4c}+e\,i\,(m-2k)+g} \sum_{j=0}^{n} 2^{j-n} (-i\,d\,(m-2k))^{n-j} (d\,i\,(m-2k)+2\,c\,z)^{j+1} \left(-\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+2\,c\,z)^2}{4c}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1144.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = 2^{-m} \binom{m}{\frac{m}{2}} \left(-e^{g}\,\Gamma\left(2(n+1), -c\sqrt{z}\right) + e^{-g}\,\Gamma\left(2(n+1), c\sqrt{z}\right)\right)(1-m \bmod 2)\, c^{-2(n+1)} + 2^{-m-2n-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} (i\,d\,(m-2k))^{-2(n+1)} \left(-e^{\frac{i\,c^2}{4d(m-2k)}-g+e\,i\,(m-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^{h+j} \left(\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2\,i\,d\,(m-2k)\sqrt{\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\right)^2}{4\,d\,(m-2k)}\right) - \right.\right.$$

$$c\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,c^2}{4\,d\,(m-2\,k)}+g+e\,i\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{i\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)+2\,d\,i\,(m-2\,k)$$

$$\sqrt{\frac{i\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+2\,d\,i\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)-e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}-g-i\,e\,(m-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)+$$

$$e^{-\frac{i\,c^2}{4\,d\,(m-2\,k)}+g-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-2\,i\,d\,(m-2\,k)$$

$$\sqrt{-\frac{i\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b\,z^r)\sinh(c\,z^r+g)$

01.19.21.1145.01

$$\int z^{\alpha-1}\cos^m(b\,z^r)\sinh(c\,z^r+g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^{\alpha}\binom{m}{\frac{m}{2}}\left(e^{-g}\,(c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,c\,z^r\right)-e^{g}\,(-c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-c\,z^r\right)\right)(1-m\bmod 2)}{r} - \frac{2^{-m-1}z^{\alpha}}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{g}\,\Gamma\left(\frac{\alpha}{r},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^r\right)((-c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}} - e^{-g}\,((c-2\,i\,b\,k+i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(c-2\,i\,b\,k+i\,b\,m)\,z^r\right)+e^{g}\,((-c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^r\right)-e^{-g}\,((c+2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(c+2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)\ /;\ m\in\mathbb{N}^+$$

01.19.21.1146.01

$$\int z^n\cos^m(b\,z^2)\sinh(c\,z^2+g)\,dz = (-1)^m\,2^{-m-2}\,z^{n+1}\binom{m}{\frac{m}{2}}\left(e^{-g}\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,c\,z^2\right)-e^{g}\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,-c\,z^2\right)\right)(1-m\bmod 2)-2^{-m-2}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{g}\,\Gamma\left(\frac{n+1}{2},\,(-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)\left((-c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}-e^{-g}\left((c-2\,i\,b\,k+i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,(c-2\,i\,b\,k+i\,b\,m)\,z^2\right)+e^{g}\left((-c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,(-c+2\,i\,b\,k-i\,b\,m)\,z^2\right)-e^{-g}\left((c+2\,i\,b\,k-i\,b\,m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,(c+2\,i\,b\,k-i\,b\,m)\,z^2\right)\right)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1147.01

$$\int z^n\cos^m\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g\right)dz = (-1)^m\,2^{-m}\,c^{-2(n+1)}\binom{m}{\frac{m}{2}}\left(e^{-g}\,\Gamma\left(2(n+1),\,c\sqrt{z}\right)-e^{g}\,\Gamma\left(2(n+1),\,-c\sqrt{z}\right)\right)(1-m\bmod 2)-2^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{g}\,\Gamma\left(2(n+1),\,(-c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right)(-c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)}-e^{-g}\,(c-2\,i\,b\,k+i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(c-2\,i\,b\,k+i\,b\,m)\sqrt{z}\right)+e^{g}\,(-c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(-c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)-e^{-g}\,(c+2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(c+2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b\,z^r+e)\sinh(c\,z^r+g)$

01.19.21.1148.01

$$\int z^{\alpha-1}\cos^m(b\,z^r+e)\sinh(c\,z^r+g)\,dz = -\frac{\left(-\frac{1}{2}\right)^{m+1} z^\alpha \binom{m}{\frac{m}{2}} \left(e^{-g}\,(c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r}, c\,z^r\right) - e^g\,(-c\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r}, -c\,z^r\right)\right)(1-m \bmod 2)}{r} - \frac{2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{g+2 i e k - i e m}\,\Gamma\!\left(\frac{\alpha}{r}, (-c-2 i b k+i b m)\,z^r\right)((-c-2 i b k+i b m)\,z^r)^{-\frac{\alpha}{r}} - e^{-g+2 i e k - i e m}\,((c-2 i b k+i b m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r}, (c-2 i b k+i b m)\,z^r\right) + e^{g-2 i e k+i e m}\,((-c+2 i b k-i b m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r}, (-c+2 i b k-i b m)\,z^r\right) - e^{-g-2 i e k+i e m}\,((c+2 i b k-i b m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r}, (c+2 i b k-i b m)\,z^r\right)\right) /;\, m\in\mathbb{N}^+$$

01.19.21.1149.01

$$\int z^n\cos^m\!\left(b\,z^2+e\right)\sinh\!\left(c\,z^2+g\right)dz = (-1)^m\, 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g}\left(c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2}, c\,z^2\right) - e^g\left(-c\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2}, -c\,z^2\right)\right)(1-m \bmod 2) - 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{g+2 i e k-i e m}\,\Gamma\!\left(\frac{n+1}{2}, (-c-2 i b k+i b m)\,z^2\right)\left((-c-2 i b k+i b m)\,z^2\right)^{\frac{1}{2}(-n-1)} - e^{-g+2 i e k-i e m}\left((c-2 i b k+i b m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2}, (c-2 i b k+i b m)\,z^2\right) + e^{g-2 i e k+i e m}\left((-c+2 i b k-i b m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2}, (-c+2 i b k-i b m)\,z^2\right) - e^{-g-2 i e k+i e m}\left((c+2 i b k-i b m)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2}, (c+2 i b k-i b m)\,z^2\right)\right) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1150.01

$$\int z^n\cos^m\!\left(\sqrt{z}\,b+e\right)\sinh\!\left(\sqrt{z}\,c+g\right)dz = (-1)^m\, 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g}\,\Gamma\!\left(2(n+1), c\sqrt{z}\right) - e^g\,\Gamma\!\left(2(n+1), -c\sqrt{z}\right)\right)(1-m \bmod 2) - 2^{-m} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(e^{g+2 i e k-i e m}\,\Gamma\!\left(2(n+1), (-c-2 i b k+i b m)\sqrt{z}\right)(-c-2 i b k+i b m)^{-2(n+1)} - e^{-g+2 i e k-i e m}\,(c-2 i b k+i b m)^{-2(n+1)}\,\Gamma\!\left(2(n+1), (c-2 i b k+i b m)\sqrt{z}\right) + e^{g-2 i e k+i e m}\,(-c+2 i b k-i b m)^{-2(n+1)}\,\Gamma\!\left(2(n+1), (-c+2 i b k-i b m)\sqrt{z}\right) - e^{-g-2 i e k+i e m}\,(c+2 i b k-i b m)^{-2(n+1)}\,\Gamma\!\left(2(n+1), (c+2 i b k-i b m)\sqrt{z}\right)\right) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m\!\left(b\,z^r+d\,z\right)\sinh\!\left(c\,z^r+g\right)$

01.19.21.1151.01

$$\int z^n \cos^m\left(b z^2 + d z\right) \sinh\left(c z^2 + g\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g} \left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - e^{g} \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4 (i b (2k-m) - c)} - g} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4 (c + b i (2k-m))} + g} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4 (i b (m-2k) - c)} - g} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4 (c + b i (m-2k))} + g} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1152.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + g\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g} \Gamma\left(2(n+1), c \sqrt{z}\right) - e^{g} \Gamma\left(2(n+1), -c \sqrt{z}\right)\right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n}\right.$$

$$\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i\,b\,(2s-m)-c)\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)+2\,d\,i\,(2s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)\sqrt{\frac{i\left(-c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(2s-m))^2}{4\,d\,(2s-m)}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2s-m))^{-h-j+2n}\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c+b\,i\,(2s-m))\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)+2\,d\,i\,(2s-m)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{4\,d\,(2s-m)}\right)\sqrt{\frac{i\left(c+b\,i\,(2s-m)+2\,d\,i\,(2s-m)\sqrt{z}\right)^2}{d\,(2s-m)}}\right)-$$

$$e^{\frac{i\,(i\,b\,(m-2s)-c)^2}{4\,d\,(m-2s)}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c)^{-h-j+2n}\left(-c+b\,i\,(m-2s)+2\,d\,i\,(m-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2s)+2\,d\,i\,(m-2s)\sqrt{z}\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\, b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\Bigg)+2\,d\,i\,(m-2\,s)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\Bigg)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\Bigg)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\Bigg)$$

$$\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\sqrt{z}\right)^2}{d\,(m-2\,s)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+g\right)$

01.19.21.1153.01

$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + g\right) dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{-g} \left(c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c z^2\right) - e^{g} \left(-c z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -c z^2\right)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{\frac{d^2 (2k-m)^2}{4 (i b (2k-m) - c)} + e i (2k-m) - g} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\right) (i b (2k-m) - c)^{-n-1} + e^{\frac{d^2 (2k-m)^2}{4 (c + b i (2k-m))} + e i (2k-m) + g} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1} \left(-\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) - e^{\frac{d^2 (m-2k)^2}{4 (i b (m-2k) - c)} + e i (m-2k) - g} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) + e^{\frac{d^2 (m-2k)^2}{4 (c + b i (m-2k))} + e i (m-2k) + g} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1} \left(-\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1154.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d z + e\right) \sinh\left(\sqrt{z}\, c + g\right) dz = 2^{-m} c^{-2(n+1)} \binom{m}{\frac{m}{2}} \left(e^{-g} \Gamma\left(2(n+1), c\sqrt{z}\right) - e^{g} \Gamma\left(2(n+1), -c\sqrt{z}\right)\right) (1 - m \bmod 2) - 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (d (m-2s))^{-2n-2} \left(-e^{\frac{i (i b (2s-m) - c)^2}{4 d (2s-m)} - g + e i (2s-m)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n}\right.$$

$$\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(\left(i\,b\,(2\,s-m)-c\right)\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{4\,d\,(2\,s-m)}\Bigg)+2\,d\,i\,(2\,s-m)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{4\,d\,(2\,s-m)}\Bigg)\sqrt{\frac{i\left(-c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{d\,(2\,s-m)}}\Bigg)+$$

$$e^{\frac{i\,(c+b\,i\,(2\,s-m))^{2}}{4\,d\,(2\,s-m)}+g+e\,i\,(2\,s-m)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{4\,d\,(2\,s-m)}\Bigg)+2\,d\,i\,(2\,s-m)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{4\,d\,(2\,s-m)}\Bigg)\sqrt{\frac{i\left(c+b\,i\,(2\,s-m)+2\,d\,i\,(2\,s-m)\,\sqrt{z}\right)^{2}}{d\,(2\,s-m)}}\Bigg)-$$

$$e^{\frac{i\,(i\,b\,(m-2\,s)-c)^{2}}{4\,d\,(m-2\,s)}-g+e\,i\,(m-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{2}}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)\sqrt{\frac{i\left(-c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)+$$

$$e^{\frac{i\,(c+b\,i\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+g+e\,i\,(m-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(m-2\,s))\right.$$

$$\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(c+b\,i\,(m-2\,s)+2\,d\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{d\,(m-2\,s)}}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1155.01

$$\int z^n \cos^m(d z) \sinh\left(c z^2 + f z\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 c z)^{j+1} \left(\frac{(-f - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f - 2 c z)^2}{4 c}\right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 c z)^{j+1} \left(-\frac{(f + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 c z)^2}{4 c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{\frac{(i d (m-2k) - f)^2}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (f - i d (m - 2 k))^{n-j} (-f + d i (m - 2 k) - 2 c z)^{j+1} \left(\frac{(-f + d i (m - 2 k) - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f + d i (m - 2 k) - 2 c z)^2}{4 c}\right)\right) (-c)^{-n-1} - (-c)^{-n-1} e^{\frac{(i d (2k-m) - f)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (f - i d (2 k - m))^{n-j} (-f + d i (2 k - m) - 2 c z)^{j+1} \left(\frac{(-f + d i (2 k - m) - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f + d i (2 k - m) - 2 c z)^2}{4 c}\right) + c^{-n-1} e^{-\frac{(f + d i (2k-m))^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2 k - m))^{n-j} (f + d i (2 k - m) + 2 c z)^{j+1} \left(-\frac{(f + d i (2 k - m) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2 k - m) + 2 c z)^2}{4 c}\right) + c^{-n-1} e^{-\frac{(f + d i (m-2k))^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m - 2 k))^{n-j} (f + d i (m - 2 k) + 2 c z)^{j+1} \left(-\frac{(f + d i (m - 2 k) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m - 2 k) + 2 c z)^2}{4 c}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1156.01

$$\int z^n \cos^m(d z) \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2} + 2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{c^2}{4 (i d (2 s-m)-f)}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(2 (i d (2 s-m)-f) \sqrt{z} - c\right)^{h+j}$$

$$\left(-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z} - c\right)^2}{i d (2 s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2 (i d (2 s-m)-f)$$

$$\sqrt{-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z} - c\right)^2}{i d (2 s-m)-f}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z} - c\right)^2}{4 (i d (2 s-m)-f)}\right) - c$$

$$\left(2 (i d (2 s-m)-f) \sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z} - c\right)^2}{4 (i d (2 s-m)-f)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i d (2 s-m)-f)^{-2 n-2} + e^{-\frac{c^2}{4 (f+d i (2 s-m))}} (f+d i (2 s-m))^{-2 n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2 n}$$

$$\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^2}{f+d i (2 s-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg(c\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 (f+d i (2 s-m)) \sqrt{z}\right)^2}{4 (f+d i (2 s-m))}\right) +$$

$$2\sqrt{-\frac{\left(c+2\left(f+d\,i\,(2s-m)\right)\sqrt{z}\right)^2}{f+d\,i\,(2s-m)}}\,(f+d\,i\,(2s-m))\,\Gamma\Bigg(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\left(f+d\,i\,(2s-m)\right)\sqrt{z}\right)^2}{4\left(f+d\,i\,(2s-m)\right)}\Bigg)\Bigg)-$$

$$e^{-\frac{c^2}{4(i\,d\,(m-2s)-f)}}\,(i\,d\,(m-2s)-f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(i\,d\,(m-2s)-f)$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2s)-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)-$$

$$c\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f+d\,i\,(m-2s))}}\,(f+d\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\Bigg)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}}$$

$$(f+d\,i\,(m-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\cos^m(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1157.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1}e^{\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}f^{n-j}(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2\,c\,z)^2}{4\,c}\right)-c^{-n-1}e^{-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}(-f)^{n-j}(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{\frac{(i\,d\,(m-2k)-f)^2}{4c}+e\,i\,(m-2k)}\left(\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(m-2\,k))^{n-j}(-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}e^{\frac{(i\,d\,(2k-m)-f)^2}{4c}+e\,i\,(2k-m)}\sum_{j=0}^{n}2^{j-n}(f-i\,d\,(2\,k-m))^{n-j}(-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right)+c^{-n-1}e^{-\frac{(f+d\,i\,(2k-m))^2}{4c}+e\,i\,(2k-m)}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(2\,k-m))^{n-j}(f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+c^{-n-1}e^{-\frac{(f+d\,i\,(m-2k))^2}{4c}+e\,i\,(m-2k)}\sum_{j=0}^{n}2^{j-n}(-f-i\,d\,(m-2\,k))^{n-j}(f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1158.01

$$\int z^n \cos^m(e+d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(e^{-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2}+2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{c^2}{4 (i d (2 s-m)-f)}+e\, i\, (2 s-m)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{i d (2 s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2 (i d (2 s-m)-f)$$

$$\sqrt{-\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{i d (2 s-m)-f}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{4 (i d (2 s-m)-f)}\right)-c$$

$$\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(2 (i d (2 s-m)-f) \sqrt{z}-c\right)^2}{4 (i d (2 s-m)-f)}\right)\Bigg)\Bigg)$$

$$(i d (2 s-m)-f)^{-2 n-2}+e^{-\frac{c^2}{4 (f+d i (2 s-m))}+e\, i\, (2 s-m)} (f+d\, i\, (2 s-m))^{-2 n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2 n} \left(c+2 (f+d\, i\, (2 s-m)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2 (f+d\, i\, (2 s-m)) \sqrt{z}\right)^2}{f+d\, i\, (2 s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(c\left(c+2 (f+d\, i\, (2 s-m)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c+2 (f+d\, i\, (2 s-m)) \sqrt{z}\right)^2}{4 (f+d\, i\, (2 s-m))}\right)+$$

$$2 \sqrt{-\frac{\left(c+2 (f+d\, i\, (2 s-m)) \sqrt{z}\right)^2}{f+d\, i\, (2 s-m)}}\; (f+d\, i\, (2 s-m))\, \Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+2), -\frac{\left(c+2\left(f+d\,i\,(2s-m)\right)\sqrt{z}\right)^2}{4\left(f+d\,i\,(2s-m)\right)}\right)\right) -$$

$$e^{-\frac{c^2}{4(i\,d\,(m-2s)-f)}+e\,i\,(m-2s)}\,(i\,d\,(m-2s)-f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(i\,d\,(m-2s)-f)\right.$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{i\,d\,(m-2s)-f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)-$$

$$\left.c\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(i\,d\,(m-2s)-f)\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)\right)+$$

$$e^{-\frac{c^2}{4(f+d\,i\,(m-2s))}+e\,i\,(m-2s)}\,(f+d\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)\Gamma\right($$

$$\left.\frac{1}{2}(h+j+1), -\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}}$$

$$\left.\left.(f+d\,i\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r)\sinh(c\,z^r+f\,z)$

01.19.21.1159.01

$$\int z^n \cos^m(b z^2) \sinh(c z^2 + f z)\, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c} \right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{-\frac{f^2}{4(i b(2k-m)-c)}} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(2k-m) - c) z - f)^{j+1} \left(-\frac{(2(i b(2k-m)-c)z - f)^2}{i b(2k-m) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)} \right) \right) (i b(2k-m) - c)^{-n-1} + e^{-\frac{f^2}{4(c+b i(2k-m))}} (c + b i(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + b i(2k-m)) z)^{j+1} \left(-\frac{(f + 2(c+b i(2k-m))z)^2}{c + b i(2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))} \right) - e^{-\frac{f^2}{4(i b(m-2k)-c)}} (i b(m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(m-2k) - c) z - f)^{j+1} \left(-\frac{(2(i b(m-2k)-c)z - f)^2}{i b(m-2k) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)} \right) + e^{-\frac{f^2}{4(c+b i(m-2k))}} (c + b i(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c + b i(m-2k)) z)^{j+1} \left(-\frac{(f + 2(c+b i(m-2k))z)^2}{c + b i(m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1160.01

$$\int z^n \cos^m(b \sqrt{z}) \sinh(\sqrt{z}\, c + f z)\, dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2f\sqrt{z} \right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg) -$$

$$e^{\frac{c^2}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \Bigg(-e^{\frac{(i\,b\,(2s-m)-c)^2}{4f}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\,b\,(2s-m)-c)^{-h-j+2n}$$

$$\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(2s-m)-c)\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right) - 2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)(-f)^{-2n-2} -$$

$$e^{\frac{(i\,b\,(m-2s)-c)^2}{4f}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\,b\,(m-2s)-c)^{-h-j+2n} \left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2s)-c)\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{4f}\right) - 2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\,\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+e)\sinh(c\,z^r+f\,z)$

01.19.21.1161.01

$$\int z^n \cos^m\left(b z^2+e\right) \sinh\left(c z^2+f z\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^n 2^{j-n} f^{n-j} (-f-2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c}\right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \left(-e^{-\frac{f^2}{4(i b(2k-m)-c)}+e i (2k-m)} \left(\sum_{j=0}^n 2^{j-n} f^{n-j} (2(i b(2k-m)-c)z-f)^{j+1} \left(-\frac{(2(i b(2k-m)-c)z-f)^2}{i b(2k-m)-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)}\right)\right)(i b(2k-m)-c)^{-n-1} + e^{-\frac{f^2}{4(c+b i(2k-m))}+e i(2k-m)} (c+b i(2k-m))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2(c+b i(2k-m))z)^{j+1} \left(-\frac{(f+2(c+b i(2k-m))z)^2}{c+b i(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))}\right) - e^{-\frac{f^2}{4(i b(m-2k)-c)}+e i(m-2k)} (i b(m-2k)-c)^{-n-1} \sum_{j=0}^n 2^{j-n} f^{n-j} (2(i b(m-2k)-c)z-f)^{j+1} \left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)}\right) + e^{-\frac{f^2}{4(c+b i(m-2k))}+e i(m-2k)} (c+b i(m-2k))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2(c+b i(m-2k))z)^{j+1} \left(-\frac{(f+2(c+b i(m-2k))z)^2}{c+b i(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1162.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+f z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j c^{-h-j+2n} \left(c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c+2f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2}+2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{\frac{(i b (2 s-m)-c)^2}{4 f}+e\, i\, (2 s-m)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2 s-m)-c)^{-h-j+2 n}$$

$$\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c)\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b\, i\, (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)(-f)^{-2 n-2} -$$

$$e^{\frac{(i b (m-2 s)-c)^2}{4 f}+e\, i\, (m-2 s)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (m-2 s)-c)^{-h-j+2 n} \left(-c+b\, i\, (m-2 s)-2 f \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b\, i\, (m-2 s)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i b (m-2 s)-c)\left(-c+b\, i\, (m-2 s)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b\, i\, (m-2 s)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+e\,i\,(2\,s-m)}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+e\,i\,(m-2\,s)}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r+d\,z)\sinh(c\,z^r+f\,z)$

01.19.21.1163.01

$$\int z^n\cos^m(b\,z^2+d\,z)\sinh(c\,z^2+f\,z)\,dz=$$

$$2^{-m-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\Bigg((-c)^{-n-1}\,e^{\frac{f^2}{4\,c}}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f-2\,c\,z)^2}{4\,c}\right)-$$

$$c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 c z)^{j+1} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\Bigg) -$$

$$2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \Bigg(-e^{-\frac{(i d (2k-m)-f)^2}{4(i b (2k-m)-c)}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (f - i d (2k-m))^{n-j} (-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^{j+1}$$

$$\left(-\frac{(-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{i b (2k-m) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (2k-m) + 2 (i b (2k-m) - c) z)^2}{4 (i b (2k-m) - c)}\right)\Bigg) (i b (2k-m) - c)^{-n-1} +$$

$$e^{-\frac{(f + d i (2k-m))^2}{4(c + b i (2k-m))}} (c + b i (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k-m))^{n-j} (f + d i (2k-m) + 2 (c + b i (2k-m)) z)^{j+1}$$

$$\left(-\frac{(f + d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{c + b i (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2k-m) + 2 (c + b i (2k-m)) z)^2}{4 (c + b i (2k-m))}\right) -$$

$$e^{-\frac{(i d (m-2k)-f)^2}{4(i b (m-2k)-c)}} (i b (m-2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m-2k))^{n-j} (-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^{j+1}$$

$$\left(-\frac{(-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{i b (m-2k) - c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (m-2k) + 2 (i b (m-2k) - c) z)^2}{4 (i b (m-2k) - c)}\right) +$$

$$e^{-\frac{(f + d i (m-2k))^2}{4(c + b i (m-2k))}} (c + b i (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m-2k))^{n-j} (f + d i (m-2k) + 2 (c + b i (m-2k)) z)^{j+1}$$

$$\left(-\frac{(f + d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{c + b i (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m-2k) + 2 (c + b i (m-2k)) z)^2}{4 (c + b i (m-2k))}\right)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c + 2 f \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(-c\left(-c - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) -\right.$$

$$\left.\left.2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) f^{-2n-2} + 2^{-m-2n-2}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{(i b (2s-m)-c)^2}{4(i d (2s-m)-f)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2s-m) - c)^{-h-j+2n} \left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{i d (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i b (2s-m) - c)\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + b\, i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right) + 2$$

$$(i\, d\,(2\,s-m)-f)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(2\,s-m)-f)}\Bigg)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\Bigg)\Bigg)(i\,d\,(2\,s-m)-f)^{-2\,n-2}\,+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\Bigg)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\Bigg)$$

$$\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\Bigg)-e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\left.\frac{1}{2}(h+j+1),-\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)+$$

$$2\,(i\,d\,(m-2s)-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)$$

$$\left.\sqrt{-\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{i\,d\,(m-2s)-f}}\right)+e^{-\frac{(c+b\,i\,(m-2s))^2}{4\,(f+d\,i\,(m-2s))}}\,(f+d\,i\,(m-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2s))^{-h-j+2n}\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2s))\Big(c+b\,i\,(m-2s)+$$

$$\left.2\,(f+d\,i\,(m-2s))\sqrt{z}\Big)\,\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)+\right.$$

$$2\,(f+d\,i\,(m-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}}\right)\right)\text{/; } n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+d\,z+e)\sinh(c\,z^r+f\,z)$

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$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2 c z)^{j+1} \left(\frac{(-f - 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f - 2 c z)^2}{4 c} \right) - c^{-n-1} e^{-\frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2 c z)^{j+1} \left(-\frac{(f + 2 c z)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2 c z)^2}{4 c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{-\frac{(i d (2k-m) - f)^2}{4 (i b (2k-m) - c)} + e i (2k-m)} (i b (2k - m) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (2k - m))^{n-j} (-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^{j+1} \left(-\frac{(-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^2}{i b (2k - m) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (2k - m) + 2 (i b (2k - m) - c) z)^2}{4 (i b (2k - m) - c)} \right) + e^{-\frac{(f + d i (2k-m))^2}{4 (c + b i (2k-m))} + e i (2k-m)} (c + b i (2k - m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (2k - m))^{n-j} (f + d i (2k - m) + 2 (c + b i (2k - m)) z)^{j+1} \left(-\frac{(f + d i (2k - m) + 2 (c + b i (2k - m)) z)^2}{c + b i (2k - m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (2k - m) + 2 (c + b i (2k - m)) z)^2}{4 (c + b i (2k - m))} \right) - e^{-\frac{(i d (m-2k) - f)^2}{4 (i b (m-2k) - c)} + e i (m-2k)} (i b (m - 2k) - c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f - i d (m - 2k))^{n-j} (-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^{j+1} \left(-\frac{(-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^2}{i b (m - 2k) - c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-f + d i (m - 2k) + 2 (i b (m - 2k) - c) z)^2}{4 (i b (m - 2k) - c)} \right) + e^{-\frac{(f + d i (m-2k))^2}{4 (c + b i (m-2k))} + e i (m-2k)} (c + b i (m - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f - i d (m - 2k))^{n-j} (f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^{j+1} \left(-\frac{(f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^2}{c + b i (m - 2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + d i (m - 2k) + 2 (c + b i (m - 2k)) z)^2}{4 (c + b i (m - 2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, f^{-2n-2}$$

$$\left(e^{-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right) \right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c \left(-c - 2 f \sqrt{z}\right) \right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) +$$

$$2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{(i b (2s-m) - c)^2}{4 (i d (2s-m) - f)} + e\, i (2s-m)} (i\, d\, (2s - m) - f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (2s - m) - c)^{-h-j+2n} \right.$$

$$\left(-c + b\, i\, (2s - m) + 2 (i\, d\, (2s - m) - f) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c + b\, i\, (2s - m) + 2 (i\, d\, (2s - m) - f) \sqrt{z}\right)^2}{i\, d\, (2s - m) - f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i\, b\, (2s - m) - c) \left(-c + b\, i\, (2s - m) + 2 (i\, d\, (2s - m) - f) \sqrt{z}\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h + j + 1), -\frac{\left(-c + b\, i\, (2s - m) + 2 (i\, d\, (2s - m) - f) \sqrt{z}\right)^2}{4 (i\, d\, (2s - m) - f)}\right) +$$

$$2 (i\, d\, (2s - m) - f)\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(-c + b\, i\, (2s - m) + 2 (i\, d\, (2s - m) - f) \sqrt{z}\right)^2}{4 (i\, d\, (2s - m) - f)}\right)$$

$$\left.\sqrt{-\frac{\left(-c+b\,i\,(2\,s-m)+2\,(i\,d\,(2\,s-m)-f)\,\sqrt{z}\right)^2}{i\,d\,(2\,s-m)-f}}\right)+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,(f+d\,i\,(2\,s-m))}+e\,i\,(2\,s-m)}\,(f+d\,i\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\right)-e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}+e\,i\,(m-2\,s)}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\;\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}+e\,i\,(m-2\,s)}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\Bigg)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\;\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(d\,z)\sinh\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos^m(d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1}\,e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2\,c\,z)^2}{4\,c}\right)-c^{-n-1}\,e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}\,(-f)^{n-j}\,(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\right)-2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{\frac{(i\,d\,(m-2k)-f)^2}{4c}-g}\left(\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(m-2\,k))^{n-j}\,(-f+d\,i\,(m-2\,k)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(m-2\,k)-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}-(-c)^{-n-1}\,e^{\frac{(i\,d\,(2k-m)-f)^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(2\,k-m))^{n-j}\,(-f+d\,i\,(2\,k-m)-2\,c\,z)^{j+1}\left(\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d\,i\,(2\,k-m)-2\,c\,z)^2}{4\,c}\right)+c^{-n-1}\,e^{-\frac{(f+d\,i\,(2k-m))^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(2\,k-m))^{n-j}\,(f+d\,i\,(2\,k-m)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,c\,z)^2}{4\,c}\right)+c^{-n-1}\,e^{-\frac{(f+d\,i\,(m-2k))^2}{4c}+g}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(m-2\,k))^{n-j}\,(f+d\,i\,(m-2\,k)+2\,c\,z)^{j+1}\left(-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n \cos^m(d\,z)\sinh\left(\sqrt{z}\;c+g+f\,z\right)dz = 2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,f\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,f\,\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\, f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg) -$$

$$e^{\frac{c^2}{4f}-g} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{c^2}{4(i\,d(2s-m)-f)}-g} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)^2}{i\,d(2s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2(i\,d(2s-m)-f)$$

$$\sqrt{-\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)^2}{i\,d(2s-m)-f}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i\,d(2s-m)-f)}\right) - c$$

$$\left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i\,d(2s-m)-f)\sqrt{z}-c\right)^2}{4(i\,d(2s-m)-f)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i\,d(2s-m)-f)^{-2n-2} + e^{-\frac{c^2}{4(f+d\,i(2s-m))}+g} (f+d\,i(2s-m))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n}$$

$$\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{f+d\,i(2s-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f+d\,i(2s-m))\sqrt{z}\right)^2}{4(f+d\,i(2s-m))}\right) +$$

$$2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\;(f+d\,i\,(2\,s-m))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)\Bigg)-$$

$$e^{-\frac{c^2}{4\,(i\,d\,(m-2\,s)-f)}-g}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(i\,d\,(m-2\,s)-f)$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$c\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4\,(f+d\,i\,(m-2\,s))}+g}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\Bigg)+2\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos^m(e+d z)\sinh\left(c z^2+f z+g\right) dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left((-c)^{-n-1} e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n} 2^{j-n} f^{n-j}(-f-2cz)^{j+1}\left(\frac{(-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f-2cz)^2}{4c}\right)-\right.$$

$$\left.c^{-n-1} e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-f)^{n-j}(f+2cz)^{j+1}\left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+2cz)^2}{4c}\right)\right)-$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{\frac{(i d(m-2k)-f)^2}{4c}-g+e i(m-2k)}\left(\sum_{j=0}^{n} 2^{j-n}(f-i d(m-2k))^{n-j}(-f+d i(m-2k)-2cz)^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f+d i(m-2k)-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d i(m-2k)-2cz)^2}{4c}\right)\right)(-c)^{-n-1}-$$

$$(-c)^{-n-1} e^{\frac{(i d(2k-m)-f)^2}{4c}-g+e i(2k-m)}\sum_{j=0}^{n} 2^{j-n}(f-i d(2k-m))^{n-j}(-f+d i(2k-m)-2cz)^{j+1}$$

$$\left(\frac{(-f+d i(2k-m)-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f+d i(2k-m)-2cz)^2}{4c}\right)+$$

$$c^{-n-1} e^{-\frac{(f+d i(2k-m))^2}{4c}+g+e i(2k-m)}\sum_{j=0}^{n} 2^{j-n}(-f-i d(2k-m))^{n-j}(f+d i(2k-m)+2cz)^{j+1}$$

$$\left(-\frac{(f+d i(2k-m)+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d i(2k-m)+2cz)^2}{4c}\right)+$$

$$c^{-n-1} e^{-\frac{(f+d i(m-2k))^2}{4c}+g+e i(m-2k)}\sum_{j=0}^{n} 2^{j-n}(-f-i d(m-2k))^{n-j}(f+d i(m-2k)+2cz)^{j+1}$$

$$\left.\left(-\frac{(f+d i(m-2k)+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d i(m-2k)+2cz)^2}{4c}\right)\right)/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n \cos^m(e+d z)\sinh\left(\sqrt{z}\,c+g+f z\right) dz = 2^{-m-2n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j c^{-h-j+2n}\left(c+2f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right) + 2\sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\ f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) -$$

$$e^{\frac{c^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2} + 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{c^2}{4(i d (2s-m)-f)}-g+e\, i\,(2s-m)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2\,(i\, d\,(2s-m)-f)\sqrt{z} - c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\, d\,(2s-m)-f)\sqrt{z}-c\right)^2}{i\, d\,(2s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2\,(i\, d\,(2s-m)-f)$$

$$\sqrt{-\frac{\left(2\,(i\, d\,(2s-m)-f)\sqrt{z}-c\right)^2}{i\, d\,(2s-m)-f}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,(i\, d\,(2s-m)-f)\sqrt{z}-c\right)^2}{4\,(i\, d\,(2s-m)-f)}\right) - c$$

$$\left(2\,(i\, d\,(2s-m)-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(i\, d\,(2s-m)-f)\sqrt{z}-c\right)^2}{4\,(i\, d\,(2s-m)-f)}\right)\Bigg)\Bigg)\Bigg)$$

$$(i\, d\,(2s-m)-f)^{-2n-2} + e^{-\frac{c^2}{4(f+d\, i\,(2s-m))}+g+e\, i\,(2s-m)} \left(f+d\, i\,(2s-m)\right)^{-2n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c+2\,(f+d\, i\,(2s-m))\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2\,(f+d\, i\,(2s-m))\sqrt{z}\right)^2}{f+d\, i\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(c\left(c+2\,(f+d\, i\,(2s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2\,(f+d\, i\,(2s-m))\sqrt{z}\right)^2}{4\,(f+d\, i\,(2s-m))}\right) +$$

$$2\sqrt{-\frac{\left(c+2\,(f+d\, i\,(2s-m))\sqrt{z}\right)^2}{f+d\, i\,(2s-m)}}\ (f+d\, i\,(2s-m))\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\,\right)^2}{4\,(f+d\,i\,(2\,s-m))}\Bigg)\Bigg)-e^{-\frac{c^2}{4\,(i\,d\,(m-2\,s)-f)}-g+e\,i\,(m-2\,s)}$$

$$(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(i\,d\,(m-2\,s)-f)$$

$$\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{i\,d\,(m-2\,s)-f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)-$$

$$c\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\,-c\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4\,(f+d\,i\,(m-2\,s))}+g+e\,i\,(m-2\,s)}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2\,n}\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\Bigg)+2\,\sqrt{-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}$$

$$(f+d\,i\,(m-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+2\,(f+d\,i\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r)\sinh(c\,z^r+f\,z+g)$

01.19.21.1171.01

$$\int z^n \cos^m(b z^2) \sinh(c z^2 + f z + g) \, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c} - g} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (-f - 2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c} \right) - c^{-n-1} e^{g - \frac{f^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c} \right) \right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{-\frac{f^2}{4(i b(2k-m)-c)} - g} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(2k-m)-c)z - f)^{j+1} \left(-\frac{(2(i b(2k-m)-c)z-f)^2}{i b(2k-m)-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)} \right) \right) (i b(2k-m)-c)^{-n-1} + e^{g - \frac{f^2}{4(c+b i(2k-m))}} (c + b i(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c+b i(2k-m))z)^{j+1} \left(-\frac{(f+2(c+b i(2k-m))z)^2}{c + b i(2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))} \right) - e^{-\frac{f^2}{4(i b(m-2k)-c)} - g} (i b(m-2k)-c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(i b(m-2k)-c)z - f)^{j+1} \left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)} \right) + e^{g - \frac{f^2}{4(c+b i(m-2k))}} (c + b i(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c+b i(m-2k))z)^{j+1} \left(-\frac{(f+2(c+b i(m-2k))z)^2}{c + b i(m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

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$$\int z^n \cos^m(b \sqrt{z}) \sinh(\sqrt{z}\, c + g + f z) \, dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(e^{g - \frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)+2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}} f \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4 f}-g} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c \left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2 n-2}+2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{\frac{(i b (2 s-m)-c)^2}{4 f}-g} \Bigg(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b (2 s-m)-c)^{-h-j+2 n}$$

$$\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c) \left(-c+b i (2 s-m)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{f}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c+b i (2 s-m)-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg)(-f)^{-2 n-2}-$$

$$e^{\frac{(i b (m-2 s)-c)^2}{4 f}-g} \Bigg(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b (m-2 s)-c)^{-h-j+2 n} \left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (m-2 s)-c) \left(-c+b i (m-2 s)-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c+b i (m-2 s)-2 f \sqrt{z}\right)^2}{4 f}\right)-2 f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)\,(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+g}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\,\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+g}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\,\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+e\right)\sinh\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos^m\left(b z^2+e\right) \sinh\left(c z^2+f z+g\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left((-c)^{-n-1} e^{\frac{f^2}{4c}-g} \sum_{j=0}^n 2^{j-n} f^{n-j} (-f-2cz)^{j+1} \left(\frac{(-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f-2cz)^2}{4c}\right) - c^{-n-1} e^{g-\frac{f^2}{4c}} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2cz)^{j+1} \left(-\frac{(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2cz)^2}{4c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{-\frac{f^2}{4(i b(2k-m)-c)}-g+e\,i(2k-m)} \left(\sum_{j=0}^n 2^{j-n} f^{n-j} (2(i b(2k-m)-c)z-f)^{j+1} \left(-\frac{(2(i b(2k-m)-c)z-f)^2}{i b(2k-m)-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(2k-m)-c)z-f)^2}{4(i b(2k-m)-c)}\right)\right) (i b(2k-m)-c)^{-n-1} + e^{-\frac{f^2}{4(c+b i(2k-m))}+g+e\,i(2k-m)} (c+b i(2k-m))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2(c+b i(2k-m))z)^{j+1} \left(-\frac{(f+2(c+b i(2k-m))z)^2}{c+b i(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(2k-m))z)^2}{4(c+b i(2k-m))}\right) - e^{-\frac{f^2}{4(i b(m-2k)-c)}-g+e\,i(m-2k)} (i b(m-2k)-c)^{-n-1} \sum_{j=0}^n 2^{j-n} f^{n-j} (2(i b(m-2k)-c)z-f)^{j+1} \left(-\frac{(2(i b(m-2k)-c)z-f)^2}{i b(m-2k)-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b(m-2k)-c)z-f)^2}{4(i b(m-2k)-c)}\right) + e^{-\frac{f^2}{4(c+b i(m-2k))}+g+e\,i(m-2k)} (c+b i(m-2k))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f)^{n-j} (f+2(c+b i(m-2k))z)^{j+1} \left(-\frac{(f+2(c+b i(m-2k))z)^2}{c+b i(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c+b i(m-2k))z)^2}{4(c+b i(m-2k))}\right)\right) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(e^{g-\frac{c^2}{4f}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j c^{-h-j+2n} \left(c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c+2f\sqrt{z}\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)+2\sqrt{-\frac{\left(c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c+2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)-$$

$$e^{\frac{c^2}{4f}-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\left(-c-2f\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)-2f\sqrt{\frac{\left(-c-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)\Bigg)$$

$$f^{-2n-2}+2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(-e^{\frac{(ib(2s-m)-c)^2}{4f}-g+e\,i(2s-m)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2s-m)-c)^{-h-j+2n}$$

$$\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^{h+j}\left(\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(2s-m)-c)\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right)-2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{f}}\;\Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c+b\,i\,(2s-m)-2f\sqrt{z}\right)^2}{4f}\right)\Bigg)\Bigg)(-f)^{-2n-2}-$$

$$e^{\frac{(ib(m-2s)-c)^2}{4f}-g+e\,i(m-2s)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c)^{-h-j+2n}\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2s)-c)\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-c+b\,i\,(m-2s)-2f\sqrt{z}\right)^2}{4f}\right)-2f$$

$$\sqrt{\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{f}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c+b\,i\,(m-2\,s)-2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)\Bigg)(-f)^{-2\,n-2}+$$

$$e^{-\frac{(c+b\,i\,(2\,s-m))^2}{4\,f}+g+e\,i\,(2\,s-m)}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(2\,s-m))^{-h-j+2\,n}\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)+$$

$$2\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(2\,s-m)+2\,f\,\sqrt{z}\right)^2}{4\,f}\right)\Bigg)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,f}+g+e\,i\,(m-2\,s)}\,f^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)+2\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{f}}\;f\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,f\,\sqrt{z}\right)^2}{4\,f}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+d\,z)\sinh(c\,z^r+f\,z+g)$

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$$\int z^n\cos^m(b\,z^2+d\,z)\sinh(c\,z^2+f\,z+g)\,dz=$$

$$2^{-m-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\Bigg((-c)^{-n-1}\,e^{\frac{f^2}{4\,c}-g}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f-2\,c\,z)^2}{4\,c}\right)-$$

$$c^{-n-1}\,e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}\,(-f)^{n-j}\,(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f+2\,c\,z)^2}{4\,c}\right)\Bigg)-$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Bigg(-e^{-\frac{(i\,d\,(2\,k-m)-f)^2}{4\,(i\,b\,(2\,k-m)-c)}-g}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(2\,k-m))^{n-j}\,(-f+d\,i\,(2\,k-m)+2\,(i\,b\,(2\,k-m)-c)\,z)^{j+1}$$

$$\left(-\frac{(-f+d\,i\,(2\,k-m)+2\,(i\,b\,(2\,k-m)-c)\,z)^2}{i\,b\,(2\,k-m)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(-f+d\,i\,(2\,k-m)+2\,(i\,b\,(2\,k-m)-c)\,z)^2}{4\,(i\,b\,(2\,k-m)-c)}\right)\Bigg)(i\,b\,(2\,k-m)-c)^{-n-1}+$$

$$e^{-\frac{(f+d\,i\,(2\,k-m))^2}{4\,(c+b\,i\,(2\,k-m))}+g}\,(c+b\,i\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(2\,k-m))^{n-j}\,(f+d\,i\,(2\,k-m)+2\,(c+b\,i\,(2\,k-m))\,z)^{j+1}$$

$$\left(-\frac{(f+d\,i\,(2\,k-m)+2\,(c+b\,i\,(2\,k-m))\,z)^2}{c+b\,i\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2\,k-m)+2\,(c+b\,i\,(2\,k-m))\,z)^2}{4\,(c+b\,i\,(2\,k-m))}\right)-$$

$$e^{-\frac{(i\,d\,(m-2\,k)-f)^2}{4\,(i\,b\,(m-2\,k)-c)}-g}\,(i\,b\,(m-2\,k)-c)^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(m-2\,k))^{n-j}\,(-f+d\,i\,(m-2\,k)+2\,(i\,b\,(m-2\,k)-c)\,z)^{j+1}$$

$$\left(-\frac{(-f+d\,i\,(m-2\,k)+2\,(i\,b\,(m-2\,k)-c)\,z)^2}{i\,b\,(m-2\,k)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(-f+d\,i\,(m-2\,k)+2\,(i\,b\,(m-2\,k)-c)\,z)^2}{4\,(i\,b\,(m-2\,k)-c)}\right)+$$

$$e^{-\frac{(f+d\,i\,(m-2\,k))^2}{4\,(c+b\,i\,(m-2\,k))}+g}\,(c+b\,i\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(m-2\,k))^{n-j}\,(f+d\,i\,(m-2\,k)+2\,(c+b\,i\,(m-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(f+d\,i\,(m-2\,k)+2\,(c+b\,i\,(m-2\,k))\,z)^2}{c+b\,i\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2\,k)+2\,(c+b\,i\,(m-2\,k))\,z)^2}{4\,(c+b\,i\,(m-2\,k))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{g-\frac{c^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c \left(c + 2 f \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c + 2 f \sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2 f \sqrt{z}\right)^2}{4 f}\right)\right) -$$

$$e^{\frac{c^2}{4f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(-c \left(-c - 2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right) - \right.$$

$$\left.\left. 2 f \sqrt{\frac{\left(-c - 2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c - 2 f \sqrt{z}\right)^2}{4 f}\right)\right)\right) f^{-2n-2} + 2^{-m-2n-2}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{(i b (2s-m)-c)^2}{4 (i d (2s-m)-f)}-g} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2s-m) - c)^{-h-j+2n} \left(-c + b i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-c + b i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{i d (2s-m) - f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i b (2s-m) - c) \left(-c + b i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + b i (2s-m) + 2 (i d (2s-m) - f) \sqrt{z}\right)^2}{4 (i d (2s-m) - f)}\right) + 2$$

$$(i\, d\, (2\, s - m) - f)\, \Gamma\left(\frac{1}{2}\,(h + j + 2),\, -\frac{\left(-c + b\, i\, (2\, s - m) + 2\, (i\, d\, (2\, s - m) - f)\, \sqrt{z}\right)^2}{4\, (i\, d\, (2\, s - m) - f)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-c + b\, i\, (2\, s - m) + 2\, (i\, d\, (2\, s - m) - f)\, \sqrt{z}\right)^2}{i\, d\, (2\, s - m) - f}}\right)\right)(i\, d\, (2\, s - m) - f)^{-2\, n - 2} +$$

$$e^{-\frac{(c + b\, i\, (2\, s - m))^2}{4\, (f + d\, i\, (2\, s - m))} + g}\, (f + d\, i\, (2\, s - m))^{-2\, n - 2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j - h}\, 4^j\, (c + b\, i\, (2\, s - m))^{-h - j + 2\, n}$$

$$\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)^{h + j} \left(-\frac{\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)^2}{f + d\, i\, (2\, s - m)}\right)^{\frac{1}{2}\,(-h - j - 1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c + b\, i\, (2\, s - m))\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h + j + 1),\, -\frac{\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)^2}{4\, (f + d\, i\, (2\, s - m))}\right) +$$

$$2\, (f + d\, i\, (2\, s - m))\, \Gamma\left(\frac{1}{2}\,(h + j + 2),\, -\frac{\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)^2}{4\, (f + d\, i\, (2\, s - m))}\right)$$

$$\left.\sqrt{-\frac{\left(c + b\, i\, (2\, s - m) + 2\, (f + d\, i\, (2\, s - m))\, \sqrt{z}\right)^2}{f + d\, i\, (2\, s - m)}}\right) - e^{-\frac{(i\, b\, (m - 2\, s) - c)^2}{4\, (i\, d\, (m - 2\, s) - f)} - g}\, (i\, d\, (m - 2\, s) - f)^{-2\, n - 2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j - h}\, 4^j\, (i\, b\, (m - 2\, s) - c)^{-h - j + 2\, n} \left(-c + b\, i\, (m - 2\, s) + 2\, (i\, d\, (m - 2\, s) - f)\, \sqrt{z}\right)^{h + j}$$

$$\left(-\frac{\left(-c + b\, i\, (m - 2\, s) + 2\, (i\, d\, (m - 2\, s) - f)\, \sqrt{z}\right)^2}{i\, d\, (m - 2\, s) - f}\right)^{\frac{1}{2}\,(-h - j - 1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\, (m - 2\, s) - c)\left(-c + b\, i\, (m - 2\, s) + 2\, (i\, d\, (m - 2\, s) - f)\, \sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\frac{1}{2}(h+j+1), -\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f)}\Bigg)+$$

$$2\,(i\,d\,(m-2s)-f)\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f)\sqrt{z}\right)^2}{i\,d\,(m-2s)-f}}\Bigg)+e^{-\frac{(c+b\,i\,(m-2s))^2}{4\,(f+d\,i\,(m-2s))}+g}\,(f+d\,i\,(m-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2s))^{-h-j+2n}\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c+b\,i\,(m-2s))\Big(c+b\,i\,(m-2s)+$$

$$2\,(f+d\,i\,(m-2s))\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)+$$

$$2\,(f+d\,i\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2s))}\right)$$

$$\sqrt{-\frac{\left(c+b\,i\,(m-2s)+2\,(f+d\,i\,(m-2s))\sqrt{z}\right)^2}{f+d\,i\,(m-2s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+d\,z+e\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1177.01

$$\int z^n\cos^m\left(b\,z^2+d\,z+e\right)\sinh\left(c\,z^2+f\,z+g\right)dz ==$$

$$2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\Bigg((-c)^{-n-1}\,e^{\frac{f^2}{4c}-g}\sum_{j=0}^{n}2^{j-n}\,f^{n-j}\,(-f-2\,c\,z)^{j+1}\left(\frac{(-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, \frac{(-f-2\,c\,z)^2}{4c}\right)-$$

$$c^{-n-1}\,e^{g-\frac{f^2}{4c}}\sum_{j=0}^{n}2^{j-n}\,(-f)^{n-j}\,(f+2\,c\,z)^{j+1}\left(-\frac{(f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, -\frac{(f+2\,c\,z)^2}{4c}\right)\Bigg)-$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-e^{-\frac{(i d (2k-m)-f)^2}{4(i b(2k-m)-c)}-g+e\,i\,(2k-m)}\left(\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(2k-m))^{n-j}\,(-f+d\,i\,(2k-m)+2\,(i\,b\,(2k-m)-c)\,z)^{j+1}\right.\right.$$
$$\left(-\frac{(-f+d\,i\,(2k-m)+2\,(i\,b\,(2k-m)-c)\,z)^2}{i\,b\,(2k-m)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\left.\Gamma\left(\frac{j+1}{2},-\frac{(-f+d\,i\,(2k-m)+2\,(i\,b\,(2k-m)-c)\,z)^2}{4\,(i\,b\,(2k-m)-c)}\right)\right)(i\,b\,(2k-m)-c)^{-n-1}+$$
$$e^{-\frac{(f+d\,i\,(2k-m))^2}{4(c+b\,i\,(2k-m))}+g+e\,i\,(2k-m)}\,(c+b\,i\,(2k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(2k-m))^{n-j}$$
$$(f+d\,i\,(2k-m)+2\,(c+b\,i\,(2k-m))\,z)^{j+1}\left(-\frac{(f+d\,i\,(2k-m)+2\,(c+b\,i\,(2k-m))\,z)^2}{c+b\,i\,(2k-m)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(2k-m)+2\,(c+b\,i\,(2k-m))\,z)^2}{4\,(c+b\,i\,(2k-m))}\right)-$$
$$e^{-\frac{(i\,d\,(m-2k)-f)^2}{4(i\,b\,(m-2k)-c)}-g+e\,i\,(m-2k)}\,(i\,b\,(m-2k)-c)^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(f-i\,d\,(m-2k))^{n-j}$$
$$(-f+d\,i\,(m-2k)+2\,(i\,b\,(m-2k)-c)\,z)^{j+1}\left(-\frac{(-f+d\,i\,(m-2k)+2\,(i\,b\,(m-2k)-c)\,z)^2}{i\,b\,(m-2k)-c}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-f+d\,i\,(m-2k)+2\,(i\,b\,(m-2k)-c)\,z)^2}{4\,(i\,b\,(m-2k)-c)}\right)+$$
$$e^{-\frac{(f+d\,i\,(m-2k))^2}{4(c+b\,i\,(m-2k))}+g+e\,i\,(m-2k)}\,(c+b\,i\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f-i\,d\,(m-2k))^{n-j}$$
$$(f+d\,i\,(m-2k)+2\,(c+b\,i\,(m-2k))\,z)^{j+1}\left(-\frac{(f+d\,i\,(m-2k)+2\,(c+b\,i\,(m-2k))\,z)^2}{c+b\,i\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f+d\,i\,(m-2k)+2\,(c+b\,i\,(m-2k))\,z)^2}{4\,(c+b\,i\,(m-2k))}\right)\right)/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\;b+d\,z+e\right)\sinh\left(\sqrt{z}\;c+f\,z+g\right)dz=2^{-m-2n-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,f^{-2n-2}$$
$$\left(e^{g-\frac{c^2}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2f\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2f\sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right) + 2 \sqrt{-\frac{\left(c+2 f \sqrt{z}\right)^2}{f}}\; f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) -$$

$$e^{\frac{c^2}{4 f}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2 n} \left(-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\left(-c-2 f \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-c-2 f \sqrt{z}\right)^2}{f}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) +$$

$$2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{(i b (2 s-m)-c)^2}{4 (i d (2 s-m)-f)}-g+e i (2 s-m)} (i d (2 s-m)-f)^{-2 n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2 s-m)-c)^{-h-j+2 n} \left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right)^2}{i d (2 s-m)-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i b (2 s-m)-c) \left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right)^2}{4 (i d (2 s-m)-f)}\Bigg) +$$

$$2 (i d (2 s-m)-f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right)^2}{4 (i d (2 s-m)-f)}\right)$$

$$\sqrt{-\frac{\left(-c+b i (2 s-m)+2 (i d (2 s-m)-f) \sqrt{z}\right)^2}{i d (2 s-m)-f}}\Bigg) +$$

$$e^{-\frac{(c+b i (2 s-m))^2}{4 (f+d i (2 s-m))}+g+e i (2 s-m)} (f+d i (2 s-m))^{-2 n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c+b i (2 s-m))^{-h-j+2 n}$$

$$\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(2\,s-m))\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)+$$

$$2\,(f+d\,i\,(2\,s-m))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f+d\,i\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(2\,s-m)+2\,(f+d\,i\,(2\,s-m))\,\sqrt{z}\right)^2}{f+d\,i\,(2\,s-m)}}\right)-$$

$$e^{-\frac{(i\,b\,(m-2\,s)-c)^2}{4\,(i\,d\,(m-2\,s)-f)}-g+e\,i\,(m-2\,s)}\,(i\,d\,(m-2\,s)-f)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c)^{-h-j+2\,n}$$

$$\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2\,s)-c)\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f)}\right)$$

$$\left.\sqrt{-\frac{\left(-c+b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f)\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f}}\right)+$$

$$e^{-\frac{(c+b\,i\,(m-2\,s))^2}{4\,(f+d\,i\,(m-2\,s))}+g+e\,i\,(m-2\,s)}\,(f+d\,i\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+b\,i\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)+$$

$$2\,(f+d\,i\,(m-2\,s))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f+d\,i\,(m-2\,s))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,(f+d\,i\,(m-2\,s))\sqrt{z}\right)^2}{f+d\,i\,(m-2\,s)}}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving trigonometric and exponential functions

Involving sin and exp

Involving $e^{b\,z}\sin(c\,z)\sinh(a\,z)$

01.19.21.1179.01

$$\int e^{b\,z}\sin(c\,z)\sinh(a\,z)\,dz=-\frac{1}{4}\,i\left(\frac{e^{(-a+b+i\,c)\,z}}{a-b-i\,c}+\frac{e^{(-a+b-i\,c)\,z}}{-a+b-i\,c}-\frac{e^{(a+b-i\,c)\,z}}{a+b-i\,c}+\frac{e^{(a+b+i\,c)\,z}}{a+b+i\,c}\right)$$

01.19.21.1180.01

$$\int e^{c\,z}\sin(c\,z)\sinh(a\,z)\,dz=-\frac{1}{4}\,i\left(\frac{e^{(a+c\,(1+i))\,z}}{a+c\,(1+i)}+\frac{e^{(1+i)\,c\,z-a\,z}}{a-(1+i)\,c}-\frac{e^{-(a-(1-i)\,c)\,z}}{a-(1-i)\,c}-\frac{e^{(a+c\,(1-i))\,z}}{a+c\,(1-i)}\right)$$

Involving $e^{p\,z}\sin(c\,z+d)\sinh(a\,z)$

01.19.21.1181.01

$$\int e^{p\,z}\sin(d+c\,z)\sinh(a\,z)\,dz=-\frac{1}{4}\,e^{-i\,d}\left(\frac{e^{(a-i\,c+p)\,z}}{c+i\,a+i\,p}-\frac{e^{(-a-i\,c+p)\,z}}{c+i\,(p-a)}-\frac{e^{2\,i\,d+(-a+i\,c+p)\,z}}{c-i\,(p-a)}+\frac{e^{2\,i\,d+(a+i\,c+p)\,z}}{c+i\,(-a-p)}\right)$$

Involving $e^{p\,z}\sin(c\,z)\sinh(a\,z+b)$

01.19.21.1182.01

$$\int e^{p z} \sin(c z) \sinh(b + a z) \, dz = -\frac{1}{4} e^{-b} \left(\frac{e^{2 b + (a - i c + p) z}}{c + i a + i p} - \frac{e^{(-a - i c + p) z}}{c + i (p - a)} - \frac{e^{(-a + i c + p) z}}{c - i (p - a)} + \frac{e^{2 b + (a + i c + p) z}}{c + i (-a - p)} \right)$$

Involving $e^{p z} \sin(c z + d) \sinh(a z + b)$

01.19.21.1183.01

$$\int e^{p z} \sin(d + c z) \sinh(b + a z) \, dz = -\frac{1}{4} e^{-b - i d} \left(\frac{e^{2 b + (a - i c + p) z}}{c + i a + i p} - \frac{e^{(-a - i c + p) z}}{c + i (p - a)} - \frac{e^{2 i d + (-a + i c + p) z}}{c - i (p - a)} + \frac{e^{2 b + 2 i d + (a + i c + p) z}}{c + i (-a - p)} \right)$$

Involving $e^{p z^r} \sin(b z^r) \sinh(c z)$

01.19.21.1184.01

$$\int e^{p z^2} \sin(b z^2) \sinh(c z) \, dz = \frac{1}{8 \sqrt{b - i p} \sqrt{b + i p}} \left(\sqrt[4]{-1} \, e^{-\frac{i c^2}{4 (b + i p)}} \sqrt{\pi} \left(i \sqrt{b - i p} \, \operatorname{erfi}\left(\frac{(-1)^{3/4} (-i c + 2 b z + 2 i p z)}{2 \sqrt{b + i p}} \right) - i \sqrt{b - i p} \, \operatorname{erfi}\left(\frac{(-1)^{3/4} (i c + 2 b z + 2 i p z)}{2 \sqrt{b + i p}} \right) + e^{\frac{i b c^2}{2 (b^2 + p^2)}} \sqrt{b + i p} \, \operatorname{erfi}\left(\frac{(-1)^{3/4} (c + 2 i b z + 2 p z)}{2 \sqrt{b - i p}} \right) + e^{\frac{i b c^2}{2 (b^2 + p^2)}} \sqrt{b + i p} \, \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \, (i c + 2 (b - i p) z)}{2 \sqrt{b - i p}} \right) \right) \right)$$

01.19.21.1185.01

$$\int e^{p \sqrt{z}} \sin(b \sqrt{z}) \sinh(c z) \, dz = \frac{1}{8 c^{3/2}} e^{-\frac{b^2 + 2 i (2 \sqrt{z} c + p) b + p^2 + 4 c^2 z}{4 c}} \left(e^{\frac{2 z c^2 + p^2 + 2 b i (\sqrt{z} c + p)}{2 c}} (i b + p) \sqrt{\pi} \, \operatorname{erfi}\left(\frac{b - i (p - 2 c \sqrt{z})}{2 \sqrt{c}} \right) + e^{c z} \left(-4 \sqrt{c} \, e^{\sqrt{z} p + \frac{b^2 + 2 i p b + p^2}{4 c}} \left(-1 + e^{2 i b \sqrt{z}} \right) i \cosh(c z) + e^{\frac{p^2}{2 c} + i b \sqrt{z}} (-i b + p) \sqrt{\pi} \, \operatorname{erfi}\left(\frac{b + i (p - 2 c \sqrt{z})}{2 \sqrt{c}} \right) - e^{\frac{b (b + 2 i c \sqrt{z})}{2 c}} (b - i p) \sqrt{\pi} \, \operatorname{erfi}\left(\frac{2 \sqrt{z} \, c + i b + p}{2 \sqrt{c}} \right) + e^{\frac{b (b + 2 i (\sqrt{z} c + p))}{2 c}} (b + i p) \sqrt{\pi} \, \operatorname{erfi}\left(\frac{-2 \sqrt{z} \, c + i b - p}{2 \sqrt{c}} \right) \right) \right)$$

Involving $e^{p z^r} \sin(b z) \sinh(c z)$

01.19.21.1186.01

$$\int e^{p z^2} \sin(b z) \sinh(c z) \, dz = -\frac{1}{8 \sqrt{p}} \left(\left(i \sqrt{\pi} \right) e^{\frac{(b - i c)^2}{4 p}} \left(\operatorname{erfi}\left(\frac{-c - i b + 2 p z}{2 \sqrt{p}} \right) - e^{\frac{i b c}{p}} \operatorname{erfi}\left(\frac{-c + i b + 2 p z}{2 \sqrt{p}} \right) - e^{\frac{i b c}{p}} \operatorname{erfi}\left(\frac{c - i b + 2 p z}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c + i b + 2 p z}{2 \sqrt{p}} \right) \right) \right)$$

01.19.21.1187.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\sinh(c\,z)\,dz = \frac{1}{8}\left(\frac{8\,e^{p\sqrt{z}}\,(c\cosh(c\,z)\sin(b\,z)-b\cos(b\,z)\sinh(c\,z))}{b^2+c^2}+\frac{\sqrt[4]{-1}\;e^{-\frac{i\,p^2}{4(b+i\,c)}}\,p\,\sqrt{\pi}\;\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,\left(2\sqrt{z}\,(c-i\,b)+p\right)}{2\sqrt{b+i\,c}}\right)}{(b+i\,c)^{3/2}}+\frac{(-1)^{3/4}\,e^{\frac{i\,p^2}{4b-4i\,c}}\,p\,\sqrt{\pi}\;\mathrm{erfi}\left(\frac{(-1)^{3/4}\left(2\sqrt{z}\,(c+i\,b)+p\right)}{2\sqrt{b-i\,c}}\right)}{(b-i\,c)^{3/2}}-\frac{(-1)^{3/4}\,e^{\frac{i\,p^2}{4(b+i\,c)}}\,p\,\sqrt{\pi}\;\mathrm{erfi}\left(\frac{(-1)^{3/4}\left(p+2\,i\,(b+i\,c)\sqrt{z}\right)}{2\sqrt{b+i\,c}}\right)}{(b+i\,c)^{3/2}}-\frac{\sqrt[4]{-1}\;e^{\frac{i\,p^2}{4i\,c-4b}}\,p\,\sqrt{\pi}\;\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,\left(p-2\,i\,(b-i\,c)\sqrt{z}\right)}{2\sqrt{b-i\,c}}\right)}{(b-i\,c)^{3/2}}\right)$$

Involving $e^{p\,z}\sin(b\,z^r)\sinh(c\,z)$

01.19.21.1188.01

$$\int e^{p\,z}\sin(b\,z^2)\sinh(c\,z)\,dz = \frac{1}{8\sqrt{b}}\sqrt[4]{-1}\;e^{-\frac{i(c+p)^2}{4b}}\sqrt{\pi}\left(e^{\frac{i\,c\,p}{b}}\,i\,\mathrm{erfi}\left(\frac{(-1)^{3/4}\,(-i\,c+i\,p+2\,b\,z)}{2\sqrt{b}}\right)+e^{\frac{i\left(c^2+p^2\right)}{2b}}\,\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,(i\,c-i\,p+2\,b\,z)}{2\sqrt{b}}\right)+e^{\frac{i(c+p)^2}{2b}}\,\mathrm{erfi}\left(\frac{(-1)^{3/4}\,(c+p+2\,i\,b\,z)}{2\sqrt{b}}\right)+i\,\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,(c+p-2\,i\,b\,z)}{2\sqrt{b}}\right)\right)$$

01.19.21.1189.01

$$\int e^{p\,z}\sin\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = \frac{1}{8}\left(\frac{8\,e^{p\,z}\sin\left(b\sqrt{z}\right)(p\sinh(c\,z)-c\cosh(c\,z))}{p^2-c^2}-\frac{i\,b\,e^{\frac{b^2}{4p-4c}}\sqrt{\pi}\;\mathrm{erfi}\left(\frac{b-2\,i\,(c-p)\sqrt{z}}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}}+\frac{i\,b\,e^{\frac{b^2}{4p-4c}}\sqrt{\pi}\;\mathrm{erfi}\left(\frac{b+2\,i\,(c-p)\sqrt{z}}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}}+\frac{b\,e^{\frac{b^2}{4(c+p)}}\sqrt{\pi}\;\mathrm{erfi}\left(\frac{i\,b-2\,(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}}-\frac{b\,e^{\frac{b^2}{4(c+p)}}\sqrt{\pi}\;\mathrm{erfi}\left(\frac{i\,b+2\,(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}}\right)$$

Involving $e^{p\,z}\sin(b\,z)\sinh(c\,z^r)$

01.19.21.1190.01

$$\int e^{p z} \sin(b z) \sinh\left(c z^2\right) dz = \frac{1}{8\sqrt{c}} \left(e^{-\frac{b^2+2 i p b+p^2}{4c}} \sqrt{\pi} \left(-i e^{\frac{p^2}{2c}} \operatorname{erf}\left(\frac{i b - p + 2 c z}{2\sqrt{c}}\right) + i \left(e^{\frac{b(b+2 i p)}{2c}} \operatorname{erfi}\left(\frac{-i b + p + 2 c z}{2\sqrt{c}}\right) - e^{\frac{b^2}{2c}} \operatorname{erfi}\left(\frac{i b + p + 2 c z}{2\sqrt{c}}\right)\right) + e^{\frac{p(2 i b+p)}{2c}} \operatorname{erfi}\left(\frac{b - i p + 2 i c z}{2\sqrt{c}}\right)\right)\right)$$

01.19.21.1191.01

$$\int e^{p z} \sin(b z) \sinh\left(c \sqrt{z}\right) dz = \frac{1}{8} i \left(\frac{c\, e^{-\frac{c^2}{4(-i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(i b-p)\sqrt{z}}{2\sqrt{-i b+p}}\right)}{(-i b + p)^{3/2}} + \frac{c\, e^{-\frac{c^2}{4(i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(i b+p)\sqrt{z}}{2\sqrt{i b+p}}\right)}{(i b + p)^{3/2}} - \frac{2 e^{(-i b+p) z - c\sqrt{z}}}{-i b + p} + \frac{2 e^{\sqrt{z}\, c + (-i b+p) z}}{-i b + p} - \frac{c\, e^{-\frac{c^2}{4(-i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(-i b+p)\sqrt{z}}{2\sqrt{-i b+p}}\right)}{(-i b + p)^{3/2}} + \frac{2 e^{(i b+p) z - c\sqrt{z}}}{i b + p} - \frac{2 e^{\sqrt{z}\, c + (i b+p) z}}{i b + p} - \frac{c\, e^{-\frac{c^2}{4(i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(-i b-p)\sqrt{z}}{2\sqrt{i b+p}}\right)}{(i b + p)^{3/2}} \right)$$

Involving $e^{p z^r} \sin(b z) \sinh(c z^r)$

01.19.21.1192.01

$$\int e^{p z^2} \sin(b z) \sinh\left(c z^2\right) dz = \frac{1}{8\sqrt{c-p}\,\sqrt{c+p}} \left(e^{\frac{b^2}{4p-4c}} \sqrt{\pi} \left(-i \sqrt{c+p} \operatorname{erf}\left(\frac{i b + 2(c-p) z}{2\sqrt{c-p}}\right) + \sqrt{c+p} \operatorname{erfi}\left(\frac{b + 2 i (c-p) z}{2\sqrt{c-p}}\right) + e^{\frac{b^2 c}{2c^2-2p^2}} i \sqrt{c-p} \left(\operatorname{erfi}\left(\frac{-i b + 2(c+p) z}{2\sqrt{c+p}}\right) - \operatorname{erfi}\left(\frac{i b + 2(c+p) z}{2\sqrt{c+p}}\right)\right)\right)\right)$$

01.19.21.1193.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\sinh\left(c\sqrt{z}\right)dz = -\frac{1}{8}i\left(-\frac{c\,e^{-\frac{i(c+p)^2}{4b}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c-p+2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}+\frac{c\,e^{-\frac{i(p-c)^2}{4b}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}+\frac{e^{-\frac{i(c+p)^2}{4b}}p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{c+p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}+\frac{e^{\frac{i(p-c)^2}{4b}}p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}+\frac{c\,e^{\frac{i(c+p)^2}{4b}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c-p-2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}-\frac{8\,i\,e^{p\sqrt{z}}\cos(b\,z)\sinh\left(c\sqrt{z}\right)}{b}-\frac{e^{-\frac{i(p-c)^2}{4b}}p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+p-2\,i\,b\sqrt{z}}{2\sqrt{-i\,b}}\right)}{(-i\,b)^{3/2}}-\frac{c\,e^{\frac{i(p-c)^2}{4b}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}-\frac{e^{\frac{i(c+p)^2}{4b}}p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{c+p+2\,i\,b\sqrt{z}}{2\sqrt{i\,b}}\right)}{(i\,b)^{3/2}}\right)$$

Involving $e^{p\,z}\sin(b\,z^r)\sinh(c\,z^r)$

01.19.21.1194.01

$$\int e^{p\,z}\sin\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = \frac{1}{8}\sqrt[4]{-1}\sqrt{\pi}\left(\frac{e^{\frac{i\,p^2}{4(b+i\,c)}}\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-i\,p+2\,b\,z+2\,i\,c\,z)}{2\sqrt{b+i\,c}}\right)}{\sqrt{b+i\,c}}+\frac{e^{\frac{i\,p^2}{4b-4\,i\,c}}\operatorname{erfi}\left(\frac{(-1)^{3/4}(p+2\,c\,z+2\,i\,b\,z)}{2\sqrt{b-i\,c}}\right)}{\sqrt{b-i\,c}}+\frac{e^{\frac{i\,p^2}{4\,i\,c-4b}}\,i\operatorname{erfi}\left(\frac{(-1)^{3/4}(i\,p+2(b-i\,c)z)}{2\sqrt{b-i\,c}}\right)}{\sqrt{b-i\,c}}-\frac{i\,e^{-\frac{i\,p^2}{4(b+i\,c)}}\operatorname{erfi}\left(\frac{(-1)^{3/4}(i\,p+2\,b\,z+2\,i\,c\,z)}{2\sqrt{b+i\,c}}\right)}{\sqrt{b+i\,c}}\right)$$

01.19.21.1195.01

$$\int e^{p\,z}\sin\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = -\frac{1}{8}i\left(\frac{(b-i\,c)\,e^{\frac{(b-i\,c)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{b-i\,c+2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{(b+i\,c)\,e^{\frac{(b+i\,c)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{-b-i\,c-2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{(b-i\,c)\,e^{\frac{(i\,c-b)^2}{4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{b-i\,c-2\,i\,p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{(b+i\,c)\,e^{\frac{(b+i\,c)^2}{4p}}\,i\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-c+i\,b+2\,p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{8\,e^{p\,z}\,i\sin\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)}{p}\right)$$

Involving $e^{p\,z^r}\sin(b\,z^r)\sinh(c\,z^r)$

01.19.21.1196.01

$$\int e^{p z^r} \sin(b z^r) \sinh(c z^r) \, dz = \frac{i z}{4 r} \left(-\Gamma\left(\frac{1}{r}, (-c + i b - p) z^r\right) ((-c + i b - p) z^r)^{-1/r} + ((c + i b - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c + i b - p) z^r\right) + ((-c - i b - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-c - i b - p) z^r\right) - ((c - i b - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - i b - p) z^r\right) \right)$$

01.19.21.1197.01

$$\int e^{p z^2} \sin(b z^2) \sinh(c z^2) \, dz = \frac{1}{8} i \sqrt{\pi} \left(\frac{\sqrt[4]{-1} \operatorname{erf}\left((-1)^{3/4} \sqrt{b - i (c + p)} \, z\right)}{\sqrt{b - i (c + p)}} - \frac{i \sqrt{-c + i b + p} \operatorname{erfi}\left(\sqrt{-c + i b + p} \, z\right)}{b + i (c - p)} - \frac{\sqrt[4]{-1} \operatorname{erfi}\left((-1)^{3/4} \sqrt{b + i c + i p} \, z\right)}{\sqrt{b + i c + i p}} - \frac{i \sqrt{-c - i b + p} \operatorname{erfi}\left(\sqrt{-c - i b + p} \, z\right)}{b - i c + i p} \right)$$

01.19.21.1198.01

$$\int e^{p \sqrt{z}} \sin\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = \frac{1}{2} i \left(e^{(c - i b + p) \sqrt{z}} \left(\frac{e^{2 i (b + i c) \sqrt{z}} \left(-1 + i (b + i c) \sqrt{z} + p \sqrt{z}\right)}{(-c + i b + p)^2} + \frac{\sqrt{z}}{c - i b + p} + \frac{1}{(b + i (c + p))^2} \right) - e^{(-c - i b + p) \sqrt{z}} \left(\frac{e^{2 (c + i b) \sqrt{z}} \left(\sqrt{z} (c + i b) + p \sqrt{z} - 1\right)}{(c + i b + p)^2} + \frac{\sqrt{z}}{-c - i b + p} + \frac{1}{(b - i (c - p))^2} \right) \right)$$

Involving $e^{b z^r + e} \sin(a z^r + q) \sinh(c z^r + g)$

01.19.21.1199.01

$$\int e^{b z^r + e} \sin(a z^r + q) \sinh(c z^r + g) \, dz = \frac{z}{4 r} \left(-e^{e + g + i q - \frac{i \pi}{2}} \Gamma\left(\frac{1}{r}, (-b - c - i a) z^r\right) ((-b - c - i a) z^r)^{-1/r} - e^{e + g - i q + \frac{i \pi}{2}} ((-b - c + i a) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - c + i a) z^r\right) + e^{e - g + i q - \frac{i \pi}{2}} ((-b + c - i a) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + c - i a) z^r\right) + e^{e - g - i q + \frac{i \pi}{2}} ((-b + c + i a) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + c + i a) z^r\right) \right)$$

01.19.21.1200.01

$$\int e^{b z^2 + e} \sin\left(a z^2 + q\right) \sinh\left(c z^2 + g\right) dz = -\frac{1}{8} i e^{e - g - i q} \sqrt{\pi} \left(e^{2 g} \left(\frac{e^{2 i q} \operatorname{erfi}\left(\sqrt{b + c + i a} \, z\right)}{\sqrt{b + c + i a}} - \frac{\operatorname{erfi}\left(\sqrt{b + c - i a} \, z\right)}{\sqrt{b + c - i a}} \right) + \frac{\operatorname{erfi}\left(\sqrt{b - c - i a} \, z\right)}{\sqrt{b - c - i a}} - \frac{e^{2 i q} \operatorname{erfi}\left(\sqrt{b - c + i a} \, z\right)}{\sqrt{b - c + i a}} \right)$$

01.19.21.1201.01

$$\int e^{\sqrt{z}\, b+e} \sin\left(\sqrt{z}\, a+q\right) \sinh\left(\sqrt{z}\, c+g\right) dz = -\frac{1}{2} i \left(-\frac{e^{\sqrt{z}\,(b+c-i a)+e+g-i q}\left(\sqrt{z}\, b+(c-i a)\sqrt{z}-1\right)}{(b+c-i a)^2}+\frac{e^{\sqrt{z}\,(b+c+i a)+e+g+i q}\left(\sqrt{z}\, b+(c+i a)\sqrt{z}-1\right)}{(b+c+i a)^2}+\frac{e^{\sqrt{z}\,(b-c-i a)+e-g-i q}\left(\sqrt{z}\, b-(c+i a)\sqrt{z}-1\right)}{(-b+c+i a)^2}-\frac{e^{\sqrt{z}\,(b-c+i a)+e-g+i q}\left(\sqrt{z}\, b-(c-i a)\sqrt{z}-1\right)}{(-b+c-i a)^2}\right)$$

Involving $e^{b z^r+d z+e} \sin\left(a z^r+p z+q\right) \sinh\left(c z^r+f z+g\right)$

01.19.21.1202.01

$$\int e^{b z^2+d z+e} \sin\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right) dz = \frac{1}{8} \sqrt[4]{-1}\, e^{e-g-i q} \sqrt{\pi} \left(e^{2 g}\left(\frac{8\sqrt{a+(b+c) i}\; e^{-\frac{i (d+f-i p)^2}{4 (a+(b+c) i)}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (i d+i f+p+2 a z+2 i b z+2 i c z)}{2\sqrt{a+(b+c) i}}\right)}{8 i a-8 (b+c)}+\frac{e^{\frac{1}{4} i\left(\frac{(d+f+i p)^2}{a-i (b+c)}+8 q\right)} \operatorname{erfi}\left(\frac{(-1)^{3/4} (d+f+i p+2 b z+2 c z+2 i a z)}{2\sqrt{a-i (b+c)}}\right)}{\sqrt{a-i (b+c)}}\right)-\frac{i\, e^{-\frac{i (-d+f+i p)^2}{4 (a+(b-c) i)}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d-f-i p-2 i a z+2 b z-2 c z)}{2\sqrt{a+(b-c) i}}\right)}{\sqrt{a+(b-c) i}}-\frac{e^{\frac{1}{4} i\left(\frac{(d-f+i p)^2}{a-i b+i c}+8 q\right)} \operatorname{erfi}\left(\frac{(-1)^{3/4} (d-f+i p+2 b z-2 c z+2 i a z)}{2\sqrt{a-i b+i c}}\right)}{\sqrt{a-i b+i c}}\right)$$

01.19.21.1203.01

$$\int e^{\sqrt{z}\, b+d z+e} \sin\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = \frac{i\, e^{\sqrt{z}\,(b+c-i a)+e+g-i q+(d+f-i p) z}}{4 (d+f-i p)}-\frac{i\, e^{\sqrt{z}\,(b+c+i a)+e+g+i q+(d+f+i p) z}}{4 (d+f+i p)}-\frac{i\, e^{\sqrt{z}\,(b-c-i a)+e-g-i q+(d-f-i p) z}}{4 (d-f-i p)}+$$

$$\frac{i\, e^{\sqrt{z}\,(b-c+i a)+e-g+i q+(d-f+i p) z}}{4 (d-f+i p)}-\frac{(a+(b-c) i)\, e^{\frac{(a+(b-c) i)^2+4 (d-f-i p)(e-g-i q)}{4 (d-f-i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-b+c+i a-2 d \sqrt{z}+2 f \sqrt{z}+2 i p \sqrt{z}}{2 \sqrt{d-f-i p}}\right)}{8 (d-f-i p)^{3/2}}+$$

$$\frac{(a-i (b-c))\, e^{\frac{(a-i (b-c))^2+4 (d-f+i p)(e-g+i q)}{4 (d-f+i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c+i a+2 d \sqrt{z}-2 f \sqrt{z}+2 i p \sqrt{z}}{2 \sqrt{d-f+i p}}\right)}{8 (d-f+i p)^{3/2}}+$$

$$\frac{(a+(b+c) i)\, e^{\frac{(a+(b+c) i)^2+4 (d+f-i p)(e+g-i q)}{4 (d+f-i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-b-c+i a-2 d \sqrt{z}-2 f \sqrt{z}+2 i p \sqrt{z}}{2 \sqrt{d+f-i p}}\right)}{8 (d+f-i p)^{3/2}}-$$

$$\frac{a\, e^{\frac{(a-i (b+c))^2}{4 (d+f+i p)}+e+g+i q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+i a+2 d \sqrt{z}+2 f \sqrt{z}+2 i p \sqrt{z}}{2 \sqrt{d+f+i p}}\right)}{8 (d+f+i p)^{3/2}}+$$

$$\frac{i (b+c)\, e^{\frac{(a-i (b+c))^2+4 (d+f+i p)(e+g+i q)}{4 (d+f+i p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+i a+2 d \sqrt{z}+2 f \sqrt{z}+2 i p \sqrt{z}}{2 \sqrt{d+f+i p}}\right)}{8 (d+f+i p)^{3/2}}$$

Involving sin and rational functions of exp

Involving $\sin(e z) \sin(c z) \left(a+b e^{d z}\right)^{-n}$

01.19.21.1204.01

$$\int \frac{\sin(e z) \sinh(c z)}{\left(a+b e^{d z}\right)^n} dz = \frac{1}{4} i a^{-n} \left(\frac{e^{(c-i e) z}\, {}_2F_1\left(\frac{c-i e}{d}, n; \frac{c+d-i e}{d}; -\frac{b e^{d z}}{a}\right)-e^{(i e-c) z}\, {}_2F_1\left(\frac{i e-c}{d}, n; \frac{-c+d+i e}{d}; -\frac{b e^{d z}}{a}\right)}{c-i e}+\right.$$

$$\left.\frac{e^{(c+i e) z}\, {}_2F_1\left(\frac{c+i e}{d}, n; \frac{c+d+i e}{d}; -\frac{b e^{d z}}{a}\right)-e^{(-c-i e) z}\, {}_2F_1\left(\frac{-c-i e}{d}, n; \frac{-c+d-i e}{d}; -\frac{b e^{d z}}{a}\right)}{-c-i e}\right) /; n \in \mathbb{N}^+$$

Involving $e^{p z} \sin(e z) \sinh(c z) \left(a+b e^{d z}\right)^{-n}$

01.19.21.1205.01

$$\int \frac{e^{p z} \sin(e z) \sinh(c z)}{\left(a + b\, e^{d z}\right)^n}\, dz = \frac{1}{4}\, i\, a^{-n} \left(\frac{1}{(c - i e - p)(c - i e + p)} \left(e^{(c - i e + p) z} (c - i e - p)\, {}_2F_1\!\left(\frac{c - i e + p}{d}, n; \frac{c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-c + i e + p) z} (c - i e + p)\, {}_2F_1\!\left(\frac{-c + i e + p}{d}, n; \frac{-c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) \right) + \frac{1}{(c + i e - p)(c + i e + p)} \left(e^{(c + i e + p) z} (-c - i e + p)\, {}_2F_1\!\left(\frac{c + i e + p}{d}, n; \frac{c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) + e^{(-c - i e + p) z} (c + i e + p)\, {}_2F_1\!\left(\frac{-c - i e + p}{d}, n; \frac{-c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \right) /;\, n \in \mathbb{N}^+$$

Involving sin and algebraic functions of exp

Involving $\left(a + b\, e^{d z}\right)^\beta \sin(e z) \sinh(c z)$

01.19.21.1206.01

$$\int \left(a + b\, e^{d z}\right)^\beta \sin(e z) \sinh(c z)\, dz = \frac{1}{4}\, i \left(a + b\, e^{d z}\right)^\beta \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta} \left(\frac{e^{(c - i e) z}\, {}_2F_1\!\left(\frac{c - i e}{d}, -\beta; \frac{c + d - i e}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(i e - c) z}\, {}_2F_1\!\left(\frac{i e - c}{d}, -\beta; \frac{-c + d + i e}{d}; -\frac{b\, e^{d z}}{a} \right)}{c - i e} + \frac{e^{(c + i e) z}\, {}_2F_1\!\left(\frac{c + i e}{d}, -\beta; \frac{c + d + i e}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-c - i e) z}\, {}_2F_1\!\left(\frac{-c - i e}{d}, -\beta; \frac{-c + d - i e}{d}; -\frac{b\, e^{d z}}{a} \right)}{-c - i e} \right)$$

Involving $e^{p z} \left(a + b\, e^{d z}\right)^\beta \sin(e z) \sinh(c z)$

01.19.21.1207.01

$$\int e^{p z} \left(a + b\, e^{d z}\right)^\beta \sin(e z) \sinh(c z)\, dz = \frac{1}{4}\, i \left(a + b\, e^{d z}\right)^\beta \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta} \left(\frac{1}{(c - i e - p)(c - i e + p)} \left(e^{(c - i e + p) z} (c - i e - p)\, {}_2F_1\!\left(\frac{c - i e + p}{d}, -\beta; \frac{c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-c + i e + p) z} (c - i e + p)\, {}_2F_1\!\left(\frac{-c + i e + p}{d}, -\beta; \frac{-c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) \right) + \left(e^{(c + i e + p) z} (-c - i e + p)\, {}_2F_1\!\left(\frac{c + i e + p}{d}, -\beta; \frac{c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) - e^{(-c - i e + p) z} (-c - i e - p)\, {}_2F_1\!\left(\frac{-c - i e + p}{d}, -\beta; \frac{-c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a} \right) \right) \Big/ ((-c - i e - p)(-c - i e + p)) \right)$$

Involving powers of sin and exp

Involving $e^{b z} \sin^{\mu}(c z) \sinh(a z)$

01.19.21.1208.01

$$\int e^{b z} \sin^{\mu}(c z) \sinh(a z) \, dz = e^{(b-a) z} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left((a + b - i c \mu) \, {}_2F_1\left(\frac{i (a - b + i c \mu)}{2 c}, -\mu; \frac{i (a - b + c i (\mu - 2))}{2 c}; e^{2 i c z}\right) + e^{2 a z} (a - b + i c \mu) \, {}_2F_1\left(-\frac{i (a + b - i c \mu)}{2 c}, -\mu; -\frac{i (a + b - i c (\mu - 2))}{2 c}; e^{2 i c z}\right)\right) \Big/ (2 ((a + b - i c \mu) (a - b + i c \mu)))$$

01.19.21.1209.01

$$\int e^{b z} \sin^{m}(c z) \sinh(a z) \, dz = 2^{-m-1} \left(\frac{e^{(a+b) z}}{a + b} + \frac{e^{(b-a) z}}{a - b}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - i^{-m} 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(-\frac{(-1)^m e^{(-a+b+2 i c k - i c m) z}}{a - b - 2 i c k + i c m} + \frac{e^{(a+b-2 i c k + i c m) z}}{-a - b + 2 i c k - i c m} - \frac{e^{(-a+b-2 i c k + i c m) z}}{a - b + 2 i c k - i c m} + \frac{(-1)^m e^{(a+b+2 i c k - i c m) z}}{-a - b - 2 i c k + i c m}\right) \binom{m}{k} /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \sinh(a z)$

01.19.21.1210.01

$$\int e^{p z} \sin^{\mu}(d + c z) \sinh(a z) \, dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \left(\frac{e^{-a z + p z}}{a - p + i c \mu} \, {}_2F_1\left(\frac{i (a - p + i c \mu)}{2 c}, -\mu; \frac{1}{2} \left(\frac{i (a - p)}{c} - \mu + 2\right); e^{2 i (d + c z)}\right) + \frac{e^{(a+p) z}}{a + p - i c \mu} \, {}_2F_1\left(-\frac{i (a + p - i c \mu)}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i (a + p)}{c} - \mu + 2\right); e^{2 i (d + c z)}\right)\right)$$

01.19.21.1211.01

$$\int e^{p z} \sin^{m}(d + c z) \sinh(a z) \, dz = 2^{-m-1} \left(\frac{e^{(a+p) z}}{a + p} + \frac{e^{-(a-p) z}}{a - p}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m - \frac{i m \pi}{2}} \left(\frac{e^{4 i d k + i \pi + i m \pi - (a - 2 i c k + i c m - p) z}}{a - 2 i c k + i c m - p} + \frac{e^{2 i d m - (-a + 2 i c k - i c m - p) z}}{-a + 2 i c k - i c m - p} + \frac{e^{2 i d m + i \pi - (a + 2 i c k - i c m - p) z}}{a + 2 i c k - i c m - p} + \frac{e^{4 i d k - (-a - 2 i c k + i c m - p) z + i m \pi}}{-a - 2 i c k + i c m - p}\right) \binom{m}{k} /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z) \sinh(a z + b)$

01.19.21.1212.01

$$\int e^{p z} \sin^{\mu}(c z) \sinh(b + a z)\, dz = \frac{1}{2} e^{b} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \left(\frac{e^{-2 b - a z + p z}}{a - p + i c \mu} \, {}_2F_1\left(\frac{i (a - p + i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(\frac{i (a - p)}{c} - \mu + 2\right); e^{2 i c z}\right) + \frac{e^{(a+p) z}}{a + p - i c \mu} \, {}_2F_1\left(-\frac{i (a + p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (a + p)}{c} - \mu + 2\right); e^{2 i c z}\right)\right)$$

01.19.21.1213.01

$$\int e^{p z} \sin^{m}(c z) \sinh(b + a z)\, dz = 2^{-m-1} e^{-b} \left(\frac{e^{2 b + (a+p) z}}{a + p} + \frac{e^{-(a-p) z}}{a - p}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-b - \frac{i m \pi}{2}} \left(e^{2 b} \left(\frac{e^{-(-a + 2 i c k - i c m - p) z}}{-a + 2 i c k - i c m - p} + \frac{e^{i m \pi - (-a - 2 i c k + i c m - p) z}}{-a - 2 i c k + i c m - p}\right) - \frac{e^{i m \pi - (a - 2 i c k + i c m - p) z}}{a - 2 i c k + i c m - p} - \frac{e^{-(a + 2 i c k - i c m - p) z}}{a + 2 i c k - i c m - p}\right) \binom{m}{k} \;/;\; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \sinh(a z + b)$

01.19.21.1214.01

$$\int e^{p z} \sin^{\mu}(d + c z) \sinh(b + a z)\, dz = \frac{1}{2} e^{b} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \left(\frac{e^{-2 b - a z + p z}}{a - p + i c \mu} \, {}_2F_1\left(\frac{i (a - p + i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(\frac{i (a - p)}{c} - \mu + 2\right); e^{2 i (d + c z)}\right) + \frac{e^{(a+p) z}}{a + p - i c \mu} \, {}_2F_1\left(-\frac{i (a + p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (a + p)}{c} - \mu + 2\right); e^{2 i (d + c z)}\right)\right)$$

01.19.21.1215.01

$$\int e^{p z} \sin^{m}(d + c z) \sinh(b + a z)\, dz = 2^{-m-1} e^{-b} \left(\frac{e^{2 b - (-a - p) z}}{a + p} - \frac{e^{i \pi - (a - p) z}}{a - p}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} e^{-b - 2 i d k - i d m - \frac{i m \pi}{2}} \left(e^{2 b} \left(\frac{e^{2 i d m - (-a + 2 i c k - i c m - p) z}}{-a + 2 i c k - i c m - p} + \frac{e^{4 i d k - (-a - 2 i c k + i c m - p) z + i m \pi}}{-a - 2 i c k + i c m - p}\right) + \frac{e^{4 i d k + i \pi + i m \pi - (a - 2 i c k + i c m - p) z}}{a - 2 i c k + i c m - p} + \frac{e^{2 i d m + i \pi - (a + 2 i c k - i c m - p) z}}{a + 2 i c k - i c m - p}\right) \;/;\; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^{m}\left(b z^r\right) \sinh(c z)$

01.19.21.1216.01

$$\int e^{p z^2} \sin^m(b z^2) \sinh(c z)\, dz = -\frac{2^{-m-2}\sqrt{\pi}\,(m \bmod 2 - 1)}{\sqrt{p}}\, e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} \left(\operatorname{erfi}\left(\frac{c+2pz}{2\sqrt{p}}\right) + \operatorname{erfi}\left(\frac{c-2pz}{2\sqrt{p}}\right)\right) + i^m\, 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{\frac{c^2}{4(-2bik+ibm-p)}} \operatorname{erf}\left(\frac{-c-4ibkz+2ibmz-2pz}{2\sqrt{-2bik+ibm-p}}\right)}{\sqrt{-2bik+ibm-p}} + \frac{(-1)^m e^{-\frac{c^2}{4(-2bik+ibm+p)}} \operatorname{erfi}\left(\frac{c-4ibkz+2ibmz+2pz}{2\sqrt{-2bik+ibm+p}}\right)}{\sqrt{-2bik+ibm+p}} + \frac{(-1)^m e^{-\frac{c^2}{4(-2bik+ibm+p)}} \operatorname{erfi}\left(\frac{c+4ibkz-2ibmz-2pz}{2\sqrt{-2bik+ibm+p}}\right)}{\sqrt{-2bik+ibm+p}} - \frac{e^{\frac{c^2}{4(-2bik+ibm-p)}} \operatorname{erf}\left(\frac{c-4ibkz+2ibmz-2pz}{2\sqrt{-2bik+ibm-p}}\right)}{\sqrt{-2bik+ibm-p}} \right) /;\ m \in \mathbb{N}$$

01.19.21.1217.01

$$\int e^{p\sqrt{z}} \sin^m(b\sqrt{z}) \sinh(c z)\, dz = \frac{2^{-m-2}}{c^{3/2}}\, e^{-\frac{p^2}{4c}-cz} \binom{m}{\frac{m}{2}} \left(2\sqrt{c}\, e^{\frac{p^2}{4c}+\sqrt{z}\, p} \left(1+e^{2cz}\right) + e^{\frac{p^2}{2c}+cz}\, p\sqrt{\pi}\, \operatorname{erf}\left(\frac{p-2c\sqrt{z}}{2\sqrt{c}}\right) - e^{cz}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{2\sqrt{z}\, c+p}{2\sqrt{c}}\right)\right) (1 - m \bmod 2) + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{4 e^{p\sqrt{z}} \cos\left(b\sqrt{z}\,(2k-m) + \frac{m\pi}{2}\right) \cosh(cz)}{c} + \frac{\sqrt{\pi}}{2c^{3/2}}\, e^{-\frac{2\left(4k^2+m^2\right)b^2+8ikpb+p^2+2\pi icm}{4c}} \left(e^{\frac{b\left(b\left(12k^2-4mk+3m^2\right)+2i(6k-m)p\right)}{4c}} (2bk-bm+ip) \operatorname{erf}\left(\frac{2bk-bm+ip+2ic\sqrt{z}}{2\sqrt{c}}\right) + e^{\frac{\left(12k^2-4mk+3m^2\right)b^2+2i(2k+m)pb+4\pi icm}{4c}} (2bk-bm-ip) \operatorname{erf}\left(\frac{2bk-bm-ip-2ic\sqrt{z}}{2\sqrt{c}}\right) - e^{\frac{b^2(2k+m)^2+2p^2}{4c}} \left(e^{\frac{1}{2} i\left(2\pi m+\frac{b(6k-m)p}{c}\right)} (bm+ip) \operatorname{erfi}\left(\frac{b(m-2k)+i\left(p-2c\sqrt{z}\right)}{2\sqrt{c}}\right) + 2b\, e^{\frac{1}{2} i\left(2\pi m+\frac{b(6k-m)p}{c}\right)} k \operatorname{erfi}\left(\frac{2bk-bm-ip+2ic\sqrt{z}}{2\sqrt{c}}\right) + e^{\frac{ib(2k+m)p}{2c}} (2bk-bm+ip) \operatorname{erfi}\left(\frac{2bk-bm+ip-2ic\sqrt{z}}{2\sqrt{c}}\right)\right)\right)\right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \sinh(c z)$

01.19.21.1218.01

$$\int e^{p z^2} \sin^m(b z) \sinh(c z)\, dz = \frac{2^{-m-2}\sqrt{\pi}}{\sqrt{p}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-\frac{c^2+2 b i (2k+m) c - b^2 (m-2k)^2 + 2 \pi i m p}{4p}}$$

$$\binom{m}{k} \left(e^{\frac{2 i b c k}{p}} \operatorname{erfi}\left(\frac{c - 2 i b k + i b m + 2 p z}{2\sqrt{p}} \right) + e^{\frac{i b c m}{p} + i \pi m} \operatorname{erfi}\left(\frac{c + 2 i b k - i b m + 2 p z}{2\sqrt{p}} \right) + \right.$$

$$\left. e^{\frac{2 i b c k}{p} + i m \pi} \operatorname{erfi}\left(\frac{c - 2 i b k + i b m - 2 p z}{2\sqrt{p}} \right) + e^{\frac{i b c m}{p}} \operatorname{erfi}\left(\frac{c + 2 i b k - i b m - 2 p z}{2\sqrt{p}} \right) \right) -$$

$$\frac{2^{-m-2}\sqrt{\pi}\, (m \bmod 2 - 1)}{\sqrt{p}} e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} \left(\operatorname{erfi}\left(\frac{c + 2 p z}{2\sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c - 2 p z}{2\sqrt{p}} \right) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1219.01

$$\int e^{p\sqrt{z}} \sin^m(b z) \sinh(c z)\, dz =$$

$$2^{-m-2} \left(\frac{4 e^{p\sqrt{z}} \cosh(c z)}{c} + \frac{e^{\frac{p^2}{4c}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p - 2 c \sqrt{z}}{2\sqrt{-c}} \right)}{(-c)^{3/2}} + \frac{e^{-\frac{p^2}{4c} - i\pi} p \sqrt{\pi} \operatorname{erfi}\left(\frac{2\sqrt{z}\, c + p}{2\sqrt{c}} \right)}{c^{3/2}} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) +$$

$$2^{-m-2} i \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{\frac{1}{2} i (m+1)\pi} \left(-\frac{\left(4 e^{p\sqrt{z} - \frac{i m \pi}{2}} \right) \cosh\left((c + b i (m-2s)) z - \frac{i m \pi}{2} \right)}{c + b i (m - 2s)} - \right. \right.$$

$$\left(e^{-\frac{p^2}{4(c + b i (m-2s))} - i (m+1)\pi} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2 (c + b i (m-2s)) \sqrt{z}}{2\sqrt{c + b i (m - 2s)}} \right) \right) \Big/ (c + b i (m-2s))^{3/2} -$$

$$\left. \frac{e^{-\frac{p^2}{4(-c - i b (m-2s))}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2(-c - i b (m-2s)) \sqrt{z}}{2\sqrt{-c - i b (m-2s)}} \right)}{(-c - i b (m-2s))^{3/2}} \right) +$$

$$e^{-\frac{1}{2} i (1-m)\pi} \left(\frac{4 e^{p\sqrt{z} - \frac{i m \pi}{2}} \cos\left(\frac{\pi m}{2} + (-i c - b m + 2 b s) z \right)}{c - i b (m - 2s)} - \right.$$

$$\left(\left(e^{i (1-m)\pi - \frac{p^2}{4(i b (m-2s) - c)}} p \sqrt{\pi} \right) \operatorname{erfi}\left(\frac{p + 2 (i b (m-2s) - c) \sqrt{z}}{2\sqrt{i b (m-2s) - c}} \right) \right) \Big/ (i b (m-2s) - c)^{3/2} -$$

$$\left. \left. \frac{\left(e^{-\frac{p^2}{4(c - i b (m-2s))}} p \sqrt{\pi} \right) \operatorname{erfi}\left(\frac{p + 2 (c - i b (m-2s)) \sqrt{z}}{2\sqrt{c - i b (m-2s)}} \right)}{(c - i b (m-2s))^{3/2}} \right) \right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z^r) \sinh(c z)$

01.19.21.1220.01

$$\int e^{p z} \sin^m(b z^2) \sinh(c z) \, dz = \frac{2^{-m} (1 - m \bmod 2)}{p^2 - c^2} e^{p z} (p \sinh(c z) - c \cosh(c z)) \binom{m}{\frac{m}{2}} + \frac{2^{-m-2} \sqrt{\pi}}{\sqrt{b}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{\sqrt[4]{-1} \, e^{\frac{i m \pi}{2} - \frac{i (c^2 - 2 p c + p^2)}{4 b (m - 2 k)}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \, (c - p - 4 i b k z + 2 i b m z)}{2 \sqrt{b} \sqrt{m - 2 k}} \right)}{\sqrt{m - 2 k}} + \frac{1}{\sqrt{m - 2 k}} \left((-1)^{3/4} e^{\frac{i (c^2 + 2 p c + p^2)}{4 b (m - 2 k)} - \frac{i m \pi}{2}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (c + p - 4 i b k z + 2 i b m z)}{2 \sqrt{b} \sqrt{m - 2 k}} \right) \right) + \frac{1}{\sqrt{m - 2 k}} \left((-1)^{3/4} e^{\frac{i (c^2 - 2 p c + p^2)}{4 b (m - 2 k)} - \frac{i m \pi}{2}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (c - p + 4 i b k z - 2 i b m z)}{2 \sqrt{b} \sqrt{m - 2 k}} \right) \right) + \frac{1}{\sqrt{m - 2 k}} \left(\sqrt[4]{-1} \, e^{\frac{i m \pi}{2} - \frac{i (c^2 + 2 p c + p^2)}{4 b (m - 2 k)}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \, (c + p + 4 i b k z - 2 i b m z)}{2 \sqrt{b} \sqrt{m - 2 k}} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.1221.01

$$\int e^{p z} \sin^m(b \sqrt{z}) \sinh(c z) \, dz = 2^{-m-1} \left(\frac{e^{(c+p) z}}{c + p} - \frac{e^{(p-c) z}}{p - c} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{2} e^{-\frac{1}{2} i m \pi} \sqrt{\pi} \left(\frac{1}{(p - c)^{3/2}} \left(e^{-\frac{(i b m - 2 i b k)^2}{4 (p - c)}} (i b m - 2 i b k) \operatorname{erfi}\left(\frac{-2 \sqrt{z} \, c - 2 i b k + i b m + 2 p \sqrt{z}}{2 \sqrt{p - c}} \right) \right) + \frac{1}{(p - c)^{3/2}} \left(i b e^{\frac{b^2 (2 k - m)^2}{4 (p - c)} + i m \pi} (2 k - m) \operatorname{erfi}\left(\frac{-2 \sqrt{z} \, c + 2 i b k - i b m + 2 p \sqrt{z}}{2 \sqrt{p - c}} \right) \right) \right) + \frac{1}{2} e^{-\frac{1}{2} i m \pi} \sqrt{\pi} \left(\frac{1}{(c + p)^{3/2}} \left(i e^{-\frac{(i b m - 2 i b k)^2}{4 (c + p)}} (2 b k - b m) \operatorname{erfi}\left(\frac{2 \sqrt{z} \, c - 2 i b k + i b m + 2 p \sqrt{z}}{2 \sqrt{c + p}} \right) \right) - \frac{1}{(c + p)^{3/2}} \left(i b e^{\frac{b^2 (2 k - m)^2}{4 (c + p)} + i m \pi} (2 k - m) \operatorname{erfi}\left(\frac{2 \sqrt{z} \, c + 2 i b k - i b m + 2 p \sqrt{z}}{2 \sqrt{c + p}} \right) \right) \right) + \frac{2 e^{(p-c) z} \cos\left(b \sqrt{z} \, (2 k - m) + \frac{m \pi}{2} \right)}{c - p} + \frac{2 e^{(c+p) z} \cos\left(b \sqrt{z} \, (2 k - m) + \frac{m \pi}{2} \right)}{c + p} \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z) \sinh(c z^r)$

01.19.21.1222.01

$$\int e^{p z} \sin^m(b z) \sinh(c z^2)\, dz = 2^{-m-2} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(\frac{e^{-\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p+2cz}{2\sqrt{c}}\right)}{\sqrt{c}} - \frac{e^{\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p-2cz}{2\sqrt{-c}}\right)}{\sqrt{-c}} \right) (1 - m \bmod 2) -$$

$$\frac{2^{-m-2}\sqrt{\pi}}{c} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(\sqrt[4]{-1}\, \sqrt{-i c}\, e^{\frac{4k^2b^2+m^2b^2-4kmb^2+4ikpb-2impb-p^2}{4c} - \frac{i m \pi}{2}} \operatorname{erfi}\left(\frac{(-1)^{3/4}(-2bik + ibm + p + 2cz)}{2\sqrt{-ic}}\right) + \right.$$

$$(-1)^{3/4} \sqrt{-i c}\, e^{\frac{i m \pi}{2} - \frac{4k^2b^2+m^2b^2-4kmb^2-4ikpb+2impb-p^2}{4c}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(2ibk - ibm + p - 2cz)}{2\sqrt{-ic}}\right) +$$

$$(-1)^{3/4} \sqrt{i c}\, e^{\frac{i \pi m}{2} + \frac{4k^2b^2+m^2b^2-4kmb^2-4ikpb+2impb-p^2}{4c}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(2ibk - ibm + p + 2cz)}{2\sqrt{ic}}\right) +$$

$$\left. \sqrt[4]{-1}\, \sqrt{i c}\, e^{-\frac{1}{2} i \pi m - \frac{4k^2b^2+m^2b^2-4kmb^2+4ikpb-2impb-p^2}{4c}} \operatorname{erfi}\left(\frac{(-1)^{3/4}(-2bik + ibm + p - 2cz)}{2\sqrt{ic}}\right) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1223.01

$$\int e^{p z} \sin^m(b z) \sinh(c \sqrt{z})\, dz =$$

$$-2^{-m-2} \left(\frac{c\, e^{-\frac{c^2}{4p}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{4 e^{p z} \sinh(c\sqrt{z})}{p} - \frac{c\, e^{-\frac{c^2}{4p}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c-2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) -$$

$$2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(i^{-m} \left(\frac{(-1)^m e^{-\frac{c^2}{4(bi(2k-m)+p)}} \operatorname{erfi}\left(\frac{c+2(bi(2k-m)+p)\sqrt{z}}{2\sqrt{bi(2k-m)+p}}\right) \sqrt{\pi}\, c}{(bi(2k-m)+p)^{3/2}} - \right.\right.$$

$$\left. \frac{e^{-\frac{c^2}{4(p-ib(2k-m))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2(ib(2k-m)-p)\sqrt{z}}{2\sqrt{p-ib(2k-m)}}\right) c}{(p-ib(2k-m))^{3/2}} + \frac{2 e^{(p-ib(2k-m))z - c\sqrt{z}}}{p-ib(2k-m)} - \frac{2(-1)^m e^{\sqrt{z}\, c + (bi(2k-m)+p)z}}{bi(2k-m)+p} \right) +$$

$$i^m \left(\frac{(-1)^m e^{-\frac{c^2}{4(bi(m-2k)+p)}} \operatorname{erfi}\left(\frac{c+2(bi(m-2k)+p)\sqrt{z}}{2\sqrt{bi(m-2k)+p}}\right) \sqrt{\pi}\, c}{(bi(m-2k)+p)^{3/2}} - \frac{e^{-\frac{c^2}{4(p-ib(m-2k))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+2(ib(m-2k)-p)\sqrt{z}}{2\sqrt{p-ib(m-2k)}}\right) c}{(p-ib(m-2k))^{3/2}} + \right.$$

$$\left.\left. \frac{2 e^{(p-ib(m-2k))z - c\sqrt{z}}}{p-ib(m-2k)} - \frac{2(-1)^m e^{\sqrt{z}\, c + (bi(m-2k)+p)z}}{bi(m-2k)+p} \right) \right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \sinh(c z^r)$

01.19.21.1224.01

$$\int e^{p z^2} \sin^m(b z) \sinh(c z^2)\, dz = 2^{-m-2} \left(\frac{\operatorname{erfi}\left(\frac{2 c z+2 p z}{2 \sqrt{c+p}}\right)}{\sqrt{c+p}} - \frac{\operatorname{erfi}\left(\frac{2 p z-2 c z}{2 \sqrt{p-c}}\right)}{\sqrt{p-c}} \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{p-c} \left((-1)^{3/4} e^{\frac{i \pi m}{2} + \frac{i (4 k^2 b^2 + m^2 b^2 - 4 k m b^2)}{4(-i c + i p)}} \sqrt{-i c + i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (2 i b k - i b m - 2 c z + 2 p z)}{2 \sqrt{-i c + i p}} \right) \right) - \frac{1}{c+p} \left((-1)^{3/4} e^{\frac{i \pi m}{2} + \frac{i (4 k^2 b^2 + m^2 b^2 - 4 k m b^2)}{4(i c + i p)}} \sqrt{i c + i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (2 i b k - i b m + 2 c z + 2 p z)}{2 \sqrt{i c + i p}} \right) \right) - \frac{1}{c+p} \left(\sqrt[4]{-1}\, e^{-\frac{1}{2} i \pi m - \frac{i (4 k^2 b^2 + m^2 b^2 - 4 k m b^2)}{4(-i c - i p)}} \sqrt{-i c - i p}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (-2 b i k + i b m + 2 c z + 2 p z)}{2 \sqrt{-i c - i p}} \right) \right) + \frac{1}{p-c} \left(\sqrt[4]{-1}\, e^{-\frac{1}{2} i \pi m - \frac{i (4 k^2 b^2 + m^2 b^2 - 4 k m b^2)}{4(i c - i p)}} \sqrt{i c - i p}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (-2 b i k + i b m - 2 c z + 2 p z)}{2 \sqrt{i c - i p}} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.1225.01

$$\int e^{p\sqrt{z}} \sin^m(b z) \sinh\left(c\sqrt{z}\right) dz = 2^{-m} e^{(c+p)\sqrt{z}} \left(-\frac{e^{-2c\sqrt{z}}\left(-\sqrt{z}\, c + p\sqrt{z} - 1\right)}{(p-c)^2} + \frac{\sqrt{z}}{c+p} - \frac{1}{(-c-p)^2}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(i^{-m} \left(\frac{2\, i\, e^{(c+p)\sqrt{z} - i b (2k-m) z}}{b(2k-m)} + \frac{(-1)^m\, 2\, i\, e^{\sqrt{z}\,(p-c) + b\, i (2k-m) z}}{b(2k-m)} - \frac{e^{-\frac{i (c+p)^2}{4b(2k-m)}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+p-2\, i\, b(2k-m)\sqrt{z}}{2\sqrt{-i\, b(2k-m)}}\right)}{(-i\, b(2k-m))^{3/2}} + \frac{c\, e^{-\frac{i (c+p)^2}{4b(2k-m)}}\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c-p+2\, b\, i(2k-m)\sqrt{z}}{2\sqrt{-i\, b(2k-m)}}\right)}{(-i\, b(2k-m))^{3/2}} - \frac{(-1)^m\, c\, e^{\frac{i (p-c)^2}{4b(2k-m)}}\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+p+2\, b\, i(2k-m)\sqrt{z}}{2\sqrt{i\, b(2k-m)}}\right)}{(i\, b(2k-m))^{3/2}} + \frac{(-1)^m\, e^{\frac{i (p-c)^2}{4b(2k-m)}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+p+2\, b\, i(2k-m)\sqrt{z}}{2\sqrt{i\, b(2k-m)}}\right)}{(i\, b(2k-m))^{3/2}} \right) + i^m \left(\frac{2\, i\, e^{(c+p)\sqrt{z} - i b (m-2k) z}}{b(m-2k)} + \frac{(-1)^m\, 2\, i\, e^{\sqrt{z}\,(p-c) + b\, i (m-2k) z}}{b(m-2k)} - \frac{e^{-\frac{i (c+p)^2}{4b(m-2k)}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{c+p-2\, i\, b(m-2k)\sqrt{z}}{2\sqrt{-i\, b(m-2k)}}\right)}{(-i\, b(m-2k))^{3/2}} + \frac{c\, e^{-\frac{i (c+p)^2}{4b(m-2k)}}\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c-p+2\, b\, i(m-2k)\sqrt{z}}{2\sqrt{-i\, b(m-2k)}}\right)}{(-i\, b(m-2k))^{3/2}} - \frac{(-1)^m\, c\, e^{\frac{i (p-c)^2}{4b(m-2k)}}\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+p+2\, b\, i(m-2k)\sqrt{z}}{2\sqrt{i\, b(m-2k)}}\right)}{(i\, b(m-2k))^{3/2}} + \frac{(-1)^m\, e^{\frac{i (p-c)^2}{4b(m-2k)}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-c+p+2\, b\, i(m-2k)\sqrt{z}}{2\sqrt{i\, b(m-2k)}}\right)}{(i\, b(m-2k))^{3/2}} \right) \right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m\left(b z^r\right) \sinh\left(c z^r\right)$

01.19.21.1226.01

$$\int e^{p z} \sin^m(b z^2) \sinh(c z^2) \, dz = 2^{-m-2} \left(\frac{e^{-\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p+2cz}{2\sqrt{c}}\right)}{\sqrt{c}} - \frac{e^{\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p-2cz}{2\sqrt{-c}}\right)}{\sqrt{-c}} \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(\frac{1}{-c + 2 i b k - i b m} \left((-1)^{3/4} e^{\frac{i m \pi}{2} - \frac{i p^2}{4(-i c - 2 b k + b m)}} \sqrt{-i c - 2 b k + b m} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} (p - 2 c z + 4 i b k z - 2 i b m z)}{2\sqrt{-i c - 2 b k + b m}} \right) \right) + \right.$$

$$\frac{1}{-c - 2 i b k + i b m} \left(\sqrt[4]{-1} e^{\frac{i p^2}{4(i c - 2 b k + b m)} - \frac{i m \pi}{2}} \sqrt{i c - 2 b k + b m} \operatorname{erfi}\left(\frac{(-1)^{3/4} (p - 2 c z - 4 i b k z + 2 i b m z)}{2\sqrt{i c - 2 b k + b m}} \right) \right) -$$

$$\frac{1}{c - 2 i b k + i b m} \left(\sqrt[4]{-1} e^{\frac{i p^2}{4(-i c - 2 b k + b m)} - \frac{i m \pi}{2}} \sqrt{-i c - 2 b k + b m} \operatorname{erfi}\left(\frac{(-1)^{3/4} (p + 2 c z - 4 i b k z + 2 i b m z)}{2\sqrt{-i c - 2 b k + b m}} \right) \right) -$$

$$\frac{1}{c + 2 i b k - i b m} \left. \left((-1)^{3/4} e^{\frac{i m \pi}{2} - \frac{i p^2}{4(i c - 2 b k + b m)}} \sqrt{i c - 2 b k + b m} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} (p + 2 c z + 4 i b k z - 2 i b m z)}{2\sqrt{i c - 2 b k + b m}} \right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.1227.01

$$\int e^{p z} \sin^m(b \sqrt{z}) \sinh(c \sqrt{z}) \, dz = 2^{-m-2} \left(-\frac{c e^{-\frac{c^2}{4p}} \sqrt{\pi} \operatorname{erfi}\left(\frac{2p\sqrt{z} - c}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{4 e^{p z} \sinh(c\sqrt{z})}{p} - \frac{c e^{-\frac{c^2}{4p}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c + 2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) +$$

$$2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{8 e^{p z} \cos\left(\frac{m\pi}{2} - b(m - 2s)\sqrt{z}\right) \sinh(c\sqrt{z})}{p} + \frac{1}{p^{3/2}} i^{-m} \sqrt{\pi} \right.$$

$$\left(e^{-\frac{(c + b i (m-2s))^2}{4p}} (-i c + b(m - 2s)) \operatorname{erf}\left(\frac{-i c + b(m - 2s) - 2 i p \sqrt{z}}{2\sqrt{p}} \right) + (-1)^m e^{-\frac{(c + b i (m-2s))^2}{4p}} (i c - b m + 2 b s) \operatorname{erf}\left(\right. \right.$$

$$\left. \frac{-i c + b(m - 2s) + 2 i p \sqrt{z}}{2\sqrt{p}} \right) - (-1)^m e^{\frac{(i c + b(m-2s))^2}{4p}} (c - i b(m - 2s)) \operatorname{erfi}\left(\frac{c - i b(m - 2s) + 2p\sqrt{z}}{2\sqrt{p}} \right) -$$

$$\left. \left. e^{\frac{(i c + b(m-2s))^2}{4p}} (c - i b(m - 2s)) \operatorname{erfi}\left(\frac{-c + b i (m - 2s) + 2p\sqrt{z}}{2\sqrt{p}} \right) \right) \right) /; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z^r) \sinh(c z^r)$

01.19.21.1228.01

$$\int e^{p z^r} \sin^m(b z^r) \sinh(c z^r)\, dz = \frac{2^{-m-1} z (1 - m \bmod 2)}{r} \binom{m}{\frac{m}{2}} \left(((c-p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c-p) z^r\right) - ((-c-p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-c-p) z^r\right) \right) + \frac{2^{-m-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{i m \pi}{2}}\, \Gamma\left(\frac{1}{r}, (-c - 2 i b k + i b m - p) z^r\right) ((-c - 2 i b k + i b m - p) z^r)^{-1/r} + e^{\frac{i m \pi}{2}} ((c - 2 i b k + i b m - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c - 2 i b k + i b m - p) z^r\right) - e^{-\frac{1}{2} i m \pi} ((-c + 2 i b k - i b m - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-c + 2 i b k - i b m - p) z^r\right) + e^{-\frac{1}{2} i m \pi} ((c + 2 i b k - i b m - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c + 2 i b k - i b m - p) z^r\right) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1229.01

$$\int e^{p z^2} \sin^m(b z^2) \sinh(c z^2)\, dz = \frac{2^{-m-2} \sqrt{\pi}\, (1 - m \bmod 2)}{(p-c)(c+p)} \binom{m}{\frac{m}{2}} \left((p-c) \sqrt{c+p}\, \operatorname{erfi}\left(\sqrt{c+p}\, z\right) - \sqrt{p-c}\, (c+p) \operatorname{erfi}\left(\sqrt{p-c}\, z\right) \right) + 2^{-m-2} i \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(e^{\frac{1}{2} i (m-1) \pi} \sqrt{c + b i (2k - m) + p}\, (-c - i b (2k - m) + p) \operatorname{erfi}\left(\sqrt{c + b i (2k - m) + p}\, z\right) + e^{-\frac{1}{2} i (m-1) \pi} (c + b i (2k - m) + p) \sqrt{-c - i b (2k - m) + p}\, \operatorname{erfi}\left(\sqrt{-c - i b (2k - m) + p}\, z\right) \right) \Big/ ((-c - i b (2k - m) + p)(c + b i (2k - m) + p)) + \left(e^{-\frac{1}{2} i (m+1) \pi} \sqrt{c + b i (m - 2k) + p}\, (-c - i b (m - 2k) + p) \operatorname{erfi}\left(\sqrt{c + b i (m - 2k) + p}\, z\right) + e^{\frac{1}{2} i (m+1) \pi} (c + b i (m - 2k) + p) \sqrt{-c - i b (m - 2k) + p}\, \operatorname{erfi}\left(\sqrt{-c - i b (m - 2k) + p}\, z\right) \right) \Big/ ((-c - i b (m - 2k) + p)(c + b i (m - 2k) + p)) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1230.01

$$\int e^{p\sqrt{z}}\sin^m\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = 2^{-m}\,e^{\frac{i\pi}{2}+(p-c)\sqrt{z}}\,i\left(\frac{e^{2\left(c\sqrt{z}-\frac{i\pi}{2}\right)}\left(\sqrt{z}\,c+p\sqrt{z}-1\right)}{(c+p)^2}+\frac{\sqrt{z}}{p-c}-\frac{1}{(c-p)^2}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)+$$
$$2^{-m}\,i\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{\frac{1}{2}i\pi(m+1)+(-c+p-ib(m-2s))\sqrt{z}}\left(\frac{e^{2\left((c+bi(m-2s))\sqrt{z}-\frac{1}{2}i(m+1)\pi\right)}\left(\sqrt{z}\,p+(c+bi(m-2s))\sqrt{z}-1\right)}{(c+p+bi(m-2s))^2}+\right.\right.$$
$$\left.\frac{\sqrt{z}}{-c+p-ib(m-2s)}-\frac{1}{(c-p+bi(m-2s))^2}\right)+$$
$$e^{(c+p-ib(m-2s))\sqrt{z}-\frac{1}{2}i(1-m)\pi}\left(\frac{e^{2\left(\frac{1}{2}i\pi(1-m)+(ib(m-2s)-c)\sqrt{z}\right)}\left(\sqrt{z}\,p+(ib(m-2s)-c)\sqrt{z}-1\right)}{(-c+p+bi(m-2s))^2}+\right.$$
$$\left.\left.\frac{\sqrt{z}}{c+p-ib(m-2s)}-\frac{1}{(-c-p+bi(m-2s))^2}\right)\right)\;/;\;m\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sin^m(a z^r+q)\sinh(c z^r+g)$

01.19.21.1231.01

$$\int e^{b z^r+e}\sin^m(a z^r+q)\sinh(c z^r+g)\,dz = \frac{z\,2^{-m-1}}{r}\binom{m}{\frac{m}{2}}\left(e^{e-g}\left((c-b)z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(c-b)z^r\right)-e^{e+g}\left((-b-c)z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b-c)z^r\right)\right)(1-m\bmod 2)+$$
$$\frac{2^{-m-1}z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(-e^{e+g+2ikq-imq+\frac{im\pi}{2}}\,\Gamma\left(\frac{1}{r},(-b-c-2iak+iam)z^r\right)\left((-b-c-2iak+iam)z^r\right)^{-1/r}+\right.$$
$$e^{e-g+2ikq-imq+\frac{im\pi}{2}}\left((-b+c-2iak+iam)z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b+c-2iak+iam)z^r\right)-$$
$$e^{e+g-2ikq+imq-\frac{im\pi}{2}}\left((-b-c+2iak-iam)z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b-c+2iak-iam)z^r\right)+$$
$$\left.e^{e-g-2ikq+imq-\frac{im\pi}{2}}\left((-b+c+2iak-iam)z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b+c+2iak-iam)z^r\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1232.01

$$\int e^{b z^2+e} \sin^m(a z^2+q) \sinh(c z^2+g)\, dz = -2^{-m-2} e^{e-g} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(\frac{\operatorname{erfi}(\sqrt{b-c}\, z)}{\sqrt{b-c}} - \frac{e^{2g} \operatorname{erfi}(\sqrt{b+c}\, z)}{\sqrt{b+c}} \right) (1 - m \bmod 2) - 2^{-m-2} i^{-m} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k} \left(e^{e-g+i(m-2k)q} \left(\frac{\operatorname{erfi}(\sqrt{b-c+a i (m-2k)}\, z)}{\sqrt{b-c+a i (m-2k)}} + \frac{(-1)^{m-1} e^{2(g-i(m-2k)q)} \operatorname{erfi}(\sqrt{b+c-i a (m-2k)}\, z)}{\sqrt{b+c-i a (m-2k)}} \right) + e^{e-g-i(m-2k)q} \left(\frac{(-1)^m \operatorname{erfi}(\sqrt{b-c-i a (m-2k)}\, z)}{\sqrt{b-c-i a (m-2k)}} - \frac{e^{2(g+i(m-2k)q)} \operatorname{erfi}(\sqrt{b+c+a i (m-2k)}\, z)}{\sqrt{b+c+a i (m-2k)}} \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.1233.01

$$\int e^{\sqrt{z}\, b+e} \sin^m(\sqrt{z}\, a+q) \sinh(\sqrt{z}\, c+g)\, dz = 2^{-m} \left(\frac{e^{\sqrt{z}\,(b+c)+e+g} (\sqrt{z}\, b + c\sqrt{z} - 1)}{(b+c)^2} - \frac{e^{\sqrt{z}\,(b-c)+e-g} (\sqrt{z}\, b - c\sqrt{z} - 1)}{(c-b)^2} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \left(-\frac{i^{-m} \left(e^{e-g+i(m-2k)q+(b-c+a i (m-2k))\sqrt{z}} (\sqrt{z}\, b - (c - i a (m-2k))\sqrt{z} - 1) \right)}{(-b+c-i a (m-2k))^2} + \frac{i^m \left(e^{e+g-i(m-2k)q+(b+c-i a (m-2k))\sqrt{z}} (\sqrt{z}\, b + (c - i a (m-2k))\sqrt{z} - 1) \right)}{(b+c-i a (m-2k))^2} - \frac{i^m \left(e^{e-g-i(m-2k)q+(b-c-i a (m-2k))\sqrt{z}} (\sqrt{z}\, b - (c + a i (m-2k))\sqrt{z} - 1) \right)}{(-b+c+a i (m-2k))^2} + \frac{i^{-m} \left(e^{e+g+i(m-2k)q+(b+c+a i (m-2k))\sqrt{z}} (\sqrt{z}\, b + (c + a i (m-2k))\sqrt{z} - 1) \right)}{(b+c+a i (m-2k))^2} \right) \binom{m}{k} /; m \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sin^m(a z^r+p z+q) \sinh(c z^r+f z+g)$

01.19.21.1234.01

$$\int e^{b z^2+d z+e} \sin^m(a z^2 + p z + q) \sinh(c z^2 + f z + g)\, dz = 2^{-m-2} \left(\frac{e^{e+g-\frac{d^2+2 f d+f^2}{4(b+c)}} \operatorname{erfi}\left(\frac{d+f+2 b z+2 c z}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} - \frac{e^{e-g-\frac{d^2-2 f d+f^2}{4(b-c)}} \operatorname{erfi}\left(\frac{d-f+2 b z-2 c z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}} \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{b-c-2 i a k+i a m} \left(\sqrt[4]{-1}\, e^{\frac{1}{2}(2 e-2 g-4 i k q+2 i m q-i m \pi)-\frac{i\left(-d^2+2 f d+4 i k p d-2 i m p d-f^2+4 k^2 p^2+m^2 p^2-4 k m p^2-4 i f k p+2 i f m p\right)}{4(-i b+i c-2 a k+a m)}} \sqrt{-i b+i c-2 a k+a m}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (d-f-2 i k p+i m p+2 b z-2 c z-4 i a k z+2 i a m z)}{2\sqrt{-i b+i c-2 a k+a m}}\right)\right) + \frac{1}{b-c+2 i a k-i a m} \left((-1)^{3/4} e^{\frac{i\left(-d^2+2 f d-4 i k p d+2 i m p d-f^2+4 k^2 p^2+m^2 p^2-4 k m p^2+4 i f k p-2 i f m p\right)}{4(i b-i c-2 a k+a m)}+\frac{1}{2}(2 e-2 g+4 i k q-2 i m q+i m \pi)} \sqrt{i b-i c-2 a k+a m}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d-f+2 i k p-i m p+2 b z-2 c z+4 i a k z-2 i a m z)}{2\sqrt{i b-i c-2 a k+a m}}\right)\right) - \frac{1}{b+c-2 i a k+i a m} \left(\sqrt[4]{-1}\, e^{\frac{1}{2}(2 e+2 g-4 i k q+2 i m q-i m \pi)-\frac{i\left(-d^2-2 f d+4 i k p d-2 i m p d-f^2+4 k^2 p^2+m^2 p^2-4 k m p^2+4 i f k p-2 i f m p\right)}{4(-i b-i c-2 a k+a m)}} \sqrt{-i b-i c-2 a k+a m}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (d+f-2 i k p+i m p+2 b z+2 c z-4 i a k z+2 i a m z)}{2\sqrt{-i b-i c-2 a k+a m}}\right)\right) - \frac{1}{b+c+2 i a k-i a m} \left((-1)^{3/4} e^{\frac{i\left(-d^2-2 f d-4 i k p d+2 i m p d-f^2+4 k^2 p^2+m^2 p^2-4 k m p^2-4 i f k p+2 i f m p\right)}{4(i b+i c-2 a k+a m)}+\frac{1}{2}(2 e+2 g+4 i k q-2 i m q+i m \pi)} \sqrt{i b+i c-2 a k+a m}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d+f+2 i k p-i m p+2 b z+2 c z+4 i a k z-2 i a m z)}{2\sqrt{i b+i c-2 a k+a m}}\right)\right)\right) /;\ m \in \mathbb{N}^+$$

01.19.21.1235.01

$$\int e^{b\sqrt{z}+d z+e} \sin^m(a\sqrt{z} + p z + q) \sinh(c\sqrt{z} + f z + g)\, dz = 2^{-m-1} \binom{m}{\frac{m}{2}} \left(\frac{(b-c)\, e^{-\frac{b^2-2 c b+c^2-4(d-f)(e-g)}{4(d-f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-c+2(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{2(d-f)^{3/2}} - \frac{(b+c)\, e^{-\frac{b^2+2 c b+c^2-4(d+f)(e+g)}{4(d+f)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{2(d+f)^{3/2}} - \frac{e^{\sqrt{z}\,(b-c)+e-g+(d-f) z}}{d-f} + \frac{e^{\sqrt{z}\,(b+c)+e+g+(d+f) z}}{d+f} \right) (1 - m \bmod 2) + 2^{-m-1}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{\sqrt{\pi}}{2} e^{e-g-2 i k q-\frac{1}{2} i m (\pi-2 q)} \left(\frac{1}{(d-f+i (2 k-m) p)^{3/2}} e^{-\frac{(b-c+a i (2 k-m))^2}{4 (d-f+i (2 k-m) p)}+4 i k q+i m (\pi-2 q)} (b-c+a i (2 k-m)) \right.\right.$$

$$\operatorname{erfi}\left(\frac{b-c+2 i a k-i a m+2 d \sqrt{z}-2 f \sqrt{z}+4 i k p \sqrt{z}-2 i m p \sqrt{z}}{2 \sqrt{d-f+i (2 k-m) p}} \right) + e^{-\frac{(b-c-2 i a k+i a m)^2}{4 (d-f-2 i k p+i m p)}}$$

$$(b-c-2 i a k+i a m) \operatorname{erfi}\left(\frac{b-c-2 i a k+i a m+2 d \sqrt{z}-2 f \sqrt{z}-4 i k p \sqrt{z}+2 i m p \sqrt{z}}{2 \sqrt{d-f-2 i k p+i m p}} \right) \Big/$$

$$\left. (d-f-2 i k p+i m p)^{3/2} \right) + \frac{\sqrt{\pi}}{2} e^{e+g-\frac{1}{2} i (-2 q m+\pi m+4 k q)} \left(i e^{-\frac{(b+c-2 i a k+i a m)^2}{4 (d+f-2 i k p+i m p)}} (i b+i c+2 a k-a m) \right.$$

$$\operatorname{erfi}\left(\frac{b+c-2 i a k+i a m+2 d \sqrt{z}+2 f \sqrt{z}-4 i k p \sqrt{z}+2 i m p \sqrt{z}}{2 \sqrt{d+f-2 i k p+i m p}} \right) \Big/ (d+f-2 i k p+i m p)^{3/2} -$$

$$e^{-\frac{(b+c+a i (2 k-m))^2}{4 (d+f+i (2 k-m) p)}+4 i k q+i m (\pi-2 q)} (b+c+a i (2 k-m))$$

$$\operatorname{erfi}\left(\frac{b+c+2 i a k-i a m+2 d \sqrt{z}+2 f \sqrt{z}+4 i k p \sqrt{z}-2 i m p \sqrt{z}}{2 \sqrt{d+f+i (2 k-m) p}} \right) \Big/$$

$$\left. (d+f+2 i k p-i m p)^{3/2} \right) - \frac{e^{\sqrt{z} (b-c-2 i a k+i a m)+\frac{1}{2} (2 e-2 g-4 i k q+2 i m q-i m \pi)+(d-f-2 i k p+i m p) z}}{d-f-2 i k p+i m p} +$$

$$\frac{e^{\sqrt{z} (b+c-2 i a k+i a m)+\frac{1}{2} (2 e+2 g-4 i k q+2 i m q-i m \pi)+(d+f-2 i k p+i m p) z}}{d+f-2 i k p+i m p} -$$

$$\frac{e^{\sqrt{z} (b-c+2 i a k-i a m)+\frac{1}{2} (2 e-2 g+4 i k q-2 i m q+i m \pi)+(d-f+2 i k p-i m p) z}}{d-f+2 i k p-i m p} +$$

$$\left. \frac{e^{\sqrt{z} (b+c+2 i a k-i a m)+\frac{1}{2} (2 e+2 g+4 i k q-2 i m q+i m \pi)+(d+f+2 i k p-i m p) z}}{d+f+2 i k p-i m p} \right) /; m \in \mathbb{N}^+$$

Involving powers of sin and rational functions of exp

Involving $\sin^m(e z) \sinh(c z) \left(a + b e^{d z}\right)^{-n}$

01.19.21.1236.01

$$\int \frac{\sin^m(e z)\sinh(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = 2^{-m-1}\, i \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(\frac{1}{-c+2 i e k-i e m}\left(i\left(e^{(c-2 i e k+i e m) z}\, {}_2F_1\left(\frac{c-2 i e k+i e m}{d}, n; \frac{c+d-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\right)+ e^{(-c+2 i e k-i e m) z}\, {}_2F_1\left(\frac{-c+2 i e k-i e m}{d}, n; \frac{-c+d+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\right)\right)\cos\left(\frac{m\pi}{2}\right)\right)+ \frac{1}{c+2 i e k-i e m}\left(\sin\left(\frac{m\pi}{2}\right)\left(e^{(c+2 i e k-i e m) z}\, {}_2F_1\left(\frac{c+2 i e k-i e m}{d}, n; \frac{c+d+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\right)- e^{(-c-2 i e k+i e m) z}\, {}_2F_1\left(\frac{-c-2 i e k+i e m}{d}, n; \frac{-c+d-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\right)\right)\right)- \frac{1}{-c+2 i e k-i e m}\left(\sin\left(\frac{m\pi}{2}\right)\left(e^{(-c+2 i e k-i e m) z}\, {}_2F_1\left(\frac{-c+2 i e k-i e m}{d}, n; \frac{-c+d+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\right)- e^{(c-2 i e k+i e m) z}\, {}_2F_1\left(\frac{c-2 i e k+i e m}{d}, n; \frac{c+d-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\right)\right)\right)- \frac{1}{c+2 i e k-i e m}\left(i\left(e^{(-c-2 i e k+i e m) z}\, {}_2F_1\left(\frac{-c-2 i e k+i e m}{d}, n; \frac{-c+d-2 i e k+i e m}{d}; -\frac{b e^{d z}}{a}\right)+ e^{(c+2 i e k-i e m) z}\, {}_2F_1\left(\frac{c+2 i e k-i e m}{d}, n; \frac{c+d+2 i e k-i e m}{d}; -\frac{b e^{d z}}{a}\right)\right)\cos\left(\frac{m\pi}{2}\right)\right)\right)\right) a^{-n} + \frac{2^{-m-1} a^{-n} e^{-c z} (1-m \bmod 2)}{c}\binom{m}{\frac{m}{2}}\left(e^{2 c z}\, {}_2F_1\left(\frac{c}{d}, n; \frac{c+d}{d}; -\frac{b e^{d z}}{a}\right)+ {}_2F_1\left(-\frac{c}{d}, n; 1-\frac{c}{d}; -\frac{b e^{d z}}{a}\right)\right) /; n \in \mathbb{N}^+ \land m \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(e z) \sinh(c z) \left(a+b\, e^{d z}\right)^{-n}$

01.19.21.1237.01

$$\begin{aligned}
&\int \frac{e^{p z} \sin^m(e z) \sinh(c z)}{(a + b e^{d z})^n} \, dz = \\
&2^{-m-1} i \Bigg(\sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k} \Bigg(\Bigg(\Bigg(i \Bigg(e^{(c-2iek+iem+p)z} (-c+2iek-iem+p)\, {}_2F_1\Big(\frac{c-2iek+iem+p}{d}, n; \\
&\quad \frac{c+d-2iek+iem+p}{d}; -\frac{b e^{dz}}{a}\Big) + e^{(-c+2iek-iem+p)z} (-c+2iek-iem-p)\, {}_2F_1 \\
&\quad \Big(\frac{-c+2iek-iem+p}{d}, n; \frac{-c+d+2iek-iem+p}{d}; -\frac{b e^{dz}}{a}\Big)\Bigg) \cos\Big(\frac{m\pi}{2}\Big)\Bigg) \Big/ \\
&\quad ((-c+2iek-iem-p)(-c+2iek-iem+p)) + \Bigg(\sin\Big(\frac{m\pi}{2}\Big) \Bigg(e^{(c+2iek-iem+p)z} (c+2iek-iem-p) \\
&\quad {}_2F_1\Big(\frac{c+2iek-iem+p}{d}, n; \frac{c+d+2iek-iem+p}{d}; -\frac{b e^{dz}}{a}\Big) - e^{(-c-2iek+iem+p)z} \\
&\quad (c+2iek-iem+p)\, {}_2F_1\Big(\frac{-c-2iek+iem+p}{d}, n; \frac{-c+d-2iek+iem+p}{d}; -\frac{b e^{dz}}{a}\Big)\Bigg)\Bigg) \Big/ \\
&\quad ((c+2iek-iem-p)(c+2iek-iem+p)) - \Bigg(\sin\Big(\frac{m\pi}{2}\Big) \Bigg(e^{(-c+2iek-iem+p)z} (-c+2iek-iem-p) \\
&\quad {}_2F_1\Big(\frac{-c+2iek-iem+p}{d}, n; \frac{-c+d+2iek-iem+p}{d}; -\frac{b e^{dz}}{a}\Big) - e^{(c-2iek+iem+p)z} \\
&\quad (-c+2iek-iem+p)\, {}_2F_1\Big(\frac{c-2iek+iem+p}{d}, n; \frac{c+d-2iek+iem+p}{d}; -\frac{b e^{dz}}{a}\Big)\Bigg)\Bigg) \Big/ \\
&\quad ((-c+2iek-iem-p)(-c+2iek-iem+p)) - \Bigg(i \Bigg(e^{(-c-2iek+iem+p)z} (c+2iek-iem+p) \\
&\quad {}_2F_1\Big(\frac{-c-2iek+iem+p}{d}, n; \frac{-c+d-2iek+iem+p}{d}; -\frac{b e^{dz}}{a}\Big) + e^{(c+2iek-iem+p)z} \\
&\quad (c+2iek-iem-p)\, {}_2F_1\Big(\frac{c+2iek-iem+p}{d}, n; \frac{c+d+2iek-iem+p}{d}; -\frac{b e^{dz}}{a}\Big)\Bigg) \\
&\quad \cos\Big(\frac{m\pi}{2}\Big)\Bigg) \Big/ ((c+2iek-iem-p)(c+2iek-iem+p))\Bigg)\Bigg) a^{-n} - \\
&\frac{1}{(c-p)(c+p)} \Bigg(2^{-m-1} a^{-n} \binom{m}{\frac{m}{2}} \Bigg(e^{(p-c)z} (c+p)\, {}_2F_1\Big(\frac{p-c}{d}, n; \frac{-c+d+p}{d}; -\frac{b e^{dz}}{a}\Big) + \\
&\quad e^{(c+p)z} (c-p)\, {}_2F_1\Big(\frac{c+p}{d}, n; \frac{c+d+p}{d}; -\frac{b e^{dz}}{a}\Big)\Bigg) (m \bmod 2 - 1)\Bigg) /; n \in \mathbb{N}^+ \land m \in \mathbb{N}^+
\end{aligned}$$

Involving powers of sin and algebraic functions of exp

Involving $\left(a+b\,e^{d z}\right)^{\beta}\sin^{m}(e\,z)\sinh(c\,z)$

01.19.21.1238.01

$$\int \left(a+b\,e^{d z}\right)^{\beta}\sin^{m}(e\,z)\sinh(c\,z)\,dz = 2^{-m-1}\left(a+b\,e^{d z}\right)^{\beta} i \left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k}\binom{m}{k}\left(\frac{1}{-c+2\,i\,e\,k-i\,e\,m}\left(i\left(e^{(c-2\,i\,e\,k+i\,e\,m)z}\,{}_2F_1\left(\frac{c-2\,i\,e\,k+i\,e\,m}{d},-\beta;\frac{c+d-2\,i\,e\,k+i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)+ e^{(-c+2\,i\,e\,k-i\,e\,m)z}\,{}_2F_1\left(\frac{-c+2\,i\,e\,k-i\,e\,m}{d},-\beta;\frac{-c+d+2\,i\,e\,k-i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)\right)\cos\left(\frac{m\,\pi}{2}\right)\right)+ \frac{1}{c+2\,i\,e\,k-i\,e\,m}\left(\sin\left(\frac{m\,\pi}{2}\right)\left(e^{(c+2\,i\,e\,k-i\,e\,m)z}\,{}_2F_1\left(\frac{c+2\,i\,e\,k-i\,e\,m}{d},-\beta;\frac{c+d+2\,i\,e\,k-i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)- e^{(-c-2\,i\,e\,k+i\,e\,m)z}\,{}_2F_1\left(\frac{-c-2\,i\,e\,k+i\,e\,m}{d},-\beta;\frac{-c+d-2\,i\,e\,k+i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)- \frac{1}{-c+2\,i\,e\,k-i\,e\,m}\left(\sin\left(\frac{m\,\pi}{2}\right)\left(e^{(-c+2\,i\,e\,k-i\,e\,m)z}\,{}_2F_1\left(\frac{-c+2\,i\,e\,k-i\,e\,m}{d},-\beta;\frac{-c+d+2\,i\,e\,k-i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)- e^{(c-2\,i\,e\,k+i\,e\,m)z}\,{}_2F_1\left(\frac{c-2\,i\,e\,k+i\,e\,m}{d},-\beta;\frac{c+d-2\,i\,e\,k+i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)- \frac{1}{c+2\,i\,e\,k-i\,e\,m}\left(i\left(e^{(-c-2\,i\,e\,k+i\,e\,m)z}\,{}_2F_1\left(\frac{-c-2\,i\,e\,k+i\,e\,m}{d},-\beta;\frac{-c+d-2\,i\,e\,k+i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)+ e^{(c+2\,i\,e\,k-i\,e\,m)z}\,{}_2F_1\left(\frac{c+2\,i\,e\,k-i\,e\,m}{d},-\beta;\frac{c+d+2\,i\,e\,k-i\,e\,m}{d};-\frac{b\,e^{d z}}{a}\right)\right)\cos\left(\frac{m\,\pi}{2}\right)\right)\right)+ \frac{2^{-m-1}}{c}\,e^{-c z}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\left(e^{2 c z}\,{}_2F_1\left(\frac{c}{d},-\beta;\frac{c+d}{d};-\frac{b\,e^{d z}}{a}\right)+{}_2F_1\left(-\frac{c}{d},-\beta;1-\frac{c}{d};-\frac{b\,e^{d z}}{a}\right)\right) (1-m \bmod 2)\;/;\; m\in\mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\sin^{m}(e\,z)\sinh(c\,z)$

01.19.21.1239.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^{\beta}\sin^m(e\,z)\sinh(c\,z)\,dz = 2^{-m-1}\left(a+b\,e^{dz}\right)^{\beta} i\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(\Bigg(\Bigg(i\Bigg(e^{(c-2iek+iem+p)z}(-c+2iek-iem+p)\,{}_2F_1\!\left(\frac{c-2iek+iem+p}{d},-\beta;\frac{c+d-2iek+iem+p}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(-c+2iek-iem+p)z}(-c+2iek-iem-p)\,{}_2F_1\!\left(\frac{-c+2iek-iem+p}{d},-\beta;\frac{-c+d+2iek-iem+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\cos\!\left(\frac{m\pi}{2}\right)\Bigg)\Bigg/\left((-c+2iek-iem-p)(-c+2iek-iem+p)\right)+\Bigg(\sin\!\left(\frac{m\pi}{2}\right)\Bigg(e^{(c+2iek-iem+p)z}(c+2iek-iem-p)\,{}_2F_1\!\left(\frac{c+2iek-iem+p}{d},-\beta;\frac{c+d+2iek-iem+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-c-2iek+iem+p)z}(c+2iek-iem+p)\,{}_2F_1\!\left(\frac{-c-2iek+iem+p}{d},-\beta;\frac{-c+d-2iek+iem+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg/\left((c+2iek-iem-p)(c+2iek-iem+p)\right)-\Bigg(\sin\!\left(\frac{m\pi}{2}\right)\Bigg(e^{(-c+2iek-iem+p)z}(-c+2iek-iem-p)\,{}_2F_1\!\left(\frac{-c+2iek-iem+p}{d},-\beta;\frac{-c+d+2iek-iem+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(c-2iek+iem+p)z}(-c+2iek-iem+p)\,{}_2F_1\!\left(\frac{c-2iek+iem+p}{d},-\beta;\frac{c+d-2iek+iem+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg/\left((-c+2iek-iem-p)(-c+2iek-iem+p)\right)-\Bigg(i\Bigg(e^{(-c-2iek+iem+p)z}(c+2iek-iem+p)\,{}_2F_1\!\left(\frac{-c-2iek+iem+p}{d},-\beta;\frac{-c+d-2iek+iem+p}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(c+2iek-iem+p)z}(c+2iek-iem-p)\,{}_2F_1\!\left(\frac{c+2iek-iem+p}{d},-\beta;\frac{c+d+2iek-iem+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\cos\!\left(\frac{m\pi}{2}\right)\Bigg)\Bigg/\left((c+2iek-iem-p)(c+2iek-iem+p)\right)\Bigg)+\frac{1}{(c-p)(c+p)}\left(2^{-m-1}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\left(e^{(p-c)z}(c+p)\,{}_2F_1\!\left(\frac{p-c}{d},-\beta;\frac{-c+d+p}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(c+p)z}(c-p)\,{}_2F_1\!\left(\frac{c+p}{d},-\beta;\frac{c+d+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)(1-m\bmod 2)\right)\;/;\;m\in\mathbb{N}^+$$

Involving products of sin and exp

Involving $e^{pz}\sin(a\,z)\sin(b\,z)\sinh(c\,z)$

01.19.21.1240.01

$$\int e^{p z} \sin(a z) \sin(b z) \sinh(c z) \, dz = -\frac{1}{4} e^{p z} \left(\frac{(c - i a + i b) \cos((a - b + i c) z) + i p \sin((a - b + i c) z)}{(a - b + i (c - p)) (a - b + i (c + p))} + \frac{i ((a + b + i c) \cos((a + b + i c) z) - p \sin((a + b + i c) z))}{(a + b + i (c - p)) (a + b + i (c + p))} + \frac{p \sinh((c + i a + i b) z) - i (a + b - i c) \cosh((c + i a + i b) z)}{(a + b - i (c - p)) (a + b - i (c + p))} + \frac{(c - i b + i a) \cosh((c - i b + i a) z) - p \sinh((c - i b + i a) z)}{a^2 - 2 (b + i c) a + b^2 - c^2 + p^2 + 2 i b c} \right)$$

Involving rational functions of sin and exp

Involving $\frac{e^{p z} \sinh(d z)}{a+b \sinh(c z)}$

01.19.21.1241.01

$$\int \frac{e^{p z} \sinh(c z)}{a + b \sin(d z)} \, dz = -\frac{i}{2 b \sqrt{a^2 - b^2}} \left(\frac{1}{c - i d - p} e^{(-c + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 1; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 1; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right)\right) + \frac{1}{c + i d + p} e^{(c + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + \left(\sqrt{a^2 - b^2} - a\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right)\right)\right)$$

Involving $e^{p z} (a + b \sin(d z))^{-n} \sinh(c z)$

01.19.21.1242.01

$$\int \frac{e^{p z} \sinh(c z)}{(a + b \sin(d z))^2} \, dz = \frac{i}{2 b \left(a^2 - b^2\right)^{3/2}} \left(\frac{1}{c + i d + p} e^{(c + i d + p) z} \left(-a \left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + a \left(a - \sqrt{a^2 - b^2}\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right) + \left(a^2 + \sqrt{a^2 - b^2} \, a - b^2\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + \left(-a^2 + \sqrt{a^2 - b^2} \, a + b^2\right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right) \right) - \frac{1}{-c + i d + p} e^{(-c + i d + p) z} \left(-a \left(a + \sqrt{a^2 - b^2}\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 1; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + a \left(a - \sqrt{a^2 - b^2}\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 1; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right) + \left(a^2 + \sqrt{a^2 - b^2} \, a - b^2\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 2; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a - \sqrt{a^2 - b^2}}\right) + \left(-a^2 + \sqrt{a^2 - b^2} \, a + b^2\right) {}_2F_1\left(\frac{d + i c - i p}{d}, 2; \frac{i (c - p)}{d} + 2; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}}\right) \right) \right)$$

Involving $\frac{e^{p z} \sinh(c z)}{a + b \sin^2(d z)}$

01.19.21.1243.01

$$\int \frac{e^{p z} \sinh(c z)}{a + b \sin^2(d z)} \, dz = -\frac{1}{2 \sqrt{a} \, b \sqrt{a+b}} \left(\frac{1}{c - 2 i d + p} e^{(c-2 i d+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{i (c+p)}{2 d} + 1, 1; \frac{i (c+p)}{2 d} + 2; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{i (c+p)}{2 d} + 1, 1; \frac{i (c+p)}{2 d} + 2; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) - \frac{1}{-c - 2 i d + p} e^{(-c-2 i d+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(-\frac{i (c + 2 i d - p)}{2 d}, 1; -\frac{i (c + 4 i d - p)}{2 d}; \frac{b e^{-2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(-\frac{i (c + 2 i d - p)}{2 d}, 1; -\frac{i (c + 4 i d - p)}{2 d}; \frac{b e^{-2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right)$$

01.19.21.1244.01

$$\int \frac{e^{p z} \sinh(c z)}{b \sinh^2(c z) + a} \, dz = \frac{1}{2 \sqrt{a} \sqrt{a-b} \, b} \left(\frac{1}{p - c} \left(e^{(p-c) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{c+p}{2 c}, 1; 2 - \frac{c+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b} \right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{c+p}{2 c}, 1; 2 - \frac{c+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{p - 3 c} \left(e^{(p-3 c) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(\frac{3 c - p}{2 c}, 1; \frac{5 c - p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b} \right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(\frac{3 c - p}{2 c}, 1; \frac{5 c - p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $e^{p z} \left(a + b \sin^2(d z)\right)^{-n} \sinh(c z)$

01.19.21.1245.01

$$\int \frac{e^{p z} \sinh(c z)}{\left(a+b \sin^2(d z)\right)^2} \, dz = -\frac{1}{4 a^{3/2} b (a+b)^{3/2}} \left(\frac{1}{c+2 i d+p} e^{(c+2 i d+p) z} \right.$$
$$\left((2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\!\left(1-\frac{i(c+p)}{2d}, 1; 2-\frac{i(c+p)}{2d}; \frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right) + \right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\!\left(1-\frac{i(c+p)}{2d}, 1; 2-\frac{i(c+p)}{2d}; \frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right) + 2\sqrt{a}$$
$$\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right) {}_2F_1\!\left(1-\frac{i(c+p)}{2d}, 2; 2-\frac{i(c+p)}{2d}; \frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right) - \right.$$
$$\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right)$$
$$\left.\left.\left. {}_2F_1\!\left(1-\frac{i(c+p)}{2d}, 2; 2-\frac{i(c+p)}{2d}; \frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right) - \frac{1}{-c+2 i d+p} e^{(-c+2 i d+p) z}$$
$$\left((2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right) {}_2F_1\!\left(\frac{i(c-p)}{2d}+1, 1; \frac{i(c-p)}{2d}+2; \frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right) + \right.$$
$$(2a+b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right) {}_2F_1\!\left(\frac{i(c-p)}{2d}+1, 1; \frac{i(c-p)}{2d}+2; \frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right) + 2\sqrt{a}$$
$$\left(\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right) {}_2F_1\!\left(\frac{i(c-p)}{2d}+1, 2; \frac{i(c-p)}{2d}+2; \frac{b e^{2 i d z}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right) - \right.$$
$$\left(2a^{3/2}+2\sqrt{a+b}\,a+2b\sqrt{a}+b\sqrt{a+b}\right)$$
$$\left.\left.\left.\left. {}_2F_1\!\left(\frac{i(c-p)}{2d}+1, 2; \frac{i(c-p)}{2d}+2; \frac{b e^{2 i d z}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\right)\right)\right)$$

01.19.21.1246.01

$$\int \frac{e^{p z} \sin(e z) \sinh(c z)}{a + b \sin(d z)} \, dz = \frac{1}{4 b \sqrt{a^2 - b^2}} \left(\frac{1}{-c + i d + i e + p} \left(e^{(-c + i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(-c + i d + i e + p)}{d}, 1; 2 - \frac{i(-c + i e + p)}{d}; -\frac{i b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i(-c + i d + i e + p)}{d}, 1; 2 - \frac{i(-c + i e + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \frac{1}{c + i d + i e + p} \left(e^{(c + i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(c + i d + i e + p)}{d}, 1; 2 - \frac{i(c + i e + p)}{d}; -\frac{i b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i(c + i d + i e + p)}{d}, 1; 2 - \frac{i(c + i e + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{c - i e + i d + p} \left(e^{(c - i e + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(c - i e + i d + p)}{d}, 1; 2 - \frac{i(c - i e + p)}{d}; -\frac{i b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i(c - i e + i d + p)}{d}, 1; 2 - \frac{i(c - i e + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \frac{1}{-c - i e + i d + p} \left(e^{(-c - i e + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(-c - i e + i d + p)}{d}, 1; \frac{i(c + i e - p)}{d} + 2; -\frac{i b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i(-c - i e + i d + p)}{d}, 1; \frac{i(c + i e - p)}{d} + 2; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right)$$

Involving $e^{p z} \sin(e z) \sinh(c z) (a + b \sin(d z))^{-n}$

01.19.21.1247.01

$$\int \frac{e^{p z} \sin(e z) \sinh(c z)}{(a + b \sin(d z))^2} \, dz = \frac{1}{4} \left(\left(e^{(c + i d + i e + p) z} \left(-a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(c + i d + i e + p)}{d}, 1; 2 - \frac{i(c + i e + p)}{d}; -\frac{i b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(a - \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i(c + i d + i e + p)}{d}, 1; 2 - \frac{i(c + i e + p)}{d}; \frac{i b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) + \left(a^2 + \sqrt{a^2 - b^2} \, a - b^2 \right) \right.\right.\right.$$

$$ {}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(c+i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right) $$

$$ \left.\left.\left.{}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(c+i\,e+p)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(c+i\,d+i\,e+p)\right)+ $$

$$ \left(e^{(-c-i\,e+i\,d+p)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d},1;2-\frac{i\,(-c-i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right. $$

$$ a\left(a-\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d},1;2-\frac{i\,(-c-i\,e+p)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+ $$

$$ \left(a^2+\sqrt{a^2-b^2}\,a-b^2\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(-c-i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+ $$

$$ \left.\left.\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(-c-i\,e+p)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\Big/ $$

$$ \left(b\left(a^2-b^2\right)^{3/2}(-c-i\,e+i\,d+p)\right)-\left(e^{(-c+i\,d+i\,e+p)\,z}\right. $$

$$ \left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},1;2-\frac{i\,(-c+i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+a\left(a-\sqrt{a^2-b^2}\right)\right. $$

$$ {}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},1;2-\frac{i\,(-c+i\,e+p)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,a-b^2\right) $$

$$ {}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(-c+i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\left(-a^2+\sqrt{a^2-b^2}\,a+b^2\right){}_2F_1 $$

$$ \left.\left.\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(-c+i\,e+p)}{d};\frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(-c+i\,d+i\,e+p)\right)- $$

$$ \left(e^{(c-i\,e+i\,d+p)\,z}\left(-a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},1;2-\frac{i\,(c-i\,e+p)}{d};-\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right. $$

$$a\left(a-\sqrt{a^2-b^2}\right) {}_2F_1\left(-\frac{i\,(c-i\,e+i\,d\,+p)}{d}, 1; 2-\frac{i\,(c-i\,e+p)}{d}; \frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+\left(a^2+\sqrt{a^2-b^2}\,\,a-b^2\right)$$

$$ {}_2F_1\left(-\frac{i\,(c-i\,e+i\,d\,+p)}{d}, 2; 2-\frac{i\,(c-i\,e+p)}{d}; -\frac{i\,b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}\,\,-a}\right)+\left(-a^2+\sqrt{a^2-b^2}\,\,a+b^2\right)$$

$$ {}_2F_1\left(-\frac{i\,(c-i\,e+i\,d\,+p)}{d}, 2; 2-\frac{i\,(c-i\,e+p)}{d}; \frac{i\,b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg) \Big/ \left(b\left(a^2-b^2\right)^{3/2}(c-i\,e+i\,d\,+p)\right)$$

Involving $\frac{e^{p\,z}\sin(e\,z)\sinh(c\,z)}{a+b\sin^2(d\,z)}$

01.19.21.1248.01

$$\int \frac{e^{p z} \sin(e z) \sinh(c z)}{a + b \sin^2(d z)} \, dz = -\frac{i}{4} \Bigg(\Bigg(\Bigg(e^{(-c - 2 i d + i e + p) z}$$

$$\Bigg(\Big(2 a + 2 \sqrt{a + b} \sqrt{a} + b \Big) \, {}_2F_1\Bigg(\frac{i (-c + i e + p)}{2 d} + 1, 1; \frac{i (-c + i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a + 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) +$$

$$\Big(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \Big) \, {}_2F_1\Bigg(\frac{i (-c + i e + p)}{2 d} + 1, 1; \frac{i (-c + i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a - 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) \Bigg) \Bigg) \Bigg/$$

$$\Big(\sqrt{a} \, b \sqrt{a + b} \, (-c - 2 i d + i e + p) \Big) + \Bigg(e^{(c - 2 i d - i e + p) z}$$

$$\Bigg(\Big(2 a + 2 \sqrt{a + b} \sqrt{a} + b \Big) \, {}_2F_1\Bigg(\frac{i (c - i e + p)}{2 d} + 1, 1; \frac{i (c - i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a + 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) +$$

$$\Big(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \Big) \, {}_2F_1\Bigg(\frac{i (c - i e + p)}{2 d} + 1, 1; \frac{i (c - i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a - 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) \Bigg) \Bigg) \Bigg/$$

$$\Big(\sqrt{a} \, b \sqrt{a + b} \, (c - 2 i d - i e + p) \Big) - \Bigg(e^{(c - 2 i d + i e + p) z} \Bigg(\Big(2 a + 2 \sqrt{a + b} \sqrt{a} + b \Big)$$

$${}_2F_1\Bigg(\frac{i (c + i e + p)}{2 d} + 1, 1; \frac{i (c + i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a + 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) +$$

$$\Big(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \Big) \, {}_2F_1\Bigg(\frac{i (c + i e + p)}{2 d} + 1, 1; \frac{i (c + i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a - 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) \Bigg) \Bigg) \Bigg/$$

$$\Big(\sqrt{a} \, b \sqrt{a + b} \, (c - 2 i d + i e + p) \Big) - \Bigg(e^{(-c - 2 i d - i e + p) z}$$

$$\Bigg(\Big(2 a + 2 \sqrt{a + b} \sqrt{a} + b \Big) \, {}_2F_1\Bigg(\frac{i (-c - i e + p)}{2 d} + 1, 1; \frac{i (-c - i e + p)}{2 d} + 2; -\frac{b e^{-2 i d z}}{-2 a + 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) +$$

$$\Big(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \Big) \, {}_2F_1\Bigg(\frac{i (-c - i e + p)}{2 d} + 1, 1; \frac{i (-c - i e + p)}{2 d} + 2;$$

$$-\frac{b e^{-2 i d z}}{-2 a - 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) \Bigg) \Bigg) \Bigg/ \Big(\sqrt{a} \, b \sqrt{a + b} \, (-c - 2 i d - i e + p) \Big) \Bigg)$$

Involving $e^{p z} \sin(e z) \sinh(c z) \left(a + b \sin^2(d z) \right)^{-n}$

01.19.21.1249.01

$$\int \frac{e^{p z} \sin(e z) \sinh(c z)}{\left(a + b \sin^2(d z) \right)^2} \, dz =$$

$$-i \, \frac{1}{4} \Bigg(\Bigg(e^{(-c + 2 i d + i e + p) z} \Bigg((2 a + b) \Big(2 a + 2 \sqrt{a + b} \sqrt{a} + b \Big) \, {}_2F_1\Bigg(1 - \frac{i (-c + i e + p)}{2 d}, 1; 2 - \frac{i (-c + i e + p)}{2 d};$$

$$-\frac{b e^{2 i d z}}{-2 a + 2 \sqrt{a + b} \sqrt{a} - b} \Bigg) + (2 a + b) \Big(-2 a + 2 \sqrt{a + b} \sqrt{a} - b \Big)$$

$$ {}_2F_1\Big(1-\frac{i\,(-c+i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(-c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+ $$

$$ 2\,\sqrt{a}\,\Big(\Big(-2\,a^{3/2}-2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big)\,{}_2F_1\Big(1-\frac{i\,(-c+i\,e+p)}{2\,d},\,2;\,2- $$

$$ \frac{i\,(-c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+\Big(2\,a^{3/2}-2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(-c+i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(-c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)\Big)\Big)\Big)\Big)\Big/ $$

$$ \Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(-c+2\,i\,d+i\,e+p)\Big)+\Big(e^{(c-i\,e+2\,i\,d+p)\,z}\,\Big((2\,a+b)\,\Big(2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+(2\,a+b) $$

$$ \Big(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b\Big)\,{}_2F_1\Big(1-\frac{i\,(c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+ $$

$$ 2\,\sqrt{a}\,\Big(\Big(-2\,a^{3/2}-2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big)\,{}_2F_1\Big(1-\frac{i\,(c-i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(c-i\,e+p)}{2\,d}; $$

$$ -\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+\Big(2\,a^{3/2}-2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(c-i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)\Big)\Big)\Big)\Big)\Big/ $$

$$ \Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(c-i\,e+2\,i\,d+p)\Big)-\Big(e^{(c+2\,i\,d+i\,e+p)\,z}\,\Big((2\,a+b)\,\Big(2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(c+i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+(2\,a+b) $$

$$ \Big(-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b\Big)\,{}_2F_1\Big(1-\frac{i\,(c+i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+ $$

$$ 2\,\sqrt{a}\,\Big(\Big(-2\,a^{3/2}-2\,\sqrt{a+b}\,a-2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big)\,{}_2F_1\Big(1-\frac{i\,(c+i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(c+i\,e+p)}{2\,d}; $$

$$ -\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+\Big(2\,a^{3/2}-2\,\sqrt{a+b}\,a+2\,b\,\sqrt{a}-b\,\sqrt{a+b}\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(c+i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(c+i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a-2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)\Big)\Big)\Big)\Big)\Big/ $$

$$ \Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(c+2\,i\,d+i\,e+p)\Big)-\Big(e^{(-c-i\,e+2\,i\,d+p)\,z}\,\Big((2\,a+b)\,\Big(2\,a+2\,\sqrt{a+b}\,\sqrt{a}+b\Big) $$

$$ {}_2F_1\Big(1-\frac{i\,(-c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(-c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{-2\,a+2\,\sqrt{a+b}\,\sqrt{a}-b}\Big)+(2\,a+b) $$

$$\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{i(-c-ie+p)}{2d},1;2-\frac{i(-c-ie+p)}{2d};-\frac{b\,e^{2idz}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)+$$
$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a+b}\,a-2b\sqrt{a}-b\sqrt{a+b}\right)\right.$$
$${}_2F_1\left(1-\frac{i(-c-ie+p)}{2d},2;2-\frac{i(-c-ie+p)}{2d};-\frac{b\,e^{2idz}}{-2a+2\sqrt{a+b}\sqrt{a}-b}\right)+$$
$$\left(2a^{3/2}-2\sqrt{a+b}\,a+2b\sqrt{a}-b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(-c-ie+p)}{2d},2;2-\frac{i(-c-ie+p)}{2d};\right.$$
$$\left.\left.\left.\left.-\frac{b\,e^{2idz}}{-2a-2\sqrt{a+b}\sqrt{a}-b}\right)\right)\right)\right)\Big/\left(2a^{3/2}\,b\,(a+b)^{3/2}\,(-c-ie+2id+p)\right)\Big)$$

Involving algebraic functions of sin and exp

Involving $e^{pz}(a+b\sin(dz))^{\beta}\sinh(cz)$

01.19.21.1250.01

$$\int e^{pz}\,(a+b\sin(dz))^{\beta}\sinh(cz)\,dz = \left(\left(1+\frac{i\,b\,e^{idz}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}\right.$$
$$\left(e^{(p-c)z}\,(c+p-id\beta)\,F_1\left(\frac{i(c-p+id\beta)}{d};-\beta,-\beta;\frac{-\beta d+d+ic-ip}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\right.$$
$$\left.e^{(c+p)z}\,(c-p+id\beta)\,F_1\left(-\frac{i(c+p-id\beta)}{d};-\beta,-\beta;-\frac{i(c+p-id(\beta-1))}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)\right)$$
$$\left.(a+b\sin(dz))^{\beta}\right)\Big/\left(2\,(c+p-id\beta)\,(c-p+id\beta)\right)$$

Involving $e^{pz}\left(a+b\sin^2(dz)\right)^{\beta}\sinh(cz)$

01.19.21.1251.01

$$\int e^{pz}\left(b\sin^2(dz)+a\right)^{\beta}\sinh(cz)\,dz = \left(\left(1-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(a-\frac{1}{4}b\,e^{-2idz}\left(-1+e^{2idz}\right)^2\right)^{\beta}\left(e^{(p-c)z}(c+p-2id\beta)F_1\left(\frac{i(c-p+2id\beta)}{2d};-\beta,-\beta;\frac{i(c-p)}{2d}-\beta+1;\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)+e^{(c+p)z}(c-p+2id\beta)F_1\left(-\frac{i(c+p-2id\beta)}{2d};-\beta,-\beta;-\frac{i(c+p)}{2d}-\beta+1;\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)\Big/(2(c+p-2id\beta)(c-p+2id\beta))$$

Involving $e^{pz}\sin(ez)\sinh(cz)(a+b\sin(dz))^{\beta}$

01.19.21.1252.01

$$\int e^{pz}\sin(ez)\sinh(cz)(a+b\sin(dz))^{\beta}\,dz = -\frac{i}{4}\left(1+\frac{i\,b\,e^{idz}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}(a+b\sin(dz))^{\beta}\left(\frac{e^{(-c+ie+p)z}}{c-ie-p+id\beta}F_1\left(\frac{e+ic-ip-d\beta}{d};-\beta,-\beta;\frac{-\beta d+d+e+ic-ip}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)+\frac{e^{(c+ie+p)z}}{c+ie+p-id\beta}F_1\left(-\frac{i(c+ie+p-id\beta)}{d};-\beta,-\beta;\frac{-\beta d+d+e-ic-ip}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)-\frac{e^{(c-ie+p)z}}{c-ie+p-id\beta}F_1\left(-\frac{e+ic+ip+d\beta}{d};-\beta,-\beta;-\frac{e+ic+ip+d(\beta-1)}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)-\frac{e^{(-c-ie+p)z}}{c+i(e+ip+d\beta)}F_1\left(\frac{i(c+i(e+ip+d\beta))}{d};-\beta,-\beta;\frac{-\beta d+d-e+ic-ip}{d};\frac{i\,b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{i\,b\,e^{idz}}{a-\sqrt{a^2-b^2}}\right)\right)$$

Involving $e^{pz}\sin(ez)\sinh(cz)\left(a+b\sin^2(dz)\right)^{\beta}$

01.19.21.1253.01

$$\int e^{p z} \sin(e z) \sinh(c z) \left(a + b \sin^2(d z)\right)^{\beta} \, dz = -\frac{1}{4} i \left(1 - \frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a+b)}}\right)^{-\beta} \left(1 - \frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a+b)}}\right)^{-\beta} \left(a - \frac{1}{4} b e^{-2 i d z} \left(-1 + e^{2 i d z}\right)^2\right)^{\beta} \left(\frac{e^{(-c + i e + p) z}}{c - i e - p + 2 i d \beta} F_1\left(\frac{e + i c - i p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{e + i c - i p}{2 d} - \beta + 1; \frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a+b)}}, \frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a+b)}}\right) + \frac{e^{(c + i e + p) z}}{c + i e + p - 2 i d \beta} F_1\left(-\frac{i (c + i e + p - 2 i d \beta)}{2 d}; -\beta, -\beta; -\frac{i (c + i e + p)}{2 d} - \beta + 1; \frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a+b)}}, \frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a+b)}}\right) - \frac{e^{(-c - i e + p) z}}{c + i e - p + 2 i d \beta} F_1\left(\frac{i (c + i e - p + 2 i d \beta)}{2 d}; -\beta, -\beta; \frac{i (c + i (e + i p + 2 d (\beta - 1)))}{2 d}; \frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a+b)}}, \frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a+b)}}\right) - \frac{e^{(c - i e + p) z}}{c - i e + p - 2 i d \beta} F_1\left(-\frac{e + i c + i p + 2 d \beta}{2 d}; -\beta, -\beta; -\frac{i (c - i e + p)}{2 d} - \beta + 1; \frac{b e^{2 i d z}}{2 a + b + 2 \sqrt{a (a+b)}}, \frac{b e^{2 i d z}}{2 a + b - 2 \sqrt{a (a+b)}}\right)\right)$$

Involving cos and exp

Involving $e^{p z} \cos(c z) \sinh(a z)$

01.19.21.1254.01

$$\int e^{p z} \cos(c z) \sinh(a z) \, dz = \frac{1}{4} \left(\frac{e^{(-a + i c + p) z}}{a - i c - p} + \frac{e^{(a + i c + p) z}}{a + i c + p} + \frac{e^{(a - i c + p) z}}{a - i c + p} + \frac{e^{-(a + i c - p) z}}{a + i c - p}\right)$$

01.19.21.1255.01

$$\int e^{c z} \cos(c z) \sinh(a z) \, dz = \frac{1}{4} \left(\frac{e^{(a + c (1 + i)) z}}{a + c (1 + i)} + \frac{e^{-(a - (1 - i) c) z}}{a - (1 - i) c} + \frac{e^{(1 + i) c z - a z}}{a - (1 + i) c} + \frac{e^{(a + c (1 - i)) z}}{a + c (1 - i)}\right)$$

Involving $e^{p z} \cos(c z + d) \sinh(a z)$

01.19.21.1256.01

$$\int e^{p z} \cos(d + c z) \sinh(a z) \, dz = \frac{1}{4} e^{-i d} \left(\frac{e^{2 i d + (-a + i c + p) z}}{a - i c - p} + \frac{e^{2 i d + (a + i c + p) z}}{a + i c + p} + \frac{e^{(a - i c + p) z}}{a - i c + p} + \frac{e^{-(a + i c - p) z}}{a + i c - p}\right)$$

Involving $e^{p z} \cos(c z) \sinh(a z + b)$

01.19.21.1257.01

$$\int e^{p z} \cos(c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b} \left(\frac{e^{(-a + i c + p) z}}{a - i c - p} + \frac{e^{2 b + (a + i c + p) z}}{a + i c + p} + \frac{e^{2 b + (a - i c + p) z}}{a - i c + p} + \frac{e^{-(a + i c - p) z}}{a + i c - p}\right)$$

Involving $e^{p z} \cos(c z + d) \sinh(a z + b)$

01.19.21.1258.01

$$\int e^{p z} \cos(d + c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b - i d} \left(\frac{e^{2 i d + (-a + i c + p) z}}{a - i c - p} + \frac{e^{2 b + 2 i d + (a + i c + p) z}}{a + i c + p} + \frac{e^{2 b + (a - i c + p) z}}{a - i c + p} + \frac{e^{-(a + i c - p) z}}{a + i c - p} \right)$$

Involving $e^{p z^r} \cos(b z^r) \sinh(c z)$

01.19.21.1259.01

$$\int e^{p z^2} \cos(b z^2) \sinh(c z) \, dz = \frac{1}{8 \sqrt{b - i p} \sqrt{b + i p}} \left(\sqrt[4]{-1} \, e^{-\frac{i c^2}{4 (b + i p)}} \sqrt{\pi} \left(\sqrt{b - i p} \operatorname{erfi}\left(\frac{(-1)^{3/4} (-i c + 2 b z + 2 i p z)}{2 \sqrt{b + i p}} \right) - \sqrt{b - i p} \operatorname{erfi}\left(\frac{(-1)^{3/4} (i c + 2 b z + 2 i p z)}{2 \sqrt{b + i p}} \right) + e^{\frac{i b c^2}{2 (b^2 + p^2)}} i \sqrt{b + i p} \operatorname{erfi}\left(\frac{(-1)^{3/4} (c + 2 i b z + 2 p z)}{2 \sqrt{b - i p}} \right) + e^{\frac{i b c^2}{2 (b^2 + p^2)}} i \sqrt{b + i p} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} (i c + 2 (b - i p) z)}{2 \sqrt{b - i p}} \right) \right) \right)$$

01.19.21.1260.01

$$\int e^{p \sqrt{z}} \cos(b \sqrt{z}) \sinh(c z) \, dz = \frac{1}{8 c^{3/2}} \left(8 \sqrt{c} \, e^{p \sqrt{z}} \cos(b \sqrt{z}) \cosh(c z) - e^{-\frac{(b + i p)^2}{4 c}} (b + i p) \sqrt{\pi} \operatorname{erfi}\left(\frac{b + i (p - 2 c \sqrt{z})}{2 \sqrt{c}} \right) - e^{-\frac{(b - i p)^2}{4 c}} (b - i p) \sqrt{\pi} \operatorname{erfi}\left(\frac{b - i (p - 2 c \sqrt{z})}{2 \sqrt{c}} \right) - e^{\frac{(b - i p)^2}{4 c}} (i b + p) \sqrt{\pi} \operatorname{erfi}\left(\frac{2 \sqrt{z} \, c + i b + p}{2 \sqrt{c}} \right) + e^{\frac{(b + i p)^2}{4 c}} (-i b + p) \sqrt{\pi} \operatorname{erfi}\left(\frac{-2 \sqrt{z} \, c + i b - p}{2 \sqrt{c}} \right) \right)$$

Involving $e^{p z^r} \cos(b z) \sinh(c z)$

01.19.21.1261.01

$$\int e^{p z^2} \cos(b z) \sinh(c z) \, dz = \frac{1}{8 \sqrt{p}} \left(e^{\frac{(b - i c)^2}{4 p}} \sqrt{\pi} \left(-\operatorname{erfi}\left(\frac{-c - i b + 2 p z}{2 \sqrt{p}} \right) - e^{\frac{i b c}{p}} \operatorname{erfi}\left(\frac{-c + i b + 2 p z}{2 \sqrt{p}} \right) + e^{\frac{i b c}{p}} \operatorname{erfi}\left(\frac{c - i b + 2 p z}{2 \sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c + i b + 2 p z}{2 \sqrt{p}} \right) \right) \right)$$

01.19.21.1262.01

$$\int e^{p\sqrt{z}}\cos(b\,z)\sinh(c\,z)\,dz = \frac{1}{8}\left(\frac{8\,e^{p\sqrt{z}}\,(c\cos(b\,z)\cosh(c\,z)+b\sin(b\,z)\sinh(c\,z))}{b^2+c^2} + \frac{(-1)^{3/4}\,e^{\frac{i\,p^2}{4\,i\,c-4\,b}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,\left(p-2\,i\,(b-i\,c)\sqrt{z}\right)}{2\sqrt{b-i\,c}}\right)}{(b-i\,c)^{3/2}} + \frac{\sqrt[4]{-1}\,e^{\frac{i\,p^2}{4\,(b+i\,c)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{(-1)^{3/4}\left(p+2\,i\,(b+i\,c)\sqrt{z}\right)}{2\sqrt{b+i\,c}}\right)}{(b+i\,c)^{3/2}} - \frac{(-1)^{3/4}\,e^{-\frac{i\,p^2}{4\,(b+i\,c)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\left(2\sqrt{z}\,(c-i\,b)+p\right)}{2\sqrt{b+i\,c}}\right)}{(b+i\,c)^{3/2}} - \frac{\sqrt[4]{-1}\,e^{\frac{i\,p^2}{4\,b-4\,i\,c}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{(-1)^{3/4}\left(2\sqrt{z}\,(c+i\,b)+p\right)}{2\sqrt{b-i\,c}}\right)}{(b-i\,c)^{3/2}}\right)$$

Involving $e^{p\,z}\cos(b\,z^r)\sinh(c\,z)$

01.19.21.1263.01

$$\int e^{p\,z}\cos(b\,z^2)\sinh(c\,z)\,dz = \frac{1}{8\sqrt{b}}\left(\sqrt[4]{-1}\,e^{-\frac{i\,(c+p)^2}{4\,b}}\sqrt{\pi}\left(e^{\frac{i\,c\,p}{b}}\operatorname{erfi}\left(\frac{(-1)^{3/4}\,(-i\,c+i\,p+2\,b\,z)}{2\sqrt{b}}\right) + e^{\frac{i\,(c^2+p^2)}{2\,b}}\,i\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(i\,c-i\,p+2\,b\,z)}{2\sqrt{b}}\right) + e^{\frac{i\,(c+p)^2}{2\,b}}\,i\operatorname{erfi}\left(\frac{(-1)^{3/4}\,(c+p+2\,i\,b\,z)}{2\sqrt{b}}\right) + \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(c+p-2\,i\,b\,z)}{2\sqrt{b}}\right)\right)\right)$$

01.19.21.1264.01

$$\int e^{p\,z}\cos\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = \frac{1}{8}\left(\frac{8\,e^{p\,z}\cos\left(b\sqrt{z}\right)(p\sinh(c\,z)-c\cosh(c\,z))}{p^2-c^2} - \frac{b\,e^{\frac{b^2}{4\,p-4\,c}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b+2\,i\,(c-p)\sqrt{z}}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}} - \frac{b\,e^{\frac{b^2}{4\,p-4\,c}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b-2\,i\,(c-p)\sqrt{z}}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}} - \frac{i\,b\,e^{\frac{b^2}{4\,(c+p)}}\sqrt{\pi}\operatorname{erfi}\left(\frac{i\,b+2\,(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}} - \frac{i\,b\,e^{\frac{b^2}{4\,(c+p)}}\sqrt{\pi}\operatorname{erfi}\left(\frac{i\,b-2\,(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}}\right)$$

Involving $e^{p\,z}\cos(b\,z)\sinh(c\,z^r)$

01.19.21.1265.01

$$\int e^{p z} \cos(b z) \sinh(c z^2)\, dz = \frac{1}{8\sqrt{c}} \left(e^{-\frac{b^2+2 i p b+p^2}{4c}} \sqrt{\pi} \left(-e^{\frac{p^2}{2c}} \operatorname{erf}\left(\frac{i b - p + 2 c z}{2\sqrt{c}}\right) + e^{\frac{b(b+2 i p)}{2c}} \operatorname{erfi}\left(\frac{-i b + p + 2 c z}{2\sqrt{c}}\right) + e^{\frac{b^2}{2c}} \operatorname{erfi}\left(\frac{i b + p + 2 c z}{2\sqrt{c}}\right) + e^{\frac{p(2 i b+p)}{2c}} i \operatorname{erfi}\left(\frac{b - i p + 2 i c z}{2\sqrt{c}}\right)\right)\right)$$

01.19.21.1266.01

$$\int e^{p z} \cos(b z) \sinh(c\sqrt{z})\, dz = -\frac{1}{8}\left(-\frac{c\, e^{-\frac{c^2}{4(-i b+p)}} \sqrt{\pi} \operatorname{erf}\left(\frac{c+2(i b-p)\sqrt{z}}{2\sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}} + \frac{c\, e^{-\frac{c^2}{4(-i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(-i b+p)\sqrt{z}}{2\sqrt{-i b+p}}\right)}{(-i b+p)^{3/2}} + \frac{c\, e^{-\frac{c^2}{4(i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(i b+p)\sqrt{z}}{2\sqrt{i b+p}}\right)}{(i b+p)^{3/2}} + \frac{4 e^{(-i b+p) z} \sinh(c\sqrt{z})}{i b - p} - \frac{4 e^{(i b+p) z} \sinh(c\sqrt{z})}{i b + p} - \frac{c\, e^{-\frac{c^2}{4(i b+p)}} \sqrt{\pi} \operatorname{erfi}\left(\frac{c+2(-i b-p)\sqrt{z}}{2\sqrt{i b+p}}\right)}{(i b+p)^{3/2}} \right)$$

Involving $e^{p z^r} \cos(b z) \sinh(c z^r)$

01.19.21.1267.01

$$\int e^{p z^2} \cos(b z) \sinh(c z^2)\, dz = \frac{1}{8\sqrt{c-p}\,\sqrt{c+p}} \left(e^{\frac{b^2}{4p-4c}} \sqrt{\pi} \left(-\sqrt{c+p}\, \operatorname{erf}\left(\frac{i b + 2(c-p) z}{2\sqrt{c-p}}\right) + i\sqrt{c+p}\, \operatorname{erfi}\left(\frac{b + 2 i (c-p) z}{2\sqrt{c-p}}\right) + e^{\frac{b^2 c}{2c^2-2p^2}} \sqrt{c-p} \left(\operatorname{erfi}\left(\frac{-i b + 2(c+p) z}{2\sqrt{c+p}}\right) + \operatorname{erfi}\left(\frac{i b + 2(c+p) z}{2\sqrt{c+p}}\right)\right)\right)\right)$$

01.19.21.1268.01

$$\int e^{p\sqrt{z}} \cos(b z) \sinh(c\sqrt{z})\, dz = \frac{1}{8}\left(\frac{8 e^{p\sqrt{z}} \sin(b z) \sinh(c\sqrt{z})}{b} - \frac{1}{b\sqrt{b^2}} \left(i e^{-\frac{i(c+p)^2}{4b}} \sqrt{\pi} \left(-\sqrt{i b}\; c \operatorname{erfi}\left(\frac{-c - p + 2 i b\sqrt{z}}{2\sqrt{-i b}}\right) + \sqrt{i b}\; e^{\frac{i c p}{b}} (c-p) \operatorname{erfi}\left(\frac{-c + p - 2 i b\sqrt{z}}{2\sqrt{-i b}}\right) + \sqrt{i b}\; p \operatorname{erfi}\left(\frac{c + p - 2 i b\sqrt{z}}{2\sqrt{-i b}}\right) - \sqrt{-i b}\; c\, e^{\frac{i(c^2+p^2)}{2b}} \operatorname{erfi}\left(\frac{-c + p + 2 i b\sqrt{z}}{2\sqrt{i b}}\right) + \sqrt{-i b}\; e^{\frac{i(c^2+p^2)}{2b}} p \operatorname{erfi}\left(\frac{-c + p + 2 i b\sqrt{z}}{2\sqrt{i b}}\right) - \sqrt{-i b}\; e^{\frac{i(c+p)^2}{2b}} p \operatorname{erfi}\left(\frac{c + p + 2 i b\sqrt{z}}{2\sqrt{i b}}\right) + \sqrt{-i b}\; c\, e^{\frac{i(c+p)^2}{2b}} \operatorname{erfi}\left(\frac{-c - p - 2 i b\sqrt{z}}{2\sqrt{i b}}\right)\right)\right)\right)$$

Involving $e^{p z} \cos(b z^r) \sinh(c z^r)$

01.19.21.1269.01

$$\int e^{p z} \cos(b z^2) \sinh(c z^2)\, dz = \frac{1}{8} \sqrt[4]{-1} \sqrt{\pi} \left(\frac{e^{\frac{i p^2}{4(b+i c)}} i \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-i p+2 b z+2 i c z)}{2\sqrt{b+i c}}\right)}{\sqrt{b+i c}} + \frac{e^{\frac{i p^2}{4 b-4 i c}} i \operatorname{erfi}\left(\frac{(-1)^{3/4}(p+2 c z+2 i b z)}{2\sqrt{b-i c}}\right)}{\sqrt{b-i c}} + \frac{e^{\frac{i p^2}{4 i c-4 b}} \operatorname{erfi}\left(\frac{(-1)^{3/4}(i p+2 (b-i c) z)}{2\sqrt{b-i c}}\right)}{\sqrt{b-i c}} - \frac{e^{-\frac{i p^2}{4(b+i c)}} \operatorname{erfi}\left(\frac{(-1)^{3/4}(i p+2 b z+2 i c z)}{2\sqrt{b+i c}}\right)}{\sqrt{b+i c}} \right)$$

01.19.21.1270.01

$$\int e^{p z} \cos(b\sqrt{z}) \sinh(c\sqrt{z})\, dz = \frac{1}{8} \left(\frac{(b+i c)\, e^{\frac{(b+i c)^2}{4 p}} \sqrt{\pi} \operatorname{erf}\left(\frac{b+i c+2 i p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{(b-i c)\, e^{\frac{(i c-b)^2}{4 p}} \sqrt{\pi} \operatorname{erf}\left(\frac{b-i c-2 i p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{(b+i c)\, e^{\frac{(b+i c)^2}{4 p}} i\sqrt{\pi} \operatorname{erfi}\left(\frac{-c+i b+2 p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{8 e^{p z} \cos(b\sqrt{z}) \sinh(c\sqrt{z})}{p} - \frac{(b-i c)\, e^{\frac{(b-i c)^2}{4 p}} \sqrt{\pi} \operatorname{erf}\left(\frac{b-i c+2 i p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} \right)$$

Involving $e^{p z^r} \cos(b z^r) \sinh(c z^r)$

01.19.21.1271.01

$$\int e^{p z^r} \cos(b z^r) \sinh(c z^r)\, dz = \frac{z}{4 r} \left(\Gamma\left(\frac{1}{r}, (c+i b-p) z^r\right) ((c+i b-p) z^r)^{-1/r} + ((c-i b-p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c-i b-p) z^r\right) - (-(c+i b+p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -(c+i b+p) z^r\right) - (-(c-i b+p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -(c-i b+p) z^r\right) \right)$$

01.19.21.1272.01

$$\int e^{p z^2} \cos(b z^2) \sinh(c z^2)\, dz = \frac{1}{8}\sqrt{\pi} \left(-\frac{\operatorname{erfi}\left(\sqrt{-c-i b+p}\, z\right)}{\sqrt{-c-i b+p}} + \frac{\operatorname{erfi}\left(\sqrt{c-i b+p}\, z\right)}{\sqrt{c-i b+p}} + \frac{\operatorname{erfi}\left(\sqrt{c+i b+p}\, z\right)}{\sqrt{c+i b+p}} - \frac{\operatorname{erfi}\left(\sqrt{-c+i b+p}\, z\right)}{\sqrt{-c+i b+p}} \right)$$

01.19.21.1273.01

$$\int e^{p\sqrt{z}} \cos\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right) dz = i\, e^{p\sqrt{z}} \left(\frac{1}{\left(b^2-2\,i\,c\,b-c^2+p^2\right)^2} \left(i\left(\left(\sqrt{z}\;p+1\right)(b-i\,c)^2+p^2\left(p\sqrt{z}-1\right)\right)\sinh\left((-c-i\,b)\sqrt{z}\right)- i\,(-c-i\,b)\left(\sqrt{z}\;(b-i\,c)^2-2\,p+p^2\sqrt{z}\right)\cosh\left((-c-i\,b)\sqrt{z}\right)\right)+ \frac{1}{\left(b^2+2\,i\,c\,b-c^2+p^2\right)^2} \left(i\left(\left(\sqrt{z}\;p+1\right)(b+i\,c)^2+p^2\left(p\sqrt{z}-1\right)\right)\sinh\left((i\,b-c)\sqrt{z}\right)- i\,(i\,b-c)\left(\sqrt{z}\;(b+i\,c)^2-2\,p+p^2\sqrt{z}\right)\cos\left((b+i\,c)\sqrt{z}\right)\right)\right)$$

Involving $e^{b\,z^r+e}\cos\left(a\,z^r+q\right)\sinh\left(c\,z^r+g\right)$

01.19.21.1274.01

$$\int e^{b\,z^r+e}\cos(a\,z^r+q)\sinh(c\,z^r+g)\,dz = \frac{z}{4\,r}\left(-e^{e+g+i\,q}\,\Gamma\left(\frac{1}{r},(-b-c-i\,a)\,z^r\right)\left((-b-c-i\,a)\,z^r\right)^{-1/r}-e^{e+g-i\,q}\left((-b-c+i\,a)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b-c+i\,a)\,z^r\right)+ e^{e-g+i\,q}\left((-b+c-i\,a)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b+c-i\,a)\,z^r\right)+e^{e-g-i\,q}\left((-b+c+i\,a)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},(-b+c+i\,a)\,z^r\right)\right)$$

01.19.21.1275.01

$$\int e^{b\,z^2+e}\cos\left(a\,z^2+q\right)\sinh\left(c\,z^2+g\right)dz = -\frac{1}{8}\sqrt{\pi}\left(e^{e-g+i\,q}\left(\frac{\operatorname{erfi}\left(\sqrt{b-c+i\,a}\;z\right)}{\sqrt{b-c+i\,a}}-\frac{e^{2(g-i\,q)}\operatorname{erfi}\left(\sqrt{b+c-i\,a}\;z\right)}{\sqrt{b+c-i\,a}}\right)+ \left(\frac{\operatorname{erfi}\left(\sqrt{b-c-i\,a}\;z\right)}{\sqrt{b-c-i\,a}}-\frac{e^{2(g+i\,q)}\operatorname{erfi}\left(\sqrt{b+c+i\,a}\;z\right)}{\sqrt{b+c+i\,a}}\right)e^{e-g-i\,q}\right)$$

01.19.21.1276.01

$$\int e^{\sqrt{z}\;b+e}\cos\left(\sqrt{z}\;a+q\right)\sinh\left(\sqrt{z}\;c+g\right)dz = \frac{1}{2}\left(\frac{e^{\sqrt{z}\;(b+c-i\,a)+e+g-i\,q}\left(\sqrt{z}\;b+(c-i\,a)\sqrt{z}-1\right)}{(b+c-i\,a)^2}+\frac{e^{\sqrt{z}\;(b+c+i\,a)+e+g+i\,q}\left(\sqrt{z}\;b+(c+i\,a)\sqrt{z}-1\right)}{(b+c+i\,a)^2}- \frac{e^{\sqrt{z}\;(b-c+i\,a)+e-g+i\,q}\left(\sqrt{z}\;b-(c-i\,a)\sqrt{z}-1\right)}{(-b+c-i\,a)^2}-\frac{e^{\sqrt{z}\;(b-c-i\,a)+e-g-i\,q}\left(\sqrt{z}\;b-(c+i\,a)\sqrt{z}-1\right)}{(-b+c+i\,a)^2}\right)$$

Involving $e^{b\,z^r+d\,z+e}\cos\left(a\,z^r+p\,z+q\right)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1277.01

$$\int e^{b z^2+d z+e} \cos\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right) dz = \frac{\sqrt[4]{-1}\, e^{e+g-i q-\frac{i\left(d^2+2 f d-2 i p d+f^2-p^2-2 i f p\right)}{4(a+i b+i c)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d+f-i p-2 i a z+2 b z+2 c z)}{2\sqrt{a+i b+i c}}\right)}{8\sqrt{a+i b+i c}} - \frac{1}{8(-b+c-i a)}\left(\sqrt[4]{-1}\sqrt{a-i b+i c}\; e^{e-g+\frac{i\left(d^2-2 f d+2 i p d+f^2-p^2-2 i f p\right)}{4(a-i b+i c)}+i q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{(-1)^{3/4}(d-f+i p+2 b z-2 c z+2 i a z)}{2\sqrt{a-i b+i c}}\right)\right) - \frac{1}{8(-b+c+i a)}\left((-1)^{3/4}\sqrt{a-i c+i b}\; e^{e-g-i q-\frac{i\left(d^2-2 f d-2 i p d+f^2-p^2+2 i f p\right)}{4(a-i c+i b)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d-f-i p-2 i a z+2 b z-2 c z)}{2\sqrt{a-i c+i b}}\right)\right) + \frac{(-1)^{3/4} e^{e+g+\frac{i\left(d^2+2 f d+2 i p d+f^2-p^2+2 i f p\right)}{4(a-i b-i c)}+i q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{(-1)^{3/4}(d+f+i p+2 b z+2 c z+2 i a z)}{2\sqrt{a-i b-i c}}\right)}{8\sqrt{a-i b-i c}}$$

01.19.21.1278.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = \frac{\left((b-c+i a)\, e^{\frac{(a-i(b-c))^2}{4(d-f+i p)}+e-g+i q} \sqrt{\pi}\right) \operatorname{erfi}\left(\frac{b-c+i a+2 d\sqrt{z}-2 f\sqrt{z}+2 i p\sqrt{z}}{2\sqrt{d-f+i p}}\right)}{8(d-f+i p)^{3/2}} - \frac{(b+c+i a)\, e^{\frac{(a-i(b+c))^2}{4(d+f+i p)}+e+g+i q} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c+i a+2 d\sqrt{z}+2 f\sqrt{z}+2 i p\sqrt{z}}{2\sqrt{d+f+i p}}\right)}{8(d+f+i p)^{3/2}} + \frac{\left((-b+c+i a)\, e^{\frac{(a+(b-c) i)^2}{4(d-f-i p)}+e-g-i q} \sqrt{\pi}\right) \operatorname{erfi}\left(\frac{-b+c+i a-2 d\sqrt{z}+2 f\sqrt{z}+2 i p\sqrt{z}}{2\sqrt{d-f-i p}}\right)}{8(d-f-i p)^{3/2}} + \frac{e^{\frac{(a+(b+c) i)^2}{4(d+f-i p)}+e+g-i q} (b+c-i a)\sqrt{\pi}\, \operatorname{erfi}\left(\frac{-b-c+i a-2 d\sqrt{z}-2 f\sqrt{z}+2 i p\sqrt{z}}{2\sqrt{d+f-i p}}\right)}{8(d+f-i p)^{3/2}} - \frac{e^{\sqrt{z}\,(b-c+i a)+e-g+i q+(d-f+i p) z}}{4(d-f+i p)} + \frac{e^{\sqrt{z}\,(b+c+i a)+e+g+i q+(d+f+i p) z}}{4(d+f+i p)} - \frac{e^{\sqrt{z}\,(b-c-i a)+e-g-i q+(d-f-i p) z}}{4(d-f-i p)} + \frac{e^{\sqrt{z}\,(b+c-i a)+e+g-i q+(d+f-i p) z}}{4(d+f-i p)}$$

Involving cos and rational functions of exp

Involving $\cos(e z) \sinh(c z) \left(a+b e^{d z}\right)^{-n}$

01.19.21.1279.01

$$\int \frac{\cos(e z)\sinh(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = -\frac{1}{4}a^{-n}\left(\frac{1}{i e-c}\left(e^{(i e-c) z}\,{}_2F_1\left(\frac{i e-c}{d}, n; \frac{-c+d+i e}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(c-i e) z}\,{}_2F_1\left(\frac{c-i e}{d}, n; \frac{c+d-i e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)+\frac{1}{-c-i e}\left(e^{(c+i e) z}\,{}_2F_1\left(\frac{c+i e}{d}, n; \frac{c+d+i e}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(-c-i e) z}\,{}_2F_1\left(\frac{-c-i e}{d}, n; \frac{-c+d-i e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right) /; n\in\mathbb{N}^+$$

Involving $e^{p z}\cos(e z)\sinh(c z)\left(a+b\,e^{d z}\right)^{-n}$

01.19.21.1280.01

$$\int \frac{e^{p z}\cos(e z)\sinh(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = -\frac{1}{4}a^{-n}\left(\left(e^{(-c+i e+p) z}(-c+i e-p)\,{}_2F_1\left(\frac{-c+i e+p}{d}, n; \frac{-c+d+i e+p}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(c-i e+p) z}(-c+i e+p)\,{}_2F_1\left(\frac{c-i e+p}{d}, n; \frac{c+d-i e+p}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\Big/((-c+i e-p)(-c+i e+p))+\left(e^{(c+i e+p) z}(-c-i e+p)\,{}_2F_1\left(\frac{c+i e+p}{d}, n; \frac{c+d+i e+p}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(-c-i e+p) z}(-c-i e-p)\,{}_2F_1\left(\frac{-c-i e+p}{d}, n; \frac{-c+d-i e+p}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\Big/((-c-i e-p)(-c-i e+p))\right) /; n\in\mathbb{N}^+$$

Involving cos and algebraic functions of exp

Involving $\left(a+b\,e^{d z}\right)^{\beta}\cos(e z)\sinh(c z)$

01.19.21.1281.01

$$\int \left(a+b\,e^{d z}\right)^{\beta}\cos(e z)\sinh(c z)\,dz = -\frac{1}{4}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\left(\frac{1}{i e-c}\left(e^{(i e-c) z}\,{}_2F_1\left(\frac{i e-c}{d}, -\beta; \frac{-c+d+i e}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(c-i e) z}\,{}_2F_1\left(\frac{c-i e}{d}, -\beta; \frac{c+d-i e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)+\frac{1}{-c-i e}\left(e^{(c+i e) z}\,{}_2F_1\left(\frac{c+i e}{d}, -\beta; \frac{c+d+i e}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(-c-i e) z}\,{}_2F_1\left(\frac{-c-i e}{d}, -\beta; \frac{-c+d-i e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\cos(e z)\sinh(c z)$

01.19.21.1282.01

$$\int e^{p z} \left(a + b\, e^{d z}\right)^{\beta} \cos(e z) \sinh(c z)\, dz = -\frac{1}{4} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \left(\left(e^{(-c+i e+p) z} (-c + i e - p)\, {}_2F_1\left(\frac{-c + i e + p}{d}, -\beta; \frac{-c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(c-i e+p) z} (-c + i e + p)\, {}_2F_1\left(\frac{c - i e + p}{d}, -\beta; \frac{c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((-c + i e - p)(-c + i e + p)) + \left(e^{(c+i e+p) z} (-c - i e + p)\, {}_2F_1\left(\frac{c + i e + p}{d}, -\beta; \frac{c + d + i e + p}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-c-i e+p) z} (-c - i e - p)\, {}_2F_1\left(\frac{-c - i e + p}{d}, -\beta; \frac{-c + d - i e + p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) \Big/ ((-c - i e - p)(-c - i e + p))\right)$$

Involving powers of cos and exp

Involving $e^{b z} \cos^{\mu}(c z) \sinh(a z)$

01.19.21.1283.01

$$\int e^{b z} \cos^{\mu}(c z) \sinh(a z)\, dz = 2^{-1} e^{(b-a) z} \cos(c z)^{\mu} \left(1 + e^{2 i c z}\right)^{-\mu} \left(e^{2 a z} (-i a + i b + c \mu)\, {}_2F_1\left(-\frac{i (a + b - i c \mu)}{2 c}, -\mu; -\frac{i (a + b - i c (\mu - 2))}{2 c}; -e^{2 i c z}\right) - i (a + b - i c \mu)\, {}_2F_1\left(\frac{i (a - b + i c \mu)}{2 c}, -\mu; \frac{i (a - b + c i (\mu - 2))}{2 c}; -e^{2 i c z}\right)\right) \Big/ ((a + b - i c \mu)(-i a + i b + c \mu))$$

01.19.21.1284.01

$$\int e^{b z} \cos^{m}(c z) \sinh(a z)\, dz = 2^{-m-1} \left(\frac{e^{(a+b) z}}{a + b} - \frac{e^{i \pi - (a-b) z}}{a - b}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{i \pi - (a - b - i c m + 2 i c s) z}}{a - b - i c m + 2 i c s} + \frac{e^{(a + b - i c m + 2 i c s) z}}{-a - b + i c m - 2 i c s} + \frac{e^{i \pi - (a - b + i c m - 2 i c s) z}}{a - b + i c m - 2 i c s} + \frac{e^{(a + b + i c m - 2 i c s) z}}{-a - b - i c m + 2 i c s}\right) \binom{m}{s} /; m \in \mathbb{N}^{+}$$

Involving $e^{p z} \cos^{\mu}(c z + d) \sinh(a z)$

01.19.21.1285.01

$$\int e^{p z} \cos^{\mu}(d + c z) \sinh(a z)\, dz = \frac{1}{2} \left(1 + e^{-2 i (d + c z)}\right)^{-\mu} \cos^{\mu}(d + c z) \left(\frac{e^{p z - a z}}{a - p - i c \mu}\, {}_2F_1\left(\frac{i (-a + p + i c \mu)}{2 c}, -\mu; \frac{i (-a + p + c i (\mu - 2))}{2 c}; -e^{-2 i (d + c z)}\right) + \frac{e^{(a+p) z}}{a + p + i c \mu}\, {}_2F_1\left(\frac{i (a + p + i c \mu)}{2 c}, -\mu; \frac{i (a + p + c i (\mu - 2))}{2 c}; -e^{-2 i (d + c z)}\right)\right)$$

01.19.21.1286.01

$$\int e^{p z} \cos^m(d + c z) \sinh(a z) \, dz = 2^{-m-1} \left(\frac{e^{(a+p) z}}{a + p} + \frac{e^{-(a-p) z}}{a - p} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d m - 2 i d s} \left(-\frac{e^{2 i d m - (a - i c m - p + 2 i c s) z}}{a - i c m - p + 2 i c s} + \frac{e^{4 i d s - (-a + i c m - p - 2 i c s) z}}{-a + i c m - p - 2 i c s} - \frac{e^{4 i d s - (a + i c m - p - 2 i c s) z}}{a + i c m - p - 2 i c s} + \frac{e^{2 i d m - (-a - i c m - p + 2 i c s) z}}{-a - i c m - p + 2 i c s} \right) \binom{m}{s} /; m \in \mathbb{N}^+$$

Involving $e^{p z} \cos^\mu(c z) \sinh(a z + b)$

01.19.21.1287.01

$$\int e^{p z} \cos^\mu(c z) \sinh(b + a z) \, dz = \frac{1}{2} e^b \left(1 + e^{-2 i c z}\right)^{-\mu} \cos^\mu(c z) \left(\frac{e^{-2 b - a z + p z}}{a - p - i c \mu} \, {}_2F_1\left(\frac{i (-a + p + i c \mu)}{2 c}, -\mu; \frac{i (-a + p + c i (\mu - 2))}{2 c}; -e^{-2 i c z} \right) + \frac{e^{(a+p) z}}{a + p + i c \mu} \, {}_2F_1\left(\frac{i (a + p + i c \mu)}{2 c}, -\mu; \frac{i (a + p + c i (\mu - 2))}{2 c}; -e^{-2 i c z} \right) \right)$$

01.19.21.1288.01

$$\int e^{p z} \cos^m(c z) \sinh(b + a z) \, dz = 2^{-m-1} e^{-b} \left(\frac{e^{2 b + (a+p) z}}{a + p} + \frac{e^{-(a-p) z}}{a - p} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} e^{-b} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(e^{2 b} \left(\frac{e^{-(-a + i c m - p - 2 i c s) z}}{-a + i c m - p - 2 i c s} + \frac{e^{-(-a - i c m - p + 2 i c s) z}}{-a - i c m - p + 2 i c s} \right) - \frac{e^{-(a - i c m - p + 2 i c s) z}}{a - i c m - p + 2 i c s} - \frac{e^{-(a + i c m - p - 2 i c s) z}}{a + i c m - p - 2 i c s} \right) \binom{m}{s} /; m \in \mathbb{N}^+$$

Involving $e^{p z} \cos^\mu(c z + d) \sinh(a z + b)$

01.19.21.1289.01

$$\int e^{p z} \cos^\mu(d + c z) \sinh(b + a z) \, dz = \frac{1}{2} e^b \left(1 + e^{-2 i (d + c z)}\right)^{-\mu} \cos^\mu(d + c z) \left(\frac{e^{-2 b - a z + p z}}{a - p - i c \mu} \, {}_2F_1\left(\frac{i (-a + p + i c \mu)}{2 c}, -\mu; \frac{i (-a + p + c i (\mu - 2))}{2 c}; -e^{-2 i (d + c z)} \right) + \frac{e^{(a+p) z}}{a + p + i c \mu} \, {}_2F_1\left(\frac{i (a + p + i c \mu)}{2 c}, -\mu; \frac{i (a + p + c i (\mu - 2))}{2 c}; -e^{-2 i (d + c z)} \right) \right)$$

01.19.21.1290.01

$$\int e^{p z} \cos^m(d + c z) \sinh(b + a z)\, dz = 2^{-m-1} e^{-b} \left(\frac{e^{2b+(a+p)z}}{a+p} + \frac{e^{-(a-p)z}}{a-p} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) - 2^{-m-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-b-i d m-2 i d s} \left(e^{2b} \left(\frac{e^{4 i d s-(-a+i c m-p-2 i c s) z}}{-a+i c m-p-2 i c s} + \frac{e^{2 i d m-(-a-i c m-p+2 i c s) z}}{-a-i c m-p+2 i c s} \right) - \frac{e^{2 i d m-(a-i c m-p+2 i c s) z}}{a-i c m-p+2 i c s} - \frac{e^{4 i d s-(a+i c m-p-2 i c s) z}}{a+i c m-p-2 i c s} \right) \binom{m}{s} /;\, m \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m(b z^r) \sinh(c z)$

01.19.21.1291.01

$$\int e^{p z^2} \cos^m(b z^2) \sinh(c z)\, dz = \frac{e^{-\frac{c^2}{4p}} 2^{-m-2} \sqrt{\pi}\, (1 - m \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \left(\operatorname{erfi}\left(\frac{c+2 p z}{2\sqrt{p}} \right) + \operatorname{erfi}\left(\frac{c-2 p z}{2\sqrt{p}} \right) \right) + \sqrt[4]{-1}\, 2^{-m-2} \sqrt{\pi} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{j} e^{\frac{i c^2}{-8 b j+4 b m-4 i p}} \left(-\sqrt{2 b j-b m-i p}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (i c+4 b j z-2 b m z+2 i p z)}{2\sqrt{2 b j-b m+i p}} \right) + \sqrt{2 b j-b m-i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (c+2 i (2 b j-b m+i p) z)}{2\sqrt{2 b j-b m+i p}} \right) - i e^{\frac{i b c^2 (2 j-m)}{2\left(b^2 (m-2 j)^2+p^2\right)}} \sqrt{2 b j-b m+i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (-i c+4 b j z-2 b m z-2 i p z)}{2\sqrt{2 b j-b m-i p}} \right) + e^{\frac{i b c^2 (2 j-m)}{2\left(b^2 (m-2 j)^2+p^2\right)}} i \sqrt{2 b j-b m+i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (i c+4 b j z-2 b m z-2 i p z)}{2\sqrt{2 b j-b m-i p}} \right) \right) \right) \Big/ \left(\sqrt{2 b j-b m-i p} \sqrt{2 b j-b m+i p} \right) /;\, m \in \mathbb{N}^+$$

01.19.21.1292.01

$$\int e^{p\sqrt{z}}\cos^m\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = 2^{-m}\left(\frac{e^{p\sqrt{z}}\cosh(c\,z)}{c}+\frac{e^{\frac{p^2}{4c}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{p-2c\sqrt{z}}{2\sqrt{-c}}\right)}{4(-c)^{3/2}}-\frac{e^{-\frac{p^2}{4c}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c+p}{2\sqrt{c}}\right)}{4c^{3/2}}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)+2^{-m-1}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\left(\frac{4e^{p\sqrt{z}}\cos\left(b(2j-m)\sqrt{z}\right)\cosh(c\,z)}{c}-\frac{i\,e^{-\frac{b^2(m-2j)^2-p^2+2b\,i(2j-m)p}{4c}}(2b\,j-b\,m+i\,p)\sqrt{\pi}\,\text{erfi}\left(\frac{-2\sqrt{z}\,c-2i\,b\,j+i\,b\,m+p}{2\sqrt{-c}}\right)}{2(-c)^{3/2}}+\frac{i\,e^{-\frac{b^2(m-2j)^2-p^2+2(i\,b\,m-2i\,b\,j)p}{4c}}(2b\,j-b\,m-i\,p)\sqrt{\pi}\,\text{erfi}\left(\frac{-2\sqrt{z}\,c+2i\,b\,j-i\,b\,m+p}{2\sqrt{-c}}\right)}{2(-c)^{3/2}}+\frac{i\,e^{\frac{b^2(m-2j)^2-p^2-2(i\,b\,m-2i\,b\,j)p}{4c}}(2b\,j-b\,m+i\,p)\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c-2i\,b\,j+i\,b\,m+p}{2\sqrt{c}}\right)}{2c^{3/2}}-\frac{e^{\frac{b^2(m-2j)^2-p^2-2i\,b(2j-m)p}{4c}}(b\,i(2j-m)+p)\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c+2i\,b\,j-i\,b\,m+p}{2\sqrt{c}}\right)}{2c^{3/2}}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $e^{p z^r}\cos^m(b z)\sinh(c z)$

01.19.21.1293.01

$$\int e^{p z^2}\cos^m(b z)\sinh(c z)\,dz = \frac{e^{-\frac{c^2}{4p}}\,2^{-m-2}\sqrt{\pi}\,(1-m\bmod 2)}{\sqrt{p}}\binom{m}{\frac{m}{2}}\left(\text{erfi}\left(\frac{c+2p\,z}{2\sqrt{p}}\right)+\text{erfi}\left(\frac{c-2p\,z}{2\sqrt{p}}\right)\right)+\frac{2^{-m-2}\sqrt{\pi}}{\sqrt{p}}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}e^{-\frac{c^2+2b\,i(2j+m)c-b^2(m-2j)^2}{4p}}\left(e^{\frac{2i\,b\,c\,j}{p}}\text{erfi}\left(\frac{c-2i\,b\,j+i\,b\,m+2p\,z}{2\sqrt{p}}\right)-e^{\frac{2i\,b\,c\,j}{p}}\text{erfi}\left(\frac{-c+2i\,b\,j-i\,b\,m+2p\,z}{2\sqrt{p}}\right)+e^{\frac{i\,b\,c\,m}{p}}\text{erfi}\left(\frac{c+2i\,b\,j-i\,b\,m+2p\,z}{2\sqrt{p}}\right)+e^{\frac{i\,b\,c\,m}{p}}\text{erfi}\left(\frac{c+2i\,b\,j-i\,b\,m-2p\,z}{2\sqrt{p}}\right)\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1294.01

$$\int e^{p\sqrt{z}}\cos^m(b\,z)\sinh(c\,z)\,dz = 2^{-m}\left(\frac{e^{\frac{p^2}{4c}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{p-2c\sqrt{z}}{2\sqrt{-c}}\right)}{4(-c)^{3/2}} - \frac{e^{-\frac{p^2}{4c}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c+p}{2\sqrt{c}}\right)}{4c^{3/2}} + \frac{e^{\sqrt{z}\,p+c\,z}}{2c} + \frac{e^{p\sqrt{z}-c\,z}}{2c}\right)\binom{m}{\frac{m}{2}}(1-m \bmod 2) + 2^{-m-1}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\left(\frac{e^{-\frac{p^2}{4(i\,b(2j-m)-c)}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{-2\sqrt{z}\,c+p+4\,i\,b\,j\sqrt{z}-2\,i\,b\,m\sqrt{z}}{2\sqrt{i\,b(2j-m)-c}}\right)}{2(-c+2\,i\,b\,j-i\,b\,m)^{3/2}} + \frac{e^{-\frac{p^2}{4(-c-2\,i\,b\,j+i\,b\,m)}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{-2\sqrt{z}\,c+p-4\,i\,b\,j\sqrt{z}+2\,i\,b\,m\sqrt{z}}{2\sqrt{-c-2\,i\,b\,j+i\,b\,m}}\right)}{2(-c-2\,i\,b\,j+i\,b\,m)^{3/2}} - \frac{e^{-\frac{p^2}{4(c+b\,i(2j-m))}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c+p+4\,i\,b\,j\sqrt{z}-2\,i\,b\,m\sqrt{z}}{2\sqrt{c+b\,i(2j-m)}}\right)}{2(c+2\,i\,b\,j-i\,b\,m)^{3/2}} - \frac{e^{-\frac{p^2}{4(c-2\,i\,b\,j+i\,b\,m)}}\,p\sqrt{\pi}\,\text{erfi}\left(\frac{2\sqrt{z}\,c+p-4\,i\,b\,j\sqrt{z}+2\,i\,b\,m\sqrt{z}}{2\sqrt{c-2\,i\,b\,j+i\,b\,m}}\right)}{2(c-2\,i\,b\,j+i\,b\,m)^{3/2}} + \frac{4\,e^{p\sqrt{z}}\,(c\cos(b(2j-m)z)\cosh(c\,z)+b(2j-m)\sin(b(2j-m)z)\sinh(c\,z))}{c^2+b^2(m-2j)^2}\right) /;\ m\in\mathbb{N}^+$$

Involving $e^{p\,z}\cos^m(b\,z^r)\sinh(c\,z)$

01.19.21.1295.01

$$\int e^{p\,z}\cos^m(b\,z^2)\sinh(c\,z)\,dz = 2^{-m-1}\left(\frac{e^{(c+p)z}}{c+p}+\frac{e^{(p-c)z}}{c-p}\right)\binom{m}{\frac{m}{2}}(1-m \bmod 2) + \frac{2^{-m-2}\sqrt[4]{-1}\,\sqrt{\pi}}{\sqrt{b}}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{2j-m}}\binom{m}{j}e^{-\frac{i(c+p)^2}{b(8j-4m)}}\left(e^{\frac{i(c+p)^2}{b(4j-2m)}}\,i\,\text{erfi}\left(\frac{(-1)^{3/4}(c+p+2\,b\,i(2j-m)z)}{2\sqrt{b}\sqrt{2j-m}}\right) + e^{\frac{i\,c\,p}{2\,b\,j-b\,m}}\,\text{erfi}\left(\frac{(-1)^{3/4}(-i\,c+i\,p+4\,b\,j\,z-2\,b\,m\,z)}{2\sqrt{b}\sqrt{2j-m}}\right) - \text{erfi}\left(\frac{(-1)^{3/4}(i\,c+i\,p+4\,b\,j\,z-2\,b\,m\,z)}{2\sqrt{b}\sqrt{2j-m}}\right) + e^{\frac{i(c^2+p^2)}{4\,b\,j-2\,b\,m}}\,i\,\text{erfi}\left(\frac{\sqrt[4]{-1}\,(i\,c-i\,p+4\,b\,j\,z-2\,b\,m\,z)}{2\sqrt{b}\sqrt{2j-m}}\right)\right) /;\ m\in\mathbb{N}^+$$

01.19.21.1296.01

$$\int e^{p z} \cos^m\left(b \sqrt{z}\right) \sinh(c z)\, dz = 2^{-1-m} \left(\frac{e^{(c+p) z}}{c+p} + \frac{e^{(p-c) z}}{c-p}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-1} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(-\frac{i\, e^{\frac{b^2 (m-2j)^2}{4(p-c)}} (2 b j - b m) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-2 \sqrt{z}\, c - 2 i b j + i b m + 2 p \sqrt{z}}{2 \sqrt{p-c}}\right)}{2 (p-c)^{3/2}} + \frac{i\, e^{\frac{b^2 (m-2j)^2}{4(p-c)}} (2 b j - b m) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{-2 \sqrt{z}\, c + 2 i b j - i b m + 2 p \sqrt{z}}{2 \sqrt{p-c}}\right)}{2 (p-c)^{3/2}} + \frac{i\, e^{\frac{b^2 (m-2j)^2}{4(c+p)}} (2 b j - b m) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 \sqrt{z}\, c - 2 i b j + i b m + 2 p \sqrt{z}}{2 \sqrt{c+p}}\right)}{2 (c+p)^{3/2}} - \frac{i\, b\, e^{\frac{b^2 (m-2j)^2}{4(c+p)}} (2 j - m) \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 \sqrt{z}\, c + 2 i b j - i b m + 2 p \sqrt{z}}{2 \sqrt{c+p}}\right)}{2 (c+p)^{3/2}} + \frac{4 e^{p z} \cos\left(b (2 j - m) \sqrt{z}\right) (p \sinh(c z) - c \cosh(c z))}{p^2 - c^2} \right) /;\ m \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m(b z) \sinh\left(c z^r\right)$

01.19.21.1297.01

$$\int e^{p z} \cos^m(b z) \sinh\left(c z^2\right) dz = 2^{-m-2} \left(\frac{1}{\sqrt{c}} e^{-\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p + 2 c z}{2 \sqrt{c}}\right) - \frac{1}{\sqrt{-c}} e^{\frac{p^2}{4c}} \operatorname{erfi}\left(\frac{p - 2 c z}{2 \sqrt{-c}}\right) \right) \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sqrt{\pi} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(-\frac{1}{\sqrt{-c}} e^{\frac{(-2 b i j + i b m + p)^2}{4c}} \operatorname{erfi}\left(\frac{-2 b i j + i b m + p - 2 c z}{2 \sqrt{-c}}\right) + \frac{1}{\sqrt{c}} e^{-\frac{(-2 b i j + i b m + p)^2}{4c}} \operatorname{erfi}\left(\frac{-2 b i j + i b m + p + 2 c z}{2 \sqrt{c}}\right) + \frac{1}{\sqrt{c}} e^{-\frac{(b i (2 j - m) + p)^2}{4c}} \operatorname{erfi}\left(\frac{2 i b j - i b m + p + 2 c z}{2 \sqrt{c}}\right) - \frac{1}{\sqrt{-c}} e^{\frac{(b i (2 j - m) + p)^2}{4c}} \operatorname{erfi}\left(\frac{2 i b j - i b m + p - 2 c z}{2 \sqrt{-c}}\right) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1298.01

$$\int e^{p z}\cos^m(b z)\sinh\left(c\sqrt{z}\right)dz = -2^{-m-2}\left(\frac{c\,e^{-\frac{c^2}{4p}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{4e^{p z}\sinh\left(c\sqrt{z}\right)}{p} - \frac{c\,e^{-\frac{c^2}{4p}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c-2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}\right)\binom{m}{\frac{m}{2}}(1-m \bmod 2) - 2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(-\frac{c\,e^{-\frac{c^2}{4(p-i b(2k-m))}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2(i b(2k-m)-p)\sqrt{z}}{2\sqrt{p-i b(2k-m)}}\right)}{(p-i b(2k-m))^{3/2}} + \frac{c\,e^{-\frac{c^2}{4(b i(2k-m)+p)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2(b i(2k-m)+p)\sqrt{z}}{2\sqrt{b i(2k-m)+p}}\right)}{(b i(2k-m)+p)^{3/2}} + \frac{c\,e^{-\frac{c^2}{4(b i(m-2k)+p)}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2(b i(m-2k)+p)\sqrt{z}}{2\sqrt{b i(m-2k)+p}}\right)}{(b i(m-2k)+p)^{3/2}} + \frac{2e^{(p-i b(2k-m))z-c\sqrt{z}}}{p-i b(2k-m)} - \frac{2e^{\sqrt{z}\,c+(b i(2k-m)+p)z}}{b i(2k-m)+p} + \frac{2e^{(p-i b(m-2k))z-c\sqrt{z}}}{p-i b(m-2k)} - \frac{c\,e^{-\frac{c^2}{4(p-i b(m-2k))}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{c+2(i b(m-2k)-p)\sqrt{z}}{2\sqrt{p-i b(m-2k)}}\right)}{(p-i b(m-2k))^{3/2}} - \frac{2e^{\sqrt{z}\,c+(b i(m-2k)+p)z}}{b i(m-2k)+p}\right) /;\ m\in\mathbb{N}^+$$

Involving $e^{p z^r}\cos^m(b z)\sinh(c z^r)$

01.19.21.1299.01

$$\int e^{p z^2}\cos^m(b z)\sinh\left(c z^2\right)dz = 2^{-m-2}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\frac{\mathrm{erfi}\left(\frac{2c z+2p z}{2\sqrt{c+p}}\right)}{\sqrt{c+p}} - \frac{\mathrm{erfi}\left(\frac{2p z-2c z}{2\sqrt{p-c}}\right)}{\sqrt{p-c}}\right) + 2^{-m-2}\sqrt{\pi}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\left(-\frac{e^{-\frac{(i b m-2i b j)^2}{4(p-c)}}\mathrm{erfi}\left(\frac{-2b i j+i b m-2c z+2p z}{2\sqrt{p-c}}\right)}{\sqrt{p-c}} + \frac{e^{-\frac{(i b m-2i b j)^2}{4(c+p)}}\mathrm{erfi}\left(\frac{-2b i j+i b m+2c z+2p z}{2\sqrt{c+p}}\right)}{\sqrt{c+p}} + \frac{e^{\frac{b^2(2j-m)^2}{4(c+p)}}\mathrm{erfi}\left(\frac{2i b j-i b m+2c z+2p z}{2\sqrt{c+p}}\right)}{\sqrt{c+p}} - \frac{e^{\frac{b^2(2j-m)^2}{4(p-c)}}\mathrm{erfi}\left(\frac{2i b j-i b m-2c z+2p z}{2\sqrt{p-c}}\right)}{\sqrt{p-c}}\right) /;\ m\in\mathbb{N}^+$$

01.19.21.1300.01

$$\int e^{p\sqrt{z}}\cos^m(b\,z)\sinh\left(c\sqrt{z}\right)dz = 2^{-m}e^{(c+p)\sqrt{z}}\left(\frac{e^{2\left(-\sqrt{z}\,c-\frac{i\pi}{2}\right)}\left(-\sqrt{z}\,c+p\sqrt{z}-1\right)}{(p-c)^2}+\frac{\sqrt{z}}{c+p}-\frac{1}{(c+p)^2}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)+2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\left(i\,e^{-\frac{i\left(c^2+p\,c+p^2\right)}{b(4k-2m)}}\sqrt{\pi}\left(e^{\frac{i\left(c^2+p^2\right)}{b(8k-4m)}}\left(c\sqrt{i\,b(2k-m)}\;\mathrm{erfi}\left(\frac{-c-p+2\,b\,i(2k-m)\sqrt{z}}{2\sqrt{-i\,b(2k-m)}}\right)+e^{\frac{i\left(c^2+p^2\right)}{4bk-2bm}}\sqrt{i\,b(m-2k)}\;(c-p)\,\mathrm{erfi}\left(\frac{-c+p+2\,b\,i(2k-m)\sqrt{z}}{2\sqrt{i\,b(2k-m)}}\right)-c\,e^{\frac{i(c+p)^2}{4bk-2bm}}\sqrt{i\,b(m-2k)}\;\mathrm{erfi}\left(\frac{-c-p+2\,b\,i(m-2k)\sqrt{z}}{2\sqrt{-i\,b(m-2k)}}\right)+e^{\frac{i(c+p)^2}{4bk-2bm}}\sqrt{i\,b(m-2k)}\;p\,\mathrm{erfi}\left(\frac{c+p-2\,i\,b(m-2k)\sqrt{z}}{2\sqrt{-i\,b(m-2k)}}\right)+e^{\frac{i\,c\,p}{2bk-bm}}\sqrt{-i\,b(m-2k)}\;p\,\mathrm{erfi}\left(\frac{-c+p+2\,b\,i(m-2k)\sqrt{z}}{2\sqrt{i\,b(m-2k)}}\right)-c\,e^{\frac{i\,c\,p}{2bk-bm}}\sqrt{-i\,b(m-2k)}\;\mathrm{erfi}\left(\frac{-c+p+2\,b\,i(m-2k)\sqrt{z}}{2\sqrt{i\,b(m-2k)}}\right)\right)-e^{\frac{i\left(c^2+p^2\right)}{b(8k-4m)}}\sqrt{i\,b(2k-m)}\;p\,\mathrm{erfi}\left(\frac{c+p-2\,i\,b(2k-m)\sqrt{z}}{2\sqrt{-i\,b(2k-m)}}\right)\right)\right)\Big/\left(b(2k-m)\sqrt{b^2(m-2k)^2}\right)+\frac{8\,e^{p\sqrt{z}}\sin(b(2k-m)z)\sinh\left(c\sqrt{z}\right)}{b(2k-m)}\right)\;/;\;m\in\mathbb{N}^+$$

Involving $e^{p\,z}\cos^m\left(b\,z^r\right)\sinh\left(c\,z^r\right)$

01.19.21.1301.01

$$\int e^{p\,z}\cos^m\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = 2^{-m-2}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\frac{e^{-\frac{p^2}{4c}}\,\mathrm{erfi}\left(\frac{p+2\,c\,z}{2\sqrt{c}}\right)}{\sqrt{c}}-\frac{e^{\frac{p^2}{4c}}\,\mathrm{erfi}\left(\frac{p-2\,c\,z}{2\sqrt{-c}}\right)}{\sqrt{-c}}\right)+2^{-m-2}\sqrt{\pi}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\left(-\frac{e^{-\frac{p^2}{4(-c-2\,i\,b\,j+i\,b\,m)}}\,\mathrm{erfi}\left(\frac{p-2\,c\,z-4\,i\,b\,j\,z+2\,i\,b\,m\,z}{2\sqrt{-c-2\,i\,b\,j+i\,b\,m}}\right)}{\sqrt{-c-2\,i\,b\,j+i\,b\,m}}+\frac{e^{-\frac{p^2}{4(c-2\,i\,b\,j+i\,b\,m)}}\,\mathrm{erfi}\left(\frac{p+2\,c\,z-4\,i\,b\,j\,z+2\,i\,b\,m\,z}{2\sqrt{c-2\,i\,b\,j+i\,b\,m}}\right)}{\sqrt{c-2\,i\,b\,j+i\,b\,m}}+\frac{e^{-\frac{p^2}{4(c+b\,i(2j-m))}}\,\mathrm{erfi}\left(\frac{p+2\,c\,z+4\,i\,b\,j\,z-2\,i\,b\,m\,z}{2\sqrt{c+2\,i\,b\,j-i\,b\,m}}\right)}{\sqrt{c+2\,i\,b\,j-i\,b\,m}}-\frac{e^{-\frac{p^2}{4(i\,b(2j-m)-c)}}\,\mathrm{erfi}\left(\frac{p-2\,c\,z+4\,i\,b\,j\,z-2\,i\,b\,m\,z}{2\sqrt{-c+2\,i\,b\,j-i\,b\,m}}\right)}{\sqrt{-c+2\,i\,b\,j-i\,b\,m}}\right)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1302.01

$$\int e^{p z} \cos^m\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = 2^{-m-2} \left(-\frac{c\, e^{-\frac{c^2}{4 p}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c}{2 \sqrt{p}}\right)}{p^{3/2}} + \frac{4 e^{p z} \sinh\left(c \sqrt{z}\right)}{p} - \frac{c\, e^{-\frac{c^2}{4 p}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{c + 2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{\sqrt{\pi}}{p^{3/2}} \left(e^{-\frac{(c + b i (m-2 s))^2}{4 p}} (i c - b m + 2 b s) \operatorname{erf}\left(\frac{-i c + b (m - 2 s) + 2 i p \sqrt{z}}{2 \sqrt{p}}\right) + e^{-\frac{(c + b i (m-2 s))^2}{4 p}} (-i c + b (m - 2 s)) \operatorname{erf}\left(\frac{-i c + b (m - 2 s) - 2 i p \sqrt{z}}{2 \sqrt{p}}\right) - e^{\frac{(i c + b (m - 2 s))^2}{4 p}} (c - i b (m - 2 s)) \operatorname{erfi}\left(\frac{-c + b i (m - 2 s) + 2 p \sqrt{z}}{2 \sqrt{p}}\right) - e^{\frac{(i c + b (m - 2 s))^2}{4 p}} (c - i b (m - 2 s)) \operatorname{erfi}\left(\frac{c - i b (m - 2 s) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)\right) + \frac{8 e^{p z} \cos\left(b (m - 2 s) \sqrt{z}\right) \sinh\left(c \sqrt{z}\right)}{p}\right) /; m \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m\left(b z^r\right) \sinh\left(c z^r\right)$

01.19.21.1303.01

$$\int e^{p z^r} \cos^m(b z^r) \sinh(c z^r)\, dz = -\frac{2^{-m-1} z}{r} \left(\binom{m}{\frac{m}{2}} \left(((-c - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-c - p) z^r\right) - ((c - p) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c - p) z^r\right)\right) (1 - m \bmod 2) + \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{1}{r}, (-c - i b m - p + 2 i b s) z^r\right) ((-c - i b m - p + 2 i b s) z^r)^{-1/r} - ((c - i b m - p + 2 i b s) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c - i b m - p + 2 i b s) z^r\right) + ((-c + i b m - p - 2 i b s) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-c + i b m - p - 2 i b s) z^r\right) - ((c + i b m - p - 2 i b s) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (c + i b m - p - 2 i b s) z^r\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.1304.01

$$\int e^{p z^2} \cos^m(b z^2) \sinh(c z^2)\, dz = 2^{-m-2} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(\frac{\operatorname{erfi}(\sqrt{c+p}\, z)}{\sqrt{c+p}} - \frac{\operatorname{erfi}(\sqrt{p-c}\, z)}{\sqrt{p-c}} \right) (1 - m \bmod 2) - 2^{-m-2} \sqrt{\pi} \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} \left(\frac{\operatorname{erfi}\left(\sqrt{-c - i b m + p + 2 i b s}\, z\right)}{\sqrt{-c - i b m + p + 2 i b s}} + \frac{\operatorname{erfi}\left(\sqrt{-c + i b m + p - 2 i b s}\, z\right)}{\sqrt{-c + i b m + p - 2 i b s}} - \frac{\operatorname{erfi}\left(\sqrt{c - i b m + p + 2 i b s}\, z\right)}{\sqrt{c - i b m + p + 2 i b s}} - \frac{\operatorname{erfi}\left(\sqrt{c + i b m + p - 2 i b s}\, z\right)}{\sqrt{c + i b m + p - 2 i b s}} \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1305.01

$$\int e^{p \sqrt{z}} \cos^m(b \sqrt{z}) \sinh(c \sqrt{z})\, dz = \frac{i\, 2^{1-m} e^{p\sqrt{z}}}{(p^2 - c^2)^2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(i\, c \left(-\sqrt{z}\, c^2 - 2 p + p^2 \sqrt{z}\right) \cosh(c\sqrt{z}) - i \left(p^2 (p\sqrt{z} - 1) - c^2 (\sqrt{z}\, p + 1)\right) \sinh(c \sqrt{z}) \right) + 2^{1-m} e^{p\sqrt{z}}\, i \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} \left(\left(i \left(p^2 (p\sqrt{z} - 1) - (-c - i b m + 2 i b s)^2 (\sqrt{z}\, p + 1)\right) \sinh((-c - i b m + 2 i b s)\sqrt{z}) - i (-c - i b m + 2 i b s) \left(\sqrt{z}\, p^2 - 2 p - (-c - i b m + 2 i b s)^2 \sqrt{z}\right) \cosh((-c - i b m + 2 i b s)\sqrt{z}) \right) \Big/ \left(p^2 - (-c - i b m + 2 i b s)^2\right)^2 + \left(i \left(p^2 (p\sqrt{z} - 1) - (-c + i b m - 2 i b s)^2 (\sqrt{z}\, p + 1)\right) \sinh((-c + i b m - 2 i b s)\sqrt{z}) - i (-c + i b m - 2 i b s) \left(\sqrt{z}\, p^2 - 2 p - (-c + i b m - 2 i b s)^2 \sqrt{z}\right) \cosh((-c + i b m - 2 i b s)\sqrt{z}) \right) \Big/ \left(p^2 - (-c + i b m - 2 i b s)^2\right)^2 \right) /;\ m \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^m(a z^r + q) \sinh(c z^r + g)$

01.19.21.1306.01

$$\int e^{b z^r + e} \cos^m(a z^r + q) \sinh(c z^r + g)\, dz = -\frac{i\, 2^{-m-1} z}{r} \left(\binom{m}{\frac{m}{2}} \left(e^{e + g - \frac{i\pi}{2}} \Gamma\left(\frac{1}{r}, (-b - c) z^r\right) ((-b - c) z^r)^{-1/r} + e^{e - g + \frac{i\pi}{2}} ((c - b) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (c - b) z^r\right) \right) (1 - m \bmod 2) + \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} \left(e^{e + g + i m q - 2 i q s - \frac{i\pi}{2}} \Gamma\left(\frac{1}{r}, (-b - c - i a m + 2 i a s) z^r\right) ((-b - c - i a m + 2 i a s) z^r)^{-1/r} + e^{e - g + i m q - 2 i q s + \frac{i\pi}{2}} ((-b + c - i a m + 2 i a s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + c - i a m + 2 i a s) z^r\right) + e^{e + g - i m q + 2 i q s - \frac{i\pi}{2}} ((-b - c + i a m - 2 i a s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b - c + i a m - 2 i a s) z^r\right) + e^{e - g - i m q + 2 i q s + \frac{i\pi}{2}} ((-b + c + i a m - 2 i a s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + c + i a m - 2 i a s) z^r\right) \right) \right) /;\ m \in \mathbb{N}^+$$

01.19.21.1307.01

$$\int e^{b z^2+e} \cos^m\left(a z^2+q\right) \sinh\left(c z^2+g\right) dz = 2^{-m-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(-e^{e-g+i(m-2k)q} \left(\frac{\operatorname{erfi}\left(\sqrt{b-c+a i (m-2k)}\, z\right)}{\sqrt{b-c+a i (m-2k)}} - \frac{e^{2(g-i(m-2k)q)} \operatorname{erfi}\left(\sqrt{b+c-i a (m-2k)}\, z\right)}{\sqrt{b+c-i a (m-2k)}}\right) - e^{e-g-i(m-2k)q} \left(\frac{\operatorname{erfi}\left(\sqrt{b-c-i a (m-2k)}\, z\right)}{\sqrt{b-c-i a (m-2k)}} - \frac{e^{2(g+i(m-2k)q)} \operatorname{erfi}\left(\sqrt{b+c+a i (m-2k)}\, z\right)}{\sqrt{b+c+a i (m-2k)}}\right)\right) - 2^{-m-2} e^{e-g} \sqrt{\pi} \binom{m}{\frac{m}{2}} \left(\frac{\operatorname{erfi}\left(\sqrt{b-c}\, z\right)}{\sqrt{b-c}} + \frac{e^{2\left(g+\frac{i\pi}{2}\right)} \operatorname{erfi}\left(\sqrt{b+c}\, z\right)}{\sqrt{b+c}}\right) (1 - m \bmod 2) \;/;\; m \in \mathbb{N}^+$$

01.19.21.1308.01

$$\int e^{\sqrt{z}\, b+e} \cos^m\left(\sqrt{z}\, a+q\right) \sinh\left(\sqrt{z}\, c+g\right) dz = 2^{-m} \left(\frac{e^{\sqrt{z}\,(b+c)+e+g} \left(\sqrt{z}\, b+c\sqrt{z}-1\right)}{(b+c)^2} - \frac{e^{\sqrt{z}\,(b-c)+e-g} \left(\sqrt{z}\, b-c\sqrt{z}-1\right)}{(c-b)^2}\right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) + 2^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{e+g+i(m-2k)q+(b+c+a i (m-2k))\sqrt{z}} \left(\sqrt{z}\, b+(c+a i (m-2k))\sqrt{z}-1\right)}{(b+c+a i (m-2k))^2} + \frac{e^{e+g-i(m-2k)q+(b+c-i a (m-2k))\sqrt{z}} \left(\sqrt{z}\, b+(c-i a (m-2k))\sqrt{z}-1\right)}{(b+c-i a (m-2k))^2} - \frac{e^{e-g+i(m-2k)q+(b-c+a i (m-2k))\sqrt{z}} \left(\sqrt{z}\, b-(c-i a (m-2k))\sqrt{z}-1\right)}{(-b+c-i a (m-2k))^2} - \frac{e^{e-g-i(m-2k)q+(b-c-i a (m-2k))\sqrt{z}} \left(\sqrt{z}\, b-(c+a i (m-2k))\sqrt{z}-1\right)}{(-b+c+a i (m-2k))^2}\right) \binom{m}{k} \;/;\; m \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos^m\left(a z^r+p z+q\right) \sinh\left(c z^r+f z+g\right)$

01.19.21.1309.01

$$\int e^{b z^2+d z+e} \cos^m\left(a z^2 + p z + q\right) \sinh\left(c z^2 + f z + g\right) dz ==$$

$$2^{-m-2} \sqrt{\pi} \left(\frac{e^{e+g-\frac{d^2+2 f d+f^2}{4(b+c)}} \operatorname{erfi}\left(\frac{d+f+2 b z+2 c z}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} - \frac{e^{e-g-\frac{d^2-2 f d+f^2}{4(b-c)}} \operatorname{erfi}\left(\frac{d-f+2 b z-2 c z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}} \right) \binom{m}{\frac{m}{2}} (1 - m \bmod 2) +$$

$$2^{-m-2} \sqrt{\pi} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(-\frac{e^{-\frac{(d-f-2 i j p+i m p)^2}{4(b-c-2 i a j+i a m)}+e-g-2 i j q+i m q} \operatorname{erfi}\left(\frac{d-f-2 i j p+i m p+2 b z-2 c z-4 i a j z+2 i a m z}{2\sqrt{b-c-2 i a j+i a m}}\right)}{\sqrt{b-c-2 i a j+i a m}} + \right.$$

$$\frac{e^{-\frac{(d+f-2 i j p+i m p)^2}{4(b+c-2 i a j+i a m)}+e+g-2 i j q+i m q} \operatorname{erfi}\left(\frac{d+f-2 i j p+i m p+2 b z+2 c z-4 i a j z+2 i a m z}{2\sqrt{b+c-2 i a j+i a m}}\right)}{\sqrt{b+c-2 i a j+i a m}} -$$

$$\frac{e^{-\frac{(d-f+i(2j-m)p)^2}{4(b-c+a i(2j-m))}+e-g+2 i j q-i m q} \operatorname{erfi}\left(\frac{d-f+2 i j p-i m p+2 b z-2 c z+4 i a j z-2 i a m z}{2\sqrt{b-c+2 i a j-i a m}}\right)}{\sqrt{b-c+2 i a j-i a m}} +$$

$$\left. \frac{e^{-\frac{(d+f+i(2j-m)p)^2}{4(b+c+a i(2j-m))}+e+g+2 i j q-i m q} \operatorname{erfi}\left(\frac{d+f+2 i j p-i m p+2 b z+2 c z+4 i a j z-2 i a m z}{2\sqrt{b+c+2 i a j-i a m}}\right)}{\sqrt{b+c+2 i a j-i a m}} \right) /; m \in \mathbb{N}^+$$

01.19.21.1310.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos^m\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-m-2} e^{e-g+\frac{i\pi}{2}} i \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\sqrt{\pi}\left(-\frac{(b-c)\, e^{-\frac{(b-c)^2}{4(d-f)}} \operatorname{erfi}\left(\frac{b-c+2(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)}{(d-f)^{3/2}} - \frac{(b+c)\, e^{-\frac{(b+c)^2}{4(d+f)}+2g-i\pi} \operatorname{erfi}\left(\frac{b+c+2(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)}{(d+f)^{3/2}}\right) + \frac{2 e^{\sqrt{z}\,(b-c)+(d-f) z}}{d-f} + \frac{2 e^{2\left(g-\frac{i\pi}{2}\right)+(d+f) z+(b+c)\sqrt{z}}}{d+f}\right) + 2^{-m-2} i \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \left(e^{e-g-i q (m-2s)+\frac{i\pi}{2}} \left(\frac{2 e^{\sqrt{z}\,(b-c-i a m+2 i a s)+(d-f-i m p+2 i p s) z}}{d-f-i m p+2 i p s} - \left(e^{-\frac{(b-c-i a m+2 i a s)^2}{4(d-f-i m p+2 i p s)}} \sqrt{\pi}\, (b-c-i a m+2 i a s) \operatorname{erfi}\left(\frac{b-c+a i (2s-m)+2(d-f-i m p+2 i p s)\sqrt{z}}{2\sqrt{d-f-i m p+2 i p s}}\right)\right) \Big/ (d-f-i m p+2 i p s)^{3/2} + \frac{2 e^{2g+2 i q (m-2s)+(d+f+i m p-2 i p s) z+(b+c+i a m-2 i a s)\sqrt{z}-i\pi}}{d+f+i m p-2 i p s} - \left(e^{-\frac{(b+c+a i (m-2s))^2}{4(d+f+i m p-2 i p s)}+2g+2 i q (m-2s)-i\pi} \sqrt{\pi}\, (b+c+a i (m-2s)) \operatorname{erfi}\left(\frac{b+c+a i (m-2s)+2(d+f+i m p-2 i p s)\sqrt{z}}{2\sqrt{d+f+i m p-2 i p s}}\right)\right) \Big/ (d+f+i m p-2 i p s)^{3/2}\right) + e^{e+g-i q (m-2s)-\frac{i\pi}{2}} \left(\frac{2 e^{\sqrt{z}\,(b+c-i a m+2 i a s)+(d+f-i m p+2 i p s) z}}{d+f-i m p+2 i p s} - \left(e^{-\frac{(b+c-i a m+2 i a s)^2}{4(d+f-i m p+2 i p s)}} \sqrt{\pi}\, (b+c-i a m+2 i a s) \operatorname{erfi}\left(\frac{b+c+a i (2s-m)+2(d+f-i m p+2 i p s)\sqrt{z}}{2\sqrt{d+f-i m p+2 i p s}}\right)\right) \Big/ (d+f-i m p+2 i p s)^{3/2} + \frac{2 e^{-2g+2 i q (m-2s)+(d-f+i m p-2 i p s) z+(b-c+i a m-2 i a s)\sqrt{z}+i\pi}}{d-f+i m p-2 i p s} - \left(e^{-\frac{(b-c+i a m-2 i a s)^2}{4(d-f+i m p-2 i p s)}-2g+2 i q (m-2s)+i\pi} \sqrt{\pi}\, (b-c+i a m-2 i a s) \operatorname{erfi}\left(\frac{b-c+a i (m-2s)+2(d-f+i m p-2 i p s)\sqrt{z}}{2\sqrt{d-f+i m p-2 i p s}}\right)\right) \Big/ (d-f+i m p-2 i p s)^{3/2}\right) /;\ m \in \mathbb{N}^+$$

Involving powers of cos and rational functions of exp

Involving $\cos^m(e z)\sinh(c z)\left(a+b\,e^{d z}\right)^{-n}$

01.19.21.1311.01

$$\int \frac{\cos^m(e z)\sinh(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = \frac{2^{-m-1}a^{-n}e^{-c z}(1-m \bmod 2)}{c}\binom{m}{\frac{m}{2}}\left(e^{2 c z}\,{}_2F_1\!\left(\frac{c}{d}, n; \frac{c+d}{d}; -\frac{b\,e^{d z}}{a}\right)+{}_2F_1\!\left(-\frac{c}{d}, n; 1-\frac{c}{d}; -\frac{b\,e^{d z}}{a}\right)\right)-$$
$$2^{-m-1}a^{-n}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{-c-i e m+2 i e s}\left(e^{(-c-i e m+2 i e s) z}\,{}_2F_1\!\left(\frac{-c-i e m+2 i e s}{d}, n; \frac{-c+d-i e m+2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)+\right.\right.$$
$$\left.e^{(c+i e m-2 i e s) z}\,{}_2F_1\!\left(\frac{c+i e m-2 i e s}{d}, n; \frac{c+d+i e m-2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)\right)+$$
$$\frac{1}{-c+i e m-2 i e s}\left(e^{(c-i e m+2 i e s) z}\,{}_2F_1\!\left(\frac{c-i e m+2 i e s}{d}, n; \frac{c+d-i e m+2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)+\right.$$
$$\left.\left.\left.e^{(-c+i e m-2 i e s) z}\,{}_2F_1\!\left(\frac{-c+i e m-2 i e s}{d}, n; \frac{-c+d+i e m-2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) /; n\in\mathbb{N}^+\land m\in\mathbb{N}^+$$

Involving $e^{p z}\cos^m(e z)\sinh(c z)\left(a+b\,e^{d z}\right)^{-n}$

01.19.21.1312.01

$$\int \frac{e^{p z}\cos^m(e z)\sinh(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = \frac{2^{-m-1}a^{-n}}{(c-p)(c+p)}\binom{m}{\frac{m}{2}}\left(e^{(p-c) z}(c+p)\,{}_2F_1\!\left(\frac{p-c}{d}, n; \frac{-c+d+p}{d}; -\frac{b\,e^{d z}}{a}\right)+e^{(c+p) z}(c-p)\,{}_2F_1\!\left(\frac{c+p}{d}, n; \frac{c+d+p}{d}; -\frac{b\,e^{d z}}{a}\right)\right)$$
$$(1-m \bmod 2)-2^{-m-1}a^{-n}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}$$
$$\left(\left(e^{(-c-i e m+p+2 i e s) z}(-c-i e m-p+2 i e s)\,{}_2F_1\!\left(\frac{-c-i e m+p+2 i e s}{d}, n; \frac{-c+d-i e m+p+2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)+\right.\right.$$
$$e^{(c+i e m+p-2 i e s) z}(-c-i e m+p+2 i e s)\,{}_2F_1\!\left(\frac{c+i e m+p-2 i e s}{d}, n;\right.$$
$$\left.\left.\frac{c+d+i e m+p-2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\Big/((-c-i e m-p+2 i e s)(-c-i e m+p+2 i e s))+$$
$$\left(e^{(c-i e m+p+2 i e s) z}(-c+i e m+p-2 i e s)\,{}_2F_1\!\left(\frac{c-i e m+p+2 i e s}{d}, n; \frac{c+d-i e m+p+2 i e s}{d}; -\frac{b\,e^{d z}}{a}\right)+\right.$$
$$e^{(-c+i e m+p-2 i e s) z}(-c+i e m-p-2 i e s)\,{}_2F_1\!\left(\frac{-c+i e m+p-2 i e s}{d}, n; \frac{-c+d+i e m+p-2 i e s}{d};\right.$$
$$\left.\left.\left.-\frac{b\,e^{d z}}{a}\right)\right)\Big/((-c+i e m-p-2 i e s)(-c+i e m+p-2 i e s))\right) /; n\in\mathbb{N}^+\land m\in\mathbb{N}^+$$

Involving powers of cos and algebraic functions of exp

Involving $\left(a+b\, e^{d z}\right)^{\beta} \cos^{m}(e z) \sinh(c z)$

01.19.21.1313.01

$$\int \left(a+b\, e^{d z}\right)^{\beta} \cos^{m}(e z) \sinh(c z)\, dz = \frac{1}{c}\left(2^{-m-1} e^{-c z}\left(a+b\, e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\left(e^{2 c z}\, {}_2F_1\left(\frac{c}{d}, -\beta; \frac{c+d}{d}; -\frac{b\, e^{d z}}{a}\right)+{}_2F_1\left(-\frac{c}{d}, -\beta; 1-\frac{c}{d}; -\frac{b\, e^{d z}}{a}\right)\right)(1-m \bmod 2)\right)-2^{-m-1}\left(a+b\, e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{-c-i e m+2 i e s}\left(e^{(-c-i e m+2 i e s) z}\, {}_2F_1\left(\frac{-c-i e m+2 i e s}{d}, -\beta; \frac{-c+d-i e m+2 i e s}{d}; -\frac{b\, e^{d z}}{a}\right)+e^{(c+i e m-2 i e s) z}\, {}_2F_1\left(\frac{c+i e m-2 i e s}{d}, -\beta; \frac{c+d+i e m-2 i e s}{d}; -\frac{b\, e^{d z}}{a}\right)\right)+\frac{1}{-c+i e m-2 i e s}\left(e^{(c-i e m+2 i e s) z}\, {}_2F_1\left(\frac{c-i e m+2 i e s}{d}, -\beta; \frac{c+d-i e m+2 i e s}{d}; -\frac{b\, e^{d z}}{a}\right)+e^{(-c+i e m-2 i e s) z}\, {}_2F_1\left(\frac{-c+i e m-2 i e s}{d}, -\beta; \frac{-c+d+i e m-2 i e s}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) /; m \in \mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b\, e^{d z}\right)^{\beta} \cos^{m}(e z) \sinh(c z)$

01.19.21.1314.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^{\beta}\cos^{m}(e\,z)\sinh(c\,z)\,dz = \frac{1}{(c-p)(c+p)}\Bigg(2^{-m-1}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\Bigg(e^{(p-c)z}(c+p)\,{}_2F_1\left(\frac{p-c}{d},-\beta;\frac{-c+d+p}{d};-\frac{b\,e^{dz}}{a}\right)+ e^{(c+p)z}(c-p)\,{}_2F_1\left(\frac{c+p}{d},-\beta;\frac{c+d+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)(1-m \bmod 2)\Bigg) - 2^{-m-1}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\Bigg(e^{(-c-i\,e\,m+p+2\,i\,e\,s)z}(-c-i\,e\,m-p+2\,i\,e\,s)\,{}_2F_1\left(\frac{-c-i\,e\,m+p+2\,i\,e\,s}{d},-\beta;\frac{-c+d-i\,e\,m+p+2\,i\,e\,s}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(c+i\,e\,m+p-2\,i\,e\,s)z}(-c-i\,e\,m+p+2\,i\,e\,s)\,{}_2F_1\left(\frac{c+i\,e\,m+p-2\,i\,e\,s}{d},-\beta;\frac{c+d+i\,e\,m+p-2\,i\,e\,s}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg/ ((-c-i\,e\,m-p+2\,i\,e\,s)(-c-i\,e\,m+p+2\,i\,e\,s))+\Bigg(e^{(c-i\,e\,m+p+2\,i\,e\,s)z}(-c+i\,e\,m+p-2\,i\,e\,s)\,{}_2F_1\left(\frac{c-i\,e\,m+p+2\,i\,e\,s}{d},-\beta;\frac{c+d-i\,e\,m+p+2\,i\,e\,s}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(-c+i\,e\,m+p-2\,i\,e\,s)z}(-c+i\,e\,m-p-2\,i\,e\,s)\,{}_2F_1\left(\frac{-c+i\,e\,m+p-2\,i\,e\,s}{d},-\beta;\frac{-c+d+i\,e\,m+p-2\,i\,e\,s}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg/ ((-c+i\,e\,m-p-2\,i\,e\,s)(-c+i\,e\,m+p-2\,i\,e\,s))\Bigg)\;/;\; m\in\mathbb{N}^{+}$$

Involving products of cos and exp

Involving $e^{pz}\cos(a\,z)\cos(b\,z)\sinh(c\,z)$

01.19.21.1315.01

$$\int e^{pz}\cos(a\,z)\cos(b\,z)\sinh(c\,z)\,dz = -\frac{1}{4}\,e^{pz}\left(\frac{(c-i\,a+i\,b)\cos((a-b+i\,c)\,z)+i\,p\sin((a-b+i\,c)\,z)}{(a-b+i\,(c-p))\,(a-b+i\,(c+p))}+\frac{(c+i\,a+i\,b)\cos((a+b-i\,c)\,z)-i\,p\sin((a+b-i\,c)\,z)}{(a+b-i\,(c-p))\,(a+b-i\,(c+p))}+\frac{(c-i\,b+i\,a)\cos((a-b-i\,c)\,z)+p\sinh((-c-i\,a+i\,b)\,z)}{a^2-2\,(b+i\,c)\,a+b^2-c^2+p^2+2\,i\,b\,c}-\frac{i\,((a+b+i\,c)\cos((a+b+i\,c)\,z)-p\sin((a+b+i\,c)\,z))}{(a+b+i\,(c-p))\,(a+b+i\,(c+p))}\right)$$

Involving rational functions of cos and exp

Involving $\frac{e^{pz}\sinh(c\,z)}{a+b\cos(d\,z)}$

01.19.21.1316.01

$$\int \frac{e^{p z} \sinh(c z)}{a + b \cos(d z)} \, dz = \frac{1}{2} \left(\frac{1}{b \sqrt{a^2 - b^2} \, (c + i d + p)} \left(e^{(c + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \left(e^{(-c + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 1; 2 - \frac{i (p - c)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 1; 2 - \frac{i (p - c)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \Big/ \left(b \sqrt{a^2 - b^2} \, (-c + i d + p) \right) \right)$$

Involving $e^{p z} (a + b \cos(d z))^{-n} \sinh(c z)$

01.19.21.1317.01

$$\int \frac{e^{p z} \sinh(c z)}{(a + b \cos(d z))^2} \, dz = \frac{1}{2} \left(\frac{1}{b (a^2 - b^2)^{3/2} (c + i d + p)} \left(e^{(c + i d + p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 1; 2 - \frac{i (c + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) + (b^2 - a^2) \left({}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) - {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) - a \sqrt{a^2 - b^2} \left({}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + {}_2F_1\left(-\frac{i (c + i d + p)}{d}, 2; 2 - \frac{i (c + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) - \left(e^{(-c + i d + p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 1; 2 - \frac{i (p - c)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 1; 2 - \frac{i (p - c)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) + (b^2 - a^2) \left({}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 2; 2 - \frac{i (p - c)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) - {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 2; 2 - \frac{i (p - c)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) - a \sqrt{a^2 - b^2} \left({}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 2; 2 - \frac{i (p - c)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + {}_2F_1\left(-\frac{i (-c + i d + p)}{d}, 2; 2 - \frac{i (p - c)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right) \Big/ \left(b (a^2 - b^2)^{3/2} (-c + i d + p) \right) \right)$$

Involving $\frac{e^{p z} \sinh(c z)}{a + b \cos^2(d z)}$

01.19.21.1318.01

$$\int \frac{e^{p z} \sinh(c z)}{a + b \cos^2(d z)} \, dz = \frac{1}{2} \Bigg(\Bigg(e^{(-c+2 i d + p) z} \Bigg(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 1; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(-2 a - 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 1; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \, b \sqrt{a+b} \, (-c + 2 i d + p)\right) - \Bigg(e^{(c+2 i d + p) z} \Bigg(\left(2 a - 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 1; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(-2 a - 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 1; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \, b \sqrt{a+b} \, (c + 2 i d + p)\right)\Bigg)$$

Involving $e^{p z} \left(a + b \cos^2(d z)\right)^{-n} \sinh(c z)$

01.19.21.1319.01

$$\int \frac{e^{p z} \sinh(c z)}{\left(a + b \cos^2(d z)\right)^2} \, dz = \frac{1}{2} \Bigg(\Bigg(e^{(-c+2 i d+p) z} \Bigg(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 1; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + (-2 a - b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 1; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) + 2 \sqrt{a} \Bigg(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b}\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 2; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \sqrt{a} + b \sqrt{a+b}\right) {}_2F_1\left(1 - \frac{i (p-c)}{2 d}, 2; 2 - \frac{i (p-c)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) \Bigg) \Bigg) \Bigg) \Big/ \left(2 a^{3/2} b (a+b)^{3/2} (-c + 2 i d + p)\right) - \Bigg(e^{(c+2 i d+p) z} \Bigg(-(2 a + b) \left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 1; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + (-2 a - b) \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 1; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) + 2 \sqrt{a} \Bigg(\left(-2 a^{3/2} + 2 \sqrt{a+b} \, a - 2 b \sqrt{a} + b \sqrt{a+b}\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 2; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b}\right) + \left(2 a^{3/2} + 2 \sqrt{a+b} \, a + 2 b \sqrt{a} + b \sqrt{a+b}\right) {}_2F_1\left(1 - \frac{i (c+p)}{2 d}, 2; 2 - \frac{i (c+p)}{2 d}; -\frac{b e^{2 i d z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b}\right) \Bigg) \Bigg) \Bigg) \Big/ \left(2 a^{3/2} b (a+b)^{3/2} (c + 2 i d + p)\right) \Bigg)$$

Involving $\frac{e^{p z} \cos(e z) \sinh(c z)}{a + b \cos(d z)}$

01.19.21.1320.01

$$\int \frac{e^{p z} \cos(e z) \sinh(c z)}{a + b \cos(d z)} \, dz = \frac{1}{4} \left(\left(e^{(c+i d+i e+p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (c + i d + i e + p)}{d}, 1; 2 - \frac{i (c + i e + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (c + i d + i e + p)}{d}, 1; 2 - \frac{i (c + i e + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \Big/ \left(b \sqrt{a^2 - b^2} (c + i d + i e + p) \right) + \left(e^{(c - i e + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (c - i e + i d + p)}{d}, 1; 2 - \frac{i (c - i e + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (c - i e + i d + p)}{d}, 1; 2 - \frac{i (c - i e + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \Big/ \left(b \sqrt{a^2 - b^2} (c - i e + i d + p) \right) - \left(e^{(-c + i d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (-c + i d + i e + p)}{d}, 1; 2 - \frac{i (-c + i e + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (-c + i d + i e + p)}{d}, 1; 2 - \frac{i (-c + i e + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \Big/ \left(b \sqrt{a^2 - b^2} (-c + i d + i e + p) \right) - \left(e^{(-c - i e + i d + p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (-c - i e + i d + p)}{d}, 1; 2 - \frac{i (-c - i e + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (-c - i e + i d + p)}{d}, 1; 2 - \frac{i (-c - i e + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \Big/ \left(b \sqrt{a^2 - b^2} (-c - i e + i d + p) \right) \right)$$

Involving $e^{p z} \cos(e z) \sinh(c z) (a + b \cos(d z))^{-n}$

01.19.21.1321.01

$$\int \frac{e^{p z} \cos(e z) \sinh(c z)}{(a + b \cos(d z))^2} \, dz = \frac{1}{4} \left(\left(e^{(c+i d+i e+p) z} \left(a \left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(-\frac{i (c + i d + i e + p)}{d}, 1; 2 - \frac{i (c + i e + p)}{d}; \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + a \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(-\frac{i (c + i d + i e + p)}{d}, 1; 2 - \frac{i (c + i e + p)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}} \right) + \right.\right.\right.$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(c+i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(c+i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(c+i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\left(-\frac{i\,(c+i\,d+i\,e+p)}{d},\right.\right.$$

$$\left.\left.\left.\left.2;2-\frac{i\,(c+i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(c+i\,d+i\,e+p)\right)+$$

$$\left(e^{(c-i\,e+i\,d+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},1;2-\frac{i\,(c-i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},1;2-\frac{i\,(c-i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(c-i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(c-i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)-$$

$$a\sqrt{a^2-b^2}\left({}_2F_1\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(c-i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+{}_2F_1\right.$$

$$\left.\left.\left.\left(-\frac{i\,(c-i\,e+i\,d+p)}{d},2;2-\frac{i\,(c-i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\right)\right)\Big/\left(b\left(a^2-b^2\right)^{3/2}(c-i\,e+i\,d+p)\right)-$$

$$\left(e^{(-c+i\,d+i\,e+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},1;2-\frac{i\,(-c+i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)+\right.\right.$$

$$a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},1;2-\frac{i\,(-c+i\,e+p)}{d};-\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)+$$

$$\left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},2;2-\frac{i\,(-c+i\,e+p)}{d};\frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$

$$ {}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d}, 2; 2-\frac{i\,(-c+i\,e+p)}{d}; -\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg) - a\sqrt{a^2-b^2} $$

$$ \left({}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d}, 2; 2-\frac{i\,(-c+i\,e+p)}{d}; \frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right) + {}_2F_1\left(-\frac{i\,(-c+i\,d+i\,e+p)}{d},\right.\right. $$

$$ \left.\left. 2; 2-\frac{i\,(-c+i\,e+p)}{d}; -\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\Bigg)\Bigg)\Bigg) \Big/ \left(b\left(a^2-b^2\right)^{3/2}(-c+i\,d+i\,e+p)\right) - $$

$$ \left(e^{(-c-i\,e+i\,d+p)\,z}\left(a\left(a+\sqrt{a^2-b^2}\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d}, 1; 2-\frac{i\,(-c-i\,e+p)}{d}; \frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right) + \right.\right. $$

$$ a\left(\sqrt{a^2-b^2}-a\right){}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d}, 1; 2-\frac{i\,(-c-i\,e+p)}{d}; -\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right) + $$

$$ \left(b^2-a^2\right)\left({}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d}, 2; 2-\frac{i\,(-c-i\,e+p)}{d}; \frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right) - \right. $$

$$ \left.{}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d}, 2; 2-\frac{i\,(-c-i\,e+p)}{d}; -\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right) - a\sqrt{a^2-b^2} $$

$$ \left({}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d}, 2; 2-\frac{i\,(-c-i\,e+p)}{d}; \frac{b\,e^{i\,d\,z}}{\sqrt{a^2-b^2}-a}\right) + {}_2F_1\left(-\frac{i\,(-c-i\,e+i\,d+p)}{d},\right.\right. $$

$$ \left.\left. 2; 2-\frac{i\,(-c-i\,e+p)}{d}; -\frac{b\,e^{i\,d\,z}}{a+\sqrt{a^2-b^2}}\right)\right)\Bigg)\Bigg)\Bigg) \Big/ \left(b\left(a^2-b^2\right)^{3/2}(-c-i\,e+i\,d+p)\right)\Bigg) $$

Involving $\frac{e^{p\,z}\cos(e\,z)\sinh(c\,z)}{a+b\cos^2(d\,z)}$

01.19.21.1322.01

$$\int \frac{e^{pz}\cos(ez)\sinh(cz)}{a+b\cos^2(dz)}\,dz = \frac{1}{4}$$

$$\Bigg(\Bigg(\Bigg(e^{(-c+2id+ie+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(-c+ie+p)}{2d},1;2-\frac{i(-c+ie+p)}{2d};-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(-c+ie+p)}{2d},1;2-\frac{i(-c+ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{a}\,b\sqrt{a+b}\,(-c+2id+ie+p)\right)+\Bigg(e^{(-c-ie+2id+p)z}$$

$$\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(-c-ie+p)}{2d},1;2-\frac{i(-c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(-c-ie+p)}{2d},1;2-\frac{i(-c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{a}\,b\sqrt{a+b}\,(-c-ie+2id+p)\right)-\Bigg(e^{(c+2id+ie+p)z}$$

$$\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\left(1-\frac{i(c+ie+p)}{2d},1;2-\frac{i(c+ie+p)}{2d};-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\left(1-\frac{i(c+ie+p)}{2d},1;2-\frac{i(c+ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg/$$

$$\left(\sqrt{a}\,b\sqrt{a+b}\,(c+2id+ie+p)\right)-\Bigg(e^{(c-ie+2id+p)z}\Bigg(\left(2a-2\sqrt{a+b}\,\sqrt{a}+b\right){}_2F_1\!\Bigg(1-\frac{i(c-ie+p)}{2d},$$

$$1;2-\frac{i(c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Bigg)+\left(-2a-2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\Bigg(1-\frac{i(c-ie+p)}{2d},$$

$$1;2-\frac{i(c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\Bigg)\Bigg)\Bigg)\Bigg/\left(\sqrt{a}\,b\sqrt{a+b}\,(c-ie+2id+p)\right)\Bigg)$$

Involving $e^{pz}\cos(ez)\sinh(cz)\left(a+b\cos^2(dz)\right)^{-n}$

01.19.21.1323.01

$$\int \frac{e^{pz}\cos(ez)\sinh(cz)}{\left(a+b\cos^2(dz)\right)^2}\,dz ==$$

$$\frac{1}{4}\Bigg(\Bigg(e^{(-c+2id+ie+p)z}\Bigg(-(2a+b)\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right){}_2F_1\!\Bigg(1-\frac{i(-c+ie+p)}{2d},1;2-\frac{i(-c+ie+p)}{2d};$$

$$-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\Bigg)+(-2a-b)\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)$$

$${}_2F_1\!\left(1-\frac{i(-c+ie+p)}{2d},1;2-\frac{i(-c+ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\,\Bigg(\Bigg(\Big(-2\,a^{3/2}+2\sqrt{a+b}\;a-2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)\,{}_2F_1\Bigg(1-\frac{i\,(-c+i\,e\,+p)}{2\,d},\,2;\,2-$$

$$\frac{i\,(-c+i\,e\,+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+\Big(2\,a^{3/2}+2\sqrt{a+b}\;a+2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(-c+i\,e\,+p)}{2\,d},\,2;\,2-\frac{i\,(-c+i\,e\,+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(-c+2\,i\,d\,+i\,e\,+p)\Big)+\Bigg(e^{(-c-i\,e+2\,i\,d+p)\,z}\,\Bigg(-(2\,a+b)\Big(-2\,a+2\sqrt{a+b}\;\sqrt{a}\,-b\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(-c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(-c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+(-2\,a-b)$$

$$\Big(2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b\Big)\,{}_2F_1\Bigg(1-\frac{i\,(-c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(-c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+$$

$$2\sqrt{a}\,\Bigg(\Bigg(\Big(-2\,a^{3/2}+2\sqrt{a+b}\;a-2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)\,{}_2F_1\Bigg(1-\frac{i\,(-c-i\,e+p)}{2\,d},\,2;\,2-$$

$$\frac{i\,(-c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+\Big(2\,a^{3/2}+2\sqrt{a+b}\;a+2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(-c-i\,e+p)}{2\,d},\,2;\,2-\frac{i\,(-c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(-c-i\,e+2\,i\,d\,+p)\Big)-\Bigg(e^{(c+2\,i\,d\,+i\,e+p)\,z}\,\Bigg(-(2\,a+b)\Big(-2\,a+2\sqrt{a+b}\;\sqrt{a}\,-b\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,+p)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e\,+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+(-2\,a-b)$$

$$\Big(2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b\Big)\,{}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,+p)}{2\,d},\,1;\,2-\frac{i\,(c+i\,e\,+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+$$

$$2\sqrt{a}\,\Bigg(\Bigg(\Big(-2\,a^{3/2}+2\sqrt{a+b}\;a-2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)\,{}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,+p)}{2\,d},\,2;\,2-\frac{i\,(c+i\,e\,+p)}{2\,d};$$

$$-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+\Big(2\,a^{3/2}+2\sqrt{a+b}\;a+2\,b\sqrt{a}\,+b\sqrt{a+b}\,\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(c+i\,e\,+p)}{2\,d},\,2;\,2-\frac{i\,(c+i\,e\,+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Big(2\,a^{3/2}\,b\,(a+b)^{3/2}\,(c+2\,i\,d\,+i\,e\,+p)\Big)-\Bigg(e^{(c-i\,e+2\,i\,d+p)\,z}\,\Bigg(-(2\,a+b)\Big(-2\,a+2\sqrt{a+b}\;\sqrt{a}\,-b\Big)$$

$${}_2F_1\Bigg(1-\frac{i\,(c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+(-2\,a-b)$$

$$\Big(2\,a+2\sqrt{a+b}\;\sqrt{a}\,+b\Big)\,{}_2F_1\Bigg(1-\frac{i\,(c-i\,e+p)}{2\,d},\,1;\,2-\frac{i\,(c-i\,e+p)}{2\,d};\,-\frac{b\,e^{2\,i\,d\,z}}{2\,a-2\sqrt{a+b}\;\sqrt{a}\,+b}\Bigg)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}+2\sqrt{a+b}\ a-2b\sqrt{a}\ +b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(c-ie+p)}{2d},2;2-\frac{i(c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a+2\sqrt{a+b}\ \sqrt{a}\ +b}\right)+\left(2a^{3/2}+2\sqrt{a+b}\ a+2b\sqrt{a}\ +b\sqrt{a+b}\right){}_2F_1\left(1-\frac{i(c-ie+p)}{2d},2;2-\frac{i(c-ie+p)}{2d};-\frac{b\,e^{2idz}}{2a-2\sqrt{a+b}\ \sqrt{a}\ +b}\right)\right)\Big)\Big)\Big/\left(2a^{3/2}\,b\,(a+b)^{3/2}\,(c-ie+2id+p)\right)\Big)$$

Involving algebraic functions of cos and exp

Involving $e^{pz}(a+b\cos(dz))^{\beta}\sinh(cz)$

01.19.21.1324.01

$$\int e^{pz}(a+b\cos(dz))^{\beta}\sinh(cz)\,dz = \left(\left(\frac{e^{idz}b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{idz}b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}b\,e^{-idz}\left(1+e^{2idz}\right)\right)^{\beta}\left(e^{(p-c)z}(c+p-id\beta)\,F_1\left(\frac{i(c-p+id\beta)}{d};-\beta,-\beta;-\frac{i(-c+id+p-id\beta)}{d};-\frac{b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{idz}}{\sqrt{a^2-b^2}\ -a}\right)+e^{(c+p)z}(c-p+id\beta)\,F_1\left(-\frac{i(c+p-id\beta)}{d};-\beta,-\beta;-\frac{i(c+id+p-id\beta)}{d};-\frac{b\,e^{idz}}{a+\sqrt{a^2-b^2}},\frac{b\,e^{idz}}{\sqrt{a^2-b^2}\ -a}\right)\right)\right)\Big/(2(c+p-id\beta)(c-p+id\beta))$$

Involving $e^{pz}\left(a+b\cos^2(dz)\right)^{\beta}\sinh(cz)$

01.19.21.1325.01

$$\int e^{pz}\left(a+b\cos^2(dz)\right)^{\beta}\sinh(cz)\,dz = \left(\left(\frac{e^{2idz}b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2idz}b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}b\,e^{-2idz}\left(1+e^{2idz}\right)^2+a\right)^{\beta}\left(e^{(p-c)z}(c+p-2id\beta)\,F_1\left(\frac{i(c-p+2id\beta)}{2d};-\beta,-\beta;-\frac{i(p-c)}{2d}-\beta+1;-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)+e^{(c+p)z}(c-p+2id\beta)\,F_1\left(-\frac{i(c+p-2id\beta)}{2d};-\beta,-\beta;-\frac{i(c+p)}{2d}-\beta+1;-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)\Big/(2(c+p-2id\beta)(c-p+2id\beta))$$

Involving $e^{pz}\cos(ez)\sinh(cz)(a+b\cos(dz))^{\beta}$

01.19.21.1326.01

$$\int e^{p z} (a + b \cos(d z))^{\beta} \cos(e z) \sinh(c z) \, dz = \frac{1}{4} \left(\frac{e^{i d z} b}{a - \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(\frac{e^{i d z} b}{a + \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(a + \frac{1}{2} b \, e^{-i d z} \left(1 + e^{2 i d z}\right) \right)^{\beta}$$

$$\left(\frac{e^{(-c - i e + p) z}}{c + i e - p + i d \beta} F_1\left(\frac{i (c + i e - p + i d \beta)}{d}; -\beta, -\beta; -\frac{i (-c - i e + i d + p - i d \beta)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \right.$$

$$\frac{e^{(-c + i e + p) z}}{c - i e - p + i d \beta} F_1\left(-\frac{i (-c + i e + p - i d \beta)}{d}; -\beta, -\beta; \right.$$

$$\left. -\frac{i (-c + i d + i e + p - i d \beta)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) + \frac{e^{(c + i e + p) z}}{c + i e + p - i d \beta}$$

$$F_1\left(-\frac{i (c + i e + p - i d \beta)}{d}; -\beta, -\beta; -\frac{i (c + i d + i e + p - i d \beta)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) +$$

$$\left. \frac{e^{(c - i e + p) z}}{c - i e + p - i d \beta} F_1\left(-\frac{i (c - i e + p - i d \beta)}{d}; -\beta, -\beta; -\frac{i (c - i e + i d + p - i d \beta)}{d}; -\frac{b e^{i d z}}{a + \sqrt{a^2 - b^2}}, \frac{b e^{i d z}}{\sqrt{a^2 - b^2} - a} \right) \right)$$

Involving $e^{p z} \cos(e z) \sinh(c z) \left(a + b \cos^2(d z)\right)^{\beta}$

01.19.21.1327.01

$$\int e^{pz}\left(a+b\cos^2(dz)\right)^{\beta}\cos(ez)\sinh(cz)\,dz = \frac{1}{4}\left(\frac{e^{2idz}b}{2a+b-2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{e^{2idz}b}{2a+b+2\sqrt{a(a+b)}}+1\right)^{-\beta}\left(\frac{1}{4}b\,e^{-2idz}\left(1+e^{2idz}\right)^2+a\right)^{\beta}$$
$$\left(\frac{1}{c+ie-p+2id\beta}\left(e^{(-c-ie+p)z}F_1\left(\frac{i(c+ie-p+2id\beta)}{2d};-\beta,-\beta;\frac{i(c+ie-p+2di(\beta-1))}{2d};\right.\right.\right.$$
$$\left.\left.-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)+$$
$$\frac{1}{c-ie-p+2id\beta}\left(e^{(-c+ie+p)z}F_1\left(-\frac{i(-c+ie+p-2id\beta)}{2d};-\beta,-\beta;-\frac{i(-c+ie+p)}{2d}-\beta+1;\right.\right.$$
$$\left.\left.-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)+$$
$$\frac{1}{c+ie+p-2id\beta}\left(e^{(c+ie+p)z}F_1\left(-\frac{i(c+ie+p-2id\beta)}{2d};-\beta,-\beta;-\frac{i(c+ie+p)}{2d}-\beta+1;\right.\right.$$
$$\left.\left.-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)+$$
$$\frac{1}{c-ie+p-2id\beta}\left(e^{(c-ie+p)z}F_1\left(-\frac{i(c-ie+p-2id\beta)}{2d};-\beta,-\beta;-\frac{i(c-ie+p)}{2d}-\beta+1;\right.\right.$$
$$\left.\left.\left.-\frac{b\,e^{2idz}}{2a+b+2\sqrt{a(a+b)}},-\frac{b\,e^{2idz}}{2a+b-2\sqrt{a(a+b)}}\right)\right)\right)$$

Involving rational functions of sin, cos and exp

Involving $e^{pz}\sinh(dz)\,(a\sin(ez)+b\cos(ez))^{-n}$

01.19.21.1328.01

$$\int \frac{e^{pz}\sinh(dz)}{a\sin(ez)+b\cos(ez)}\,dz = \frac{1}{b+ia}\left(\frac{e^{(-d+ie+p)z}}{d-ie-p}\,{}_2F_1\left(\frac{e+id-ip}{2e},1;\frac{i(d-3ie-p)}{2e};\frac{(a+ib)\,e^{2iez}}{a-ib}\right)+\right.$$
$$\left.\frac{e^{(d+ie+p)z}}{d+ie+p}\,{}_2F_1\left(-\frac{i(d+ie+p)}{2e},1;-\frac{i(d+3ie+p)}{2e};\frac{(a+ib)\,e^{2iez}}{a-ib}\right)\right)$$

01.19.21.1329.01

$$\int \frac{e^{pz}\sinh(dz)}{(a\sin(ez)+b\cos(ez))^2}\,dz = -\frac{2}{(a-ib)^2}\left(\frac{e^{(-d+2ie+p)z}}{d-2ie-p}\,{}_2F_1\left(\frac{i(d-p)}{2e}+1,2;\frac{i(d-p)}{2e}+2;\frac{(a+ib)\,e^{2iez}}{a-ib}\right)+\right.$$
$$\left.\frac{e^{(d+2ie+p)z}}{d+2ie+p}\,{}_2F_1\left(1-\frac{i(d+p)}{2e},2;2-\frac{i(d+p)}{2e};\frac{(a+ib)\,e^{2iez}}{a-ib}\right)\right)$$

Involving $e^{pz}\sinh(dz)\,(a+b\sin(ez)+c\cos(ez))^{-n}$

01.19.21.1330.01

$$\int \frac{e^{p z} \sinh(d z)}{a + b \sin(e z) + c \cos(e z)} \, dz = -\frac{1}{2 (c + i b) \sqrt{a^2 - b^2 - c^2}} \left(-\frac{1}{d - i e - p} \left(e^{(-d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{e + i d - i p}{e}, 1; \frac{i (d - p)}{e} + 2; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) + \left(\sqrt{a^2 - b^2 - c^2} - a \right) {}_2F_1\left(\frac{e + i d - i p}{e}, 1; \frac{i (d - p)}{e} + 2; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) \right) \right) - \frac{1}{d + i e + p} \left(e^{(d + i e + p) z} \left(\left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(-\frac{i (d + i e + p)}{e}, 1; 2 - \frac{i (d + p)}{e}; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) + \left(\sqrt{a^2 - b^2 - c^2} - a \right) {}_2F_1\left(-\frac{i (d + i e + p)}{e}, 1; 2 - \frac{i (d + p)}{e}; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) \right) \right) \right)$$

01.19.21.1331.01

$$\int \frac{e^{p z} \sinh(d z)}{(a + b \sin(e z) + c \cos(e z))^2} \, dz = -\frac{1}{2 (c + i b) \left(a^2 - b^2 - c^2\right)^{3/2}} \left(\frac{1}{d - i e - p} \left(e^{(-d + i e + p) z} \left({}_2F_1\left(\frac{e + i d - i p}{e}, 2; \frac{i (d - p)}{e} + 2; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) a^2 - {}_2F_1\left(\frac{e + i d - i p}{e}, 2; \frac{i (d - p)}{e} + 2; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a^2 + \left(a - \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{e + i d - i p}{e}, 1; \frac{i (d - p)}{e} + 2; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a + \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\left(\frac{e + i d - i p}{e}, 2; \frac{i (d - p)}{e} + 2; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) a + \sqrt{a^2 - b^2 - c^2} \, {}_2F_1\left(\frac{e + i d - i p}{e}, 2; \frac{i (d - p)}{e} + 2; \frac{i (b + i c) e^{i e z}}{a + \sqrt{a^2 - b^2 - c^2}} \right) a - a \left(a + \sqrt{a^2 - b^2 - c^2} \right) {}_2F_1\left(\frac{e + i d - i p}{e}, 1; \frac{i (d - p)}{e} + 2; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) - b^2 \, {}_2F_1\left(\frac{e + i d - i p}{e}, 2; \frac{i (d - p)}{e} + 2; \frac{(c - i b) e^{i e z}}{\sqrt{a^2 - b^2 - c^2} - a} \right) - \right.\right.\right.$$

$$c^2\,{}_2F_1\left(\frac{e+i\,d-i\,p}{e},2;\frac{i\,(d-p)}{e}+2;\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+$$

$$b^2\,{}_2F_1\left(\frac{e+i\,d-i\,p}{e},2;\frac{i\,(d-p)}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+$$

$$c^2\,{}_2F_1\left(\frac{e+i\,d-i\,p}{e},2;\frac{i\,(d-p)}{e}+2;\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{d+i\,e+p}\left(e^{(d+i\,e+p)\,z}\left({}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a^2-\right.\right.$$

$${}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a^2+$$

$$\left(a-\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},1;2-\frac{i\,(d+p)}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)a+$$

$$\sqrt{a^2-b^2-c^2}\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)a-$$

$$a\left(a+\sqrt{a^2-b^2-c^2}\right){}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},1;2-\frac{i\,(d+p)}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$b^2\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)-$$

$$c^2\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+$$

$$b^2\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)+$$

$$\left.\left.c^2\,{}_2F_1\left(-\frac{i\,(d+i\,e+p)}{e},2;2-\frac{i\,(d+p)}{e};\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}}\right)\right)\right)\Bigg)\Bigg)$$

Involving $e^{p z} \sinh(d z) \left(a \sin^2(e z) + b \cos^2(e z)\right)^{-n}$

01.19.21.1332.01

$$\int \frac{e^{p z} \sinh(d z)}{a \sin^2(e z) + b \cos^2(e z)} \, dz = \frac{i}{2 \sqrt{-a} \sqrt{b} (b-a)} \left(\frac{1}{-d + 2 i e + p} e^{(-d+2 i e+p) z} \left(\left(\sqrt{-a} + i \sqrt{b}\right)^2 {}_2F_1\left(\frac{i(d-p)}{2e} + 1, 1; \frac{i(d-p)}{2e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) - \left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(\frac{i(d-p)}{2e} + 1, 1; \frac{i(d-p)}{2e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right) - \frac{1}{d + 2 i e + p} e^{(d+2 i e+p) z} \left(\left(\sqrt{-a} + i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i(d+p)}{2e}, 1; 2 - \frac{i(d+p)}{2e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) - \left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i(d+p)}{2e}, 1; 2 - \frac{i(d+p)}{2e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right)$$

01.19.21.1333.01

$$\int \frac{e^{p z} \sinh(d z)}{\left(a \sin^2(e z) + b \cos^2(e z)\right)^2} \, dz = \frac{i}{4 (-a)^{3/2} b^{3/2} (b-a)}$$
$$\left(\frac{1}{-d + 2 i e + p} e^{(-d+2 i e+p) z} \left(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 1; \frac{i (d-p)}{2 e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) - \right.\right.$$
$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 1; \frac{i (d-p)}{2 e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$
$$2 i \sqrt{-a} \sqrt{b} \left({}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 2; \frac{i (d-p)}{2 e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 + \right.$$
$$\left.\left.\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 2; \frac{i (d-p)}{2 e} + 2; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right) -$$
$$\frac{1}{d + 2 i e + p} e^{(d+2 i e+p) z} \left(\left(\sqrt{-a} - i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 1; 2 - \frac{i (d+p)}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right) - \right.$$
$$\left(\sqrt{-a} + i \sqrt{b}\right)^2 (a+b) \, {}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 1; 2 - \frac{i (d+p)}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) -$$
$$2 i \sqrt{-a} \sqrt{b} \left({}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 2; 2 - \frac{i (d+p)}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} - i \sqrt{b}\right)^2}\right) \left(\sqrt{-a} + i \sqrt{b}\right)^2 + \right.$$
$$\left.\left.\left.\left(\sqrt{-a} - i \sqrt{b}\right)^2 {}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 2; 2 - \frac{i (d+p)}{2 e}; \frac{(b-a) e^{2 i e z}}{\left(\sqrt{-a} + i \sqrt{b}\right)^2}\right)\right)\right)\right)$$

Involving $e^{p z} \sinh(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{-n}$

01.19.21.1334.01

$$\int \frac{e^{p z} \sinh(d z)}{a + b \sin^2(e z) + c \cos^2(e z)} \, dz = \frac{1}{2 \sqrt{(a+b)(a+c)} \, (c-b)} \left(\frac{1}{d + 2 i e + p} e^{(d+2 i e+p) z} \left(\left(-2 a - b - c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 1; 2 - \frac{i (d+p)}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) + \left(2 a + b + c + 2 \sqrt{(a+b)(a+c)}\right) {}_2F_1\left(1 - \frac{i (d+p)}{2 e}, 1; 2 - \frac{i (d+p)}{2 e}; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right) \right) - \frac{1}{-d + 2 i e + p} e^{(-d+2 i e+p) z} \left(\left(-2 a - b - c + 2 \sqrt{(a+b)(a+c)} \right) {}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 1; \frac{i (d-p)}{2 e} + 2; \frac{(b-c) e^{2 i e z}}{2 a + b + c + 2 \sqrt{(a+b)(a+c)}}\right) + \left(2 a + b + c + 2 \sqrt{(a+b)(a+c)}\right) {}_2F_1\left(\frac{i (d-p)}{2 e} + 1, 1; \frac{i (d-p)}{2 e} + 2; \frac{(b-c) e^{2 i e z}}{2 a + b + c - 2 \sqrt{(a+b)(a+c)}}\right) \right) \right)$$

01.19.21.1335.01

$$\int \frac{e^{p z} \sinh(d z)}{\left(a + b \sinh^2(e z) + c \cosh^2(e z)\right)^2} \, dz = \frac{1}{2} \left(\left((b+c) e^{(-d+2e+p)z} \left(2\sqrt{(a-b)(a+c)} \left(\frac{{}_2F_1\left(\frac{p-d}{2e}+1, 2; \frac{p-d}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{{}_2F_1\left(\frac{p-d}{2e}+1, 2; \frac{p-d}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{-2a+b-c+2\sqrt{(a-b)(a+c)}} \right) + \frac{(2a-b+c)\,{}_2F_1\left(\frac{p-d}{2e}+1, 1; \frac{p-d}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{(2a-b+c)\,{}_2F_1\left(\frac{p-d}{2e}+1, 1; \frac{p-d}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c-2\sqrt{(a-b)(a+c)}} \right) \right) \Big/ \left(2\left((a-b)(a+c)\right)^{3/2}(-d+2e+p)\right) - \left((b+c) e^{(d+2e+p)z} \left(2\sqrt{(a-b)(a+c)} \left(\frac{{}_2F_1\left(\frac{d+p}{2e}+1, 2; \frac{d+p}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{{}_2F_1\left(\frac{d+p}{2e}+1, 2; \frac{d+p}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{-2a+b-c+2\sqrt{(a-b)(a+c)}} \right) + \frac{(2a-b+c)\,{}_2F_1\left(\frac{d+p}{2e}+1, 1; \frac{d+p}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c-2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c+2\sqrt{(a-b)(a+c)}} - \frac{(2a-b+c)\,{}_2F_1\left(\frac{d+p}{2e}+1, 1; \frac{d+p}{2e}+2; \frac{(b+c)e^{2ez}}{-2a+b-c+2\sqrt{(a-b)(a+c)}}\right)}{2a-b+c-2\sqrt{(a-b)(a+c)}} \right) \right) \Big/ \left(2\left((a-b)(a+c)\right)^{3/2}(d+2e+p)\right) \right)$$

Involving $e^{p z} \sinh(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{-n}$

01.19.21.1336.01

$$\int \frac{e^{pz}\sinh(dz)}{a\sin^2(ez)+b\sin(2ez)+c\cos^2(ez)}\,dz == -\Bigg((-a-2ib+c)\Bigg(\frac{1}{-d+2ie+p}\Bigg(e^{(-d+2ie+p)z}\Bigg(\Big(-a-c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(\frac{i(d-p)}{2e}+1,1;\frac{i(d-p)}{2e}+2;\frac{(a-c+2ib)e^{2iez}}{a+c+2\sqrt{ac-b^2}}\Bigg)+\Big(a+c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(\frac{i(d-p)}{2e}+1,1;\frac{i(d-p)}{2e}+2;-\frac{(-a-2ib+c)e^{2iez}}{a+c-2\sqrt{ac-b^2}}\Bigg)\Bigg)\Bigg)-\frac{1}{d+2ie+p}\Bigg(e^{(d+2ie+p)z}\Bigg(\Big(-a-c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},1;2-\frac{i(d+p)}{2e};\frac{(a-c+2ib)e^{2iez}}{a+c+2\sqrt{ac-b^2}}\Bigg)+\Big(a+c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},1;2-\frac{i(d+p)}{2e};-\frac{(-a-2ib+c)e^{2iez}}{a+c-2\sqrt{ac-b^2}}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)\Big/\Big(2\sqrt{ac-b^2}\,\big(a^2-2ca+4b^2+c^2\big)\Big)$$

01.19.21.1337.01

$$\int \frac{e^{pz}\sinh(dz)}{\big(c\cos^2(ez)+a\sin^2(ez)+b\sin(2ez)\big)^2}\,dz ==$$

$$\frac{1}{2}\Bigg(\Bigg((-a-2ib+c)\,e^{(d+2ie+p)z}\Bigg(-4\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},2;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c+2\sqrt{ac-b^2}}\Bigg)b^2+$$
$$4\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},2;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c-2\sqrt{ac-b^2}}\Bigg)b^2+$$
$$(-a-c)\Big(a+c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},1;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c+2\sqrt{ac-b^2}}\Bigg)+$$
$$(-a-c)\Big(-a-c+2\sqrt{ac-b^2}\Big)\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},1;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c-2\sqrt{ac-b^2}}\Bigg)+$$
$$4ac\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},2;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c+2\sqrt{ac-b^2}}\Bigg)+$$
$$2a\sqrt{ac-b^2}\,{}_2F_1\Bigg(1-\frac{i(d+p)}{2e},2;2-\frac{i(d+p)}{2e};\frac{(-a-2ib+c)e^{2iez}}{-a-c+2\sqrt{ac-b^2}}\Bigg)+$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{i\,(d+p)}{2\,e},\,2;\,2-\frac{i\,(d+p)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{i\,(d+p)}{2\,e},\,2;\,2-\frac{i\,(d+p)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{i\,(d+p)}{2\,e},\,2;\,2-\frac{i\,(d+p)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$\left.\left.\left.2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{i\,(d+p)}{2\,e},\,2;\,2-\frac{i\,(d+p)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)\right)\right)\right)\Big/$$

$$\left(2\left(a\,c-b^2\right)^{3/2}\left(-a-c+2\,\sqrt{a\,c-b^2}\right)\left(a+c+2\,\sqrt{a\,c-b^2}\right)(d+2\,i\,e+p)\right)-$$

$$\left((-a-2\,i\,b+c)\,e^{(-d+2\,i\,e+p)\,z}\left(-4\,{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)b^2+\right.\right.$$

$$4\,{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)b^2+$$

$$(-a-c)\left(a+c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,1;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$(-a-c)\left(-a-c+2\,\sqrt{a\,c-b^2}\right){}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,1;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c+2\,\sqrt{a\,c-b^2}}\right)-$$

$$4\,a\,c\,{}_2F_1\!\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,a\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)+$$

$$2\,c\,\sqrt{a\,c-b^2}\;{}_2F_1\left(1-\frac{i\,(p-d)}{2\,e},\,2;\,2-\frac{i\,(p-d)}{2\,e};\,\frac{(-a-2\,i\,b+c)\,e^{2\,i\,e\,z}}{-a-c-2\,\sqrt{a\,c-b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(2\left(a\,c-b^2\right)^{3/2}\left(-a-c+2\,\sqrt{a\,c-b^2}\right)\left(a+c+2\,\sqrt{a\,c-b^2}\right)(-d+2\,i\,e\,+p)\right)$$

Involving algebraic functions of sin, cos and exp

Involving $e^{p\,z}\sinh(d\,z)\,(a\sin(e\,z)+b\cos(e\,z))^\beta$

01.19.21.1338.01

$$\int e^{p\,z}\,(a\sin(e\,z)+b\cos(e\,z))^\beta\sinh(d\,z)\,dz = \left(2^{-\beta-1}\left(\frac{e^{2\,i\,e\,z}\,(b-i\,a)}{b+i\,a}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(b\left(1+e^{2\,i\,e\,z}\right)-i\,a\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^\beta\right.$$

$$\left(e^{(p-d)\,z}\,(d+p-i\,e\,\beta)\,{}_2F_1\left(\frac{i\,(d-p+i\,e\,\beta)}{2\,e},\,-\beta;\,\frac{1}{2}\left(\frac{i\,(d-p)}{e}-\beta+2\right);\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)+e^{(d+p)\,z}\,(d-p+i\,e\,\beta)\right.$$

$$\left.\left.{}_2F_1\left(-\frac{i\,(d+p-i\,e\,\beta)}{2\,e},\,-\beta;\,\frac{1}{2}\left(-\frac{i\,(d+p)}{e}-\beta+2\right);\,\frac{(a+i\,b)\,e^{2\,i\,e\,z}}{a-i\,b}\right)\right)\right)\Big/((d+p-i\,e\,\beta)\,(d-p+i\,e\,\beta))$$

Involving $e^{p\,z}\sinh(d\,z)\,(a+b\sin(e\,z)+c\cos(e\,z))^\beta$

01.19.21.1339.01

$$\int e^{p\,z}\,(a+b\sin(e\,z)+c\cos(e\,z))^\beta\sinh(d\,z)\,dz =$$

$$\left(2^{-\beta-1}\left(1+\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)^{-\beta}\left(\frac{e^{i\,e\,z}\,(c-i\,b)}{a+\sqrt{a^2-b^2-c^2}}+1\right)^{-\beta}\left(e^{-i\,e\,z}\left(2\,e^{i\,e\,z}\,a+c\,e^{2\,i\,e\,z}+c-i\,b\left(-1+e^{2\,i\,e\,z}\right)\right)\right)^\beta\right.$$

$$\left(e^{(p-d)\,z}\,(d+p-i\,e\,\beta)\,F_1\left(\frac{i\,(d-p)}{e}-\beta;\,-\beta,\,-\beta;\,\frac{i\,(d-p)}{e}-\beta+1;\,\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)+\right.$$

$$e^{(d+p)\,z}\,(d-p+i\,e\,\beta)\,F_1\left(-\frac{i\,(d+p)}{e}-\beta;\,-\beta,\,-\beta;\,-\frac{i\,(d+p)}{e}-\beta+1;\right.$$

$$\left.\left.\left.\frac{i\,(b+i\,c)\,e^{i\,e\,z}}{a+\sqrt{a^2-b^2-c^2}},\,\frac{(c-i\,b)\,e^{i\,e\,z}}{\sqrt{a^2-b^2-c^2}-a}\right)\right)\right)\Big/((d+p-i\,e\,\beta)\,(d-p+i\,e\,\beta))$$

Involving $e^{p\,z}\sinh(d\,z)\left(a\sin^2(e\,z)+b\cos^2(e\,z)\right)^\beta$

01.19.21.1340.01

$$\int e^{p z} \left(a \sin^2(e z) + b \cos^2(e z)\right)^{\beta} \sinh(d z)\, dz = \left(2^{-2\beta-1} \left(\frac{e^{2 i e z}(b-a)}{a+b-2\sqrt{a b}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z}(b-a)}{a+b+2\sqrt{a b}} + 1\right)^{-\beta} \left(e^{-2 i e z}\left(b\left(1+e^{2 i e z}\right)^2 - a\left(-1+e^{2 i e z}\right)^2\right)\right)^{\beta} \left(e^{(p-d) z}(d+p-2 i e \beta) F_1\left(\frac{i(d-p)}{2 e} - \beta; -\beta, -\beta; \frac{i(d-p)}{2 e} - \beta + 1; \frac{(a-b) e^{2 i e z}}{a+b+2\sqrt{a b}}, \frac{(a-b) e^{2 i e z}}{a+b-2\sqrt{a b}}\right) + e^{(d+p) z}(d-p+2 i e \beta) F_1\left(-\frac{i(d+p)}{2 e} - \beta; -\beta, -\beta; -\frac{i(d+p)}{2 e} - \beta + 1; \frac{(a-b) e^{2 i e z}}{a+b+2\sqrt{a b}}, \frac{(a-b) e^{2 i e z}}{a+b-2\sqrt{a b}}\right)\right)\right) \Big/ ((d+p-2 i e \beta)(d-p+2 i e \beta))$$

Involving $e^{p z} \sinh(d z) \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta}$

01.19.21.1341.01

$$\int e^{p z} \left(a + b \sin^2(e z) + c \cos^2(e z)\right)^{\beta} \sinh(d z)\, dz = \left(2^{-2\beta-1} \left(\frac{e^{2 i e z}(c-b)}{2a+b+c-2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(\frac{e^{2 i e z}(c-b)}{2a+b+c+2\sqrt{(a+b)(a+c)}} + 1\right)^{-\beta} \left(e^{-2 i e z}\left(-b\left(-1+e^{2 i e z}\right)^2 + 4 a e^{2 i e z} + c\left(1+e^{2 i e z}\right)^2\right)\right)^{\beta} \left(e^{(p-d) z}(d+p-2 i e \beta) F_1\left(\frac{i(d-p)}{2 e} - \beta; -\beta, -\beta; \frac{i(d-p)}{2 e} - \beta + 1; \frac{(b-c) e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right) + e^{(d+p) z}(d-p+2 i e \beta) F_1\left(-\frac{i(d+p)}{2 e} - \beta; -\beta, -\beta; -\frac{i(d+p)}{2 e} - \beta + 1; \frac{(b-c) e^{2 i e z}}{2a+b+c+2\sqrt{(a+b)(a+c)}}, \frac{(b-c) e^{2 i e z}}{2a+b+c-2\sqrt{(a+b)(a+c)}}\right)\right)\right) \Big/ ((d+p-2 i e \beta)(d-p+2 i e \beta))$$

Involving $e^{p z} \sinh(d z) \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{\beta}$

01.19.21.1342.01

$$\int e^{p z} \left(a \sin^2(e z) + b \sin(2 e z) + c \cos^2(e z)\right)^{\beta} \sinh(d z)\, dz = \left(2^{-2\beta-1} \left(\frac{e^{2 i e z} (-a - 2 i b + c)}{a + c - 2\sqrt{a c - b^2}} + 1\right)^{-\beta}\right.$$
$$\left(\frac{e^{2 i e z} (-a - 2 i b + c)}{a + c + 2\sqrt{a c - b^2}} + 1\right)^{-\beta} \left(e^{-2 i e z} \left(\left(1 + e^{2 i e z}\right)\left(c\left(1 + e^{2 i e z}\right) - 2 i b \left(-1 + e^{2 i e z}\right)\right) - a\left(-1 + e^{2 i e z}\right)^2\right)\right)^{\beta}$$
$$\left(e^{(p-d) z} (d + p - 2 i e \beta) F_1\left(\frac{i (d-p)}{2 e} - \beta; -\beta, -\beta; \frac{i (d-p)}{2 e} - \beta + 1; \frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right) + \right.$$
$$e^{(d+p) z} (d - p + 2 i e \beta) F_1\left(-\frac{i (d+p)}{2 e} - \beta; -\beta, -\beta; -\frac{i (d+p)}{2 e} - \beta + 1;\right.$$
$$\left.\left.\left.\frac{(a - c + 2 i b) e^{2 i e z}}{a + c + 2\sqrt{a c - b^2}}, -\frac{(-a - 2 i b + c) e^{2 i e z}}{a + c - 2\sqrt{a c - b^2}}\right)\right)\right) \Big/ ((d + p - 2 i e \beta)(d - p + 2 i e \beta))$$

Involving tan and exp

01.19.21.1343.01

$$\int e^{b z} \tan(a z) \sinh(c z)\, dz =$$
$$\frac{1}{2}\left(\frac{e^{(b-c+2 i a) z}\, {}_2F_1\left(\frac{2 a - i b + i c}{2 a}, 1; \frac{4 a - i b + i c}{2 a}; -e^{2 i a z}\right)}{2 a - i b + i c} - \frac{e^{(b+c+2 i a) z}\, {}_2F_1\left(\frac{2 a - i (b+c)}{2 a}, 1; \frac{4 a - i (b+c)}{2 a}; -e^{2 i a z}\right)}{2 a - i (b + c)} - \right.$$
$$\left.\frac{i\, e^{(b-c) z}\, {}_2F_1\left(-\frac{i (b-c)}{2 a}, 1; 1 - \frac{i (b-c)}{2 a}; -e^{2 i a z}\right)}{b - c} + \frac{e^{(b+c) z}\, i\, {}_2F_1\left(-\frac{i (b+c)}{2 a}, 1; 1 - \frac{i (b+c)}{2 a}; -e^{2 i a z}\right)}{b + c}\right)$$

01.19.21.1344.01

$$\int e^{b z} \tan(c z) \sinh(c z)\, dz = \frac{1}{2} i \left(\frac{e^{(b-c) z}\, {}_2F_1\left(\frac{i (c-b)}{2 c}, 1; \left(1 + \frac{i}{2}\right) - \frac{i b}{2 c}; -e^{2 i c z}\right)}{c - b} + \frac{e^{(b+c) z}\, {}_2F_1\left(-\frac{i (b+c)}{2 c}, 1; 1 - \frac{i (b+c)}{2 c}; -e^{2 i c z}\right)}{b + c} - \right.$$
$$\left.\frac{e^{(b+c(1+2 i)) z}\, {}_2F_1\left(-\frac{i (b+c(1+2 i))}{2 c}, 1; -\frac{i (b+c(1+4 i))}{2 c}; -e^{2 i c z}\right)}{b + c(1 + 2 i)} + \frac{e^{(b-(1-2 i) c) z}\, {}_2F_1\left(\left(1 + \frac{i}{2}\right) - \frac{i b}{2 c}, 1; \left(2 + \frac{i}{2}\right) - \frac{i b}{2 c}; -e^{2 i c z}\right)}{b - (1 - 2 i) c}\right)$$

Involving cot and exp

01.19.21.1345.01

$$\int e^{bz}\cot(az)\sinh(cz)\,dz = \frac{1}{2}\left(\frac{e^{(b-c+2ia)z}\,{}_2F_1\left(\frac{2a-ib+ic}{2a},1;\frac{4a-ib+ic}{2a};e^{2iaz}\right)}{2a-ib+ic} - \frac{e^{(b+c+2ia)z}\,{}_2F_1\left(\frac{2a-i(b+c)}{2a},1;\frac{4a-i(b+c)}{2a};e^{2iaz}\right)}{2a-i(b+c)} + \frac{e^{(b-c)z}\,i\,{}_2F_1\left(-\frac{i(b-c)}{2a},1;1-\frac{i(b-c)}{2a};e^{2iaz}\right)}{b-c} - \frac{i\,e^{(b+c)z}\,{}_2F_1\left(-\frac{i(b+c)}{2a},1;1-\frac{i(b+c)}{2a};e^{2iaz}\right)}{b+c}\right)$$

01.19.21.1346.01

$$\int e^{bz}\cot(cz)\sinh(cz)\,dz = \frac{1}{2}i\left(\frac{e^{(b-c)z}\,{}_2F_1\left(\frac{i(c-b)}{2c},1;\left(1+\frac{i}{2}\right)-\frac{ib}{2c};e^{2icz}\right)}{b-c} - \frac{e^{(b+c(1+2i))z}\,{}_2F_1\left(-\frac{i(b+c(1+2i))}{2c},1;-\frac{i(b+c(1+4i))}{2c};e^{2icz}\right)}{b+c(1+2i)} + \frac{e^{(b-(1-2i)c)z}\,{}_2F_1\left(\left(1+\frac{i}{2}\right)-\frac{ib}{2c},1;\left(2+\frac{i}{2}\right)-\frac{ib}{2c};e^{2icz}\right)}{b-(1-2i)c} - \frac{e^{(b+c)z}\,{}_2F_1\left(-\frac{i(b+c)}{2c},1;1-\frac{i(b+c)}{2c};e^{2icz}\right)}{b+c}\right)$$

Involving csc and exp

01.19.21.1347.01

$$\int e^{bz}\csc(az)\sinh(cz)\,dz = -\frac{1}{a^2-2iba-b^2+c^2}\left(e^{(b-c+ia)z}\left((i(b+c)-a)\,{}_2F_1\left(\frac{a-ib+ic}{2a},1;\frac{3a-ib+ic}{2a};e^{2iaz}\right)+(a-i(b-c))\,e^{2cz}\,{}_2F_1\left(\frac{a-i(b+c)}{2a},1;\frac{3a-i(b+c)}{2a};e^{2iaz}\right)\right)\right)$$

01.19.21.1348.01

$$\int e^{bz}\csc(cz)\sinh(cz)\,dz = \frac{1}{(b-(1-i)c)(b+c(1+i))}\left((-ib+(1+i)c)\,e^{(b+c(1+i))z}\,{}_2F_1\left(-\frac{i(b+c(1+i))}{2c},1;-\frac{i(b+c(1+3i))}{2c};e^{2icz}\right)+(b+c(1+i))\,e^{(b-(1-i)c)z}\,i\,{}_2F_1\left(-\frac{i(b-(1-i)c)}{2c},1;-\frac{i(b-(1-3i)c)}{2c};e^{2icz}\right)\right)$$

Involving sec and exp

01.19.21.1349.01

$$\int e^{bz}\sec(az)\sinh(cz)\,dz = \frac{1}{(b-c+ia)(a-i(b+c))}\left(e^{(b-c+ia)z}\left((i(b+c)-a)\,{}_2F_1\left(\frac{a-ib+ic}{2a},1;\frac{3a-ib+ic}{2a};-e^{2iaz}\right)+(a-i(b-c))\,e^{2cz}\,{}_2F_1\left(\frac{a-i(b+c)}{2a},1;\frac{3a-i(b+c)}{2a};-e^{2iaz}\right)\right)\right)$$

01.19.21.1350.01

$$\int e^{b z} \sec(c z) \sinh(c z) \, dz = \frac{1}{(b-(1-i) c)(b+c(1+i))} \left((b-(1-i) c) e^{(b+c(1+i)) z} {}_2F_1\left(-\frac{i (b+c(1+i))}{2 c}, 1; -\frac{i (b+c(1+3 i))}{2 c}; -e^{2 i c z}\right) - (b+c(1+i)) e^{(b-(1-i) c) z} {}_2F_1\left(-\frac{i (b-(1-i) c)}{2 c}, 1; -\frac{i (b-(1-3 i) c)}{2 c}; -e^{2 i c z}\right)\right)$$

Involving trigonometric, exponential and a power functions

Involving sin, exp and power

Involving $z^{\alpha-1} e^{b z} \sin(c z) \sinh(a z)$

01.19.21.1351.01

$$\int z^{\alpha-1} e^{b z} \sin(c z) \sinh(a z) \, dz = \frac{1}{4} i z^{\alpha} \left(\Gamma(\alpha, (a+i c-b) z) ((a+i c-b) z)^{-\alpha} - ((a-i c-b) z)^{-\alpha} \Gamma(\alpha, (a-i c-b) z) + (-(a+i c+b) z)^{-\alpha} \Gamma(\alpha, -(a+i c+b) z) - (-(a-i c+b) z)^{-\alpha} \Gamma(\alpha, -(a-i c+b) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \sinh(a z)$

01.19.21.1352.01

$$\int z^{\alpha-1} e^{p z} \sin(d + c z) \sinh(a z) \, dz = \frac{1}{4} i e^{-i d} z^{\alpha} \left(\Gamma(\alpha, (a+i c-p) z) ((a+i c-p) z)^{-\alpha} - e^{2 i d} ((a-i c-p) z)^{-\alpha} \Gamma(\alpha, (a-i c-p) z) + \left(e^{2 i d} (-(a+i c+p) z)^{-\alpha} \Gamma(\alpha, -(a+i c+p) z) - (-(a-i c+p) z)^{-\alpha} \Gamma(\alpha, -(a-i c+p) z)\right)\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z) \sinh(a z + b)$

01.19.21.1353.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \sinh(b + a z) \, dz = \frac{1}{4} i e^{-b} z^{\alpha} \left(\Gamma(\alpha, (a+i c-p) z) ((a+i c-p) z)^{-\alpha} - ((a-i c-p) z)^{-\alpha} \Gamma(\alpha, (a-i c-p) z) + e^{2 b} ((-(a+i c+p) z)^{-\alpha} \Gamma(\alpha, -(a+i c+p) z) - (-(a-i c+p) z)^{-\alpha} \Gamma(\alpha, -(a-i c+p) z))\right)$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \sinh(a z + b)$

01.19.21.1354.01

$$\int z^{\alpha-1} e^{p z} \sin(d + c z) \sinh(b + a z) \, dz = \frac{1}{4} i e^{-b-i d} z^{\alpha} \left(\Gamma(\alpha, (a+i c-p) z) ((a+i c-p) z)^{-\alpha} - e^{2 i d} ((a-i c-p) z)^{-\alpha} \Gamma(\alpha, (a-i c-p) z) + e^{2 b} \left(e^{2 i d} (-(a+i c+p) z)^{-\alpha} \Gamma(\alpha, -(a+i c+p) z) - (-(a-i c+p) z)^{-\alpha} \Gamma(\alpha, -(a-i c+p) z)\right)\right)$$

Involving $z^n e^{p z^r} \sin\left(b z^r\right) \sinh(c z)$

01.19.21.1355.01

$$\int z^n e^{p z^2} \sin(b z^2) \sinh(c z)\, dz = \frac{i}{8 \sqrt{-i b + p} \sqrt{i b + p}} \left(e^{\frac{c^2}{4 i b - 4 p}} \sqrt{i b + p} \left(\sum_{q=0}^{n} 2^{q-n} c^{n-q} (-i b + p)^{-n-\frac{1}{2}} \left(-\frac{(c + 2 i b z - 2 p z)^2}{-i b + p} \right)^{\frac{1}{2}(-q-1)} (2(-i b + p) z - c)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2 i b z - 2 p z)^2}{4(-i b + p)} \right) - \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (-i b + p)^{-n-\frac{1}{2}} (c + 2(-i b + p) z)^{q+1} \left(-\frac{(c + 2(-i b + p) z)^2}{-i b + p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2(-i b + p) z)^2}{4(-i b + p)} \right) \right) + e^{\frac{c^2}{-4 i b - 4 p}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (i b + p)^{-n-\frac{1}{2}} (c + 2(i b + p) z)^{q+1} \left(-\frac{(c + 2(i b + p) z)^2}{i b + p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2(i b + p) z)^2}{4(i b + p)} \right) - e^{\frac{c^2}{-4 i b - 4 p}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} c^{n-q} (i b + p)^{-n-\frac{1}{2}} \left(-\frac{(c - 2 i b z - 2 p z)^2}{i b + p} \right)^{\frac{1}{2}(-q-1)} (2(i b + p) z - c)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c - 2 i b z - 2 p z)^2}{4(i b + p)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.1356.01

$$\int z^n e^{p \sqrt{z}} \sin(b \sqrt{z}) \sinh(c z)\, dz = i\, 2^{-2n-3} c^{-2(n+1)} e^{-\frac{b^2 + 4 i p b + 2 p^2}{4 c}} \left(e^{\frac{2 b^2 + 6 i p b + p^2}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b + p)^{2n-q-r} \left(\frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{c} \right)^{\frac{1}{2}(-q-r-1)} \left(2\sqrt{z}\, c - i b + p\right)^{q+r} \binom{n}{r} \binom{r}{q} \left((b + i p)\left(b + i\left(2\sqrt{z}\, c + p\right)\right) \Gamma\left(\frac{1}{2}(q + r + 1), \frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{4 c} \right) - 2 c \sqrt{\frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(q + r + 2), \frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{4 c} \right) \right) - e^{\frac{p(2 i b + 3 p)}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b + p)^{2n-q-r} \left(-2\sqrt{z}\, c - i b + p\right)^{q+r} \left(\frac{\left(-2\sqrt{z}\, c - i b + p\right)^2}{c} \right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg((b+i\,p)\left(b+i\left(p-2\,c\sqrt{z}\right)\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\ \frac{\left(-2\sqrt{z}\ c-i\,b+p\right)^2}{4\,c}\right)+$$

$$2\sqrt{\frac{\left(-2\sqrt{z}\ c-i\,b+p\right)^2}{c}}\ c\,\Gamma\!\left(\frac{1}{2}(q+r+2),\ \frac{\left(-2\sqrt{z}\ c-i\,b+p\right)^2}{4\,c}\right)\Bigg)\Bigg)+$$

$$e^{\frac{3\,p\,(2\,i\,b+p)}{4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b+p)^{2\,n-q-r}\left(-2\sqrt{z}\ c+i\,b+p\right)^{q+r}\left(\frac{\left(-2\sqrt{z}\ c+i\,b+p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg((i\,b+p)\left(-2\sqrt{z}\ c+i\,b+p\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\ \frac{\left(-2\sqrt{z}\ c+i\,b+p\right)^2}{4\,c}\right)-$$

$$2\,c\sqrt{\frac{\left(-2\sqrt{z}\ c+i\,b+p\right)^2}{c}}\ \Gamma\!\left(\frac{1}{2}(q+r+2),\ \frac{\left(-2\sqrt{z}\ c+i\,b+p\right)^2}{4\,c}\right)\Bigg)\Bigg)-$$

$$e^{\frac{2\,b^2+2\,i\,p\,b+p^2}{4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,(i\,b+p)^{2\,n-q-r}\left(2\sqrt{z}\ c+i\,b+p\right)^{q+r}\left(-\frac{\left(2\sqrt{z}\ c+i\,b+p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg((i\,b+p)\left(2\sqrt{z}\ c+i\,b+p\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\ -\frac{\left(2\sqrt{z}\ c+i\,b+p\right)^2}{4\,c}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\ c+i\,b+p\right)^2}{c}}\ c\,\Gamma\!\left(\frac{1}{2}(q+r+2),\ -\frac{\left(2\sqrt{z}\ c+i\,b+p\right)^2}{4\,c}\right)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z^r}\sin(b\,z)\sinh(c\,z)$

01.19.21.1357.01

$$\int z^n e^{p z^2} \sin(b z) \sinh(c z)\, dz = \frac{i}{8 \sqrt{p}} e^{\frac{b^2-c^2}{2 p}} \left(e^{\frac{(c-i b)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{n-q} p^{-n-\frac{1}{2}} (c + i b + 2 p z)^{q+1} \left(-\frac{(c + i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + i b + 2 p z)^2}{4 p}\right) - \right.$$

$$e^{\frac{(c+i b)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{n-q} p^{-n-\frac{1}{2}} (c - i b + 2 p z)^{q+1} \left(-\frac{(c - i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c - i b + 2 p z)^2}{4 p}\right) +$$

$$e^{\frac{(c-i b)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(c + i b - 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-c - i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + i b - 2 p z)^2}{4 p}\right) -$$

$$e^{\frac{(c+i b)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(c - i b - 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\left. (-c + i b + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c - i b - 2 p z)^2}{4 p}\right) \right) /; n \in \mathbb{N}$$

01.19.21.1358.01

$$\int z^n e^{p \sqrt{z}} \sin(b z) \sinh(c z)\, dz =$$

$$i\, 2^{-2 n-3} \left(e^{\frac{p^2}{4 c-4 i b}} (i b - c)^{-2 (n+1)} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2 n-q-r} \left(p - 2 (c - i b) \sqrt{z}\right)^{q+r} \left(\frac{\left(p - 2 (c - i b) \sqrt{z}\right)^2}{c - i b}\right)^{\frac{1}{2}(-q-r-1)} \right.$$

$$\binom{n}{r} \binom{r}{q} \left(p \left(p - 2 (c - i b) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (q + r + 1), \frac{\left(p - 2 (c - i b) \sqrt{z}\right)^2}{4 (c - i b)}\right) - \right.$$

$$\left. 2 (c - i b) \sqrt{\frac{\left(p - 2 (c - i b) \sqrt{z}\right)^2}{c - i b}}\, \Gamma\left(\frac{1}{2} (q + r + 2), \frac{\left(p - 2 (c - i b) \sqrt{z}\right)^2}{4 (c - i b)}\right) \right) -$$

$$(-c - i b)^{-2 (n+1)} e^{\frac{p^2}{4 c+4 i b}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2 n-q-r} \left(p - 2 (c + i b) \sqrt{z}\right)^{q+r} \left(\frac{\left(p - 2 (c + i b) \sqrt{z}\right)^2}{c + i b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r} \binom{r}{q} \left(p \left(p - 2 (c + i b) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (q + r + 1), \frac{\left(p - 2 (c + i b) \sqrt{z}\right)^2}{4 (c + i b)}\right) - \right.$$

$$2\,(c+i\,b)\sqrt{\frac{\left(p-2\,(c+i\,b)\,\sqrt{z}\right)^2}{c+i\,b}}\;\Gamma\!\left(\frac{1}{2}\,(q+r+2),\,\frac{\left(p-2\,(c+i\,b)\,\sqrt{z}\right)^2}{4\,(c+i\,b)}\right)\Bigg)\Bigg)-$$

$$(c+i\,b)^{-2\,(n+1)}\,e^{\frac{p^2}{-4c-4ib}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2\,n-q-r}\left(2\,\sqrt{z}\,(c+i\,b)+p\right)^{q+r}\left(-\frac{\left(2\,\sqrt{z}\,(c+i\,b)+p\right)^2}{c+i\,b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg(p\left(2\,\sqrt{z}\,(c+i\,b)+p\right)\Gamma\!\left(\frac{1}{2}\,(q+r+1),\,-\frac{\left(2\,\sqrt{z}\,(c+i\,b)+p\right)^2}{4\,(c+i\,b)}\right)+$$

$$2\sqrt{-\frac{\left(2\,\sqrt{z}\,(c+i\,b)+p\right)^2}{c+i\,b}}\;(c+i\,b)\,\Gamma\!\left(\frac{1}{2}\,(q+r+2),\,-\frac{\left(2\,\sqrt{z}\,(c+i\,b)+p\right)^2}{4\,(c+i\,b)}\right)\Bigg)+$$

$$(c-i\,b)^{-2\,(n+1)}\,e^{\frac{p^2}{4ib-4c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2\,n-q-r}\left(2\,\sqrt{z}\,(c-i\,b)+p\right)^{q+r}\left(-\frac{\left(2\,\sqrt{z}\,(c-i\,b)+p\right)^2}{c-i\,b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg(p\left(2\,\sqrt{z}\,(c-i\,b)+p\right)\Gamma\!\left(\frac{1}{2}\,(q+r+1),\,-\frac{\left(2\,\sqrt{z}\,(c-i\,b)+p\right)^2}{4\,(c-i\,b)}\right)+$$

$$2\sqrt{-\frac{\left(2\,\sqrt{z}\,(c-i\,b)+p\right)^2}{c-i\,b}}\;(c-i\,b)\,\Gamma\!\left(\frac{1}{2}\,(q+r+2),\,-\frac{\left(2\,\sqrt{z}\,(c-i\,b)+p\right)^2}{4\,(c-i\,b)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin\left(b\,z^r\right)\sinh(c\,z)$

01.19.21.1359.01

$$\int z^n e^{p z} \sin\left(b z^2\right) \sinh(c z)\, dz = \frac{1}{8 b} e^{-\frac{i (c+p)^2}{4 b}} \left(\sqrt{i b} \left(e^{\frac{i (c+p)^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (-c-p)^{n-q} (c+p+2 i b z)^{q+1} \left(\frac{i (c+p+2 i b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c+p+2 i b z)^2}{4 b}\right) - e^{\frac{i \left(c^2+p^2\right)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (c-p)^{n-q} (-c+p+2 i b z)^{q+1} \left(\frac{i (-c+p+2 i b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-c+p+2 i b z)^2}{4 b}\right)\right) - \sqrt{-i b}\, e^{\frac{i c p}{b}} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (c-p)^{n-q} (-c+p-2 i b z)^{q+1} \left(-\frac{i (c-p+2 i b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c-p+2 i b z)^2}{4 b}\right) + \sqrt{-i b} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (-c-p)^{n-q} (c+p-2 i b z)^{q+1} \left(-\frac{i (c+p-2 i b z)^2}{b}\right)^{\frac{1}{2} (-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c+p-2 i b z)^2}{4 b}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.1360.01

$$\int z^n e^{p z} \sin\left(b \sqrt{z}\right) \sinh(c z)\, dz = i\, 2^{-2 n-3} \left(-e^{\frac{b^2}{4 p-4 c}} (p-c)^{-2 (n+1)} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b)^{2 n-q-r} \left(\frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{c-p}\right)^{\frac{1}{2} (-q-r-1)} \left(-i b+2 (p-c) \sqrt{z}\right)^{q+r} \binom{n}{r} \binom{r}{q} \left(b \left(b-2 i (c-p) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (q+r+1), \frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{4 (c-p)}\right) + 2 \sqrt{\frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{c-p}}\, (c-p)\, \Gamma\left(\frac{1}{2} (q+r+2), \frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{4 (c-p)}\right)\right) + e^{\frac{b^2}{4 p-4 c}} (p-c)^{-2 (n+1)} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (i b)^{2 n-q-r} \left(i b+2 (p-c) \sqrt{z}\right)^{q+r} \left(\frac{\left(i b+2 (p-c) \sqrt{z}\right)^2}{c-p}\right)^{\frac{1}{2} (-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b+2\,i\,(c-p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(i\,b+2\,(p-c)\sqrt{z}\right)^2}{4\,(c-p)}\right)+\right.$$

$$\left.\left.2\sqrt{\frac{\left(i\,b+2\,(p-c)\sqrt{z}\right)^2}{c-p}}\;(c-p)\,\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(i\,b+2\,(p-c)\sqrt{z}\right)^2}{4\,(c-p)}\right)\right)\right)-$$

$$e^{\frac{b^2}{4(c+p)}}\,(c+p)^{-2(n+1)}\left(\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(i\,b)^{2n-q-r}\left(\frac{\left(b-2\,i\,(c+p)\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(i\,b+2\,(c+p)\sqrt{z}\right)^{q+r}\right.$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b-2\,i\,(c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(b-2\,i\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)-\right.$$

$$\left.\left.2\,(c+p)\sqrt{\frac{\left(b-2\,i\,(c+p)\sqrt{z}\right)^2}{c+p}}\;\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(b-2\,i\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)\right)\right)-$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(-i\,b)^{2n-q-r}\left(\frac{\left(b+2\,i\,(c+p)\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(-i\,b+2\,(c+p)\sqrt{z}\right)^{q+r}$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b+2\,i\,(c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\,\frac{\left(b+2\,i\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)-\right.$$

$$\left.\left.\left.\left.2\,(c+p)\sqrt{\frac{\left(b+2\,i\,(c+p)\sqrt{z}\right)^2}{c+p}}\;\Gamma\left(\frac{1}{2}(q+r+2),\,\frac{\left(b+2\,i\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\,\sin(b\,z)\,\sinh\left(c\,z^r\right)$

01.19.21.1361.01

$$\int z^n e^{p z} \sin(b z) \sinh\left(c z^2\right) dz = i\, 2^{-n-4} (-c)^{-n-1} e^{-\frac{b^2+4 i p b+2 p^2}{4c}} \left(e^{\frac{p(2 i b+3 p)}{4c}} \sum_{q=0}^{n} (i b - p)^{n-q} (-i b + p - 2 c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(-i b + p - 2 c z)^2}{4c}\right) - 2^n e^{\frac{3 p (2 i b + p)}{4c}} \sum_{q=0}^{n} 2^{-n} (-i b - p)^{n-q} (i b + p - 2 c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(i b + p - 2 c z)^2}{4c}\right) - (-1)^n e^{\frac{2 b^2 + 2 i p b + p^2}{4c}} \left(2^n \sum_{q=0}^{n} 2^{-n} (-i b - p)^{n-q} (i b + p + 2 c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(-\frac{(i b + p + 2 c z)^2}{4c}\right) - e^{\frac{i b p}{c}} \sum_{q=0}^{n} (i b - p)^{n-q} (-i b + p + 2 c z)^{q+1} \binom{n}{q} E_{\frac{1-q}{2}}\left(\frac{(b + i (p + 2 c z))^2}{4c}\right)\right)\right) /; n \in \mathbb{N}$$

01.19.21.1362.01

$$\int z^n e^{p z} \sin(b z) \sinh\left(c \sqrt{z}\right) dz = i\, 2^{-2n-3} \left(-e^{-\frac{c^2}{4(-i b + p)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(-i b + p)\sqrt{z} - c\right)^{h+j} \left(-\frac{\left(2(-i b + p)\sqrt{z} - c\right)^2}{-i b + p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2(-i b + p) \sqrt{-\frac{\left(2(-i b + p)\sqrt{z} - c\right)^2}{-i b + p}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i b + p)\sqrt{z} - c\right)^2}{4(-i b + p)}\right) - c\left(2(-i b + p)\sqrt{z} - c\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i b + p)\sqrt{z} - c\right)^2}{4(-i b + p)}\right)\right)\right) (-i b + p)^{-2n-2} + e^{-\frac{c^2}{4(-i b + p)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c + 2(-i b + p)\sqrt{z}\right)^{h+j} \left(-\frac{\left(c + 2(-i b + p)\sqrt{z}\right)^2}{-i b + p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\left(c + 2(-i b + p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + 2(-i b + p)\sqrt{z}\right)^2}{4(-i b + p)}\right) + 2\sqrt{-\frac{\left(c + 2(-i b + p)\sqrt{z}\right)^2}{-i b + p}}\, (-i b + p)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + 2(-i b + p)\sqrt{z}\right)^2}{4(-i b + p)}\right)\right)\right) (-i b + p)^{-2n-2} + \right.$$

$$e^{-\frac{c^2}{4(i b+p)}} (i b+p)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(i b+p)\sqrt{z}-c\right)^{h+j} \left(-\frac{\left(2(i b+p)\sqrt{z}-c\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(i b+p)\sqrt{-\frac{\left(2(i b+p)\sqrt{z}-c\right)^2}{i b+p}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i b+p)\sqrt{z}-c\right)^2}{4(i b+p)}\right)-\right.$$

$$\left. c\left(2(i b+p)\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i b+p)\sqrt{z}-c\right)^2}{4(i b+p)}\right)\right)-$$

$$e^{-\frac{c^2}{4(i b+p)}} (i b+p)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2n} \left(c+2(i b+p)\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2(i b+p)\sqrt{z}\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(i b+p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(i b+p)\sqrt{z}\right)^2}{4(i b+p)}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{\left(c+2(i b+p)\sqrt{z}\right)^2}{i b+p}}\;(i b+p)\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(i b+p)\sqrt{z}\right)^2}{4(i b+p)}\right)\right)\right) /;\; n\in\mathbb{N}$$

Involving $z^n e^{p z^r} \sin(b z) \sinh(c z^r)$

01.19.21.1363.01

$$\int z^n e^{p z^2} \sin(b z) \sinh(c z^2)\, dz = \frac{i}{8 \sqrt{p-c}\, \sqrt{c+p}} e^{\frac{b^2}{4p-4c}} \left(\sqrt{c+p} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (p-c)^{-n-\frac{1}{2}} \left(\frac{(i b + 2(c-p) z)^2}{c-p} \right)^{\frac{1}{2}(-q-1)} (-i b + 2(p-c) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b + 2(c-p) z)^2}{4(c-p)} \right) - \sqrt{c+p} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (p-c)^{-n-\frac{1}{2}} (i b - 2 c z + 2 p z)^{q+1} \left(\frac{(i b - 2 c z + 2 p z)^2}{c-p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b - 2 c z + 2 p z)^2}{4(c-p)} \right) + e^{\frac{c b^2}{2c^2-2p^2}} \sqrt{p-c} \left(\sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (c+p)^{-n-\frac{1}{2}} \left(\frac{(b - 2 i (c+p) z)^2}{c+p} \right)^{\frac{1}{2}(-q-1)} (i b + 2(c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b - 2 i (c+p) z)^2}{4(c+p)} \right) - \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (c+p)^{-n-\frac{1}{2}} \left(\frac{(b + 2 i (c+p) z)^2}{c+p} \right)^{\frac{1}{2}(-q-1)} (-i b + 2(c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b + 2 i (c+p) z)^2}{4(c+p)} \right) \right) \right) /;\ n \in \mathbb{N}$$

01.19.21.1364.01

$$\int z^n e^{p \sqrt{z}} \sin(b z) \sinh\left(c \sqrt{z}\right) dz = i (-1)^n 2^{-2n-3} b^{-2n-2} \left(-e^{\frac{i (p-c)^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-c)^{-h-j+2n} \left(-c + p + 2 i b \sqrt{z} \right)^{h+j} \left(\frac{i \left(-c + p + 2 i b \sqrt{z} \right)^2}{b} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((p-c) \left(-c + p + 2 i b \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(-c + p + 2 i b \sqrt{z} \right)^2}{4b} \right) + 2 \sqrt{\frac{i \left(-c + p + 2 i b \sqrt{z} \right)^2}{b}}\, b\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(-c + p + 2 i b \sqrt{z} \right)^2}{4b} \right) \right) + e^{\frac{i (c+p)^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c+p)^{-h-j+2n} \left(c + p + 2 i b \sqrt{z} \right)^{h+j} \left(\frac{i \left(c + p + 2 i b \sqrt{z} \right)^2}{b} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left((c+p)\left(c+p+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(c+p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+p+2\,i\,b\sqrt{z}\right)^2}{b}}\ b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(c+p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)+$$

$$e^{-\frac{i(p-c)^2}{4b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-c)^{-h-j+2n}\left(-c+p-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((p-c)\left(-c+p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.2\,i\,b\sqrt{-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{b}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)-$$

$$e^{-\frac{i(c+p)^2}{4b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+p)^{-h-j+2n}\left(c+p-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c+p-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c+p)\left(c+p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{i\left(c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.\left.2\,i\,b\sqrt{-\frac{i\left(c+p-2\,i\,b\sqrt{z}\right)^2}{b}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{i\left(c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\sin\left(b\,z^r\right)\sinh\left(c\,z^r\right)$

01.19.21.1365.01

$$\int z^n e^{p z} \sin\left(b z^2\right) \sinh\left(c z^2\right) dz = \frac{1}{8} i \left(\frac{1}{\sqrt{-c - i b}} e^{\frac{p^2}{4c+4ib}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2(c + i b) z)^{q+1} \left(\frac{(p - 2(c + i b) z)^2}{c + i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2(c + i b) z)^2}{4(c + i b)}\right) + \frac{1}{\sqrt{c + i b}} e^{\frac{p^2}{-4c-4ib}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 c z + 2 i b z)^{q+1} \left(-\frac{(p + 2 c z + 2 i b z)^2}{c + i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 c z + 2 i b z)^2}{4(c + i b)}\right) - \frac{1}{\sqrt{i b - c}} e^{\frac{p^2}{4c-4ib}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 c z + 2 i b z)^{q+1} \left(\frac{(p - 2 c z + 2 i b z)^2}{c - i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2 c z + 2 i b z)^2}{4(c - i b)}\right) - \frac{1}{\sqrt{c - i b}} e^{\frac{p^2}{4ib-4c}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2(c - i b) z)^{q+1} \left(-\frac{(p + 2(c - i b) z)^2}{c - i b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2(c - i b) z)^2}{4(c - i b)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1366.01

$$\int z^n e^{p z} \sin\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = i\, 2^{-2n-3} p^{-2n-2} \left(-e^{-\frac{(c+ib)^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c - i b)^{-h-j+2n} \left(-c - i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-c - i b)\left(-c - i b + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{4p}\right) + 2 \sqrt{-\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{p}}\, p\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{4p}\right)\right) + e^{-\frac{(ib-c)^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b - c)^{-h-j+2n} \left(-c + i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c + i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i b - c)\left(-c + i b + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c + i b + 2 p \sqrt{z}\right)^2}{4 p}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{\left(-c + i b + 2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c + i b + 2 p \sqrt{z}\right)^2}{4 p}\right)\right)\right) +$$

$$e^{-\frac{(c - i b)^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c - i b)^{-h-j+2n} \left(c - i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(c - i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c - i b)\left(c - i b + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c - i b + 2 p \sqrt{z}\right)^2}{4 p}\right) + \right.$$

$$\left.\left. 2 \sqrt{-\frac{\left(c - i b + 2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c - i b + 2 p \sqrt{z}\right)^2}{4 p}\right)\right)\right) -$$

$$e^{-\frac{(c + i b)^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c + i b)^{-h-j+2n} \left(c + i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(c + i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c + i b)\left(c + i b + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c + i b + 2 p \sqrt{z}\right)^2}{4 p}\right) + \right.$$

$$\left.\left.\left. 2 \sqrt{-\frac{\left(c + i b + 2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c + i b + 2 p \sqrt{z}\right)^2}{4 p}\right)\right)\right)\right) /;\; n \in \mathbb{N}$$

Involving $z^{\alpha-1}\, e^{p z^r} \sin(b z^r) \sinh(c z^r)$

01.19.21.1367.01

$$\int z^{\alpha-1}\, e^{p z^r} \sin(b z^r) \sinh(c z^r)\, dz =$$

$$\frac{i z^\alpha}{4 r}\left(-\Gamma\left(\frac{\alpha}{r}, (-c + i b - p) z^r\right) ((-c + i b - p) z^r)^{-\frac{\alpha}{r}} + ((c + i b - p) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (c + i b - p) z^r\right) + \right.$$

$$\left. ((-c - i b - p) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-c - i b - p) z^r\right) - ((c - i b - p) z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (c - i b - p) z^r\right)\right)$$

01.19.21.1368.01

$$\int z^n e^{p z^2} \sin(b z^2) \sinh(c z^2) \, dz = \frac{1}{8} i z^{n+1} \left(\Gamma\left(\frac{n+1}{2}, (-c - i b - p) z^2\right) \left((-c - i b - p) z^2\right)^{\frac{1}{2}(-n-1)} - \left((-c + i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c + i b - p) z^2\right) - \left((c - i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - i b - p) z^2\right) + \left((c + i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c + i b - p) z^2\right) \right) /; n \in \mathbb{N}$$

01.19.21.1369.01

$$\int z^n e^{p \sqrt{z}} \sin(b \sqrt{z}) \sinh(c \sqrt{z}) \, dz = \frac{1}{2} i \left(\Gamma\left(2(n+1), (-c - i b - p) \sqrt{z}\right) (-c - i b - p)^{-2(n+1)} - (-c + i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (-c + i b - p) \sqrt{z}\right) - (c - i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (c - i b - p) \sqrt{z}\right) + (c + i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (c + i b - p) \sqrt{z}\right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin(a z^r + q) \sinh(c z^r + g)$

01.19.21.1370.01

$$\int z^{\alpha-1} e^{b z^r + e} \sin(a z^r + q) \sinh(c z^r + g) \, dz = \frac{z^\alpha}{4 r} \left(-e^{e+g+i q - \frac{i\pi}{2}} \Gamma\left(\frac{\alpha}{r}, (-b - c - i a) z^r\right) ((-b - c - i a) z^r)^{-\frac{\alpha}{r}} - e^{e+g-i q + \frac{i\pi}{2}} ((-b - c + i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c + i a) z^r\right) + e^{e-g+i q - \frac{i\pi}{2}} ((-b + c - i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b + c - i a) z^r\right) + e^{e-g-i q + \frac{i\pi}{2}} ((-b + c + i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b + c + i a) z^r\right) \right)$$

01.19.21.1371.01

$$\int z^n e^{b z^2 + e} \sin(a z^2 + q) \sinh(c z^2 + g) \, dz = \frac{1}{8} i e^{e-g-i q} z^{n+1} \left(e^{2 g + 2 i q} \Gamma\left(\frac{n+1}{2}, (-b - c - i a) z^2\right) \left((-b - c - i a) z^2\right)^{\frac{1}{2}(-n-1)} - e^{2 g} \left((-b - c + i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - c + i a) z^2\right) - e^{2 i q} \left((-b + c - i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b + c - i a) z^2\right) + \left((-b + c + i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b + c + i a) z^2\right) \right) /; n \in \mathbb{N}$$

01.19.21.1372.01

$$\int z^n e^{\sqrt{z}\, b + e} \sin(\sqrt{z}\, a + q) \sinh(\sqrt{z}\, c + g) \, dz = \frac{1}{2} i \left(e^{e+g+i q} \Gamma\left(2(n+1), (-b - c - i a) \sqrt{z}\right) (-b - c - i a)^{-2(n+1)} - e^{e+g-i q} (-b - c + i a)^{-2(n+1)} \Gamma\left(2(n+1), (-b - c + i a) \sqrt{z}\right) - e^{e-g+i q} (-b + c - i a)^{-2(n+1)} \Gamma\left(2(n+1), (-b + c - i a) \sqrt{z}\right) + (-b + c + i a)^{-2(n+1)} e^{e-g-i q} \Gamma\left(2(n+1), (-b + c + i a) \sqrt{z}\right) \right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sin(a z^r + p z + q) \sinh(c z^r + f z + g)$

01.19.21.1373.01

$$\int z^n e^{b z^2+d z+e} \sin\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right) dz = \frac{1}{8}\Bigg(e^{-\frac{(d-f-i p)^2}{4(b-c-i a)}+e-g-i q+\frac{i\pi}{2}} (b-c-i a)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+f+i p)^{n-j} (d-f-i p+2(b-c-i a) z)^{j+1} \left(-\frac{(d-f-i p+2(b-c-i a) z)^2}{b-c-i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f-i p+2(b-c-i a) z)^2}{4(b-c-i a)}\right) + (b-c+i a)^{-n-1} e^{-\frac{(d-f+i p)^2}{4(b-c+i a)}+e-g+i q-\frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-d+f-i p)^{n-j} (d-f+i p+2(b-c+i a) z)^{j+1} \left(-\frac{(d-f+i p+2(b-c+i a) z)^2}{b-c+i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i p+2(b-c+i a) z)^2}{4(b-c+i a)}\right) - (b+c-i a)^{-n-1} e^{-\frac{(d+f-i p)^2}{4(b+c-i a)}+e+g-i q+\frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-d-f+i p)^{n-j} (d+f-i p+2(b+c-i a) z)^{j+1} \left(-\frac{(d+f-i p+2(b+c-i a) z)^2}{b+c-i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f-i p+2(b+c-i a) z)^2}{4(b+c-i a)}\right) - (b+c+i a)^{-n-1} e^{-\frac{(d+f+i p)^2}{4(b+c+i a)}+e+g+i q-\frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-d-f-i p)^{n-j} (d+f+i p+2(b+c+i a) z)^{j+1} \left(-\frac{(d+f+i p+2(b+c+i a) z)^2}{b+c+i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+i p+2(b+c+i a) z)^2}{4(b+c+i a)}\right)\Bigg) /; n \in \mathbb{N}$$

01.19.21.1374.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \sin\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-2n-3}\Bigg(-e^{-\frac{(b-c+i a)^2}{4(d-f+i p)}+e-g+i q-\frac{i\pi}{2}} (d-f+i p)^{-2n-2} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (b-c+i a)^{-h-i+2n} \left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{d-f+i p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i} \Bigg((b-c+i a)\left(b-c+i a+2(d-f+i p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{4(d-f+i p)}\right) + 2\sqrt{-\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{d-f+i p}}$$

$$(d-f+i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c+i\,a+2\,(d-f+i\,p)\sqrt{z}\right)^2}{4\,(d-f+i\,p)}\right)\Bigg)+$$

$$e^{-\frac{(b+c+i\,a)^2}{4\,(d+f+i\,p)}+e+g+i\,q-\frac{i\,\pi}{2}}\,(d+f+i\,p)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c+i\,a)^{-h-i+2\,n}\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{d+f+i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b+c+i\,a)\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,p)}\right)+2\sqrt{-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{d+f+i\,p}}$$

$$(d+f+i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,p)}\right)\Bigg)-$$

$$e^{-\frac{(b-c-i\,a)^2}{4\,(d-f-i\,p)}+e-g-i\,q+\frac{i\,\pi}{2}}\,(d-f-i\,p)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-c-i\,a)^{-h-i+2\,n}\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{d-f-i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b-c-i\,a)\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{4\,(d-f-i\,p)}\right)+2\sqrt{-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{d-f-i\,p}}$$

$$(d-f-i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{4\,(d-f-i\,p)}\right)\Bigg)+$$

$$e^{-\frac{(b+c-i\,a)^2}{4\,(d+f-i\,p)}+e+g-i\,q+\frac{i\,\pi}{2}}\,(d+f-i\,p)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c-i\,a)^{-h-i+2\,n}\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\,\sqrt{z}\right)^2}{d+f-i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b+c-i\,a)\left(b+c-i\,a+2\,(d+f-i\,p)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\,\sqrt{z}\right)^2}{4\,(d+f-i\,p)}\right)+2\,\sqrt{-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\,\sqrt{z}\right)^2}{d+f-i\,p}}$$

$$(d+f-i\,p)\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\,\sqrt{z}\right)^2}{4\,(d+f-i\,p)}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving powers of sin, exp and power

Involving $z^{\alpha-1}\,e^{p\,z}\,\sin^{\mu}(c\,z)\,\sinh(a\,z)$

01.19.21.1375.01

$$\int z^{\alpha-1}\,e^{b\,z}\,\sin^m(c\,z)\,\sinh(a\,z)\,dz = -2^{-m-1}\,z^{\alpha}\binom{m}{\frac{m}{2}}\Big(((-a-b)\,z)^{-\alpha}\,\Gamma(\alpha,\,(-a-b)\,z)-((a-b)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b)\,z)\Big)\,(1-m\bmod 2)-$$

$$i^{-m}\,2^{-m-1}\,z^{\alpha}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big((-1)^m\,\Gamma(\alpha,\,(-a-b-2\,i\,c\,k+i\,c\,m)\,z)\,((-a-b-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}+$$

$$(-1)^{m+1}\,((a-b-2\,i\,c\,k+i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b-2\,i\,c\,k+i\,c\,m)\,z)+((-a-b+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}$$

$$\Gamma(\alpha,\,(-a-b+2\,i\,c\,k-i\,c\,m)\,z)-((a-b+2\,i\,c\,k-i\,c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b+2\,i\,c\,k-i\,c\,m)\,z)\Big)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1376.01

$$\int z^n\,e^{p\,z}\,\sin^{\mu}(c\,z)\,\sinh(a\,z)\,dz =$$

$$\frac{1}{2}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}\,n!\,\sin^{\mu}(c\,z)\Bigg(e^{(a+p)\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(a+p-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\Big(-\frac{i\,a+i\,p+c\,\mu}{2\,c},\,\ldots,\,-\frac{i\,a+i\,p+c\,\mu}{2\,c},\,-\mu;$$

$$1-\frac{i\,a+i\,p+c\,\mu}{2\,c},\,\ldots,\,1-\frac{i\,a+i\,p+c\,\mu}{2\,c};\,e^{2\,i\,c\,z}\Big)-e^{(p-a)\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-a+p-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}$$

$$\Big(-\frac{-i\,a+i\,p+c\,\mu}{2\,c},\,\ldots,\,-\frac{-i\,a+i\,p+c\,\mu}{2\,c},\,-\mu;\,1-\frac{-i\,a+i\,p+c\,\mu}{2\,c},\,\ldots,\,1-\frac{-i\,a+i\,p+c\,\mu}{2\,c};\,e^{2\,i\,c\,z}\Big)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z}\,\sin^{\mu}(c\,z+d)\,\sinh(a\,z)$

01.19.21.1377.01

$$\int z^{\alpha-1} e^{p z} \sin^m(d+c z) \sinh(a z) \, dz = 2^{-m-1} z^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m - \frac{i m \pi}{2}} \binom{m}{k} \Big(e^{4 i d k + i m \pi} \Gamma(\alpha, (a - 2 i c k + i c m - p) z) ((a - 2 i c k + i c m - p) z)^{-\alpha} + \Big(-e^{4 i d k + i m \pi} \Gamma(\alpha, (-a - 2 i c k + i c m - p) z) ((-a - 2 i c k + i c m - p) z)^{-\alpha} - e^{2 i d m} ((-a + 2 i c k - i c m - p) z)^{-\alpha} \Gamma(\alpha, (-a + 2 i c k - i c m - p) z)\Big) + e^{2 i d m} ((a + 2 i c k - i c m - p) z)^{-\alpha} \Gamma(\alpha, (a + 2 i c k - i c m - p) z)\Big) - 2^{-m-1} z^\alpha \binom{m}{\frac{m}{2}} (((-a-p) z)^{-\alpha} \Gamma(\alpha, (-a-p) z) - ((a-p) z)^{-\alpha} \Gamma(\alpha, (a-p) z)) (1 - m \bmod 2) \;/;\; m \in \mathbb{N}^+$$

01.19.21.1378.01

$$\int z^n e^{p z} \sin^\mu(d+c z) \sinh(a z) \, dz = \frac{1}{2} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \left(e^{(a+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{i a + i p + c \mu}{2 c}, \ldots, -\frac{i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{i a + i p + c \mu}{2 c}; e^{2 i (d + c z)}\right) - e^{(p-a) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{-i a + i p + c \mu}{2 c}, \ldots, -\frac{-i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{-i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-i a + i p + c \mu}{2 c}; e^{2 i (d + c z)}\right)\right) \;/;\; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z) \sinh(a z + b)$

01.19.21.1379.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \sinh(b + a z) \, dz = 2^{-m-1} z^\alpha e^{-b - \frac{i m \pi}{2}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big(e^{i m \pi} \Gamma(\alpha, (a - 2 i c k + i c m - p) z) ((a - 2 i c k + i c m - p) z)^{-\alpha} + e^{2 b} \Big(-e^{i m \pi} \Gamma(\alpha, (-a - 2 i c k + i c m - p) z) ((-a - 2 i c k + i c m - p) z)^{-\alpha} - ((-a + 2 i c k - i c m - p) z)^{-\alpha} \Gamma(\alpha, (-a + 2 i c k - i c m - p) z)\Big) + ((a + 2 i c k - i c m - p) z)^{-\alpha} \Gamma(\alpha, (a + 2 i c k - i c m - p) z)\Big) - 2^{-m-1} e^{-b} z^\alpha \binom{m}{\frac{m}{2}} \left(e^{2 b} ((-a-p) z)^{-\alpha} \Gamma(\alpha, (-a-p) z) - ((a-p) z)^{-\alpha} \Gamma(\alpha, (a-p) z)\right) (1 - m \bmod 2) \;/;\; m \in \mathbb{N}^+$$

01.19.21.1380.01

$$\int z^n e^{p z} \sin^{\mu}(c z) \sinh(b + a z)\, dz = \frac{1}{2}\left(1 - e^{2 i c z}\right)^{-\mu} n!\, \sin^{\mu}(c z) \left(e^{b+(a+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a + p - i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i a + i p + c \mu}{2 c}, \ldots, -\frac{i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{i a + i p + c \mu}{2 c}; e^{2 i c z}\right) - e^{(p-a) z - b} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a + p - i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{-i a + i p + c \mu}{2 c}, \ldots, -\frac{-i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{-i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-i a + i p + c \mu}{2 c}; e^{2 i c z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin^{\mu}(c z + d) \sinh(a z + b)$

01.19.21.1381.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z + d) \sinh(a z + b)\, dz = 2^{-m-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-b-2 i d k - i d m - \frac{i m \pi}{2}} \binom{m}{k} \left(-e^{4 i d k + i \pi + i m \pi}\, \Gamma(\alpha, (a - 2 i c k + i c m - p) z)\, ((a - 2 i c k + i c m - p) z)^{-\alpha} + e^{2 b} \left(-e^{4 i d k + i m \pi}\, \Gamma(\alpha, (-a - 2 i c k + i c m - p) z)\, ((-a - 2 i c k + i c m - p) z)^{-\alpha} - e^{2 i d m} ((-a + 2 i c k - i c m - p) z)^{-\alpha}\, \Gamma(\alpha, (-a + 2 i c k - i c m - p) z)\right) - e^{2 i d m + i \pi} ((a + 2 i c k - i c m - p) z)^{-\alpha}\, \Gamma(\alpha, (a + 2 i c k - i c m - p) z)\right) - 2^{-m-1} e^{-b} z^{\alpha} \binom{m}{\frac{m}{2}} \left(e^{2 b} ((-a - p) z)^{-\alpha}\, \Gamma(\alpha, (-a - p) z) - ((a - p) z)^{-\alpha}\, \Gamma(\alpha, (a - p) z)\right) (1 - m \bmod 2) /; m \in \mathbb{N}^+$$

01.19.21.1382.01

$$\int z^n e^{p z} \sin^{\mu}(d + c z) \sinh(b + a z)\, dz = \frac{1}{2}\left(1 - e^{2 i (d + c z)}\right)^{-\mu} n!\, \sin^{\mu}(d + c z) \left(e^{b+(a+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a + p - i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{i a + i p + c \mu}{2 c}, \ldots, -\frac{i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{i a + i p + c \mu}{2 c}; e^{2 i (d + c z)}\right) - e^{(p-a) z - b} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a + p - i c \mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{-i a + i p + c \mu}{2 c}, \ldots, -\frac{-i a + i p + c \mu}{2 c}, -\mu; 1 - \frac{-i a + i p + c \mu}{2 c}, \ldots, 1 - \frac{-i a + i p + c \mu}{2 c}; e^{2 i (d + c z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sin^m\left(b z^r\right) \sinh(c z)$

01.19.21.1383.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \sinh(c z)\, dz = -2^{-m-2} e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{h=0}^{n} 2^{h-n} (-c)^{n-h} (c + 2 p z)^{h+1} \left(-\frac{(c+2pz)^2}{p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c+2pz)^2}{4p}\right) - \sum_{h=0}^{n} 2^{h-n} c^{n-h} (2pz - c)^{h+1} \left(-\frac{(2pz-c)^2}{p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2pz-c)^2}{4p}\right)\right) p^{-n-1} - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{i m \pi}{2} - \frac{c^2}{4(p - i b (m-2k))}} \left(\sum_{h=0}^{n} 2^{h-n} c^{n-h} (2 (p - i b (m-2k)) z - c)^{h+1} \left(-\frac{(2(p - i b (m-2k)) z - c)^2}{p - i b (m-2k)}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(p - i b (m-2k)) z - c)^2}{4(p - i b (m-2k))}\right)\right) (p - i b (m-2k))^{-n-1} + e^{\frac{i m \pi}{2} - \frac{c^2}{4(p - i b (m-2k))}} \left(\sum_{h=0}^{n} 2^{h-n} (-c)^{n-h} (c + 2 (p - i b (m-2k)) z)^{h+1} \left(-\frac{(c + 2(p - i b (m-2k)) z)^2}{p - i b (m-2k)}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c + 2(p - i b (m-2k)) z)^2}{4(p - i b (m-2k))}\right)\right) (p - i b (m-2k))^{-n-1} - e^{-\frac{c^2}{4(b i (m-2k) + p)} - \frac{i m \pi}{2}} (b i (m-2k) + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} c^{n-h} (2 (b i (m-2k) + p) z - c)^{h+1} \left(-\frac{(2(b i (m-2k) + p) z - c)^2}{b i (m-2k) + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(b i (m-2k) + p) z - c)^2}{4(b i (m-2k) + p)}\right) + e^{-\frac{c^2}{4(b i (m-2k) + p)} - \frac{i m \pi}{2}} (b i (m-2k) + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (-c)^{n-h} (c + 2 (b i (m-2k) + p) z)^{h+1} \left(-\frac{(c + 2(b i (m-2k) + p) z)^2}{b i (m-2k) + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c + 2(b i (m-2k) + p) z)^2}{4(b i (m-2k) + p)}\right)\right) /;\ m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1384.01

$$\int z^n e^{p \sqrt{z}} \sin^m(b \sqrt{z}) \sinh(c z)\, dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) c^{-2n-2} \left(e^{-\frac{p^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2\sqrt{z}\, c + p\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(p \left(2\sqrt{z}\, c + p\right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,c+p\right)^2}{4c}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,c+p\right)^2}{c}}\,c\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,c+p\right)^2}{4c}\right)\Bigg)\Bigg)-$$

$$e^{\frac{p^2}{4c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(p-2c\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p-2c\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)-2c\sqrt{\frac{\left(p-2c\sqrt{z}\right)^2}{c}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-2}\,c^{-2n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(-e^{\frac{(p-i\,b\,(m-2k))^2}{4c}+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-i\,b\,(m-2k))^{-h-j+2n}$$

$$\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((p-i\,b\,(m-2k))\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)^2}{4c}\right)-$$

$$2c\sqrt{\frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)^2}{c}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\,c-i\,b\,(m-2k)+p\right)^2}{4c}\right)\Bigg)-$$

$$e^{\frac{(b\,i\,(m-2k)+p)^2}{4c}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2k)+p)^{-h-j+2n}\left(-2\sqrt{z}\,c+b\,i\,(m-2k)+p\right)^{h+j}$$

$$\left(\frac{\left(-2\sqrt{z}\,c+b\,i\,(m-2k)+p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2k)+p)\left(-2\sqrt{z}\,c+b\,i\,(m-2k)+p\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\,c+b\,i\,(m-2k)+p\right)^2}{4c}\right)-$$

$$2\,c\sqrt{\frac{\left(-2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{4\,c}\right)\Bigg)+$$

$$e^{\frac{i\,m\,\pi}{2}-\frac{(p-i\,b\,(m-2\,k))^2}{4\,c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((p-i\,b\,(m-2\,k))\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)^2}{4\,c}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\;c-i\,b\,(m-2\,k)+p\right)^2}{4\,c}\right)\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2\,k)+p)^2}{4\,c}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+p)^{-h-j+2\,n}\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,k)+p)\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{4\,c}\Bigg)+2\sqrt{-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{c}}\;c\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\;c+b\,i\,(m-2\,k)+p\right)^2}{4\,c}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z^r}\,\sin^m(b\,z)\,\sinh(c\,z)$

01.19.21.1385.01

$$\int z^n e^{p z^2} \sin^m(b z) \sinh(c z)\, dz = -2^{-m-2} e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{j=0}^{n} 2^{j-n} (-c)^{n-j} (c + 2 p z)^{j+1} \left(-\frac{(c+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c+2 p z)^2}{4 p}\right) - \sum_{j=0}^{n} 2^{j-n} c^{n-j} (2 p z - c)^{j+1} \left(-\frac{(2 p z - c)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 p z - c)^2}{4 p}\right) \right) p^{-n-1} - 2^{-m-2} p^{-n-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{i m \pi}{2} - \frac{(i b (2k-m) - c)^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (c - i b (2k-m))^{n-j} (-c + b i (2k-m) + 2 p z)^{j+1} \left(-\frac{(-c + b i (2k-m) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-c + b i (2k-m) + 2 p z)^2}{4 p}\right) + e^{\frac{i m \pi}{2} - \frac{(c + b i (2k-m))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-c - i b (2k-m))^{n-j} (c + b i (2k-m) + 2 p z)^{j+1} \left(-\frac{(c + b i (2k-m) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c + b i (2k-m) + 2 p z)^2}{4 p}\right) - e^{-\frac{(i b (m-2k) - c)^2}{4p} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (c - i b (m-2k))^{n-j} (-c + b i (m-2k) + 2 p z)^{j+1} \left(-\frac{(-c + b i (m-2k) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-c + b i (m-2k) + 2 p z)^2}{4 p}\right) + e^{-\frac{(c + b i (m-2k))^2}{4p} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-c - i b (m-2k))^{n-j} (c + b i (m-2k) + 2 p z)^{j+1} \left(-\frac{(c + b i (m-2k) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c + b i (m-2k) + 2 p z)^2}{4 p}\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1386.01

$$\int z^n e^{p \sqrt{z}} \sin^m(b z) \sinh(c z)\, dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, c^{-2n-2} \left(e^{-\frac{p^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2\sqrt{z}\, c + p\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, c + p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(p \left(2 \sqrt{z}\, c + p\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\ c+p\right)^2}{4c}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\ c+p\right)^2}{c}}\ c\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\ c+p\right)^2}{4c}\right)\Bigg)\Bigg)-$$

$$e^{\frac{p^2}{4c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(p-2c\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p-2c\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\Bigg)-2c\sqrt{\frac{\left(p-2c\sqrt{z}\right)^2}{c}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)\Bigg)+2^{-m-2n-2}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(-e^{\frac{i m\pi}{2}-\frac{p^2}{4(i b(2k-m)-c)}}\,(i\,b\,(2k-m)-c)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)^2}{i\,b\,(2k-m)-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)^2}{4(i\,b\,(2k-m)-c)}\Bigg)+2\sqrt{-\frac{\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)^2}{i\,b\,(2k-m)-c}}$$

$$(i\,b\,(2k-m)-c)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\ (i\,b\,(2k-m)-c)+p\right)^2}{4(i\,b\,(2k-m)-c)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i m\pi}{2}-\frac{p^2}{4(c+b\,i\,(2k-m))}}\,(c+b\,i\,(2k-m))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(2\sqrt{z}\ (c+b\,i\,(2k-m))+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\ (c+b\,i\,(2k-m))+p\right)^2}{c+b\,i\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(2\sqrt{z}\ (c+b\,i\,(2k-m))+p\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\ (c+b\,i\,(2k-m))+p\right)^2}{4(c+b\,i\,(2k-m))}\Bigg)+2\sqrt{-\frac{\left(2\sqrt{z}\ (c+b\,i\,(2k-m))+p\right)^2}{c+b\,i\,(2k-m)}}$$

$$(c+b\,i\,(2\,k-m))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,\left(c+b\,i\,(2\,k-m)\right)+p\right)^2}{4\,(c+b\,i\,(2\,k-m))}\right)\Bigg)-$$

$$e^{-\frac{p^2}{4\,(i\,b\,(m-2\,k)-c)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k)-c)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)^2}{i\,b\,(m-2\,k)-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)^2}{4\,(i\,b\,(m-2\,k)-c)}\Bigg)+2\sqrt{-\frac{\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)^2}{i\,b\,(m-2\,k)-c}}$$

$$(i\,b\,(m-2\,k)-c)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,\left(i\,b\,(m-2\,k)-c\right)+p\right)^2}{4\,(i\,b\,(m-2\,k)-c)}\right)\Bigg)+$$

$$e^{-\frac{p^2}{4\,(c+b\,i\,(m-2\,k))}-\frac{i\,m\,\pi}{2}}\,(c+b\,i\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)^2}{c+b\,i\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)^2}{4\,(c+b\,i\,(m-2\,k))}\Bigg)+2\sqrt{-\frac{\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)^2}{c+b\,i\,(m-2\,k)}}$$

$$(c+b\,i\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,\left(c+b\,i\,(m-2\,k)\right)+p\right)^2}{4\,(c+b\,i\,(m-2\,k))}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\,\sin^m\!\left(b\,z^r\right)\sinh(c\,z)$

01.19.21.1387.01

$$\int z^n e^{p z} \sin^m(b z^2) \sinh(c z) \, dz = -2^{-m-1} \binom{m}{\frac{m}{2}} \left((-c-p)^{-n-1} \Gamma(n+1, (-c-p) z) - (c-p)^{-n-1} \Gamma(n+1, (c-p) z)\right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{i (p-c)^2}{4 b (2k-m)} + \frac{i m \pi}{2}} (i b (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c-p)^{n-j} (-c+p+2 b i (2k-m) z)^{j+1} \left(\frac{i (-c+p+2 b i (2k-m) z)^2}{b (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (-c+p+2 b i (2k-m) z)^2}{4 b (2k-m)}\right) + e^{\frac{i (c+p)^2}{4 b (2k-m)} + \frac{i m \pi}{2}} (i b (2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c-p)^{n-j} (c+p+2 b i (2k-m) z)^{j+1} \left(\frac{i (c+p+2 b i (2k-m) z)^2}{b (2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c+p+2 b i (2k-m) z)^2}{4 b (2k-m)}\right) - e^{\frac{i (p-c)^2}{4 b (m-2k)} - \frac{i m \pi}{2}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c-p)^{n-j} (-c+p+2 b i (m-2k) z)^{j+1} \left(\frac{i (-c+p+2 b i (m-2k) z)^2}{b (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (-c+p+2 b i (m-2k) z)^2}{4 b (m-2k)}\right) + e^{\frac{i (c+p)^2}{4 b (m-2k)} - \frac{i m \pi}{2}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c-p)^{n-j} (c+p+2 b i (m-2k) z)^{j+1} \left(\frac{i (c+p+2 b i (m-2k) z)^2}{b (m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c+p+2 b i (m-2k) z)^2}{4 b (m-2k)}\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1388.01

$$\int z^n e^{p z} \sin^m\left(b \sqrt{z}\right) \sinh(c z) \, dz = 2^{-m-2n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{b^2 (2k-m)^2}{4 (p-c)} + \frac{i m \pi}{2}} (p-c)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2k-m))^{-h-j+2n} \left(b i (2k-m) + 2 (p-c) \sqrt{z}\right)^{h+j} \left(-\frac{\left(b i (2k-m) + 2 (p-c) \sqrt{z}\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b i (2k-m) \left(b i (2k-m) + 2 (p-c) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b i (2k-m) + 2 (p-c) \sqrt{z}\right)^2}{4 (p-c)}\right) + \right.\right.$$

$$2\sqrt{-\frac{\left(b\,i\,(2k-m)+2(p-c)\sqrt{z}\right)^2}{p-c}}\;(p-c)\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(2k-m)+2(p-c)\sqrt{z}\right)^2}{4(p-c)}\right)\Bigg)-$$

$$e^{\frac{b^2(m-2k)^2}{4(p-c)}-\frac{i\,m\pi}{2}}\,(p-c)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2k))^{-h-j+2n}\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2k)\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)^2}{4(p-c)}\right)+$$

$$2\sqrt{-\frac{\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)^2}{p-c}}\;(p-c)\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2k)+2(p-c)\sqrt{z}\right)^2}{4(p-c)}\right)\Bigg)+$$

$$e^{\frac{b^2(2k-m)^2}{4(c+p)}+\frac{i\,m\pi}{2}}\,(c+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2k-m))^{-h-j+2n}\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(2k-m)\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)^2}{4(c+p)}\right)+$$

$$2\sqrt{-\frac{\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)^2}{c+p}}\;(c+p)\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(2k-m)+2(c+p)\sqrt{z}\right)^2}{4(c+p)}\right)\Bigg)+$$

$$e^{\frac{b^2(m-2k)^2}{4(c+p)}-\frac{i\,m\pi}{2}}\,(c+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2k))^{-h-j+2n}\left(b\,i\,(m-2k)+2(c+p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2k)+2(c+p)\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\,(m-2k)\left(b\,i\,(m-2k)+2\,(c+p)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2k)+2\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b\,i\,(m-2k)+2\,(c+p)\sqrt{z}\right)^2}{c+p}}\;(c+p)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2k)+2\,(c+p)\sqrt{z}\right)^2}{4\,(c+p)}\right)\right)\right)-$$

$$2^{-m-1}\binom{m}{\frac{m}{2}}\left((-c-p)^{-n-1}\,\Gamma(n+1,\,(-c-p)\,z)-(c-p)^{-n-1}\,\Gamma(n+1,\,(c-p)\,z)\right)$$

$$(1-m \bmod 2)\;/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\, e^{p z} \sin^m(b\, z) \sinh\left(c\, z^r\right)$

01.19.21.1389.01

$$\int z^n e^{p z} \sin^m(b z) \sinh(c z^2)\, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(-c^{-n-1} e^{-\frac{p^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 c z)^{j+1} \left(-\frac{(p+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2cz)^2}{4c}\right) + (-c)^{-n-1} e^{\frac{p^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p - 2 c z)^{j+1} \left(\frac{(p-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(p-2cz)^2}{4c}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{(b i (m-2k)+p)^2}{4c} - \frac{i m \pi}{2}} (-c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k) - p)^{n-j} (b i (m-2k) + p - 2 c z)^{j+1} \left(\frac{(b i (m-2k) + p - 2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(b i (m-2k) + p - 2cz)^2}{4c}\right) - (-c)^{-n-1} e^{\frac{(b i (2k-m)+p)^2}{4c} + \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-i b (2k-m) - p)^{n-j} (b i (2k-m) + p - 2 c z)^{j+1} \left(\frac{(b i (2k-m) + p - 2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(b i (2k-m) + p - 2cz)^2}{4c}\right) + c^{-n-1} e^{\frac{i m \pi}{2} - \frac{(b i (2k-m)+p)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-i b (2k-m) - p)^{n-j} (b i (2k-m) + p + 2 c z)^{j+1} \left(-\frac{(b i (2k-m) + p + 2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (2k-m) + p + 2cz)^2}{4c}\right) + c^{-n-1} e^{-\frac{(b i (m-2k)+p)^2}{4c} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k) - p)^{n-j} (b i (m-2k) + p + 2 c z)^{j+1} \left(-\frac{(b i (m-2k) + p + 2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (m-2k) + p + 2cz)^2}{4c}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1390.01

$$\int z^n e^{p z} \sin^m(b z) \sinh\left(c \sqrt{z}\right) dz = -2^{-m-2n-2} p^{-2n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(e^{-\frac{c^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2 p \sqrt{z} - c\right)^{h+j} \left(-\frac{\left(2 p \sqrt{z} - c\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 p \sqrt{-\frac{\left(2 p \sqrt{z} - c\right)^2}{p}}\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,p\sqrt{z}-c\right)^2}{4\,p}\right) - c\left(2\,p\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,p\sqrt{z}-c\right)^2}{4\,p}\right)\Bigg)\Bigg) -$$

$$e^{-\frac{c^2}{4p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,p\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,p\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2\,p\sqrt{z}\right)^2}{4\,p}\right) + 2\sqrt{-\frac{\left(c+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2\,p\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg) -$$

$$i^{-m}\,2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg((-1)^m\,e^{-\frac{c^2}{4(p+b\,i\,(2s-m))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)^2}{p+b\,i\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(p+b\,i\,(2s-m))$$

$$\sqrt{-\frac{\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)^2}{p+b\,i\,(2s-m)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)^2}{4\,(p+b\,i\,(2s-m))}\right) - c$$

$$\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(p+b\,i\,(2s-m))\sqrt{z}-c\right)^2}{4\,(p+b\,i\,(2s-m))}\right)\Bigg)\Bigg)$$

$$(p+b\,i\,(2s-m))^{-2n-2} + (-1)^{m+1}\,e^{-\frac{c^2}{4(p+b\,i\,(2s-m))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)^2}{p+b\,i\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)^2}{4\,(p+b\,i\,(2s-m))}\right) + 2\sqrt{-\frac{\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)^2}{p+b\,i\,(2s-m)}}$$

$$(p+b\,i\,(2s-m))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(p+b\,i\,(2s-m))\sqrt{z}\right)^2}{4\,(p+b\,i\,(2s-m))}\right)\Bigg)\Bigg)(p+b\,i\,(2s-m))^{-2n-2}+$$

$$e^{-\frac{c^2}{4\,(p+b\,i\,(m-2s))}}\,(p+b\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)^{h+j}$$

$$\left(-\frac{\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)^2}{p+b\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(p+b\,i\,(m-2s))$$

$$\sqrt{-\frac{\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)^2}{p+b\,i\,(m-2s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)^2}{4\,(p+b\,i\,(m-2s))}\right)-$$

$$c\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(p+b\,i\,(m-2s))\sqrt{z}-c\right)^2}{4\,(p+b\,i\,(m-2s))}\right)\Bigg)-$$

$$e^{-\frac{c^2}{4\,(p+b\,i\,(m-2s))}}\,(p+b\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)^2}{p+b\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(p+b\,i\,(m-2s))}\Bigg)+2\sqrt{-\frac{\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)^2}{p+b\,i\,(m-2s)}}$$

$$(p+b\,i\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,(p+b\,i\,(m-2s))\sqrt{z}\right)^2}{4\,(p+b\,i\,(m-2s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z^r}\,\sin^m(b\,z)\,\sinh(c\,z^r)$

01.19.21.1391.01

$$\int z^n e^{p z^2} \sin^m(b z) \sinh(c z^2) \, dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left((c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-p) z^2\right) - \left((-c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c-p) z^2\right) \right) (1 - m \bmod 2) - 2^{-m-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(-e^{\frac{b^2 (m-2k)^2}{4(p-c)} + \frac{i m \pi}{2}} (p-c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (2 (p-c) z - i b (m-2k))^{j+1} \left(-\frac{(2 (p-c) z - i b (m-2k))^2}{p-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (p-c) z - i b (m-2k))^2}{4 (p-c)} \right) - e^{\frac{b^2 (m-2k)^2}{4(p-c)} - \frac{i m \pi}{2}} (p-c)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (b i (m-2k) + 2 (p-c) z)^{j+1} \left(-\frac{(b i (m-2k) + 2 (p-c) z)^2}{p-c} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (m-2k) + 2 (p-c) z)^2}{4 (p-c)} \right) + e^{\frac{b^2 (m-2k)^2}{4(c+p)} + \frac{i m \pi}{2}} (c+p)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i b (m-2k))^{n-j} (2 (c+p) z - i b (m-2k))^{j+1} \left(-\frac{(2 (c+p) z - i b (m-2k))^2}{c+p} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (c+p) z - i b (m-2k))^2}{4 (c+p)} \right) + e^{\frac{b^2 (m-2k)^2}{4(c+p)} - \frac{i m \pi}{2}} (c+p)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i b (m-2k))^{n-j} (b i (m-2k) + 2 (c+p) z)^{j+1} \left(-\frac{(b i (m-2k) + 2 (c+p) z)^2}{c+p} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i (m-2k) + 2 (c+p) z)^2}{4 (c+p)} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

01.19.21.1392.01

$$\int z^n e^{p \sqrt{z}} \sin^m(b z) \sinh\left(c \sqrt{z}\right) dz = (-1)^m 2^{-m} \binom{m}{\frac{m}{2}} \left((c-p)^{-2(n+1)} \Gamma\left(2 (n+1), (c-p) \sqrt{z}\right) - (c+p)^{-2(n+1)} \Gamma\left(2 (n+1), (-c-p) \sqrt{z}\right) \right) (1 - m \bmod 2) + i^m 2^{-m-2n-2} (-1)^n \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (b (m-2s))^{-2n-2} \left((-1)^m e^{\frac{i (p-c)^2}{4 b (m-2s)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-c)^{-h-j+2n} \left(-c + p + 2 b i (m-2s) \sqrt{z}\right)^{h+j} \left(\frac{i \left(-c + p + 2 b i (m-2s) \sqrt{z}\right)^2}{b (m-2s)} \right)^{\frac{1}{2}(-h-j-1)} \right.$$

$$\binom{j}{h}\binom{n}{j}\left((p-c)\left(-c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(-c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)+2\,b\,i\right.$$

$$\left.(m-2\,s)\sqrt{\frac{i\left(-c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)\right)-$$

$$(-1)^m\,e^{\frac{i\,(c+p)^2}{4\,b\,(m-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+p)^{-h-j+2\,n}\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c+p)\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)+\right.$$

$$\left.2\,b\,i\,(m-2\,s)\sqrt{\frac{i\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c+p+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)\right)+$$

$$e^{-\frac{i\,(p-c)^2}{4\,b\,(m-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-c)^{-h-j+2\,n}\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((p-c)\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)-2\,i\,b\,(m-2\,s)\right.$$

$$\left.\sqrt{-\frac{i\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)\right)-$$

$$e^{-\frac{i\,(c+p)^2}{4\,b\,(m-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c+p)^{-h-j+2\,n}\left(c+p-2\,i\,b\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(c+p-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((c+p)\left(c+p-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{i\left(c+p-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)-2\,i\,b\,(m-2\,s)\sqrt{-\frac{i\left(c+p-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c+p-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\,\sin^m(b\,z^r)\,\sinh(c\,z^r)$

01.19.21.1393.01

$$\int z^n e^{pz}\sin^m(b z^2)\sinh(c z^2)\,dz = 2^{-m-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\Bigg((-c)^{-n-1} e^{\frac{p^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-p)^{n-j}(p-2cz)^{j+1}\left(\frac{(p-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(p-2cz)^2}{4c}\right) -$$

$$c^{-n-1} e^{-\frac{p^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-p)^{n-j}(p+2cz)^{j+1}\left(-\frac{(p+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(p+2cz)^2}{4c}\right)\Bigg) -$$

$$2^{-m-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(-e^{\frac{i m\pi}{2}-\frac{p^2}{4(ib(2k-m)-c)}}(ib(2k-m)-c)^{-n-1}\sum_{j=0}^{n}2^{j-n}(-p)^{n-j}(p+2(ib(2k-m)-c)z)^{j+1}$$

$$\left(-\frac{(p+2(ib(2k-m)-c)z)^2}{ib(2k-m)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(p+2(ib(2k-m)-c)z)^2}{4(ib(2k-m)-c)}\right)+$$

$$e^{\frac{i m\pi}{2}-\frac{p^2}{4(c+bi(2k-m))}}(c+bi(2k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-p)^{n-j}(p+2(c+bi(2k-m))z)^{j+1}$$

$$\left(-\frac{(p+2(c+bi(2k-m))z)^2}{c+bi(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(p+2(c+bi(2k-m))z)^2}{4(c+bi(2k-m))}\right)-$$

$$e^{-\frac{p^2}{4(ib(m-2k)-c)}-\frac{i m\pi}{2}}(ib(m-2k)-c)^{-n-1}\sum_{j=0}^{n}2^{j-n}(-p)^{n-j}(p+2(ib(m-2k)-c)z)^{j+1}$$

$$\left(-\frac{(p+2(ib(m-2k)-c)z)^2}{ib(m-2k)-c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(p+2(ib(m-2k)-c)z)^2}{4(ib(m-2k)-c)}\right)+$$

$$e^{-\frac{p^2}{4(c+bi(m-2k))}-\frac{i m\pi}{2}}(c+bi(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-p)^{n-j}(p+2(c+bi(m-2k))z)^{j+1}$$

$$\left(-\frac{(p+2(c+bi(m-2k))z)^2}{c+bi(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(p+2(c+bi(m-2k))z)^2}{4(c+bi(m-2k))}\right)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1394.01

$$\int z^n e^{pz}\sin^m(b\sqrt{z})\sinh(c\sqrt{z})\,dz = -(-1)^m\,2^{-m-2n-2}\,p^{-2n-2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\Bigg(e^{-\frac{c^2}{4p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c)^{-h-j+2n}\left(2p\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2p\sqrt{z}-c\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2p\sqrt{-\frac{\left(2p\sqrt{z}-c\right)^2}{p}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 p \sqrt{z}-c\right)^2}{4 p}\right) - c\left(2 p \sqrt{z}-c\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 p \sqrt{z}-c\right)^2}{4 p}\right)\Bigg)\Bigg) -$$

$$e^{-\frac{c^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j c^{-h-j+2 n} \left(c+2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c\left(c+2 p \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2 p \sqrt{z}\right)^2}{4 p}\right) + 2 \sqrt{-\frac{\left(c+2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2 p \sqrt{z}\right)^2}{4 p}\right)\Bigg)\Bigg)\Bigg) -$$

$$i^{-m} 2^{-m-2 n-2} p^{-2 n-2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{-\frac{(-c-i b (2 k-m))^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c-i b (2 k-m))^{-h-j+2 n}$$

$$\left(-c-i b (2 k-m)+2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((-c-i b (2 k-m))\left(-c-i b (2 k-m)+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{4 p}\right) +$$

$$2 \sqrt{-\frac{\left(-c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{4 p}\right)\Bigg) -$$

$$e^{-\frac{(c-i b (2 k-m))^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c-i b (2 k-m))^{-h-j+2 n} \left(c-i b (2 k-m)+2 p \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((c-i b (2 k-m))\left(c-i b (2 k-m)+2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c-i b (2 k-m)+2 p \sqrt{z}\right)^2}{4 p}\right) +$$

$$2\sqrt{-\frac{\left(c-i\,b\,(2\,k-m)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c-i\,b\,(2\,k-m)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)+$$

$$(-1)^m\,e^{-\frac{(-c-i\,b\,(m-2\,k))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-c-i\,b\,(m-2\,k))\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\sqrt{-\frac{\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)+$$

$$(-1)^{m+1}\,e^{-\frac{(c-i\,b\,(m-2\,k))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c-i\,b\,(m-2\,k))\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)+2\sqrt{-\frac{\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c-i\,b\,(m-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\,\sin^m\!\left(b\,z^r\right)\sinh\!\left(c\,z^r\right)$

01.19.21.1395.01

$$\int z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \sinh(c z^r)\, dz = \frac{2^{-m-1} (1 - m \bmod 2)}{r} z^\alpha \binom{m}{\frac{m}{2}} \left(((c-p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-p) z^r\right) - ((-c-p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-c-p) z^r\right)\right) - \frac{i^{-m} 2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{\alpha}{r}, (-c - 2 i b k + i b m - p) z^r\right) ((-c - 2 i b k + i b m - p) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+1} ((c - 2 i b k + i b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c - 2 i b k + i b m - p) z^r\right) + ((-c + 2 i b k - i b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-c + 2 i b k - i b m - p) z^r\right) - ((c + 2 i b k - i b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c + 2 i b k - i b m - p) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.1396.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \sinh(c z^2)\, dz = -2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(((-c-p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c-p) z^2\right) - ((c-p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-p) z^2\right)\right) (1 - m \bmod 2) - i^{-m} 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, (-c - 2 i b k + i b m - p) z^2\right) ((-c - 2 i b k + i b m - p) z^2)^{\frac{1}{2}(-n-1)} + (-1)^{m+1} ((c - 2 i b k + i b m - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - 2 i b k + i b m - p) z^2\right) + ((-c + 2 i b k - i b m - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c + 2 i b k - i b m - p) z^2\right) - ((c + 2 i b k - i b m - p) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c + 2 i b k - i b m - p) z^2\right)\right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1397.01

$$\int z^n e^{p \sqrt{z}} \sin^m(b \sqrt{z}) \sinh(c \sqrt{z})\, dz = -\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(2(n+1), (-c - 2 i b k + i b m - p) \sqrt{z}\right) (-c - 2 i b k + i b m - p)^{-2(n+1)} + (-1)^{m+1} (c - 2 i b k + i b m - p)^{-2(n+1)} \Gamma\left(2(n+1), (c - 2 i b k + i b m - p) \sqrt{z}\right) + (-c + 2 i b k - i b m - p)^{-2(n+1)} \Gamma\left(2(n+1), (-c + 2 i b k - i b m - p) \sqrt{z}\right) - (c + 2 i b k - i b m - p)^{-2(n+1)} \Gamma\left(2(n+1), (c + 2 i b k - i b m - p) \sqrt{z}\right)\right) (2 i)^{-m} - 2^{-m} \binom{m}{\frac{m}{2}} \left((c+p)^{-2(n+1)} \Gamma\left(2(n+1), (-c-p) \sqrt{z}\right) - (c-p)^{-2(n+1)} \Gamma\left(2(n+1), (c-p) \sqrt{z}\right)\right) (1 - m \bmod 2) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin^m(a z^r + q) \sinh(c z^r + g)$

01.19.21.1398.01

$$\int z^{\alpha-1} e^{b z^r+e} \sin^m(a z^r+q) \sinh(c z^r+g)\, dz = \frac{2^{-m-1}(1-m \bmod 2)}{r} z^\alpha \binom{m}{\frac{m}{2}} \left(e^{e-g}((c-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-b) z^r\right) - e^{e+g}((-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c) z^r\right)\right) - \frac{i^{-m} 2^{-m-1} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{e+g+2 i k q-i m q} \Gamma\left(\frac{\alpha}{r}, (-b-c-2 i a k+i a m) z^r\right) ((-b-c-2 i a k+i a m) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+1} e^{e-g+2 i k q-i m q} ((-b+c-2 i a k+i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+c-2 i a k+i a m) z^r\right) + e^{e+g-2 i k q+i m q} ((-b-c+2 i a k-i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-c+2 i a k-i a m) z^r\right) - e^{e-g-2 i k q+i m q} ((-b+c+2 i a k-i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+c+2 i a k-i a m) z^r\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.1399.01

$$\int z^n e^{b z^2+e} \sin^m\left(a z^2+q\right) \sinh\left(c z^2+g\right) dz = -2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(e^{e+g}\left((-b-c) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-c) z^2\right) - e^{e-g}\left((c-b) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-b) z^2\right)\right)(1-m \bmod 2) - i^{-m} 2^{-m-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{e+g+2 i k q-i m q} \Gamma\left(\frac{n+1}{2}, (-b-c-2 i a k+i a m) z^2\right) \left((-b-c-2 i a k+i a m) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{m+1} e^{e-g+2 i k q-i m q} \left((-b+c-2 i a k+i a m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+c-2 i a k+i a m) z^2\right) + e^{e+g-2 i k q+i m q} \left((-b-c+2 i a k-i a m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-c+2 i a k-i a m) z^2\right) - e^{e-g-2 i k q+i m q} \left((-b+c+2 i a k-i a m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+c+2 i a k-i a m) z^2\right)\right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{\sqrt{z}\, b+e} \sin^m\left(\sqrt{z}\, a+q\right) \sinh\left(\sqrt{z}\, c+g\right) dz = -\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{e+g+2 i k q-i m q} \Gamma\left(2(n+1), (-b-c-2 i a k+i a m)\sqrt{z}\right) (-b-c-2 i a k+i a m)^{-2(n+1)} + (-1)^{m+1} e^{e-g+2 i k q-i m q} (-b+c-2 i a k+i a m)^{-2(n+1)} \Gamma\left(2(n+1), (-b+c-2 i a k+i a m)\sqrt{z}\right) + e^{e+g-2 i k q+i m q} (-b-c+2 i a k-i a m)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c+2 i a k-i a m)\sqrt{z}\right) - e^{e-g-2 i k q+i m q} (-b+c+2 i a k-i a m)^{-2(n+1)} \Gamma\left(2(n+1), (-b+c+2 i a k-i a m)\sqrt{z}\right)\right)(2 i)^{-m} - 2^{-m} \binom{m}{\frac{m}{2}} \left(e^{e+g}(-b-c)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c)\sqrt{z}\right) - e^{e-g}(c-b)^{-2(n+1)} \Gamma\left(2(n+1), (c-b)\sqrt{z}\right)\right)(1-m \bmod 2) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^2+d z+e} \sin^m\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right)$

01.19.21.1401.01

$$\int z^n e^{b z^2+d z+e} \sin^m\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right) dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}+e-g} \sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f+2(b-c)z)^{j+1} \left(-\frac{(d-f+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}+e+g} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2(b+c)z)^{j+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) - 2^{-m-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(-e^{-\frac{(d-f+i(2k-m)p)^2}{4(b-c+a i(2k-m))}+e-g+i(2k-m)q+\frac{i m \pi}{2}} (b-c+a i(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+f-i(2k-m)p)^{n-j} (d-f+i(2k-m)p+2(b-c+a i(2k-m))z)^{j+1} \left(-\frac{(d-f+i(2k-m)p+2(b-c+a i(2k-m))z)^2}{b-c+a i(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i(2k-m)p+2(b-c+a i(2k-m))z)^2}{4(b-c+a i(2k-m))}\right) + e^{-\frac{(d+f+i(2k-m)p)^2}{4(b+c+a i(2k-m))}+e+g+i(2k-m)q+\frac{i m \pi}{2}} (b+c+a i(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-f-i(2k-m)p)^{n-j} (d+f+i(2k-m)p+2(b+c+a i(2k-m))z)^{j+1} \left(-\frac{(d+f+i(2k-m)p+2(b+c+a i(2k-m))z)^2}{b+c+a i(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+i(2k-m)p+2(b+c+a i(2k-m))z)^2}{4(b+c+a i(2k-m))}\right) - e^{-\frac{(d-f+i(m-2k)p)^2}{4(b-c+a i(m-2k))}+e-g+i(m-2k)q-\frac{i m \pi}{2}} (b-c+a i(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+f-i(m-2k)p)^{n-j} (d-f+i(m-2k)p+2(b-c+a i(m-2k))z)^{j+1} \left(-\frac{(d-f+i(m-2k)p+2(b-c+a i(m-2k))z)^2}{b-c+a i(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i(m-2k)p+2(b-c+a i(m-2k))z)^2}{4(b-c+a i(m-2k))}\right) + \right.$$

$$e^{-\frac{(d+f+i(m-2k)p)^2}{4(b+c+a\,i(m-2k))}+e+g+i(m-2k)q-\frac{i m\pi}{2}} (b+c+a\,i(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-d-f-i(m-2k)p)^{n-j} (d+f+i(m-2k)p+2(b+c+a\,i(m-2k))z)^{j+1}$$

$$\left(-\frac{(d+f+i(m-2k)p+2(b+c+a\,i(m-2k))z)^2}{b+c+a\,i(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d+f+i(m-2k)p+2(b+c+a\,i(m-2k))z)^2}{4(b+c+a\,i(m-2k))}\right)\Bigg) /; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

01.19.21.1402.01

$$\int z^n e^{\sqrt{z}\,b+d z+e} \sin^m\left(\sqrt{z}\,a+p z+q\right) \sinh\left(\sqrt{z}\,c+f z+g\right) dz = 2^{-m-2n-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\Bigg(e^{-\frac{(b+c)^2}{4(d+f)}+e+g} (d+f)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (b+c)^{-h-j+2n} \left(b+c+2(d+f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+$$

$$2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\Bigg) - e^{-\frac{(b-c)^2}{4(d-f)}+e-g}$$

$$(d-f)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+$$

$$2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \Bigg(-e^{-\frac{(b-c+a\,i(2k-m))^2}{4(d-f+i(2k-m)p)}+e-g+i(2k-m)q+\frac{i m\pi}{2}} (d-f+i(2k-m)p)^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c+a\,i\,(2k-m))^{-h-j+2n}\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d-f+i\,(2k-m)\,p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b-c+a\,i\,(2k-m))\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\,-\frac{\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d-f+i\,(2k-m)\,p)}\Bigg)+$$

$$2\,(d-f+i\,(2k-m)\,p)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d-f+i\,(2k-m)\,p)}\right)$$

$$\sqrt{-\frac{\left(b-c+a\,i\,(2k-m)+2\,(d-f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d-f+i\,(2k-m)\,p}}\Bigg)+$$

$$e^{-\frac{(b+c+a\,i\,(2k-m))^2}{4\,(d+f+i\,(2k-m)\,p)}+e+g+i\,(2k-m)\,q+\frac{i\,m\,\pi}{2}}\,(d+f+i\,(2k-m)\,p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c+a\,i\,(2k-m))^{-h-j+2n}$$

$$\left(b+c+a\,i\,(2k-m)+2\,(d+f+i\,(2k-m)\,p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c+a\,i\,(2k-m)+2\,(d+f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d+f+i\,(2k-m)\,p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c+a\,i\,(2k-m))\left(b+c+a\,i\,(2k-m)+2\,(d+f+i\,(2k-m)\,p)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\,-\frac{\left(b+c+a\,i\,(2k-m)+2\,(d+f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,(2k-m)\,p)}\Bigg)+$$

$$2\,(d+f+i\,(2k-m)\,p)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b+c+a\,i\,(2k-m)+2\,(d+f+i\,(2k-m)\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,(2k-m)\,p)}\right)$$

$$\sqrt{-\frac{\left(b+c+a\,i\,(2\,k-m)+2\,(d+f+i\,(2\,k-m)\,p)\,\sqrt{z}\right)^2}{d+f+i\,(2\,k-m)\,p}}\Bigg)-$$

$$e^{-\frac{(b-c+a\,i\,(m-2\,k))^2}{4\,(d-f+i\,(m-2\,k)\,p)}+e-g+i\,(m-2\,k)\,q-\frac{i\,m\,\pi}{2}}\,(d-f+i\,(m-2\,k)\,p)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c+a\,i\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{d-f+i\,(m-2\,k)\,p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b-c+a\,i\,(m-2\,k))\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{4\,(d-f+i\,(m-2\,k)\,p)}\Bigg)+$$

$$2\,(d-f+i\,(m-2\,k)\,p)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{4\,(d-f+i\,(m-2\,k)\,p)}\right)$$

$$\sqrt{-\frac{\left(b-c+a\,i\,(m-2\,k)+2\,(d-f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{d-f+i\,(m-2\,k)\,p}}\Bigg)+$$

$$e^{-\frac{(b+c+a\,i\,(m-2\,k))^2}{4\,(d+f+i\,(m-2\,k)\,p)}+e+g+i\,(m-2\,k)\,q-\frac{i\,m\,\pi}{2}}\,(d+f+i\,(m-2\,k)\,p)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c+a\,i\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(b+c+a\,i\,(m-2\,k)+2\,(d+f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c+a\,i\,(m-2\,k)+2\,(d+f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{d+f+i\,(m-2\,k)\,p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c+a\,i\,(m-2\,k))\left(b+c+a\,i\,(m-2\,k)+2\,(d+f+i\,(m-2\,k)\,p)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\, -\frac{\left(b+c+a\,i\,(m-2k)+2\,(d+f+i\,(m-2k)\,p)\,\sqrt{z}\right)^2}{4\,(d+f+i\,(m-2k)\,p)}\Bigg)+$$

$$2\,(d+f+i\,(m-2k)\,p)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(b+c+a\,i\,(m-2k)+2\,(d+f+i\,(m-2k)\,p)\,\sqrt{z}\right)^2}{4\,(d+f+i\,(m-2k)\,p)}\right)$$

$$\sqrt{-\frac{\left(b+c+a\,i\,(m-2k)+2\,(d+f+i\,(m-2k)\,p)\,\sqrt{z}\right)^2}{d+f+i\,(m-2k)\,p}}\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+$$

Involving cos, exp and power

Involving $z^{\alpha-1}\,e^{b z}\cos(c\,z)\sinh(a\,z)$

01.19.21.1403.01

$$\int z^{\alpha-1}\,e^{b z}\cos(c\,z)\sinh(a\,z)\,dz = \frac{1}{4}\,z^\alpha\left(\Gamma(\alpha,\,(a-b+i\,c)\,z)\,((a-b+i\,c)\,z)^{-\alpha}-(-(a+b+i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a+b+i\,c)\,z)+\right.$$
$$\left.((a-b-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b-i\,c)\,z)-(-(a+b-i\,c)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a+b-i\,c)\,z)\right)$$

Involving $z^{\alpha-1}\,e^{p z}\cos(c\,z+d)\sinh(a\,z)$

01.19.21.1404.01

$$\int z^{\alpha-1}\,e^{p z}\cos(d+c\,z)\sinh(a\,z)\,dz =$$
$$\frac{1}{4}\,e^{-i d}\,z^\alpha\left(\Gamma(\alpha,\,(a+i\,c-p)\,z)\,((a+i\,c-p)\,z)^{-\alpha}+e^{2 i d}\,((a-i\,c-p)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-i\,c-p)\,z)+\right.$$
$$\left.\left(-e^{2 i d}\,\Gamma(\alpha,\,-(a+i\,c+p)\,z)\,(-(a+i\,c+p)\,z)^{-\alpha}-(-(a-i\,c+p)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a-i\,c+p)\,z)\right)\right)$$

Involving $z^{\alpha-1}\,e^{p z}\cos(c\,z+d)\sinh(a\,z+b)$

01.19.21.1405.01

$$\int z^{\alpha-1}\,e^{p z}\cos(c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4}\,e^{-b}\,z^\alpha\left(\Gamma(\alpha,\,(a+i\,c-p)\,z)\,((a+i\,c-p)\,z)^{-\alpha}+((a-i\,c-p)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-i\,c-p)\,z)+\right.$$
$$\left.e^{2 b}\,(-\Gamma(\alpha,\,-(a+i\,c+p)\,z)\,(-(a+i\,c+p)\,z)^{-\alpha}-(-(a-i\,c+p)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a-i\,c+p)\,z))\right)$$

Involving $z^{\alpha-1}\,e^{p z}\cos(c\,z+d)\sinh(a\,z+b)$

01.19.21.1406.01

$$\int z^{\alpha-1}\,e^{p z}\cos(d+c\,z)\sinh(b+a\,z)\,dz =$$
$$\frac{1}{4}\,e^{-b-i d}\,z^\alpha\left(\Gamma(\alpha,\,(a+i\,c-p)\,z)\,((a+i\,c-p)\,z)^{-\alpha}+e^{2 i d}\,((a-i\,c-p)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-i\,c-p)\,z)+\right.$$
$$\left.e^{2 b}\left(-e^{2 i d}\,\Gamma(\alpha,\,-(a+i\,c+p)\,z)\,(-(a+i\,c+p)\,z)^{-\alpha}-(-(a-i\,c+p)\,z)^{-\alpha}\,\Gamma(\alpha,\,-(a-i\,c+p)\,z)\right)\right)$$

Involving $z^n e^{p z^r} \cos(b z^r) \sinh(c z)$

01.19.21.1407.01

$$\int z^n e^{p z^2} \cos(b z^2) \sinh(c z)\, dz = \frac{1}{8\sqrt{-i b + p}\,\sqrt{i b + p}} \left(e^{\frac{c^2}{4 i b - 4 p}} \sqrt{i b + p} \left(\sum_{q=0}^{n} 2^{q-n} c^{n-q} (-i b + p)^{-n-\frac{1}{2}} \left(-\frac{(c + 2 i b z - 2 p z)^2}{-i b + p} \right)^{\frac{1}{2}(-q-1)} (2(-i b + p) z - c)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2 i b z - 2 p z)^2}{4(-i b + p)} \right) - \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (-i b + p)^{-n-\frac{1}{2}} (c + 2(-i b + p) z)^{q+1} \left(-\frac{(c + 2(-i b + p) z)^2}{-i b + p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2(-i b + p) z)^2}{4(-i b + p)} \right) \right) - e^{\frac{c^2}{-4 i b - 4 p}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (i b + p)^{-n-\frac{1}{2}} (c + 2(i b + p) z)^{q+1} \left(-\frac{(c + 2(i b + p) z)^2}{i b + p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2(i b + p) z)^2}{4(i b + p)} \right) + e^{\frac{c^2}{-4 i b - 4 p}} \sqrt{-i b + p} \sum_{q=0}^{n} 2^{q-n} c^{n-q} (i b + p)^{-n-\frac{1}{2}} \left(-\frac{(c - 2 i b z - 2 p z)^2}{i b + p} \right)^{\frac{1}{2}(-q-1)} (2(i b + p) z - c)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c - 2 i b z - 2 p z)^2}{4(i b + p)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.1408.01

$$\int z^n e^{p \sqrt{z}} \cos(b \sqrt{z}) \sinh(c z)\, dz = 2^{-2n-3} c^{-2(n+1)} e^{-\frac{b^2 + 4 i p b + 2 p^2}{4 c}} \left(e^{\frac{2 b^2 + 6 i p b + p^2}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b + p)^{2n-q-r} \left(\frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{c} \right)^{\frac{1}{2}(-q-r-1)} \left(2\sqrt{z}\, c - i b + p\right)^{q+r} \binom{n}{r} \binom{r}{q} \left((b + i p)\left(b + i\left(2\sqrt{z}\, c + p\right)\right) \Gamma\left(\frac{1}{2}(q + r + 1), \frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{4 c} \right) - 2 c \sqrt{\frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(q + r + 2), \frac{\left(b + i\left(2\sqrt{z}\, c + p\right)\right)^2}{4 c} \right) \right) - \right.$$

$$e^{\frac{p(2 i b+3 p)}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b+p)^{2n-q-r} \left(-2\sqrt{z}\, c - i b + p\right)^{q+r} \left(\frac{\left(-2\sqrt{z}\, c - i b + p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((b+i p)\left(b+i\left(p-2 c\sqrt{z}\right)\right)\Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(-2\sqrt{z}\, c - i b + p\right)^2}{4 c}\right)+\right.$$

$$\left.2\sqrt{\frac{\left(-2\sqrt{z}\, c - i b + p\right)^2}{c}}\; c\,\Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(-2\sqrt{z}\, c - i b + p\right)^2}{4 c}\right)\right)-$$

$$e^{\frac{3 p(2 i b+p)}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r (i b+p)^{2n-q-r} \left(-2\sqrt{z}\, c + i b + p\right)^{q+r} \left(\frac{\left(-2\sqrt{z}\, c + i b + p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((i b+p)\left(-2\sqrt{z}\, c + i b + p\right)\Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(-2\sqrt{z}\, c + i b + p\right)^2}{4 c}\right)-\right.$$

$$\left.2 c\sqrt{\frac{\left(-2\sqrt{z}\, c + i b + p\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(-2\sqrt{z}\, c + i b + p\right)^2}{4 c}\right)\right)+$$

$$e^{\frac{2 b^2+2 i p b+p^2}{4 c}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r (i b+p)^{2n-q-r} \left(2\sqrt{z}\, c + i b + p\right)^{q+r} \left(-\frac{\left(2\sqrt{z}\, c + i b + p\right)^2}{c}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\left((i b+p)\left(2\sqrt{z}\, c + i b + p\right)\Gamma\left(\frac{1}{2}(q+r+1), -\frac{\left(2\sqrt{z}\, c + i b + p\right)^2}{4 c}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(2\sqrt{z}\, c + i b + p\right)^2}{c}}\; c\,\Gamma\left(\frac{1}{2}(q+r+2), -\frac{\left(2\sqrt{z}\, c + i b + p\right)^2}{4 c}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos(b z) \sinh(c z)$

01.19.21.1409.01

$$\int z^n e^{p z^2} \cos(b z) \sinh(c z) \, dz = \frac{1}{8\sqrt{p}} e^{\frac{b^2-c^2}{2p}} \left(-e^{\frac{(c-ib)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (-c-ib)^{n-q} p^{-n-\frac{1}{2}} (c+ib+2pz)^{q+1} \left(-\frac{(c+ib+2pz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+ib+2pz)^2}{4p}\right) - e^{\frac{(c+ib)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (ib-c)^{n-q} p^{-n-\frac{1}{2}} (c-ib+2pz)^{q+1} \left(-\frac{(c-ib+2pz)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c-ib+2pz)^2}{4p}\right) + e^{\frac{(c-ib)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (c+ib)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(c+ib-2pz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-c-ib+2pz)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+ib-2pz)^2}{4p}\right) + e^{\frac{(c+ib)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} (c-ib)^{n-q} p^{-n-\frac{1}{2}} \left(-\frac{(c-ib-2pz)^2}{p}\right)^{\frac{1}{2}(-q-1)} (-c+ib+2pz)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c-ib-2pz)^2}{4p}\right) \right) /; n \in \mathbb{N}$$

01.19.21.1410.01

$$\int z^n e^{p\sqrt{z}} \cos(b z) \sinh(c z) \, dz = 2^{-2n-3} \left(-(-c-ib)^{-2(n+1)} e^{\frac{p^2}{4c+4ib}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2n-q-r} \left(p - 2(c+ib)\sqrt{z}\right)^{q+r} \left(\frac{\left(p-2(c+ib)\sqrt{z}\right)^2}{c+ib}\right)^{\frac{1}{2}(-q-r-1)} \binom{n}{r} \binom{r}{q} \left(p\left(p-2(c+ib)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(p-2(c+ib)\sqrt{z}\right)^2}{4(c+ib)}\right) - 2(c+ib) \sqrt{\frac{\left(p-2(c+ib)\sqrt{z}\right)^2}{c+ib}} \, \Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(p-2(c+ib)\sqrt{z}\right)^2}{4(c+ib)}\right) \right) + (c+ib)^{-2(n+1)} e^{\frac{p^2}{-4c-4ib}} \sum_{r=0}^{n} \sum_{q=0}^{r} (-1)^{r-q} 4^r p^{2n-q-r} \left(2\sqrt{z}(c+ib)+p\right)^{q+r} \left(-\frac{\left(2\sqrt{z}(c+ib)+p\right)^2}{c+ib}\right)^{\frac{1}{2}(-q-r-1)} \binom{n}{r} \binom{r}{q} \left(p\left(2\sqrt{z}(c+ib)+p\right) \Gamma\left(\frac{1}{2}(q+r+1), -\frac{\left(2\sqrt{z}(c+ib)+p\right)^2}{4(c+ib)}\right) + \right.\right.$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,(c+i\,b)+p\right)^2}{c+i\,b}}\,(c+i\,b)\,\Gamma\!\left(\frac{1}{2}(q+r+2),\,-\frac{\left(2\sqrt{z}\,(c+i\,b)+p\right)^2}{4\,(c+i\,b)}\right)\Bigg)\Bigg)-$$

$$(i\,b-c)^{-2\,(n+1)}\,e^{\frac{p^2}{4\,c-4\,i\,b}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2\,n-q-r}\left(p-2\,(c-i\,b)\sqrt{z}\right)^{q+r}\left(\frac{\left(p-2\,(c-i\,b)\sqrt{z}\right)^2}{c-i\,b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg(p\left(p-2\,(c-i\,b)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\,\frac{\left(p-2\,(c-i\,b)\sqrt{z}\right)^2}{4\,(c-i\,b)}\right)-$$

$$2\,(c-i\,b)\sqrt{\frac{\left(p-2\,(c-i\,b)\sqrt{z}\right)^2}{c-i\,b}}\;\Gamma\!\left(\frac{1}{2}(q+r+2),\,\frac{\left(p-2\,(c-i\,b)\sqrt{z}\right)^2}{4\,(c-i\,b)}\right)\Bigg)+$$

$$(c-i\,b)^{-2\,(n+1)}\,e^{\frac{p^2}{4\,i\,b-4\,c}}\sum_{r=0}^{n}\sum_{q=0}^{r}(-1)^{r-q}\,4^r\,p^{2\,n-q-r}\left(2\sqrt{z}\,(c-i\,b)+p\right)^{q+r}\left(-\frac{\left(2\sqrt{z}\,(c-i\,b)+p\right)^2}{c-i\,b}\right)^{\frac{1}{2}(-q-r-1)}$$

$$\binom{n}{r}\binom{r}{q}\Bigg(p\left(2\sqrt{z}\,(c-i\,b)+p\right)\Gamma\!\left(\frac{1}{2}(q+r+1),\,-\frac{\left(2\sqrt{z}\,(c-i\,b)+p\right)^2}{4\,(c-i\,b)}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,(c-i\,b)+p\right)^2}{c-i\,b}}\,(c-i\,b)\,\Gamma\!\left(\frac{1}{2}(q+r+2),\,-\frac{\left(2\sqrt{z}\,(c-i\,b)+p\right)^2}{4\,(c-i\,b)}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos\left(b\,z^r\right)\sinh(c\,z)$

01.19.21.1411.01

$$\int z^n e^{p z} \cos(b z^2) \sinh(c z)\, dz = \frac{i}{8 b} e^{-\frac{i (c+p)^2}{4 b}} \left(-\sqrt{i b} \left(e^{\frac{i (c^2+p^2)}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (c-p)^{n-q} (-c+p+2 i b z)^{q+1} \left(\frac{i (-c+p+2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (-c+p+2 i b z)^2}{4 b}\right) - e^{\frac{i (c+p)^2}{2 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (-c-p)^{n-q} (c+p+2 i b z)^{q+1} \left(\frac{i (c+p+2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (c+p+2 i b z)^2}{4 b}\right)\right) + \sqrt{-i b}\; e^{\frac{i c p}{b}} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (c-p)^{n-q} (-c+p-2 i b z)^{q+1} \left(-\frac{i (c-p+2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c-p+2 i b z)^2}{4 b}\right) - \sqrt{-i b} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (-c-p)^{n-q} (c+p-2 i b z)^{q+1} \left(-\frac{i (c+p-2 i b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c+p-2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1412.01

$$\int z^n e^{p z} \cos\left(b \sqrt{z}\right) \sinh(c z)\, dz = 2^{-2 n-3} \left(-e^{\frac{b^2}{4 p-4 c}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (-i b)^{2 n-q-r} \left(\frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{c-p}\right)^{\frac{1}{2}(-q-r-1)} \left(-i b+2 (p-c) \sqrt{z}\right)^{q+r} \binom{n}{r} \binom{r}{q} \left(b \left(b-2 i (c-p) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(q+r+1), \frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{4 (c-p)}\right) + 2 \sqrt{\frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{c-p}}\; (c-p) \Gamma\left(\frac{1}{2}(q+r+2), \frac{\left(i b+2 (c-p) \sqrt{z}\right)^2}{4 (c-p)}\right)\right)\right)\right) (p-c)^{-2(n+1)} - e^{\frac{b^2}{4 p-4 c}} \left(\sum_{r=0}^{n} \sum_{q=0}^{r} -(-1)^{r-q} 4^r (i b)^{2 n-q-r} \left(i b+2 (p-c) \sqrt{z}\right)^{q+r} \left(\frac{\left(i b+2 (p-c) \sqrt{z}\right)^2}{c-p}\right)^{\frac{1}{2}(-q-r-1)} \binom{n}{r}\right.$$

$$\binom{r}{q}\left(b\left(b+2\,i\,(c-p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{\left(i\,b+2\,(p-c)\,\sqrt{z}\right)^2}{4\,(c-p)}\right)+\right.$$

$$\left.\left.2\,\sqrt{\frac{\left(i\,b+2\,(p-c)\,\sqrt{z}\right)^2}{c-p}}\ (c-p)\,\Gamma\left(\frac{1}{2}(q+r+2),\ \frac{\left(i\,b+2\,(p-c)\,\sqrt{z}\right)^2}{4\,(c-p)}\right)\right)\right)(p-c)^{-2\,(n+1)}+$$

$$e^{\frac{b^2}{4\,(c+p)}}\,(c+p)^{-2\,(n+1)}\left(\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(-i\,b)^{2\,n-q-r}\left(\frac{\left(b+2\,i\,(c+p)\,\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(-i\,b+2\,(c+p)\,\sqrt{z}\right)^{q+r}\right.$$

$$\binom{n}{r}\binom{r}{q}\left(b\left(b+2\,i\,(c+p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{\left(b+2\,i\,(c+p)\,\sqrt{z}\right)^2}{4\,(c+p)}\right)-\right.$$

$$\left.2\,(c+p)\,\sqrt{\frac{\left(b+2\,i\,(c+p)\,\sqrt{z}\right)^2}{c+p}}\ \Gamma\left(\frac{1}{2}(q+r+2),\ \frac{\left(b+2\,i\,(c+p)\,\sqrt{z}\right)^2}{4\,(c+p)}\right)\right)+$$

$$\sum_{r=0}^{n}\sum_{q=0}^{r}-(-1)^{r-q}\,4^r\,(i\,b)^{2\,n-q-r}\left(\frac{\left(b-2\,i\,(c+p)\,\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-q-r-1)}\left(i\,b+2\,(c+p)\,\sqrt{z}\right)^{q+r}\binom{n}{r}$$

$$\binom{r}{q}\left(b\left(b-2\,i\,(c+p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(q+r+1),\ \frac{\left(b-2\,i\,(c+p)\,\sqrt{z}\right)^2}{4\,(c+p)}\right)-\right.$$

$$\left.\left.\left.2\,(c+p)\,\sqrt{\frac{\left(b-2\,i\,(c+p)\,\sqrt{z}\right)^2}{c+p}}\ \Gamma\left(\frac{1}{2}(q+r+2),\ \frac{\left(b-2\,i\,(c+p)\,\sqrt{z}\right)^2}{4\,(c+p)}\right)\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos(b\,z)\sinh(c\,z^r)$

01.19.21.1413.01

$$\int z^n e^{p z}\cos(b z)\sinh\left(c z^2\right) dz = 2^{-n-4}(-c)^{-n-1} e^{-\frac{b^2+4 i p b+2 p^2}{4 c}}\left(e^{\frac{p(2 i b+3 p)}{4 c}}\sum_{q=0}^{n}(i b-p)^{n-q}(-i b+p-2 c z)^{q+1}\binom{n}{q}E_{\frac{1-q}{2}}\left(\frac{(-i b+p-2 c z)^2}{4 c}\right)+\right.$$
$$2^n e^{\frac{3 p(2 i b+p)}{4 c}}\sum_{q=0}^{n}2^{-n}(-i b-p)^{n-q}(i b+p-2 c z)^{q+1}\binom{n}{q}E_{\frac{1-q}{2}}\left(\frac{(i b+p-2 c z)^2}{4 c}\right)+$$
$$(-1)^n e^{\frac{2 b^2+2 i p b+p^2}{4 c}}\left(e^{\frac{i b p}{c}}\sum_{q=0}^{n}(i b-p)^{n-q}(-i b+p+2 c z)^{q+1}\binom{n}{q}E_{\frac{1-q}{2}}\left(\frac{(b+i(p+2 c z))^2}{4 c}\right)+\right.$$
$$\left.\left.2^n\sum_{q=0}^{n}2^{-n}(-i b-p)^{n-q}(i b+p+2 c z)^{q+1}\binom{n}{q}E_{\frac{1-q}{2}}\left(-\frac{(i b+p+2 c z)^2}{4 c}\right)\right)\right)/;\ n\in\mathbb{N}$$

01.19.21.1414.01

$$\int z^n e^{p z}\cos(b z)\sinh\left(c\sqrt{z}\right) dz = -2^{-2 n-3}\left(-e^{-\frac{c^2}{4(-i b+p)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k c^{-h-k+2 n}\left(\frac{\left(i c+2(b+i p)\sqrt{z}\right)^2}{-i b+p}\right)^{\frac{1}{2}(-h-k-1)}\left(c+2(-i b+p)\sqrt{z}\right)^{h+k}\right.\right.$$
$$\binom{k}{h}\binom{n}{k}\left(c\left(c+2(-i b+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{\left(i c+2(b+i p)\sqrt{z}\right)^2}{4(-i b+p)}\right)+\right.$$
$$\left.\left.2\sqrt{\frac{\left(i c+2(b+i p)\sqrt{z}\right)^2}{-i b+p}}(-i b+p)\Gamma\left(\frac{1}{2}(h+k+2),\frac{\left(i c+2(b+i p)\sqrt{z}\right)^2}{4(-i b+p)}\right)\right)\right)(-i b+p)^{-2(n+1)}+$$
$$e^{-\frac{c^2}{4(-i b+p)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-c)^{-h-k+2 n}\left(\frac{\left(i c+2(-b-i p)\sqrt{z}\right)^2}{-i b+p}\right)^{\frac{1}{2}(-h-k-1)}\left(2(-i b+p)\sqrt{z}-c\right)^{h+k}\right.$$
$$\binom{k}{h}\binom{n}{k}\left(2(-i b+p)\sqrt{\frac{\left(i c+2(-b-i p)\sqrt{z}\right)^2}{-i b+p}}\ \Gamma\left(\frac{1}{2}(h+k+2),\frac{\left(i c+2(-b-i p)\sqrt{z}\right)^2}{4(-i b+p)}\right)-\right.$$
$$\left.\left.c\left(2(-i b+p)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{\left(i c+2(-b-i p)\sqrt{z}\right)^2}{4(-i b+p)}\right)\right)\right)(-i b+p)^{-2(n+1)}+$$

$$e^{-\frac{c^2}{4(i b+p)}} (i b+p)^{-2(n+1)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(\frac{\left(i c+2(b-i p)\sqrt{z}\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-k-1)} \left(2(i b+p)\sqrt{z}-c\right)^{h+k} \binom{k}{h}\binom{n}{k} \left(2(i b+p)\sqrt{\frac{\left(i c+2(b-i p)\sqrt{z}\right)^2}{i b+p}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(i c+2(b-i p)\sqrt{z}\right)^2}{4(i b+p)}\right) - c\left(2(i b+p)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(i c+2(b-i p)\sqrt{z}\right)^2}{4(i b+p)}\right)\right) - \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(\frac{\left(i c+2(i p-b)\sqrt{z}\right)^2}{i b+p}\right)^{\frac{1}{2}(-h-k-1)} \left(c+2(i b+p)\sqrt{z}\right)^{h+k} \binom{k}{h}\binom{n}{k} \left(2(i b+p)\sqrt{\frac{\left(i c+2(i p-b)\sqrt{z}\right)^2}{i b+p}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(i c+2(i p-b)\sqrt{z}\right)^2}{4(i b+p)}\right) - i c\left(i c+2(i p-b)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(i c+2(i p-b)\sqrt{z}\right)^2}{4(i b+p)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos(b z) \sinh(c z^r)$

01.19.21.1415.01

$$\int z^n e^{p z^2} \cos(b z) \sinh(c z^2)\, dz = \frac{1}{8\sqrt{p-c}\,\sqrt{c+p}}\, e^{\frac{b^2}{4p-4c}} \Bigg(\sqrt{c+p} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (p-c)^{-n-\frac{1}{2}} \left(\frac{(i b + 2(c-p) z)^2}{c-p}\right)^{\frac{1}{2}(-q-1)} (-i b + 2(p-c) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b + 2(c-p) z)^2}{4(c-p)}\right) + \sqrt{c+p} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (p-c)^{-n-\frac{1}{2}} (i b - 2 c z + 2 p z)^{q+1} \left(\frac{(i b - 2 c z + 2 p z)^2}{c-p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b - 2 c z + 2 p z)^2}{4(c-p)}\right) - e^{\frac{c b^2}{2c^2-2p^2}} \sqrt{p-c} \left(\sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (c+p)^{-n-\frac{1}{2}} \left(\frac{(b + 2 i (c+p) z)^2}{c+p}\right)^{\frac{1}{2}(-q-1)} (-i b + 2(c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b + 2 i (c+p) z)^2}{4(c+p)}\right) + \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (c+p)^{-n-\frac{1}{2}} \left(\frac{(b - 2 i (c+p) z)^2}{c+p}\right)^{\frac{1}{2}(-q-1)} (i b + 2(c+p) z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(b - 2 i (c+p) z)^2}{4(c+p)}\right)\right)\Bigg) /;\, n \in \mathbb{N}$$

01.19.21.1416.01

$$\int z^n e^{p\sqrt{z}} \cos(b z) \sinh\left(c\sqrt{z}\right) dz = (-1)^n 2^{-2n-3} b^{-2n-2} \Bigg(-e^{-\frac{i(c+p)^2}{4b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (c+p)^{-h-k+2n} \left(c+p-2 i b\sqrt{z}\right)^{h+k} \left(\frac{i\left(2\sqrt{z}\, b + i c + i p\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((c+p)\left(c+p-2 i b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(2\sqrt{z}\, b + i c + i p\right)^2}{4b}\right) - 2 i b \sqrt{\frac{i\left(2\sqrt{z}\, b + i c + i p\right)^2}{b}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(2\sqrt{z}\, b + i c + i p\right)^2}{4b}\right)\right) + e^{\frac{i(p-c)^2}{4b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (p-c)^{-h-k+2n} \left(-c+p+2 i b\sqrt{z}\right)^{h+k} \left(\frac{i\left(-c+p+2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((p-c)\left(-c+p+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(2\sqrt{z}\,b+i\,c-i\,p\right)^2}{4\,b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(-c+p+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(2\sqrt{z}\,b+i\,c-i\,p\right)^2}{4\,b}\right)\right)-$$

$$e^{\frac{i(c+p)^2}{4b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+p)^{-h-k+2n}\left(c+p+2\,i\,b\sqrt{z}\right)^{h+k}\left(\frac{i\left(c+p+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((c+p)\left(c+p+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(-2\sqrt{z}\,b+i\,c+i\,p\right)^2}{4\,b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(c+p+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-2\sqrt{z}\,b+i\,c+i\,p\right)^2}{4\,b}\right)\right)+$$

$$e^{-\frac{i(p-c)^2}{4b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-c)^{-h-k+2n}\left(-c+p-2\,i\,b\sqrt{z}\right)^{h+k}\left(-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((p-c)\left(-c+p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.\left.2\,i\,b\sqrt{-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(-c+p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos\left(b\,z^r\right)\sinh\left(c\,z^r\right)$

01.19.21.1417.01

$$\int z^n e^{p z} \cos(b z^2) \sinh(c z^2) \, dz = \frac{1}{8} \left(\frac{1}{\sqrt{-c - i b}} e^{\frac{p^2}{4c+4 i b}} \sum_{q=0}^{n} 2^{q-n} (-c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2(c + i b) z)^{q+1} \left(\frac{(p - 2(c + i b) z)^2}{c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2(c + i b) z)^2}{4(c + i b)} \right) - \frac{1}{\sqrt{c + i b}} e^{\frac{p^2}{-4c-4 i b}} \sum_{q=0}^{n} 2^{q-n} (c + i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 c z + 2 i b z)^{q+1} \left(-\frac{(p + 2 c z + 2 i b z)^2}{c + i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 c z + 2 i b z)^2}{4(c + i b)} \right) + \frac{1}{\sqrt{i b - c}} e^{\frac{p^2}{4c-4 i b}} \sum_{q=0}^{n} 2^{q-n} (i b - c)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 c z + 2 i b z)^{q+1} \left(\frac{(p - 2 c z + 2 i b z)^2}{c - i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2 c z + 2 i b z)^2}{4(c - i b)} \right) - \frac{1}{\sqrt{c - i b}} e^{\frac{p^2}{4 i b-4c}} \sum_{q=0}^{n} 2^{q-n} (c - i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2(c - i b) z)^{q+1} \left(-\frac{(p + 2(c - i b) z)^2}{c - i b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2(c - i b) z)^2}{4(c - i b)} \right) \right) /; n \in \mathbb{N}$$

01.19.21.1418.01

$$\int z^n e^{p z} \cos(b \sqrt{z}) \sinh(c \sqrt{z}) \, dz = 2^{-2n-3} p^{-2(n+1)} \left(-e^{-\frac{(-c - i b)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-c - i b)^{-h-i+2n} \left(-c - i b + 2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left((-c - i b) \left(-c - i b + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{4p} \right) + 2 \sqrt{-\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{p}} \, p \, \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-c - i b + 2 p \sqrt{z}\right)^2}{4p} \right) \right) - e^{-\frac{(i b - c)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (i b - c)^{-h-i+2n} \left(-c + i b + 2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(-c + i b + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((i\,b-c)\left(-c+i\,b+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-c+i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-c+i\,b+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(-c+i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(c-i\,b)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c-i\,b)^{-h-i+2\,n}\left(c-i\,b+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(c-i\,b+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((c-i\,b)\left(c-i\,b+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(c-i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c-i\,b+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(c-i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(c+i\,b)^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c+i\,b)^{-h-i+2\,n}\left(c+i\,b+2\,p\sqrt{z}\right)^{h+i}\left(-\frac{\left(c+i\,b+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left((c+i\,b)\left(c+i\,b+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(c+i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(c+i\,b+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(c+i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\cos(b\,z^r)\sinh(c\,z^r)$

01.19.21.1419.01

$$\int z^{\alpha-1}\,e^{p\,z^r}\cos(b\,z^r)\sinh(c\,z^r)\,dz =$$

$$\frac{1}{4\,r}z^\alpha\left(\Gamma\left(\frac{\alpha}{r},\,(c+i\,b-p)\,z^r\right)((c+i\,b-p)\,z^r)^{-\frac{\alpha}{r}}+((c-i\,b-p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(c-i\,b-p)\,z^r\right)-\right.$$

$$\left.(-(c+i\,b+p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-(c+i\,b+p)\,z^r\right)-(-(c-i\,b+p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-(c-i\,b+p)\,z^r\right)\right)$$

01.19.21.1420.01

$$\int z^n e^{p z^2} \cos(b z^2) \sinh(c z^2) \, dz = \frac{1}{8} z^{n+1} \left(-\left((-c - i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c - i b - p) z^2\right) - \left((-c + i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c + i b - p) z^2\right) + \left((c - i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - i b - p) z^2\right) + \left((c + i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c + i b - p) z^2\right) \right) /; n \in \mathbb{N}$$

01.19.21.1421.01

$$\int z^n e^{p \sqrt{z}} \cos(b \sqrt{z}) \sinh(c \sqrt{z}) \, dz = \frac{1}{2} \left(-(-c - i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (-c - i b - p) \sqrt{z}\right) - (-c + i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (-c + i b - p) \sqrt{z}\right) + (c - i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (c - i b - p) \sqrt{z}\right) + (c + i b - p)^{-2(n+1)} \Gamma\left(2(n+1), (c + i b - p) \sqrt{z}\right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos(a z^r + q) \sinh(c z^r + g)$

01.19.21.1422.01

$$\int z^{\alpha-1} e^{b z^r + e} \cos(a z^r + q) \sinh(c z^r + g) \, dz = \frac{z^\alpha}{4 r} \left(-e^{e+g+i q} \Gamma\left(\frac{\alpha}{r}, (-b - c - i a) z^r\right) ((-b - c - i a) z^r)^{-\frac{\alpha}{r}} - e^{e+g-i q} ((-b - c + i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c + i a) z^r\right) + e^{e-g+i q} ((-b + c - i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c - i a) z^r\right) + e^{e-g-i q} ((-b + c + i a) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b + c + i a) z^r\right) \right)$$

01.19.21.1423.01

$$\int z^n e^{b z^2 + e} \cos(a z^2 + q) \sinh(c z^2 + g) \, dz = \frac{1}{8} z^{n+1} \left(-e^{e+g+i q} \Gamma\left(\frac{n+1}{2}, (-b - c - i a) z^2\right) \left((-b - c - i a) z^2\right)^{\frac{1}{2}(-n-1)} - e^{e+g-i q} \left((-b - c + i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - c + i a) z^2\right) + e^{e-g+i q} \left((-b + c - i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b + c - i a) z^2\right) + e^{e-g-i q} \left((-b + c + i a) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b + c + i a) z^2\right) \right) /; n \in \mathbb{N}$$

01.19.21.1424.01

$$\int z^n e^{\sqrt{z}\, b + e} \cos(\sqrt{z}\, a + q) \sinh(\sqrt{z}\, c + g) \, dz = \frac{1}{2} e^{e-g-i q} \left(-(-b - c - i a)^{-2(n+1)} e^{2 g + 2 i q} \Gamma\left(2(n+1), (-b - c - i a) \sqrt{z}\right) - (-b - c + i a)^{-2(n+1)} e^{2 g} \Gamma\left(2(n+1), (-b - c + i a) \sqrt{z}\right) + (-b + c - i a)^{-2(n+1)} e^{2 i q} \Gamma\left(2(n+1), (-b + c - i a) \sqrt{z}\right) + (-b + c + i a)^{-2(n+1)} \Gamma\left(2(n+1), (-b + c + i a) \sqrt{z}\right) \right) /; n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \cos(a z^r + p z + q) \sinh(c z^r + f z + g)$

01.19.21.1425.01

$$\int z^n e^{b z^2+d z+e} \cos\left(a z^2+p z+q\right) \sinh\left(c z^2+f z+g\right) dz = \frac{1}{8}\Bigg(e^{-\frac{(d-f-i p)^2}{4(b-c-i a)}+e-g-i q} (b-c-i a)^{-n-1} \sum_{j=0}^n 2^{j-n} (-d+f+i p)^{n-j} (d-f-i p+2(b-c-i a) z)^{j+1} \left(-\frac{(d-f-i p+2(b-c-i a) z)^2}{b-c-i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f-i p+2(b-c-i a) z)^2}{4(b-c-i a)}\right) + (b-c+i a)^{-n-1} e^{-\frac{(d-f+i p)^2}{4(b-c+i a)}+e-g+i q} \sum_{j=0}^n 2^{j-n} (-d+f-i p)^{n-j} (d-f+i p+2(b-c+i a) z)^{j+1} \left(-\frac{(d-f+i p+2(b-c+i a) z)^2}{b-c+i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i p+2(b-c+i a) z)^2}{4(b-c+i a)}\right) - (b+c-i a)^{-n-1} e^{-\frac{(d+f-i p)^2}{4(b+c-i a)}+e+g-i q} \sum_{j=0}^n 2^{j-n} (-d-f+i p)^{n-j} (d+f-i p+2(b+c-i a) z)^{j+1} \left(-\frac{(d+f-i p+2(b+c-i a) z)^2}{b+c-i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f-i p+2(b+c-i a) z)^2}{4(b+c-i a)}\right) - (b+c+i a)^{-n-1} e^{-\frac{(d+f+i p)^2}{4(b+c+i a)}+e+g+i q} \sum_{j=0}^n 2^{j-n} (-d-f-i p)^{n-j} (d+f+i p+2(b+c+i a) z)^{j+1} \left(-\frac{(d+f+i p+2(b+c+i a) z)^2}{b+c+i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+i p+2(b+c+i a) z)^2}{4(b+c+i a)}\right)\Bigg) /; n \in \mathbb{N}$$

01.19.21.1426.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-2n-3} \Bigg(-e^{-\frac{(b-c+i a)^2}{4(d-f+i p)}+e-g+i q} (d-f+i p)^{-2n-2} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (b-c+i a)^{-h-i+2n} \left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^{h+i} \left(-\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{d-f+i p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \Bigg((b-c+i a)\left(b-c+i a+2(d-f+i p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{4(d-f+i p)}\right) + 2\sqrt{-\frac{\left(b-c+i a+2(d-f+i p)\sqrt{z}\right)^2}{d-f+i p}}$$

$$(d-f+i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c+i\,a+2\,(d-f+i\,p)\sqrt{z}\right)^2}{4\,(d-f+i\,p)}\right)\Bigg)+$$

$$e^{-\frac{(b+c+i\,a)^2}{4\,(d+f+i\,p)}+e+g+i\,q}\,(d+f+i\,p)^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c+i\,a)^{-h-i+2n}\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{d+f+i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b+c+i\,a)\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,p)}\right)+2\sqrt{-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{d+f+i\,p}}$$

$$(d+f+i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c+i\,a+2\,(d+f+i\,p)\sqrt{z}\right)^2}{4\,(d+f+i\,p)}\right)\Bigg)-$$

$$e^{-\frac{(b-c-i\,a)^2}{4\,(d-f-i\,p)}+e-g-i\,q}\,(d-f-i\,p)^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-c-i\,a)^{-h-i+2n}\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{d-f-i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b-c-i\,a)\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{4\,(d-f-i\,p)}\right)+2\sqrt{-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{d-f-i\,p}}$$

$$(d-f-i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c-i\,a+2\,(d-f-i\,p)\sqrt{z}\right)^2}{4\,(d-f-i\,p)}\right)\Bigg)+$$

$$e^{-\frac{(b+c-i\,a)^2}{4\,(d+f-i\,p)}+e+g-i\,q}\,(d+f-i\,p)^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c-i\,a)^{-h-i+2n}\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^2}{d+f-i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b+c-i\,a)\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^2}{4\,(d+f-i\,p)}\right)+2\sqrt{-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^2}{d+f-i\,p}}$$

$$(d+f-i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c-i\,a+2\,(d+f-i\,p)\sqrt{z}\right)^2}{4\,(d+f-i\,p)}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving powers of cos, exp and power

Involving $z^{\alpha-1}\,e^{p\,z}\cos^{\mu}(c\,z)\sinh(a\,z)$

01.19.21.1427.01

$$\int z^{\alpha-1}\,e^{b\,z}\cos^m(c\,z)\sinh(a\,z)\,dz = -2^{-m-1}\binom{m}{\frac{m}{2}}\left(((-a-b)\,z)^{-\alpha}\,\Gamma(\alpha,\,(-a-b)\,z)-((a-b)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b)\,z)\right)(1-m \bmod 2)\,z^{\alpha}-$$

$$2^{-m-1}\,z^{\alpha}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Big(\Gamma(\alpha,\,(-a-b-i\,c\,m+2\,i\,c\,s)\,z)\,((-a-b-i\,c\,m+2\,i\,c\,s)\,z)^{-\alpha}-$$

$$((a-b-i\,c\,m+2\,i\,c\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b-i\,c\,m+2\,i\,c\,s)\,z)+((-a-b+i\,c\,m-2\,i\,c\,s)\,z)^{-\alpha}$$

$$\Gamma(\alpha,\,(-a-b+i\,c\,m-2\,i\,c\,s)\,z)-((a-b+i\,c\,m-2\,i\,c\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a-b+i\,c\,m-2\,i\,c\,s)\,z)\Big)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1428.01

$$\int z^n\,e^{p\,z}\cos^{\mu}(c\,z)\sinh(a\,z)\,dz =$$

$$\frac{1}{2}\left(1+e^{2\,i\,c\,z}\right)^{-\mu}\cos^{\mu}(c\,z)\,n!\left(e^{(a+p)\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(a+p-i\,c\,\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\left(-\frac{i\,(a+p)+c\,\mu}{2\,c},\,\ldots,\,-\frac{i\,(a+p)+c\,\mu}{2\,c},\,-\mu;\right.\right.$$

$$\left.1-\frac{i\,(a+p)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{i\,(a+p)+c\,\mu}{2\,c};\,-e^{2\,i\,c\,z}\right)-e^{(p-a)\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-a+p-i\,c\,\mu)^{-j-1}}{(n-j)!}$$

$$\left.{}_{j+2}F_{j+1}\left(-\frac{i\,(p-a)+c\,\mu}{2\,c},\,\ldots,\,-\frac{i\,(p-a)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{i\,(p-a)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{i\,(p-a)+c\,\mu}{2\,c};\,-e^{2\,i\,c\,z}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z}\cos^{\mu}(c\,z+d)\sinh(a\,z)$

01.19.21.1429.01

$$\int z^{\alpha-1} e^{pz} \cos^m(d+cz)\sinh(az)\,dz = -2^{-m-1}\binom{m}{\frac{m}{2}}\left(((-a-p)z)^{-\alpha}\,\Gamma(\alpha,(-a-p)z)-((a-p)z)^{-\alpha}\,\Gamma(\alpha,(a-p)z)\right)(1-m \bmod 2)\,z^\alpha - 2^{-m-1} z^\alpha \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{-idm-2ids}\binom{m}{s}\Big(-e^{2idm}\,\Gamma(\alpha,(a-icm-p+2ics)z)\,((a-icm-p+2ics)z)^{-\alpha} + \left(e^{2idm}\,\Gamma(\alpha,(-a-icm-p+2ics)z)\,((-a-icm-p+2ics)z)^{-\alpha}+e^{4ids}\,((-a+icm-p-2ics)z)^{-\alpha}\,\Gamma(\alpha,(-a+icm-p-2ics)z)\right)-e^{4ids}\,((a+icm-p-2ics)z)^{-\alpha}\,\Gamma(\alpha,(a+icm-p-2ics)z)\Big)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1430.01

$$\int z^n e^{pz}\cos^\mu(d+cz)\sinh(az)\,dz = \frac{1}{2}\left(1+e^{2i(d+cz)}\right)^{-\mu}\cos^\mu(d+cz)\,n!\left(e^{(a+p)z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a+p-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i(a+p)+c\mu}{2c},\ldots,-\frac{i(a+p)+c\mu}{2c},-\mu;1-\frac{i(a+p)+c\mu}{2c},\ldots,1-\frac{i(a+p)+c\mu}{2c};-e^{2i(d+cz)}\right) - e^{(p-a)z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a+p-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i(p-a)+c\mu}{2c},\ldots,-\frac{i(p-a)+c\mu}{2c},-\mu;1-\frac{i(p-a)+c\mu}{2c},\ldots,1-\frac{i(p-a)+c\mu}{2c};-e^{2i(d+cz)}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1} e^{pz} \cos^\mu(cz)\sinh(az+b)$

01.19.21.1431.01

$$\int z^{\alpha-1} e^{pz}\cos^m(cz)\sinh(b+az)\,dz = -2^{-m-1}e^{-b}\binom{m}{\frac{m}{2}}\left(e^{2b}\,((-a-p)z)^{-\alpha}\,\Gamma(\alpha,(-a-p)z)-((a-p)z)^{-\alpha}\,\Gamma(\alpha,(a-p)z)\right)(1-m \bmod 2)\,z^\alpha - 2^{-m-1}e^{-b}z^\alpha\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Big(-\Gamma(\alpha,(a-icm-p+2ics)z)\,((a-icm-p+2ics)z)^{-\alpha} + e^{2b}\left(\Gamma(\alpha,(-a-icm-p+2ics)z)\,((-a-icm-p+2ics)z)^{-\alpha}+((-a+icm-p-2ics)z)^{-\alpha}\,\Gamma(\alpha,(-a+icm-p-2ics)z)\right)-((a+icm-p-2ics)z)^{-\alpha}\,\Gamma(\alpha,(a+icm-p-2ics)z)\Big)\;/;\;m\in\mathbb{N}^+$$

01.19.21.1432.01

$$\int z^n e^{p z} \cos^\mu(c z) \sinh(b + a z) \, dz = \frac{1}{2} \left(1 + e^{2 i c z}\right)^{-\mu} \cos^\mu(c z) \, n! \left(e^{b+(a+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i (a + p) + c \mu}{2 c}, \ldots, -\frac{i (a + p) + c \mu}{2 c}, -\mu; 1 - \frac{i (a + p) + c \mu}{2 c}, \ldots, 1 - \frac{i (a + p) + c \mu}{2 c}; -e^{2 i c z}\right) - e^{(p-a) z-b} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i (p - a) + c \mu}{2 c}, \ldots, -\frac{i (p - a) + c \mu}{2 c}, -\mu; 1 - \frac{i (p - a) + c \mu}{2 c}, \ldots, 1 - \frac{i (p - a) + c \mu}{2 c}; -e^{2 i c z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos^\mu(c z + d) \sinh(a z + b)$

01.19.21.1433.01

$$\int z^{\alpha-1} e^{p z} \cos^m(c z + d) \sinh(a z + b) \, dz = -2^{-m-1} e^{-b} \binom{m}{\frac{m}{2}} \left(e^{2 b} ((-a - p) z)^{-\alpha} \Gamma(\alpha, (-a - p) z) - ((a - p) z)^{-\alpha} \Gamma(\alpha, (a - p) z)\right) (1 - m \bmod 2) z^\alpha - 2^{-m-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-b-i d m-2 i d s} \binom{m}{s} \left(-e^{2 i d m} \Gamma(\alpha, (a - i c m - p + 2 i c s) z) ((a - i c m - p + 2 i c s) z)^{-\alpha} + e^{2 b} \left(e^{2 i d m} \Gamma(\alpha, (-a - i c m - p + 2 i c s) z) ((-a - i c m - p + 2 i c s) z)^{-\alpha} + e^{4 i d s} ((-a + i c m - p - 2 i c s) z)^{-\alpha} \Gamma(\alpha, (-a + i c m - p - 2 i c s) z)\right) - e^{4 i d s} ((a + i c m - p - 2 i c s) z)^{-\alpha} \Gamma(\alpha, (a + i c m - p - 2 i c s) z)\right) /; m \in \mathbb{N}^+$$

01.19.21.1434.01

$$\int z^n e^{p z} \cos^\mu(d + c z) \sinh(b + a z) \, dz = \frac{1}{2} \left(1 + e^{2 i (d+c z)}\right)^{-\mu} \cos^\mu(d + c z) \, n! \left(e^{b+(a+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i (a + p) + c \mu}{2 c}, \ldots, -\frac{i (a + p) + c \mu}{2 c}, -\mu; 1 - \frac{i (a + p) + c \mu}{2 c}, \ldots, 1 - \frac{i (a + p) + c \mu}{2 c}; -e^{2 i (d+c z)}\right) - e^{(p-a) z-b} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a + p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i (p - a) + c \mu}{2 c}, \ldots, -\frac{i (p - a) + c \mu}{2 c}, -\mu; 1 - \frac{i (p - a) + c \mu}{2 c}, \ldots, 1 - \frac{i (p - a) + c \mu}{2 c}; -e^{2 i (d+c z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos^m\left(b z^r\right) \sinh(c z)$

01.19.21.1435.01

$$\int z^n e^{p z^2} \cos^m\left(b z^2\right) \sinh(c z)\, dz == -2^{-m-2} e^{-\frac{c^2}{4 p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (c + 2 p z)^{q+1} \left(-\frac{(c+2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+2 p z)^2}{4 p}\right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (2 p z - c)^{q+1} \left(-\frac{(2 p z - c)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 p z - c)^2}{4 p}\right)\right) p^{-n-1} - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(e^{\frac{1}{4}\left(-\frac{c^2}{-i b m + p + 2 i b s} - \frac{c^2}{p + b i (m - 2 s)}\right)} \binom{m}{s} \left(e^{\frac{c^2}{4 (p + b i (m - 2 s))} + i \pi} \sqrt{p + b i (m - 2 s)} \sum_{q=0}^{n} 2^{q-n} c^{n-q} (-i b m + p + 2 i b s)^{-n-\frac{1}{2}} (2 (-i b m + p + 2 i b s) z - c)^{q+1} \left(-\frac{(2 (-i b m + p + 2 i b s) z - c)^2}{-i b m + p + 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 (-i b m + p + 2 i b s) z - c)^2}{4 (-i b m + p + 2 i b s)}\right) + e^{\frac{c^2}{4 (i b m + p - 2 i b s)}} \sqrt{i b m + p - 2 i b s} \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (-i b m + p + 2 i b s)^{-n-\frac{1}{2}} (c + 2 (-i b m + p + 2 i b s) z)^{q+1} \left(-\frac{(c + 2 (-i b m + p + 2 i b s) z)^2}{-i b m + p + 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2 (-i b m + p + 2 i b s) z)^2}{4 (-i b m + p + 2 i b s)}\right) + e^{\frac{c^2}{4 (-i b m + p + 2 i b s)}} \sqrt{-i b m + p + 2 i b s} \left(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (i b m + p - 2 i b s)^{-n-\frac{1}{2}} (c + 2 (i b m + p - 2 i b s) z)^{q+1} \left(-\frac{(c + 2 (i b m + p - 2 i b s) z)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + 2 (i b m + p - 2 i b s) z)^2}{4 (i b m + p - 2 i b s)}\right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (i b m + p - 2 i b s)^{-n-\frac{1}{2}} (2 (i b m + p - 2 i b s) z - c)^{q+1} \left(-\frac{(2 (i b m + p - 2 i b s) z - c)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 (i b m + p - 2 i b s) z - c)^2}{4 (i b m + p - 2 i b s)}\right)\right)\right)\right) \Big/ \left(\sqrt{p + b i (m - 2 s)} \sqrt{-i b m + p + 2 i b s}\right) /;\ m \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

01.19.21.1436.01

$$\int z^n e^{p\sqrt{z}} \cos^m\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = 2^{-m-2n-2}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)$$

$$\Bigg(c^{-2n-2}\, e^{-\frac{p^2}{4c}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, p^{-h-j+2n}\left(2\sqrt{z}\; c+p\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\; c+p\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(2\sqrt{z}\; c+p\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\; c+p\right)^2}{4c}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\; c+p\right)^2}{c}}\; c\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\; c+p\right)^2}{4c}\right)\Bigg)-$$

$$(-c)^{-2n-2}\, e^{\frac{p^2}{4c}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, p^{-h-j+2n}\left(p-2c\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p-2c\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)-2c\sqrt{\frac{\left(p-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(-e^{\frac{(p+b\,i\,(m-2s))^2}{4c}}\,(-c)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p+b\,i\,(m-2s))^{-h-j+2n}$$

$$\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((p+b\,i\,(m-2s))\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)^2}{4c}\right)-$$

$$2c\sqrt{\frac{\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\; c+p+b\,i\,(m-2s)\right)^2}{4c}\right)\Bigg)-$$

$$(-c)^{-2n-2}\, e^{\frac{(p-i\,b\,(m-2s))^2}{4c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p-i\,b\,(m-2s))^{-h-j+2n}\left(-2\sqrt{z}\; c+p-i\,b\,(m-2s)\right)^{h+j}$$

$$\left(\frac{\left(-2\sqrt{z}\; c+p-i\,b\,(m-2s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((p - i\, b\,(m - 2\,s))\left(-2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)\Gamma\!\left(\frac{1}{2}(h + j + 1),\, \frac{\left(-2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{4\,c}\right) - \right.$$

$$\left. 2\,c\,\sqrt{\frac{\left(-2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{c}}\;\Gamma\!\left(\frac{1}{2}(h + j + 2),\, \frac{\left(-2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{4\,c}\right)\right)\right) +$$

$$c^{-2\,n-2}\, e^{-\frac{(p + b\, i\,(m-2\,s))^2}{4\,c}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p + b\, i\,(m - 2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((p + b\, i\,(m - 2\,s))\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)\Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)^2}{4\,c}\right) + \right.$$

$$\left. 2\sqrt{-\frac{\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(2\sqrt{z}\;c + p + b\, i\,(m - 2\,s)\right)^2}{4\,c}\right)\right) +$$

$$c^{-2\,n-2}\, e^{-\frac{(p - i\, b\,(m-2\,s))^2}{4\,c}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p - i\, b\,(m - 2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((p - i\, b\,(m - 2\,s))\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)\Gamma\!\left(\right.\right.$$

$$\left.\frac{1}{2}(h + j + 1),\, -\frac{\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{4\,c}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{c}}\;c\,\Gamma\!\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h + j + 2),\, -\frac{\left(2\sqrt{z}\;c + p - i\, b\,(m - 2\,s)\right)^2}{4\,c}\right)\right)\right) /;\; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n\, e^{p\,z^r}\cos^m(b\,z)\sinh(c\,z)$

01.19.21.1437.01

$$\int z^n e^{p z^2} \cos^m(b z) \sinh(c z) \, dz = -2^{-m-2} e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \, p^{-n-1} \left(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (c + 2 p z)^{q+1} \left(-\frac{(c+2pz)^2}{p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+2pz)^2}{4p} \right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (2pz - c)^{q+1} \left(-\frac{(2pz-c)^2}{p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2pz-c)^2}{4p} \right) \right) - \frac{i\, 2^{-m-2}}{\sqrt{p}} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-\frac{c^2 - b^2 (m-2s)^2 + i p \pi}{2p}} \binom{m}{s} \left(e^{\frac{(c + i b m - 2 i b s)^2}{4p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (-c + i b m - 2 i b s)^{n-q} (c - i b m + 2 i b s + 2 p z)^{q+1} \left(-\frac{(c - i b m + 2 i b s + 2 p z)^2}{p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c - i b m + 2 i b s + 2 p z)^2}{4p} \right) + e^{\frac{(c + i b m - 2 i b s)^2}{4p} + i\pi} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (c - i b m + 2 i b s)^{n-q} (-c + i b m - 2 i b s + 2 p z)^{q+1} \left(-\frac{(-c + i b m - 2 i b s + 2 p z)^2}{p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-c + i b m - 2 i b s + 2 p z)^2}{4p} \right) + e^{\frac{(-c + i b m - 2 i b s)^2}{4p}} \sum_{q=0}^{n} p^{-n-\frac{1}{2}} \left(i b \left(s - \frac{m}{2} \right) - \frac{c}{2} \right)^{n-q} (c + i b m - 2 i b s + 2 p z)^{q+1} \left(-\frac{(c + i b m - 2 i b s + 2 p z)^2}{p} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + i b m - 2 i b s + 2 p z)^2}{4p} \right) + e^{\frac{(-c + i b m - 2 i b s)^2}{4p} + i\pi} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (c + b i (m - 2s))^{n-q} \left(-\frac{(c + i b m - 2 i b s - 2 p z)^2}{p} \right)^{\frac{1}{2}(-q-1)} (-c - i b m + 2 i b s + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c + i b m - 2 i b s - 2 p z)^2}{4p} \right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1438.01

$$\int z^n e^{p \sqrt{z}} \cos^m(b z) \sinh(c z) \, dz = 2^{-m-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{\frac{p^2}{4c + 4 i b m - 8 i b s}} (-c - i b m + 2 i b s)^{-2(n+1)} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p - 2 (c + i b m - 2 i b s) \sqrt{z} \right)^{h+k} \right.$$

$$\left(\frac{\left(p-2\,(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c+i\,b\,m-2\,i\,b\,s}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left(p\left(p-2\,(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\,\frac{\left(p-2\,(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4\,(c+i\,b\,m-2\,i\,b\,s)}\right)-2\,(c+i\,b\,m-\right.$$

$$\left.2\,i\,b\,s)\sqrt{\frac{\left(p-2\,(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c+i\,b\,m-2\,i\,b\,s}}\;\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{\left(p-2\,(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4\,(c+i\,b\,m-2\,i\,b\,s)}\right)\right)-$$

$$e^{\frac{p^2}{4c-4ibm+8ibs}}\,(-c+i\,b\,m-2\,i\,b\,s)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c-i\,b\,m+2\,i\,b\,s}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+k+1),\,\frac{\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4\,c-4\,i\,b\,m+8\,i\,b\,s}\right)+2\sqrt{\frac{\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c-i\,b\,m+2\,i\,b\,s}}$$

$$\left.(-c+i\,b\,m-2\,i\,b\,s)\,\Gamma\left(\frac{1}{2}(h+k+2),\,\frac{\left(p+2\,(-c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4\,c-4\,i\,b\,m+8\,i\,b\,s}\right)\right)+$$

$$e^{\frac{p^2}{-4c+4ibm-8ibs}}\,(c-i\,b\,m+2\,i\,b\,s)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2n}\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)^2}{c-i\,b\,m+2\,i\,b\,s}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(p\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+k+1),\,-\frac{\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)^2}{4\,c-4\,i\,b\,m+8\,i\,b\,s}\right)+2\sqrt{-\frac{\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)^2}{c-i\,b\,m+2\,i\,b\,s}}$$

$$\left.(c-i\,b\,m+2\,i\,b\,s)\,\Gamma\left(\frac{1}{2}(h+k+2),\,-\frac{\left(p+2\,(c-i\,b\,m+2\,i\,b\,s)\sqrt{z}\right)^2}{4\,c-4\,i\,b\,m+8\,i\,b\,s}\right)\right)+$$

$$e^{\frac{p^2}{-4c-4ibm+8ibs}} (c+i\,b\,m-2\,i\,b\,s)^{-2(n+1)} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^{h+k} \left(-\frac{\left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c+i\,b\,m-2\,i\,b\,s}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(p\left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4(c+i\,b\,m-2\,i\,b\,s)}\right) + 2\sqrt{-\frac{\left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{c+i\,b\,m-2\,i\,b\,s}} (c+i\,b\,m-2\,i\,b\,s)\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(p+2(c+i\,b\,m-2\,i\,b\,s)\sqrt{z}\right)^2}{4(c+i\,b\,m-2\,i\,b\,s)}\right)\right)\right) -$$

$$2^{-m-2n-2}\left(-c^2\right)^{-2n-1} e^{-\frac{p^2}{4c}} \binom{m}{\frac{m}{2}} (1-m \bmod 2)\, c^{2n} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(2\sqrt{z}\,c+p\right)^{h+k} \left(-\frac{\left(2\sqrt{z}\,c+p\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(p\left(2\sqrt{z}\,c+p\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2\sqrt{z}\,c+p\right)^2}{4c}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\,c+p\right)^2}{c}}\; c\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2\sqrt{z}\,c+p\right)^2}{4c}\right)\right) -\right.$$

$$\left. e^{\frac{p^2}{2c}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p-2c\sqrt{z}\right)^{h+k} \left(\frac{\left(p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(p\left(p-2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(p-2c\sqrt{z}\right)^2}{c}}\;\Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(p-2c\sqrt{z}\right)^2}{4c}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n\, e^{p\,z} \cos^m\left(b\,z^r\right) \sinh(c\,z)$

01.19.21.1439.01

$$\int z^n e^{p z} \cos^m\left(b z^2\right) \sinh(c z)\, dz = -2^{-m-1} \binom{m}{\frac{m}{2}} (E_{-n}((-c-p) z) - E_{-n}((c-p) z)) (1 - m \bmod 2) z^{n+1} - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{i b (m-2 s)}} \left(e^{i \pi - \frac{i (p-c)^2}{b (8 s - 4 m)}} \sum_{q=0}^{n} 2^{q-n} (c-p)^{n-q} (i b (m-2 s))^{-n-\frac{1}{2}} (-c+p+2 b i (m-2 s) z)^{q+1} \left(\frac{i (-c+p+2 b i (m-2 s) z)^2}{b (m-2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-c+p+2 b i (m-2 s) z)^2}{b (8 s - 4 m)} \right) \right) + \frac{1}{\sqrt{i b (m-2 s)}} \left(e^{-\frac{i (c+p)^2}{b (8 s - 4 m)}} \sum_{q=0}^{n} \left(-\frac{c}{2} - \frac{p}{2} \right)^{n-q} (i b (m-2 s))^{-n-\frac{1}{2}} (c+p+2 b i (m-2 s) z)^{q+1} \left(\frac{i (c+p+2 b i (m-2 s) z)^2}{b (m-2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (c+p+2 b i (m-2 s) z)^2}{b (8 s - 4 m)} \right) \right) + \frac{1}{\sqrt{i b (2 s - m)}} \left(e^{i \pi - \frac{i (p-c)^2}{4 b (m-2 s)}} \sum_{q=0}^{n} 2^{q-n} (c-p)^{n-q} (i b (2 s - m))^{-n-\frac{1}{2}} (-c+p-2 i b m z + 4 i b s z)^{q+1} \left(-\frac{(-c+p-2 i b m z + 4 i b s z)^2}{2 i b s - i b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-c+p-2 i b m z + 4 i b s z)^2}{4 (2 i b s - i b m)} \right) \right) + \frac{1}{\sqrt{i b (2 s - m)}} \left(e^{-\frac{i (c+p)^2}{4 b (m-2 s)}} \sum_{q=0}^{n} \left(-\frac{c}{2} - \frac{p}{2} \right)^{n-q} (i b (2 s - m))^{-n-\frac{1}{2}} (c+p-2 i b m z + 4 i b s z)^{q+1} \left(-\frac{(c+p-2 i b m z + 4 i b s z)^2}{2 i b s - i b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+p-2 i b m z + 4 i b s z)^2}{4 (2 i b s - i b m)} \right) \right) \right) /;\ m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1440.01

$$\int z^n e^{p z} \cos^m\left(b \sqrt{z}\right) \sinh(c z)\, dz = 2^{-m-2 n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{\frac{b^2 (m-2 s)^2}{4 (p-c)}} (p-c)^{-2 n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n} \left(2 (p-c) \sqrt{z} - i b (m-2 s) \right)^{h+j} \right.$$

$$\left(-\frac{\left(2(p-c)\sqrt{z}-i\,b(m-2s)\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2(p-c)\sqrt{-\frac{\left(2(p-c)\sqrt{z}-i\,b(m-2s)\right)^2}{p-c}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(p-c)\sqrt{z}-i\,b(m-2s)\right)^2}{4(p-c)}\right)-\right.$$

$$\left.i\,b(m-2s)\left(2(p-c)\sqrt{z}-i\,b(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(p-c)\sqrt{z}-i\,b(m-2s)\right)^2}{4(p-c)}\right)\right)-$$

$$e^{\frac{b^2(m-2s)^2}{4(p-c)}}(p-c)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b(m-2s))^{-h-j+2n}\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i(m-2s)\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)^2}{4(p-c)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)^2}{p-c}}\;(p-c)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(p-c)+b\,i(m-2s)\right)^2}{4(p-c)}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(c+p)}}(c+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b(m-2s))^{-h-j+2n}\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2(c+p)\sqrt{-\frac{\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)^2}{c+p}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)^2}{4(c+p)}\right)-\right.$$

$$\left.i\,b(m-2s)\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(c+p)\sqrt{z}-i\,b(m-2s)\right)^2}{4(c+p)}\right)\right)+$$

$$e^{\frac{b^2 (m-2s)^2}{4(c+p)}} (c+p)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b\, (m-2s))^{-h-j+2n} \left(2\sqrt{z}\,(c+p) + b\, i\, (m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,(c+p) + b\, i\,(m-2s)\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\, i\,(m-2s)\left(2\sqrt{z}\,(c+p) + b\, i\,(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(c+p) + b\, i\,(m-2s)\right)^2}{4(c+p)}\right) + \right.$$

$$\left.\left. 2\sqrt{-\frac{\left(2\sqrt{z}\,(c+p) + b\, i\,(m-2s)\right)^2}{c+p}}\,(c+p)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(c+p) + b\, i\,(m-2s)\right)^2}{4(c+p)}\right)\right)\right) -$$

$$2^{-m-1}\binom{m}{\frac{m}{2}}\left((-c-p)^{-n-1}\,\Gamma(n+1, (-c-p)\,z) - (c-p)^{-n-1}\,\Gamma(n+1, (c-p)\,z)\right)$$

$$(1 - m \bmod 2) \;/;\; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n\, e^{p z} \cos^m(b z) \sinh(c z^r)$

01.19.21.1441.01

$$\int z^n e^{p z} \cos^m(b z) \sinh(c z^2)\, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\frac{1}{\sqrt{-c}} e^{\frac{p^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 c z)^{q+1} \left(\frac{(p-2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p-2cz)^2}{4c}\right) - \frac{1}{\sqrt{c}} e^{-\frac{p^2}{4c}} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 c z)^{q+1} \left(-\frac{(p+2cz)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p+2cz)^2}{4c}\right)\right) -$$

$$2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{-c}} e^{\frac{(-i b m + p + 2 i b s)^2}{4c} + i \pi} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (i b (m - 2 s) - p)^{n-q} (-i b m + p + 2 i b s - 2 c z)^{q+1} \left(\frac{(-i b m + p + 2 i b s - 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(-i b m + p + 2 i b s - 2 c z)^2}{4c}\right) + \frac{1}{\sqrt{-c}} e^{\frac{(i b m + p - 2 i b s)^2}{4c} + i \pi} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-i b m - p + 2 i b s)^{n-q} (i b m + p - 2 i b s - 2 c z)^{q+1} \left(\frac{(i b m + p - 2 i b s - 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(i b m + p - 2 i b s - 2 c z)^2}{4c}\right) + \frac{1}{\sqrt{c}} e^{-\frac{(-i b m + p + 2 i b s)^2}{4c}} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (i b (m - 2 s) - p)^{n-q} (p + b i (2 s - m) + 2 c z)^{q+1} \left(-\frac{(p + b i (2 s - m) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + b i (2 s - m) + 2 c z)^2}{4c}\right) + \frac{1}{\sqrt{c}} e^{-\frac{(p + b i (m - 2 s))^2}{4c}} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-i b m - p + 2 i b s)^{n-q} (p + b i (m - 2 s) + 2 c z)^{q+1} \left(-\frac{(p + b i (m - 2 s) + 2 c z)^2}{c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + b i (m - 2 s) + 2 c z)^2}{4c}\right)\right) /;\ m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1442.01

$$\int z^n e^{p z} \cos^m(b z) \sinh\left(c \sqrt{z}\right) dz =$$

$$2^{-m-2n-2} \left(-e^{-\frac{c^2}{4p}} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(\frac{\left(i c - 2 i p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\left(2 p \sqrt{z} - c\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(i c \left(i c - 2 i p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{\left(i c - 2 i p \sqrt{z}\right)^2}{4 p}\right) - \right.$$

$$\left. 2 p \sqrt{\frac{\left(i c - 2 i p \sqrt{z}\right)^2}{p}} \Gamma\left(\frac{1}{2} (h+k+2), \frac{\left(i c - 2 i p \sqrt{z}\right)^2}{4 p}\right)\right)\right) -$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(\frac{\left(i c + 2 i p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-k-1)} \left(c + 2 p \sqrt{z}\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(i c \left(i c + 2 i p \sqrt{z}\right) \right.$$

$$\left. \Gamma\left(\frac{1}{2} (h+k+1), \frac{\left(i c + 2 i p \sqrt{z}\right)^2}{4 p}\right) - 2 p \sqrt{\frac{\left(i c + 2 i p \sqrt{z}\right)^2}{p}} \Gamma\left(\frac{1}{2} (h+k+2), \frac{\left(i c + 2 i p \sqrt{z}\right)^2}{4 p}\right)\right)\right)\right)$$

$$p^{-2(n+1)} - \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{c^2}{4 (i b m + p - 2 i b s)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c)^{-h-k+2n} \left(\frac{\left(i c + 2 (b m - i p - 2 b s) \sqrt{z}\right)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\left(2 (i b m + p - 2 i b s) \sqrt{z} - c\right)^{h+k} \binom{k}{h} \binom{n}{k} \left(2 (i b m + p - 2 i b s) \right.$$

$$\sqrt{\frac{\left(i c + 2 (b m - i p - 2 b s) \sqrt{z}\right)^2}{i b m + p - 2 i b s}} \Gamma\left(\frac{1}{2} (h+k+2), \frac{\left(i c + 2 (b m - i p - 2 b s) \sqrt{z}\right)^2}{4 (i b m + p - 2 i b s)}\right) -$$

$$\left. c \left(2 (i b m + p - 2 i b s) \sqrt{z} - c\right) \Gamma\left(\frac{1}{2} (h+k+1), \frac{\left(i c + 2 (b m - i p - 2 b s) \sqrt{z}\right)^2}{4 (i b m + p - 2 i b s)}\right)\right)\right) -$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k c^{-h-k+2n} \left(c + 2 (i b m + p - 2 i b s) \sqrt{z}\right)^{h+k} \left(\frac{\left(i c + 2 (-b m + i p + 2 b s) \sqrt{z}\right)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2 (i b m + p - 2 i b s) \sqrt{\frac{\left(i c + 2 (-b m + i p + 2 b s) \sqrt{z}\right)^2}{i b m + p - 2 i b s}} \Gamma\left(\frac{1}{2} (h+k+2), \right.\right.$$

$$\left.\left.\left.\frac{\left(i c+2(-b m+i p+2 b s)\sqrt{z}\right)^2}{4(i b m+p-2 i b s)}\right)-i c\left(i c+2(-b m+i p+2 b s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{\left(i c+2(-b m+i p+2 b s)\sqrt{z}\right)^2}{4(i b m+p-2 i b s)}\right)\right)\right)(i b m+p-2 i b s)^{-2(n+1)}+e^{-\frac{c^2}{4(p+b i(2s-m))}}$$

$$(p+b i(2s-m))^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-c)^{-h-k+2n}\left(\frac{\left(i c+2(-b m-i p+2 b s)\sqrt{z}\right)^2}{p+b i(2s-m)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(2(p+b i(2s-m))\sqrt{z}-c\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(2(p+b i(2s-m))\right.$$

$$\sqrt{\frac{\left(i c+2(-b m-i p+2 b s)\sqrt{z}\right)^2}{p+b i(2s-m)}}\;\Gamma\left(\frac{1}{2}(h+k+2),\frac{\left(i c+2(-b m-i p+2 b s)\sqrt{z}\right)^2}{4(p+b i(2s-m))}\right)-c$$

$$\left.\left(2(p+b i(2s-m))\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+k+1),\frac{\left(i c+2(-b m-i p+2 b s)\sqrt{z}\right)^2}{4(p+b i(2s-m))}\right)\right)-$$

$$e^{-\frac{c^2}{4(p+b i(2s-m))}}(p+b i(2s-m))^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k c^{-h-k+2n}\left(\frac{\left(i c+2(i p+b(m-2s))\sqrt{z}\right)^2}{p+b i(2s-m)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(c+2(p+b i(2s-m))\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(c\left(c+2(p+b i(2s-m))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{\left(i c+2(i p+b(m-2s))\sqrt{z}\right)^2}{4(p+b i(2s-m))}\right)+2\sqrt{\frac{\left(i c+2(i p+b(m-2s))\sqrt{z}\right)^2}{p+b i(2s-m)}}$$

$$\left.\left.\left.(p+b i(2s-m))\Gamma\left(\frac{1}{2}(h+k+2),\frac{\left(i c+2(i p+b(m-2s))\sqrt{z}\right)^2}{4(p+b i(2s-m))}\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n e^{p z^r}\cos^m(b z)\sinh(c z^r)$

01.19.21.1443.01

$$\int z^n e^{p z^2} \cos^m(b z) \sinh(c z^2) \, dz = -2^{-m-2} \binom{m}{\frac{m}{2}} \left(\left((-c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c-p) z^2\right) - \left((c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-p) z^2\right)\right) (1 - m \bmod 2) z^{n+1} - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{p-c} \sqrt{c+p}} \left(e^{\frac{b^2 p (m-2s)^2}{2(p-c)(c+p)}} \binom{m}{s} \left(-e^{-\frac{b^2 (m-2s)^2}{4(c+p)}} \sqrt{c+p} \sum_{q=0}^{n} 2^{q-n} (p-c)^{-n-\frac{1}{2}} (i b (m-2s))^{n-q} (b i (2s-m) + 2(p-c) z)^{q+1} \left(-\frac{(b i (2s-m) + 2(p-c) z)^2}{p-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (2s-m) + 2(p-c) z)^2}{4(p-c)}\right) - e^{-\frac{b^2 (m-2s)^2}{4(c+p)}} \sqrt{c+p} \sum_{q=0}^{n} (p-c)^{-n-\frac{1}{2}} \left(i b \left(s - \frac{m}{2}\right)\right)^{n-q} (b i (m-2s) + 2(p-c) z)^{q+1} \left(-\frac{(b i (m-2s) + 2(p-c) z)^2}{p-c}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (m-2s) + 2(p-c) z)^2}{4(p-c)}\right) + e^{-\frac{b^2 (m-2s)^2}{4(p-c)}} \sqrt{p-c} \left(\sum_{q=0}^{n} 2^{q-n} (c+p)^{-n-\frac{1}{2}} (i b (m-2s))^{n-q} (b i (2s-m) + 2(c+p) z)^{q+1} \left(-\frac{(b i (2s-m) + 2(c+p) z)^2}{c+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (2s-m) + 2(c+p) z)^2}{4(c+p)}\right) + \sum_{q=0}^{n} (c+p)^{-n-\frac{1}{2}} \left(i b \left(s - \frac{m}{2}\right)\right)^{n-q} (b i (m-2s) + 2(c+p) z)^{q+1} \left(-\frac{(b i (m-2s) + 2(c+p) z)^2}{c+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (m-2s) + 2(c+p) z)^2}{4(c+p)}\right) \right) \right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1444.01

$$\int z^n e^{p \sqrt{z}} \cos^m(b z) \sinh\left(c \sqrt{z}\right) dz = 2^{-m-2} \left((-1)^n 4^{-n} b^{-2n-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (m-2s)^{-2n-2} \binom{m}{s} \left(-e^{-\frac{i (c+p)^2}{4 b (2s-m)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (c+p)^{-h-k+2n} \left(c + p + 2 b i (m-2s) \sqrt{z}\right)^{h+k} \left(\frac{i \left(c + p + 2 b i (m-2s) \sqrt{z}\right)^2}{b (m-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \right. \right.$$

$$\left((c+p)\left(c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(i\,c+i\,p+2\,b\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+2\,b\,i\,(m-2\,s)\right.$$

$$\left.\sqrt{\frac{i\left(c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}}\ \Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(i\,c+i\,p+2\,b\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\right)+$$

$$e^{\frac{i\,(p-c)^2}{b\,(8\,s-4\,m)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-c)^{-h-k+2\,n}\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((p-c)\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+2\,b\,i\,(2\,s-m)$$

$$\left.\sqrt{\frac{i\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}}\ \Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(-c+p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\right)+$$

$$e^{-\frac{i\,(p-c)^2}{8\,b\,s-4\,b\,m}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-c)^{-h-k+2\,n}\left(-c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(-c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((p-c)\left(-c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\ \frac{i\left(i\,c-i\,p+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+2\,b\,i\,(m-2\,s)$$

$$\left.\sqrt{\frac{i\left(-c+p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}}\ \Gamma\!\left(\frac{1}{2}\,(h+k+2),\ \frac{i\left(i\,c-i\,p+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\right)-$$

$$e^{\frac{i\,(c+p)^2}{b\,(8\,s-4\,m)}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c+p)^{-h-k+2\,n}\left(-\frac{i\left(i\,c+i\,p+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(c+p+2\,b\,i\,(2\,s-m)\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg((c+p)\left(c+p+2\,b\,i\,(2\,s-m)\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+k+1),\,-\frac{i\left(i\,c+i\,p+2\,b\,(m-2\,s)\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+2\,b\,i\,(2\,s-m)$$

$$\sqrt{-\frac{i\left(i\,c+i\,p+2\,b\,(m-2\,s)\sqrt{z}\right)^2}{b\,(2\,s-m)}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{i\left(i\,c+i\,p+2\,b\,(m-2\,s)\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\Bigg)\Bigg)-$$

$$4\binom{m}{\frac{m}{2}}\left((c-p)^{-2\,(n+1)}\,\Gamma\!\left(2\,(n+1),\,(c-p)\sqrt{z}\right)-(c+p)^{-2\,(n+1)}\,\Gamma\!\left(2\,(n+1),\,-(c+p)\sqrt{z}\right)\right)$$

$$(m \bmod 2-1)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\, e^{p\,z}\cos^m(b\,z^r)\sinh(c\,z^r)$

01.19.21.1445.01

$$\int z^n e^{p z} \cos^m(b z^2) \sinh(c z^2) \, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(\frac{1}{\sqrt{-c}} e^{\frac{p^2}{4c}} \sum_{q=0}^{n} 2^{q-n} (-c)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 c z)^{q+1} \left(\frac{(p - 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p - 2 c z)^2}{4 c} \right) - \right.$$

$$\left. \frac{1}{\sqrt{c}} e^{-\frac{p^2}{4c}} \sum_{q=0}^{n} 2^{q-n} c^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 c z)^{q+1} \left(-\frac{(p + 2 c z)^2}{c} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 c z)^2}{4 c} \right) \right) - 2^{-m-2}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{c + i b m - 2 i b s}} \left(e^{\frac{p^2}{-4c - 4 i b m + 8 i b s}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (c + i b m - 2 i b s)^{-n-\frac{1}{2}} (p + 2 (c + i b m - 2 i b s) z)^{q+1} \right. \right.$$

$$\left. \left(-\frac{(p + 2 (c + i b m - 2 i b s) z)^2}{c + i b m - 2 i b s} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p + 2 (c + i b m - 2 i b s) z)^2}{-4 c - 4 i b m + 8 i b s} \right) \right) +$$

$$\frac{1}{\sqrt{-c - i b m + 2 i b s}} \left(e^{\frac{p^2}{4c + 4 i b m - 8 i b s} + i \pi} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (-c - i b m + 2 i b s)^{-n-\frac{1}{2}} (p + 2 (-c - i b m + 2 i b s) z)^{q+1} \right.$$

$$\left. \left(-\frac{(p + 2 (-c - i b m + 2 i b s) z)^2}{-c - i b m + 2 i b s} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 (-c - i b m + 2 i b s) z)^2}{-4 c - 4 i b m + 8 i b s} \right) \right) +$$

$$\frac{1}{\sqrt{c - i b m + 2 i b s}} \left(e^{\frac{p^2}{-4c + 4 i b m - 8 i b s}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (c - i b m + 2 i b s)^{-n-\frac{1}{2}} (p + 2 (c - i b m + 2 i b s) z)^{q+1} \right.$$

$$\left. \left(\frac{(p + 2 (c - i b m + 2 i b s) z)^2}{-c + i b m - 2 i b s} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p + 2 (c - i b m + 2 i b s) z)^2}{-4 c + 4 i b m - 8 i b s} \right) \right) +$$

$$\frac{1}{\sqrt{-c + i b m - 2 i b s}} \left(e^{\frac{p^2}{4c - 4 i b m + 8 i b s} + i \pi} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (-c + i b m - 2 i b s)^{-n-\frac{1}{2}} \right.$$

$$(p + 2 (-c + i b m - 2 i b s) z)^{q+1} \left(-\frac{(p + 2 (-c + i b m - 2 i b s) z)^2}{-c + i b m - 2 i b s} \right)^{\frac{1}{2}(-q-1)}$$

$$\left. \left. \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 2 (-c + i b m - 2 i b s) z)^2}{-4 c + 4 i b m - 8 i b s} \right) \right) \right) /; m \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

01.19.21.1446.01

$$\int z^n e^{p z} \cos^m\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = 2^{-m-2 n-2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(e^{-\frac{c^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i c^{-h-i+2 n} \left(c + 2 p \sqrt{z}\right)^{h+i} \left(-\frac{\left(c + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i} \left(c \left(c + 2 p \sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2} (h + i + 1), -\frac{\left(c + 2 p \sqrt{z}\right)^2}{4 p}\right) + 2 \sqrt{-\frac{\left(c + 2 p \sqrt{z}\right)^2}{p}} \, p \, \Gamma\left(\frac{1}{2} (h + i + 2), -\frac{\left(c + 2 p \sqrt{z}\right)^2}{4 p}\right)\right) -$$

$$e^{-\frac{c^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (-c)^{-h-i+2 n} \left(2 p \sqrt{z} - c\right)^{h+i} \left(-\frac{\left(2 p \sqrt{z} - c\right)^2}{p}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i} \left(2 p \sqrt{-\frac{\left(2 p \sqrt{z} - c\right)^2}{p}}\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2} (h + i + 2), -\frac{\left(2 p \sqrt{z} - c\right)^2}{4 p}\right) - c \left(2 p \sqrt{z} - c\right) \Gamma\left(\frac{1}{2} (h + i + 1), -\frac{\left(2 p \sqrt{z} - c\right)^2}{4 p}\right)\right)\right) p^{-2 (n+1)} +$$

$$2^{-m-2 n-2} \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-e^{-\frac{(i b (m-2 s)-c)^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (i b (m - 2 s) - c)^{-h-i+2 n} \left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right)^{h+i}\right.\right.$$

$$\left(-\frac{\left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2} (-h-i-1)} \binom{i}{h} \binom{n}{i}$$

$$\left((i b (m - 2 s) - c) \left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + i + 1), -\frac{\left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right)^2}{4 p}\right) + 2\right.$$

$$\left.\sqrt{-\frac{\left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right)^2}{p}} \, p \, \Gamma\left(\frac{1}{2} (h + i + 2), -\frac{\left(-c + b i (m - 2 s) + 2 p \sqrt{z}\right)^2}{4 p}\right)\right) +$$

$$e^{-\frac{(c+b i (m-2 s))^2}{4 p}} \sum_{i=0}^n \sum_{h=0}^i (-1)^{i-h} 4^i (c + b i (m - 2 s))^{-h-i+2 n} \left(c + b i (m - 2 s) + 2 p \sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(c+b\,i\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}$$

$$\left((c+b\,i\,(m-2\,s))\left(c+b\,i\,(m-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(c+b\,i\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(c+b\,i\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(c+b\,i\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)-$$

$$e^{-\frac{(-c-i\,b\,(m-2\,s))^2}{4\,p}} \sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-c-i\,b\,(m-2\,s))^{-h-i+2\,n}\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}$$

$$\left((-c-i\,b\,(m-2\,s))\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(c-i\,b\,(m-2\,s))^2}{4\,p}} \sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c-i\,b\,(m-2\,s))^{-h-i+2\,n}\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\left((c-i\,b\,(m-2\,s))\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\sqrt{-\frac{\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$\left.\left.\left.p\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(c-i\,b\,(m-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)p^{-2\,(n+1)}\;/;\; m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^{\alpha-1} e^{p z^r} \cos^m(b z^r) \sinh(c z^r)$

01.19.21.1447.01

$$\int z^{\alpha-1} e^{p z^r} \cos^m(b z^r) \sinh(c z^r)\, dz = -\frac{2^{-m-1} z^\alpha}{r} \left(\binom{m}{\frac{m}{2}} \left(((-c-p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-c-p) z^r\right) - ((c-p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c-p) z^r\right) \right) (1 - m \bmod 2) + \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{\alpha}{r}, (-c - i b m - p + 2 i b s) z^r\right) ((-c - i b m - p + 2 i b s) z^r)^{-\frac{\alpha}{r}} - ((c - i b m - p + 2 i b s) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c - i b m - p + 2 i b s) z^r\right) + ((-c + i b m - p - 2 i b s) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-c + i b m - p - 2 i b s) z^r\right) - ((c + i b m - p - 2 i b s) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (c + i b m - p - 2 i b s) z^r\right) \right) \right) /; m \in \mathbb{N}^+$$

01.19.21.1448.01

$$\int z^n e^{p z^2} \cos^m(b z^2) \sinh(c z^2)\, dz = 2^{-m-2} z^{n+1} \binom{m}{\frac{m}{2}} \left(\left((c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c-p) z^2\right) - \left((-c-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c-p) z^2\right) \right) (1 - m \bmod 2) - 2^{-m-2} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{n+1}{2}, (-c - p + b i (m - 2 s)) z^2\right) \left((-c - p + b i (m - 2 s)) z^2\right)^{\frac{1}{2}(-n-1)} - \left((c - p + b i (m - 2 s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - p + b i (m - 2 s)) z^2\right) + \left((-c - p - i b (m - 2 s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-c - p - i b (m - 2 s)) z^2\right) - \left((c - p - i b (m - 2 s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (c - p - i b (m - 2 s)) z^2\right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.1449.01

$$\int z^n e^{p \sqrt{z}} \cos^m\left(b \sqrt{z}\right) \sinh\left(c \sqrt{z}\right) dz = 2^{-m} \binom{m}{\frac{m}{2}} \left((c-p)^{-2(n+1)} \Gamma\left(2(n+1), (c-p) \sqrt{z}\right) - (-c-p)^{-2(n+1)} \Gamma\left(2(n+1), (-c-p) \sqrt{z}\right) \right) (1 - m \bmod 2) - 2^{-m} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(2(n+1), (-c - p + b i (m - 2 s)) \sqrt{z}\right) (-c - p + b i (m - 2 s))^{-2(n+1)} - (c - p + b i (m - 2 s))^{-2(n+1)} \Gamma\left(2(n+1), (c - p + b i (m - 2 s)) \sqrt{z}\right) + (-c - p - i b (m - 2 s))^{-2(n+1)} \Gamma\left(2(n+1), (-c - p - i b (m - 2 s)) \sqrt{z}\right) - (c - p - i b (m - 2 s))^{-2(n+1)} \Gamma\left(2(n+1), (c - p - i b (m - 2 s)) \sqrt{z}\right) \right) /; m \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos^m(a z^r + q) \sinh(c z^r + g)$

01.19.21.1450.01

$$\int z^{\alpha-1}\, e^{b z^r+e} \cos^m(a z^r+q)\sinh(c z^r+g)\, dz = -\frac{2^{-m-1}\, z^\alpha}{r}\sum_{j=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{j}\Big(e^{e+g+2 i j q-i m q}\,\Gamma\Big(\frac{\alpha}{r}, (-b-c-2 i a j+i a m) z^r\Big)((-b-c-2 i a j+i a m) z^r)^{-\frac{\alpha}{r}} - e^{e-g+2 i j q-i m q}\,((-b+c-2 i a j+i a m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r}, (-b+c-2 i a j+i a m) z^r\Big) + e^{e+g-2 i j q+i m q}\,((-b-c+2 i a j-i a m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r}, (-b-c+2 i a j-i a m) z^r\Big) - e^{e-g-2 i j q+i m q}\,((-b+c+2 i a j-i a m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r}, (-b+c+2 i a j-i a m) z^r\Big)\Big) - \frac{2^{-m-1} z^\alpha}{r}\binom{m}{\frac{m}{2}}\Big(e^{e+g}\,((-b-c) z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r}, (-b-c) z^r\Big) - e^{e-g}\,((c-b) z^r)^{-\frac{\alpha}{r}}\,\Gamma\Big(\frac{\alpha}{r}, (c-b) z^r\Big)\Big)(1-m \bmod 2) \;/;\; m\in\mathbb{N}^+$$

01.19.21.1451.01

$$\int z^n\, e^{b z^2+e}\cos^m(a z^2+q)\sinh(c z^2+g)\, dz = 2^{-m-2} z^{n+1}\binom{m}{\frac{m}{2}}\Big(e^{e-g}\,((c-b) z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\Big(\frac{n+1}{2}, (c-b) z^2\Big) - e^{e+g}\,((-b-c) z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\Big(\frac{n+1}{2}, (-b-c) z^2\Big)\Big)(1-m \bmod 2) - 2^{-m-2} z^{n+1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Big(e^{e+g-i q (m-2 s)}\,\Gamma\Big(\frac{n+1}{2}, (-b-c+a i (m-2 s)) z^2\Big)((-b-c+a i (m-2 s)) z^2)^{\frac{1}{2}(-n-1)} - e^{e-g-i q (m-2 s)}\,((-b+c+a i (m-2 s)) z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\Big(\frac{n+1}{2}, (-b+c+a i (m-2 s)) z^2\Big) + e^{e+g+i q (m-2 s)}\,((-b-c-i a (m-2 s)) z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\Big(\frac{n+1}{2}, (-b-c-i a (m-2 s)) z^2\Big) - e^{e-g+i q (m-2 s)}\,((-b+c-i a (m-2 s)) z^2)^{\frac{1}{2}(-n-1)}\,\Gamma\Big(\frac{n+1}{2}, (-b+c-i a (m-2 s)) z^2\Big)\Big) \;/;\; m\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.19.21.1452.01

$$\int z^n\, e^{\sqrt{z}\, b+e}\cos^m(\sqrt{z}\, a+q)\sinh(\sqrt{z}\, c+g)\, dz = 2^{-m}\binom{m}{\frac{m}{2}}\Big((c-b)^{-2 (n+1)}\, e^{e-g}\,\Gamma\big(2 (n+1), (c-b)\sqrt{z}\big) - (-b-c)^{-2 (n+1)}\, e^{e+g}\,\Gamma\big(2 (n+1), (-b-c)\sqrt{z}\big)\Big)(1-m \bmod 2) - 2^{-m}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Big(e^{e+g-i q (m-2 s)}\,\Gamma\big(2 (n+1), (-b-c+a i (m-2 s))\sqrt{z}\big)(-b-c+a i (m-2 s))^{-2 (n+1)} - e^{e-g-i q (m-2 s)}\,(-b+c+a i (m-2 s))^{-2 (n+1)}\,\Gamma\big(2 (n+1), (-b+c+a i (m-2 s))\sqrt{z}\big) + e^{e+g+i q (m-2 s)}\,(-b-c-i a (m-2 s))^{-2 (n+1)}\,\Gamma\big(2 (n+1), (-b-c-i a (m-2 s))\sqrt{z}\big) - e^{e-g+i q (m-2 s)}\,(-b+c-i a (m-2 s))^{-2 (n+1)}\,\Gamma\big(2 (n+1), (-b+c-i a (m-2 s))\sqrt{z}\big)\Big) \;/;\; m\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^n\, e^{b z^r+d z+e}\cos^m(a z^r+p z+q)\sinh(c z^r+f z+g)$

01.19.21.1453.01

$$\int z^n e^{b z^2+d z+e} \cos^m(a z^2+p z+q) \sinh(c z^2+f z+g) \, dz = 2^{-m-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \Bigg((b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}+e-g} \sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f+2(b-c)z)^{j+1} \left(-\frac{(d-f+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+2(b-c)z)^2}{4(b-c)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}+e+g} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2(b+c)z)^{j+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right) \Bigg) - 2^{-m-2} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(-e^{-\frac{(d-f+i p(2s-m))^2}{4(b-c+a i(2s-m))}+e-g+i q(2s-m)} (b-c+a i(2s-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+f-i p(2s-m))^{n-j} (d-f+i p(2s-m)+2(b-c+a i(2s-m))z)^{j+1} \left(-\frac{(d-f+i p(2s-m)+2(b-c+a i(2s-m))z)^2}{b-c+a i(2s-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i p(2s-m)+2(b-c+a i(2s-m))z)^2}{4(b-c+a i(2s-m))}\right) + e^{-\frac{(d+f+i p(2s-m))^2}{4(b+c+a i(2s-m))}+e+g+i q(2s-m)} (b+c+a i(2s-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-f-i p(2s-m))^{n-j} (d+f+i p(2s-m)+2(b+c+a i(2s-m))z)^{j+1} \left(-\frac{(d+f+i p(2s-m)+2(b+c+a i(2s-m))z)^2}{b+c+a i(2s-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+i p(2s-m)+2(b+c+a i(2s-m))z)^2}{4(b+c+a i(2s-m))}\right) - e^{-\frac{(d-f+i p(m-2s))^2}{4(b-c+a i(m-2s))}+e-g+i q(m-2s)} (b-c+a i(m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+f-i p(m-2s))^{n-j} (d-f+i p(m-2s)+2(b-c+a i(m-2s))z)^{j+1} \left(-\frac{(d-f+i p(m-2s)+2(b-c+a i(m-2s))z)^2}{b-c+a i(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+i p(m-2s)+2(b-c+a i(m-2s))z)^2}{4(b-c+a i(m-2s))}\right) + e^{-\frac{(d+f+i p(m-2s))^2}{4(b+c+a i(m-2s))}+e+g+i q(m-2s)}$$

$$(b+c+a\,i\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-f-i\,p\,(m-2\,s))^{n-j}\,(d+f+i\,p\,(m-2\,s)+2\,(b+c+a\,i\,(m-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(d+f+i\,p\,(m-2\,s)+2\,(b+c+a\,i\,(m-2\,s))\,z)^2}{b+c+a\,i\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(d+f+i\,p\,(m-2\,s)+2\,(b+c+a\,i\,(m-2\,s))\,z)^2}{4\,(b+c+a\,i\,(m-2\,s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\wedge m\in\mathbb{N}^+$$

01.19.21.1454.01

$$\int z^n\,e^{\sqrt{z}\,b+d\,z+e}\cos^m\!\left(\sqrt{z}\,a+p\,z+q\right)\sinh\!\left(\sqrt{z}\,c+f\,z+g\right)dz=2^{-m-2\,n-2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\Bigg(e^{-\frac{(b+c)^2}{4\,(d+f)}+e+g}\,(d+f)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c)^{-h-i+2\,n}\left(b+c+2\,(d+f)\sqrt{z}\right)^{h+i}\left(-\frac{\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b+c)\left(b+c+2\,(d+f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),-\frac{\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)+$$

$$2\sqrt{-\frac{\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),-\frac{\left(b+c+2\,(d+f)\sqrt{z}\right)^2}{4\,(d+f)}\right)\Bigg)-e^{-\frac{(b-c)^2}{4\,(d-f)}+e-g}$$

$$(d-f)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-c)^{-h-i+2\,n}\left(b-c+2\,(d-f)\sqrt{z}\right)^{h+i}\left(-\frac{\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b-c)\left(b-c+2\,(d-f)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),-\frac{\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)+$$

$$2\sqrt{-\frac{\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),-\frac{\left(b-c+2\,(d-f)\sqrt{z}\right)^2}{4\,(d-f)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-2}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(-e^{-\frac{(b-c+a\,i\,(2\,s-m))^2}{4\,(d-f+i\,p\,(2\,s-m))}+e-g+i\,q\,(2\,s-m)}\,(d-f+i\,p\,(2\,s-m))^{-2\,n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-c+a\,i\,(2\,s-m))^{-h-i+2\,n}\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{d-f+i\,p\,(2\,s-m)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b-c+a\,i\,(2\,s-m))\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+i+1),\,-\frac{\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{4\,(d-f+i\,p\,(2\,s-m))}\Bigg)+$$

$$2\,(d-f+i\,p\,(2\,s-m))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{4\,(d-f+i\,p\,(2\,s-m))}\right)$$

$$\sqrt{-\frac{\left(b-c+a\,i\,(2\,s-m)+2\,(d-f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{d-f+i\,p\,(2\,s-m)}}\Bigg)+$$

$$e^{-\frac{(b+c+a\,i\,(2\,s-m))^2}{4\,(d+f+i\,p\,(2\,s-m))}+e+g+i\,q\,(2\,s-m)}\,(d+f+i\,p\,(2\,s-m))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c+a\,i\,(2\,s-m))^{-h-i+2\,n}$$

$$\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{d+f+i\,p\,(2\,s-m)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+c+a\,i\,(2\,s-m))\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{4\,(d+f+i\,p\,(2\,s-m))}\Bigg)+$$

$$2\,(d+f+i\,p\,(2\,s-m))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\sqrt{z}\right)^2}{4\,(d+f+i\,p\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(b+c+a\,i\,(2\,s-m)+2\,(d+f+i\,p\,(2\,s-m))\,\sqrt{z}\right)^2}{d+f+i\,p\,(2\,s-m)}}\;\right)-$$

$$e^{-\frac{(b-c+a\,i\,(m-2\,s))^2}{4\,(d-f+i\,p\,(m-2\,s))}+e-g+i\,q\,(m-2\,s)}\,(d-f+i\,p\,(m-2\,s))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-c+a\,i\,(m-2\,s))^{-h-i+2\,n}$$

$$\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{d-f+i\,p\,(m-2\,s)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b-c+a\,i\,(m-2\,s))\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+i+1),\,-\frac{\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(d-f+i\,p\,(m-2\,s))}\right)+$$

$$2\,(d-f+i\,p\,(m-2\,s))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(d-f+i\,p\,(m-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(b-c+a\,i\,(m-2\,s)+2\,(d-f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{d-f+i\,p\,(m-2\,s)}}\;\right)+$$

$$e^{-\frac{(b+c+a\,i\,(m-2\,s))^2}{4\,(d+f+i\,p\,(m-2\,s))}+e+g+i\,q\,(m-2\,s)}\,(d+f+i\,p\,(m-2\,s))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c+a\,i\,(m-2\,s))^{-h-i+2\,n}$$

$$\left(b+c+a\,i\,(m-2\,s)+2\,(d+f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c+a\,i\,(m-2\,s)+2\,(d+f+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{d+f+i\,p\,(m-2\,s)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+c+a\,i\,(m-2\,s))\left(b+c+a\,i\,(m-2\,s)+2\,(d+f+i\,p\,(m-2\,s))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\frac{1}{2}(h+i+1), -\frac{\left(b+c+a\,i\,(m-2s)+2\,(d+f+i\,p\,(m-2s))\sqrt{z}\right)^2}{4\,(d+f+i\,p\,(m-2s))}\Bigg)+$$

$$2\,(d+f+i\,p\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+i+2), -\frac{\left(b+c+a\,i\,(m-2s)+2\,(d+f+i\,p\,(m-2s))\sqrt{z}\right)^2}{4\,(d+f+i\,p\,(m-2s))}\right)$$

$$\sqrt{-\frac{\left(b+c+a\,i\,(m-2s)+2\,(d+f+i\,p\,(m-2s))\sqrt{z}\right)^2}{d+f+i\,p\,(m-2s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving functions of the direct function

Involving powers of the direct function

Involving powers of sin

Involving $\sinh^{\nu}(a\,z)$

01.19.21.1455.01

$$\int \sinh^{\nu}(a\,z)\,dz = -\frac{\cosh(a\,z)}{a}\,{}_2F_1\!\left(\frac{1}{2}, \frac{1-\nu}{2}; \frac{3}{2}; \cosh^2(a\,z)\right)\sinh^{\nu+1}(a\,z)\left(-\sinh^2(a\,z)\right)^{\frac{1}{2}(-\nu-1)}$$

01.19.21.1456.01

$$\int \sinh^2(a\,z)\,dz = \frac{\sinh(2\,a\,z)-2\,a\,z}{4\,a}$$

01.19.21.1457.01

$$\int \sinh^3(a\,z)\,dz = \frac{\cosh(3\,a\,z)-9\cosh(a\,z)}{12\,a}$$

01.19.21.1458.01

$$\int \sinh^4(a\,z)\,dz = \frac{12\,a\,z-8\sinh(2\,a\,z)+\sinh(4\,a\,z)}{32\,a}$$

01.19.21.1459.01

$$\int \sinh^5(a\,z)\,dz = \frac{150\cosh(a\,z)-25\cosh(3\,a\,z)+3\cosh(5\,a\,z)}{240\,a}$$

01.19.21.1460.01

$$\int \sinh^6(a\,z)\,dz = \frac{-60\,a\,z+45\sinh(2\,a\,z)-9\sinh(4\,a\,z)+\sinh(6\,a\,z)}{192\,a}$$

01.19.21.1461.01

$$\int \sinh^7(a\,z)\,dz = \frac{-1225\cosh(a\,z)+245\cosh(3\,a\,z)-49\cosh(5\,a\,z)+5\cosh(7\,a\,z)}{2240\,a}$$

01.19.21.1462.01

$$\int \sinh^8(a z)\, dz = \frac{840\, a z - 672 \sinh(2 a z) + 168 \sinh(4 a z) - 32 \sinh(6 a z) + 3 \sinh(8 a z)}{3072\, a}$$

01.19.21.3416.01

$$\int \sinh^{2n}(a z)\, dz = \frac{(-1)^n \left(\frac{1}{2}\right)_n}{2\, a\, n!} \left(2 a z + \coth(a z) \sum_{k=1}^{n} \frac{(-1)^k (k-1)! \sinh^{2k}(a z)}{\left(\frac{1}{2}\right)_k}\right) /;\, n \in \mathbb{N}$$

01.19.21.3417.01

$$\int \sinh^{2n+1}(a z)\, dz = \frac{(-1)^n\, n! \cosh^{2n+1}(a z)}{a} \sum_{k=0}^{n} \frac{(-1)^k \tanh^{2k}(a z)}{k! \left(\frac{3}{2}\right)_{n-k}} /;\, n \in \mathbb{N}$$

01.19.21.3418.01

$$\int \sinh^{2n}(a z)\, dz = \frac{\cosh(a z) \sinh^{2n+1}(a z)}{a (2n+1)}\, {}_2F_1\left(1, n+1; n+\frac{3}{2}; -\sinh^2(a z)\right) + \frac{(-1)^n a z \left(\frac{1}{2}\right)_n}{a\, n!} - \frac{(-1)^n \left(\frac{1}{2}\right)_n \sinh^{-1}(\sinh(a z)) \cosh(a z)}{a\, n! \sqrt{\cosh^2(a z)}} /;\, n \in \mathbb{N}$$

01.19.21.3419.01

$$\int \sinh^{2n+1}(a z)\, dz = \frac{\operatorname{sech}(a z) \sinh^{2n+2}(a z)}{2 a (n+1)}\, {}_2F_1\left(\frac{1}{2}, 1; n+2; \tanh^2(a z)\right) + \frac{(-1)^n \cosh(a z)\, n! \sqrt{\operatorname{sech}^2(a z)}}{a \left(\frac{3}{2}\right)_n} /;\, n \in \mathbb{N}$$

01.19.21.1463.01

$$\int \sinh^{\frac{3}{2}}(a z)\, dz = \frac{\sinh(2 a z) - 2 i F\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right) \sqrt{i \sinh(a z)}}{3\, a \sinh^{\frac{1}{2}}(a z)}$$

01.19.21.1464.01

$$\int \sinh^{\frac{1}{2}}(a z)\, dz = \frac{2 \sqrt{i \sinh(a z)}}{a \sinh^{\frac{1}{2}}(a z)}\, E\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right)$$

01.19.21.1465.01

$$\int \frac{1}{\sinh^{\frac{1}{2}}(a z)}\, dz = -\frac{2 \sinh^{\frac{1}{2}}(a z)}{a \sqrt{i \sinh(a z)}}\, F\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right)$$

01.19.21.1466.01

$$\int \frac{1}{\sinh^{\frac{3}{2}}(a z)}\, dz = -\frac{2 \left(\cosh(a z) - E\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right) \sqrt{i \sinh(a z)}\right)}{a \sinh^{\frac{1}{2}}(a z)}$$

01.19.21.1467.01

$$\int \frac{1}{\sqrt{\sinh^3(a z)}}\, dz = -\frac{2 \left(\cosh(a z) - E\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right) \sqrt{i \sinh(a z)}\right) \sinh(a z)}{a \sqrt{\sinh^3(a z)}}$$

01.19.21.1468.01

$$\int \frac{1}{\sinh^{\frac{5}{2}}(a z)}\, dz = -\frac{2\left(F\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right)(i \sinh(a z))^{3/2} + \cosh(a z)\right)}{3 a \sinh^{\frac{3}{2}}(a z)}$$

01.19.21.1469.01

$$\int \frac{1}{\sqrt{\sinh^5(a z)}}\, dz = -\frac{2\left(F\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right)(i \sinh(a z))^{3/2} + \cosh(a z)\right)\sinh(a z)}{3 a \sqrt{\sinh^5(a z)}}$$

Involving $\sinh^{\nu}(a z + b)$

01.19.21.1470.01

$$\int \sinh^{\nu}(b + a z)\, dz = -\frac{\cosh(b + a z)\sinh^{\nu+1}(b + a z)\left(-\sinh^2(b + a z)\right)^{\frac{1}{2}(-\nu-1)}}{a}\, {}_2F_1\left(\frac{1}{2}, \frac{1-\nu}{2}; \frac{3}{2}; \cosh^2(b + a z)\right)$$

Involving $\sinh^{\nu}\left(a z^2 + \frac{b}{z^2}\right)$

01.19.21.1471.01

$$\int \sinh^{\nu}\left(a z^2 + \frac{b}{z^2}\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-a(2k-\nu)}}\left((-1)^{\nu} e^{-2\sqrt{-a(2k-\nu)}\sqrt{-b(2k-\nu)}}\left(e^{4\sqrt{-a(2k-\nu)}\sqrt{-b(2k-\nu)}}\left(\operatorname{erf}\left(\sqrt{-a(2k-\nu)}\, z + \frac{\sqrt{-b(2k-\nu)}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{-b(2k-\nu)}}{z} - \sqrt{-a(2k-\nu)}\, z\right) + 1\right)\right) + \frac{1}{\sqrt{a(2k-\nu)}}\left(e^{-2\sqrt{a(2k-\nu)}\sqrt{b(2k-\nu)}}\left(e^{4\sqrt{a(2k-\nu)}\sqrt{b(2k-\nu)}}\left(\operatorname{erf}\left(\sqrt{a(2k-\nu)}\, z + \frac{\sqrt{b(2k-\nu)}}{z}\right) - 1\right) - \operatorname{erf}\left(\frac{\sqrt{b(2k-\nu)}}{z} - \sqrt{a(2k-\nu)}\, z\right) + 1\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh^{\nu}\left(a z^2 + \frac{b}{z^2} + c\right)$

01.19.21.1472.01

$$\int \sinh^{\nu}\left(a z^2 + c + \frac{b}{z^2}\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-c(\nu-2k)} \binom{\nu}{k} \left(\frac{1}{\sqrt{-a(2k-\nu)}} \left(e^{-2\sqrt{-a(2k-\nu)}\sqrt{-b(2k-\nu)}} (-1)^{\nu} \left(e^{4\sqrt{-a(2k-\nu)}\sqrt{-b(2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{-a(2k-\nu)}\, z + \frac{\sqrt{-b(2k-\nu)}}{z} \right) - 1 \right) - \operatorname{erf}\left(\frac{\sqrt{-b(2k-\nu)}}{z} - \sqrt{-a(2k-\nu)}\, z \right) + 1 \right) \right) + \frac{1}{\sqrt{a(2k-\nu)}} \left(e^{2c(\nu-2k)-2\sqrt{a(2k-\nu)}\sqrt{b(2k-\nu)}} \left(e^{4\sqrt{a(2k-\nu)}\sqrt{b(2k-\nu)}} \left(\operatorname{erf}\left(\sqrt{a(2k-\nu)}\, z + \frac{\sqrt{b(2k-\nu)}}{z} \right) - 1 \right) - \operatorname{erf}\left(\frac{\sqrt{b(2k-\nu)}}{z} - \sqrt{a(2k-\nu)}\, z \right) + 1 \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh^{\nu}(a z^r)$

01.19.21.1473.01

$$\int \sinh^{\nu}(a z^r)\, dz = \left(\frac{i}{2}\right)^{\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - \frac{i^{\nu} 2^{-\nu} z}{r} \sum_{i=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^i \binom{\nu}{i} \left(e^{-\frac{1}{2} i \pi \nu} (-a(\nu-2i) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -a(\nu-2i) z^r\right) + e^{\frac{i\pi\nu}{2}} (a(\nu-2i) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, a(\nu-2i) z^r\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.1474.01

$$\int \sinh^{\nu}(a z^2)\, dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{\frac{1}{2}-\nu} i^{-\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{i a (\nu-2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{i a (\nu-2k)}\, z \right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{i a (\nu-2k)}\, z \right) \sin\left(\frac{\pi \nu}{2}\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.1475.01

$$\int \sinh^{\nu}\left(a \sqrt{z}\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - \frac{2^{2-\nu} i^{-\nu}}{a^2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2} - i a (\nu-2k) \sqrt{z}\right) - i a (\nu-2k) \sqrt{z} \sin\left(\frac{\pi\nu}{2} - i a (\nu-2k) \sqrt{z}\right) \right)}{(\nu-2k)^2} /; \nu \in \mathbb{N}^+$$

Involving $\sinh^{\nu}\left(a (z^r)^p\right)$

01.19.21.1476.01

$$\int \sinh^{\nu}(a\,(z^r)^p)\,dz = 2^{-\nu}\,i^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) - \frac{1}{p\,r}\,2^{-\nu}\,z\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\Gamma\left(\frac{1}{p\,r}, -a\,(\nu-2\,k)\,(z^r)^p\right)(-a\,(\nu-2\,k)\,(z^r)^p)^{-\frac{1}{p\,r}} + (-1)^{\nu}\,(a\,(\nu-2\,k)\,(z^r)^p)^{-\frac{1}{p\,r}}\,\Gamma\left(\frac{1}{p\,r}, a\,(\nu-2\,k)\,(z^r)^p\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1477.01

$$\int \sinh^{\nu}\left(a\,(z^r)^{1/r}\right)dz = 2^{-\nu}\,i^{-\nu}\,z\left(\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) - \frac{2\,i\,(z^r)^{-1/r}}{a}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{e^{i\,k\,\pi}\binom{\nu}{k}\sin\left(a\,i\,(2\,k-\nu)\,(z^r)^{1/r}+\frac{\pi\,\nu}{2}\right)}{2\,k-\nu}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1478.01

$$\int \sinh^{\nu}\left(a\sqrt{z^2}\right)dz = 2^{-\nu}\,z\,i^{-\nu}\left(\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) - \frac{2\,i}{a\sqrt{z^2}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{e^{i\,k\,\pi}\binom{\nu}{k}\sin\left(a\,i\sqrt{z^2}\,(2\,k-\nu)+\frac{\pi\,\nu}{2}\right)}{2\,k-\nu}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sinh^{\nu}(a\,z^r + b)$

01.19.21.1479.01

$$\int \sinh^{\nu}(a\,z^r+b)\,dz = 2^{-\nu}\,i^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) - \frac{1}{r}\,2^{-\nu}\,z\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{b\,(\nu-2\,k)}\,\Gamma\left(\frac{1}{r}, -a\,(\nu-2\,k)\,z^r\right)(-a\,(\nu-2\,k)\,z^r)^{-1/r} + (-1)^{\nu}\,e^{-b\,(\nu-2\,k)}\,(a\,(\nu-2\,k)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r}, a\,(\nu-2\,k)\,z^r\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1480.01

$$\int \sinh^{\nu}\left(a\,z^2+b\right)dz = 2^{-\nu}\,i^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + \frac{1}{\sqrt{i\,a}}\,2^{\frac{1}{2}-\nu}\,i^{-\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{\nu-2\,k}}\binom{\nu}{k}\left(\cosh\left(2\,b\,k-b\,\nu-\frac{i\,\pi\,\nu}{2}\right)C\left(\sqrt{i\,a}\sqrt{\frac{2}{\pi}}\sqrt{\nu-2\,k}\,z\right) + i\,S\left(\sqrt{i\,a}\sqrt{\frac{2}{\pi}}\sqrt{\nu-2\,k}\,z\right)\sinh\left(2\,b\,k-b\,\nu-\frac{i\,\pi\,\nu}{2}\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1481.01

$$\int \sinh^{\nu}\left(\sqrt{z}\,a+b\right)dz = 2^{-\nu}\,i^{-\nu}\,z\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) - \frac{1}{a^2}\,2^{2-\nu}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2\,k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2\,b\,k-b\,\nu+a\,(2\,k-\nu)\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right) - a\,(2\,k-\nu)\sqrt{z}\,\sinh\left(2\,b\,k-b\,\nu+a\,(2\,k-\nu)\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sin^{\nu}(a\,z^r + b\,z)$

01.19.21.1482.01

$$\int \sinh^{\nu}\left(a z^2+b z\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + \frac{1}{\sqrt{i a}} \left(2^{\frac{1}{2}-\nu} i^{-\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{\nu-2k}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{1}{4}\left(\frac{i(\nu-2k)b^2}{a}+2\pi\nu\right)\right) C\left(\frac{\sqrt{\nu-2k}\,(i b+2 i a z)}{\sqrt{i a}\,\sqrt{2\pi}}\right) + S\left(\frac{\sqrt{\nu-2k}\,(i b+2 i a z)}{\sqrt{i a}\,\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{i(\nu-2k)b^2}{a}+2\pi\nu\right)\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1483.01

$$\int \sinh^{\nu}\left(\sqrt{z}\, a+b z\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + \frac{1}{(i b)^{3/2}} \left(2^{-\nu} i^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(\nu-2k)^{3/2}} \left((-1)^k \binom{\nu}{k} \left(a\sqrt{2\pi}\,(2k-\nu) \cos\left(\frac{1}{4}\left(\frac{i(\nu-2k)a^2}{b}+2\pi\nu\right)\right) C\left(\frac{\sqrt{\nu-2k}\,\left(i a+2 i b\sqrt{z}\right)}{\sqrt{i b}\,\sqrt{2\pi}}\right) + a\sqrt{2\pi}\,(2k-\nu) S\left(\frac{\sqrt{\nu-2k}\,\left(i a+2 i b\sqrt{z}\right)}{\sqrt{i b}\,\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{i(\nu-2k)a^2}{b}+2\pi\nu\right)\right) + 2\sqrt{i b}\,\sqrt{\nu-2k}\, \sinh\left(\frac{i\pi\nu}{2} + i(2k-\nu)\left(i a+i b\sqrt{z}\right)\sqrt{z}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh^{\nu}\left(a z^r+b z+c\right)$

01.19.21.1484.01

$$\int \sinh^{\nu}\left(a z^2+b z+c\right) dz = 2^{-\nu} i^{-\nu} z \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + \frac{1}{\sqrt{i a}} \left(2^{\frac{1}{2}-\nu} i^{-\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{\nu-2k}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{1}{4}\left(\frac{i(\nu-2k)b^2}{a}+8 i c k-4 i c \nu+2\pi\nu\right)\right) C\left(\frac{\sqrt{\nu-2k}\,(i b+2 i a z)}{\sqrt{i a}\,\sqrt{2\pi}}\right) + S\left(\frac{\sqrt{\nu-2k}\,(i b+2 i a z)}{\sqrt{i a}\,\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{i(\nu-2k)b^2}{a}+8 i c k-4 i c \nu+2\pi\nu\right)\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1485.01

$$\int \sinh^{\nu}\left(\sqrt{z}\, a + c + b\, z\right) dz = 2^{-\nu}\, i^{-\nu}\, z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{1}{(i\, b)^{3/2}} \left(2^{-\nu}\, i^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(\nu - 2\, k)^{3/2}} \left((-1)^k \binom{\nu}{k} \left(a \sqrt{2\pi}\, (2\, k - \nu) \cos\left(\frac{1}{4} \left(\frac{i\, (\nu - 2\, k)\, a^2}{b} + 8\, i\, c\, k - 4\, i\, c\, \nu + 2\, \pi\, \nu \right) \right) C\left(\frac{\sqrt{\nu - 2\, k}\, \left(i\, a + 2\, i\, b \sqrt{z}\right)}{\sqrt{i\, b}\, \sqrt{2\pi}} \right) + a \sqrt{2\pi}\, (2\, k - \nu)\, S\left(\frac{\sqrt{\nu - 2\, k}\, \left(i\, a + 2\, i\, b \sqrt{z}\right)}{\sqrt{i\, b}\, \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{i\, (\nu - 2\, k)\, a^2}{b} + 8\, i\, c\, k - 4\, i\, c\, \nu + 2\, \pi\, \nu \right) \right) - 2 \sqrt{i\, b}\, \sqrt{\nu - 2\, k}\, \sinh\left(c\, (2\, k - \nu) - i \left(i\, a + i\, b \sqrt{z} \right) \sqrt{z}\, (2\, k - \nu) - \frac{i\, \pi\, \nu}{2} \right) \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving products of the direct function

Involving products of two direct functions

Involving $\sinh(c\, z) \sinh(a\, z)$

01.19.21.1486.01

$$\int \sinh(a\, z) \sinh(c\, z)\, dz = \frac{c \cosh(c\, z) \sinh(a\, z) - a \cosh(a\, z) \sinh(c\, z)}{c^2 - a^2}$$

Involving $\sinh(c\, z + d) \sinh(a\, z + b)$

01.19.21.1487.01

$$\int \sinh(c\, z) \sinh(b + a\, z)\, dz = \frac{(a - c) \sinh(b + (a + c)\, z) - (a + c) \sinh(b + a\, z - c\, z)}{2\, (a - c)\, (a + c)}$$

Involving $\sinh(c\, z + d) \sinh(a\, z + b)$

01.19.21.1488.01

$$\int \sinh(d + c\, z) \sinh(b + a\, z)\, dz = \frac{(a - c) \sinh(b + d + (a + c)\, z) - (a + c) \sinh(b - d + a\, z - c\, z)}{2\, (a - c)\, (a + c)}$$

Involving $\sinh(b\, z) \sinh\left(c\, z^r\right)$

01.19.21.1489.01

$$\int \sinh(b\, z) \sinh\left(c\, z^2\right) dz = -\frac{1}{2} \sqrt{\frac{\pi}{2}} \left(\frac{i \cosh\left(\frac{b^2}{4\, c}\right) C\left(\frac{2\, c\, z - b}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) + S\left(\frac{2\, c\, z - b}{\sqrt{i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}\right)}{\sqrt{i\, c}} + \frac{i \cosh\left(\frac{b^2}{4\, c}\right) C\left(\frac{b + 2\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) - S\left(\frac{b + 2\, c\, z}{\sqrt{-i\, c}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, c}\right)}{\sqrt{-i\, c}} \right)$$

01.19.21.1490.01

$$\int \sinh(b\,z)\sinh\left(c\sqrt{z}\right)dz = -\frac{1}{4(-i\,b)^{3/2}}\left(-c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4\,b}\right)C\left(\frac{2\sqrt{z}\,b+c}{\sqrt{-i\,b}\,\sqrt{2\pi}}\right)+c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4\,b}\right)C\left(\frac{c-2\,b\sqrt{z}}{\sqrt{-i\,b}\,\sqrt{2\pi}}\right)-\right.$$
$$\left. i\,c\sqrt{2\pi}\,S\left(\frac{2\sqrt{z}\,b+c}{\sqrt{-i\,b}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,b}\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c-2\,b\sqrt{z}}{\sqrt{-i\,b}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,b}\right)+4\sqrt{-i\,b}\,i\cosh(b\,z)\sinh\left(c\sqrt{z}\right)\right)$$

Involving $\sinh(d\,z+e)\sinh\left(c\,z^r\right)$

01.19.21.1491.01

$$\int \sinh(e+d\,z)\sinh\left(c\,z^2\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}$$
$$\left(\frac{i\cosh\left(\frac{d^2}{4\,c}-e\right)C\left(\frac{d+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)-S\left(\frac{d+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4\,c}-e\right)}{\sqrt{-i\,c}}+\frac{i\cosh\left(\frac{d^2}{4\,c}+e\right)C\left(\frac{2\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{2\,c\,z-d}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4\,c}+e\right)}{\sqrt{i\,c}}\right)$$

01.19.21.1492.01

$$\int \sinh(e+d\,z)\sinh\left(c\sqrt{z}\right)dz =$$
$$-\frac{1}{4(-i\,d)^{3/2}}\left(-c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4\,d}-e\right)C\left(\frac{c+2\,d\sqrt{z}}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)+c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4\,d}-e\right)C\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\right.$$
$$\left. S\left(\frac{c+2\,d\sqrt{z}}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,d}-e\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c-2\,d\sqrt{z}}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4\,d}-e\right)+4\sqrt{-i\,d}\,i\cosh(e+d\,z)\sinh\left(c\sqrt{z}\right)\right)$$

Involving $\sinh\left(a\,z^r\right)\sinh\left(c\,z^r\right)$

01.19.21.1493.01

$$\int \sinh(b\,z^r)\sinh(c\,z^r+g)\,dz =$$
$$-\frac{1}{4\,r}\left(z\left(e^g\,\Gamma\left(\frac{1}{r},(-b-c)\,z^r\right)((-b-c)\,z^r)^{-1/r}-e^g\,((b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b-c)\,z^r\right)-e^{-g}\,((c-b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-b)\,z^r\right)+\right.\right.$$
$$\left.\left. e^{-g}\,((b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b+c)\,z^r\right)\right)\right)$$

01.19.21.1494.01

$$\int \sinh(b z^2) \sinh(c z^2 + g) \, dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{\cosh(g)\, C\left(\sqrt{-i b + i c} \sqrt{\frac{2}{\pi}} z\right) - i S\left(\sqrt{-i b + i c}\sqrt{\frac{2}{\pi}} z\right) \sinh(g)}{\sqrt{-i b + i c}} + \frac{-\cosh(g)\, C\left(\sqrt{-i b - i c}\sqrt{\frac{2}{\pi}} z\right) - i S\left(\sqrt{-i b - i c}\sqrt{\frac{2}{\pi}} z\right) \sinh(g)}{\sqrt{-i b - i c}} \right)$$

01.19.21.1495.01

$$\int \sinh(b \sqrt{z}) \sinh(\sqrt{z}\, c + g) \, dz = \frac{\cosh(\sqrt{z}\,(c-b)+g) - (c-b)\sqrt{z}\, \sinh(\sqrt{z}\,(c-b)+g)}{(c-b)^2} - \frac{\cosh(\sqrt{z}\,(b+c)+g) - (b+c)\sqrt{z}\,\sinh(\sqrt{z}\,(b+c)+g)}{(b+c)^2}$$

Involving $\sinh(d\, z) \sinh(c\, z^r + g)$

01.19.21.1496.01

$$\int \sinh(d\, z) \sinh(c z^2 + g) \, dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{i \cosh\left(\frac{d^2}{4c} - g\right) C\left(\frac{2 c z - d}{\sqrt{i c}\sqrt{2\pi}}\right) + S\left(\frac{2 c z - d}{\sqrt{i c}\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c} - g\right)}{\sqrt{i c}} + \frac{i \cosh\left(\frac{d^2}{4c} - g\right) C\left(\frac{d + 2 c z}{\sqrt{-i c}\sqrt{2\pi}}\right) - S\left(\frac{d + 2 c z}{\sqrt{-i c}\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c} - g\right)}{\sqrt{-i c}} \right)$$

01.19.21.1497.01

$$\int \sinh(d\, z) \sinh(\sqrt{z}\, c + g) \, dz = -\frac{1}{4(-i d)^{3/2}} \left(-c\sqrt{2\pi}\, \cosh\left(\frac{c^2}{4d} - g\right) C\left(\frac{c + 2 d\sqrt{z}}{\sqrt{-i d}\sqrt{2\pi}}\right) + c\sqrt{2\pi}\, \cosh\left(\frac{c^2}{4d} + g\right) C\left(\frac{c - 2d\sqrt{z}}{\sqrt{-i d}\sqrt{2\pi}}\right) - i c \sqrt{2\pi}\, S\left(\frac{c + 2 d\sqrt{z}}{\sqrt{-i d}\sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4d} - g\right) + c\, i \sqrt{2\pi}\, S\left(\frac{c - 2 d\sqrt{z}}{\sqrt{-i d}\sqrt{2\pi}}\right) \sinh\left(\frac{c^2}{4d} + g\right) + 4\sqrt{-i d}\; i \cosh(d\, z) \sinh(\sqrt{z}\, c + g) \right)$$

Involving $\sinh(d\, z + e) \sinh(c\, z^r + g)$

01.19.21.1498.01

$$\int \sinh(e+d\,z)\sinh\left(c\,z^2+g\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{d^2}{4c}-e-g\right)C\left(\frac{d+2cz}{\sqrt{-ic}\sqrt{2\pi}}\right)-S\left(\frac{d+2cz}{\sqrt{-ic}\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}-e-g\right)}{\sqrt{-ic}}+\frac{i\cosh\left(\frac{d^2}{4c}+e-g\right)C\left(\frac{2cz-d}{\sqrt{ic}\sqrt{2\pi}}\right)+S\left(\frac{2cz-d}{\sqrt{ic}\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4c}+e-g\right)}{\sqrt{ic}}\right)$$

01.19.21.1499.01

$$\int \sinh(e+d\,z)\sinh\left(\sqrt{z}\,c+g\right)dz = -\frac{1}{4(-i\,d)^{3/2}}\left(-c\sqrt{2\pi}\cosh\left(\frac{c^2}{4d}-e-g\right)C\left(\frac{c+2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)+c\sqrt{2\pi}\cosh\left(\frac{c^2}{4d}-e+g\right)C\left(\frac{c-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4d}-e-g\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4d}-e+g\right)+4\sqrt{-i\,d}\;i\cosh(e+d\,z)\sinh\left(\sqrt{z}\,c+g\right)\right)$$

Involving $\sinh\left(a\,z^r\right)\sinh\left(c\,z^r+g\right)$

01.19.21.1500.01

$$\int \sinh(b\,z^r)\sinh(c\,z^r+g)\,dz = -\frac{1}{4r}\left(z\left(e^g\,\Gamma\left(\frac{1}{r},(-b-c)\,z^r\right)((-b-c)\,z^r)^{-1/r}-e^g\,((b-c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b-c)\,z^r\right)-e^{-g}\,((c-b)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-b)\,z^r\right)+e^{-g}\,((b+c)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b+c)\,z^r\right)\right)\right)$$

01.19.21.1501.01

$$\int \sinh\left(b\,z^2\right)\sinh\left(c\,z^2+g\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{\cosh(g)\,C\left(\sqrt{-i\,b+i\,c}\sqrt{\frac{2}{\pi}}\,z\right)-i\,S\left(\sqrt{-i\,b+i\,c}\sqrt{\frac{2}{\pi}}\,z\right)\sinh(g)}{\sqrt{-i\,b+i\,c}}+\frac{-\cosh(g)\,C\left(\sqrt{-i\,b-i\,c}\sqrt{\frac{2}{\pi}}\,z\right)-i\,S\left(\sqrt{-i\,b-i\,c}\sqrt{\frac{2}{\pi}}\,z\right)\sinh(g)}{\sqrt{-i\,b-i\,c}}\right)$$

01.19.21.1502.01

$$\int \sinh\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{\cosh\left(\sqrt{z}\,(c-b)+g\right)-(c-b)\sqrt{z}\,\sinh\left(\sqrt{z}\,(c-b)+g\right)}{(c-b)^2}-\frac{\cosh\left(\sqrt{z}\,(b+c)+g\right)-(b+c)\sqrt{z}\,\sinh\left(\sqrt{z}\,(b+c)+g\right)}{(b+c)^2}$$

Involving $\sinh\left(a z^r+e\right)\sinh\left(c z^r+g\right)$

01.19.21.1503.01

$$\int \sinh(b z^r+e)\sinh(c z^r+g)\,dz = -\frac{1}{4r}\left(z\left(e^{e+g}\,\Gamma\left(\frac{1}{r},(-b-c)z^r\right)((-b-c)z^r)^{-1/r}-e^{g-e}((b-c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b-c)z^r\right)-e^{e-g}((c-b)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(c-b)z^r\right)+e^{-e-g}((b+c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b+c)z^r\right)\right)\right)$$

01.19.21.1504.01

$$\int \sinh\left(b z^2+e\right)\sinh\left(c z^2+g\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{\cosh(e-g)\,C\left(\sqrt{-i b+i c}\,\sqrt{\frac{2}{\pi}}\,z\right)+i\,S\left(\sqrt{-i b+i c}\,\sqrt{\frac{2}{\pi}}\,z\right)\sinh(e-g)}{\sqrt{-i b+i c}}+\frac{-\cosh(e+g)\,C\left(\sqrt{-i b-i c}\,\sqrt{\frac{2}{\pi}}\,z\right)-i\,S\left(\sqrt{-i b-i c}\,\sqrt{\frac{2}{\pi}}\,z\right)\sinh(e+g)}{\sqrt{-i b-i c}}\right)$$

01.19.21.1505.01

$$\int \sinh\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{\cosh\left(-\sqrt{z}\,(c-b)+e-g\right)+(c-b)\sqrt{z}\,\sinh\left(-\sqrt{z}\,(c-b)+e-g\right)}{(c-b)^2}-\frac{\cosh\left(-\sqrt{z}\,(-b-c)+e+g\right)-(b+c)\sqrt{z}\,\sinh\left(-\sqrt{z}\,(-b-c)+e+g\right)}{(b+c)^2}$$

Involving $\sinh(d z)\sinh\left(c z^r+f z\right)$

01.19.21.1506.01

$$\int \sinh(d z)\sinh\left(c z^2+f z\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{(f-d)^2}{4c}\right)C\left(\frac{-d+f+2cz}{\sqrt{i c}\,\sqrt{2\pi}}\right)+S\left(\frac{-d+f+2cz}{\sqrt{i c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(f-d)^2}{4c}\right)}{\sqrt{i c}}+\frac{i\cosh\left(\frac{(d+f)^2}{4c}\right)C\left(\frac{d+f+2cz}{\sqrt{-i c}\,\sqrt{2\pi}}\right)-S\left(\frac{d+f+2cz}{\sqrt{-i c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(d+f)^2}{4c}\right)}{\sqrt{-i c}}\right)$$

01.19.21.1507.01

$$\int \sinh(d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{4}\left(-\frac{1}{(-i\,d+i\,f)^{3/2}}\left(c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4(f-d)}\right)C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4(f-d)}\right)+2\sqrt{-i\,d+i\,f}\;i\sinh\left(\sqrt{z}\;c+(f-d)\,z\right)\right)-\frac{1}{(-i\,d-i\,f)^{3/2}}\left(-c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4(d+f)}\right)C\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4(d+f)}\right)+2\sqrt{-i\,d-i\,f}\;i\sinh\left(\sqrt{z}\;c+(d+f)\,z\right)\right)\right)$$

Involving $\sinh(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1508.01

$$\int \sinh(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{(f-d)^2}{4c}+e\right)C\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(f-d)^2}{4c}+e\right)}{\sqrt{i\,c}}+\frac{i\cosh\left(e-\frac{(-d-f)^2}{4c}\right)C\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(e-\frac{(-d-f)^2}{4c}\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.1509.01

$$\int \sinh(e+d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = \frac{1}{4}\left(-\frac{1}{(-i\,d-i\,f)^{3/2}}\left(-c\sqrt{2\pi}\,\cosh\left(e-\frac{c^2}{4(d+f)}\right)C\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)\sinh\left(e-\frac{c^2}{4(d+f)}\right)+2\sqrt{-i\,d-i\,f}\;i\sinh\left(\sqrt{z}\;c+e+(d+f)\,z\right)\right)-\frac{1}{(-i\,d+i\,f)^{3/2}}\left(c\sqrt{2\pi}\,\cosh\left(\frac{c^2}{4(f-d)}+e\right)C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4(f-d)}+e\right)-2\,i\sqrt{-i\,d+i\,f}\;\sinh\left(-\sqrt{z}\;c+e-(f-d)\,z\right)\right)\right)$$

Involving $\sinh\left(b\,z^r\right)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1510.01

$$\int \sinh(b z^2)\sinh(c z^2+f z)\,dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{f^2}{4(c-b)}\right)C\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\,\sqrt{2\pi}}\right)+S\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4(c-b)}\right)}{\sqrt{-i b+i c}}+\frac{i\cosh\left(\frac{f^2}{4(b+c)}\right)C\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\,\sqrt{2\pi}}\right)-S\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4(b+c)}\right)}{\sqrt{-i b-i c}}\right)$$

01.19.21.1511.01

$$\int \sinh(b\sqrt{z})\sinh(\sqrt{z}\,c+f z)\,dz = \frac{1}{4}\left(-\frac{1}{(i f)^{3/2}}\left((c-b)\sqrt{2\pi}\cosh\left(\frac{(c-b)^2}{4f}\right)C\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right)-i(c-b)\sqrt{2\pi}\,S\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(c-b)^2}{4f}\right)+2\sqrt{i f}\,i\sinh(\sqrt{z}\,(c-b)+f z)\right)-\frac{1}{(-i f)^{3/2}}\left(-(b+c)\sqrt{2\pi}\cosh\left(\frac{(b+c)^2}{4f}\right)C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right)-i(b+c)\sqrt{2\pi}\,S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(b+c)^2}{4f}\right)+2\sqrt{-i f}\,i\sinh(\sqrt{z}\,(b+c)+f z)\right)\right)$$

Involving $\sinh(b z^r+e)\sinh(c z^r+f z)$

01.19.21.1512.01

$$\int \sinh(b z^2+e)\sinh(c z^2+f z)\,dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{f^2}{4(c-b)}+e\right)C\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\,\sqrt{2\pi}}\right)+S\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4(c-b)}+e\right)}{\sqrt{-i b+i c}}+\frac{i\cosh\left(e-\frac{f^2}{4(b+c)}\right)C\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\,\sqrt{2\pi}}\right)+S\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\,\sqrt{2\pi}}\right)\sinh\left(e-\frac{f^2}{4(b+c)}\right)}{\sqrt{-i b-i c}}\right)$$

01.19.21.1513.01

$$\int \sinh\left(\sqrt{z}\; b+e\right) \sinh\left(\sqrt{z}\; c+f z\right) dz = \frac{1}{4} \left(-\frac{1}{(-i f)^{3/2}} \left(-(b+c)\sqrt{2\pi}\cosh\left(e-\frac{(b+c)^2}{4f}\right) C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right) + (b+c)\, i \sqrt{2\pi}\, S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right) \sinh\left(e-\frac{(b+c)^2}{4f}\right) + 2\sqrt{-i f}\; i \sinh\left(\sqrt{z}\,(b+c)+e+f z\right)\right) - \frac{1}{(i f)^{3/2}} \left((c-b)\sqrt{2\pi}\cosh\left(\frac{(c-b)^2}{4f}+e\right) C\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i f}\sqrt{2\pi}}\right) - i (c-b)\sqrt{2\pi}\, S\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i f}\sqrt{2\pi}}\right) \sinh\left(\frac{(c-b)^2}{4f}+e\right) - 2 i \sqrt{i f}\, \sinh\left(-\sqrt{z}\,(c-b)+e-f z\right)\right)\right)$$

Involving $\sinh(b z^r + d z) \sinh(c z^r + f z)$

01.19.21.1514.01

$$\int \sinh(b z^2 + d z) \sinh(c z^2 + f z)\, dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{i \cosh\left(\frac{(f-d)^2}{4(c-b)}\right) C\left(\frac{-d+f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) + S\left(\frac{-d+f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(f-d)^2}{4(c-b)}\right)}{\sqrt{-i b+i c}} + \frac{i \cosh\left(\frac{(d+f)^2}{4(b+c)}\right) C\left(\frac{d+f+2(b+c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) - S\left(\frac{d+f+2(b+c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(d+f)^2}{4(b+c)}\right)}{\sqrt{-i b-i c}}\right)$$

01.19.21.1515.01

$$\int \sinh\left(\sqrt{z}\; b+d z\right) \sinh\left(\sqrt{z}\; c+f z\right) dz = \frac{1}{4} \left(-\frac{1}{(-i d+i f)^{3/2}} \left(-(b-c)\sqrt{2\pi}\cosh\left(\frac{(c-b)^2}{4(f-d)}\right) C\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{-i d+i f}\sqrt{2\pi}}\right) - i (c-b)\sqrt{2\pi}\, S\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{-i d+i f}\sqrt{2\pi}}\right) \sinh\left(\frac{(c-b)^2}{4(f-d)}\right) + 2\sqrt{-i d+i f}\; i \sinh\left(\sqrt{z}\,(c-b)+(f-d)z\right)\right) - \frac{1}{(-i d-i f)^{3/2}} \left(-(b+c)\sqrt{2\pi}\cosh\left(\frac{(b+c)^2}{4(d+f)}\right) C\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{-i d-i f}\sqrt{2\pi}}\right) - i (b+c)\sqrt{2\pi}\, S\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{-i d-i f}\sqrt{2\pi}}\right) \sinh\left(\frac{(b+c)^2}{4(d+f)}\right) + 2\sqrt{-i d-i f}\; i \sinh\left(\sqrt{z}\,(b+c)+(d+f)z\right)\right)\right)$$

Involving $\sinh(d z) \sinh(c z^r + f z + g)$

01.19.21.1516.01

$$\int \sinh(d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{(f-d)^2}{4c}-g\right)C\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(f-d)^2}{4c}-g\right)}{\sqrt{i\,c}}+\frac{i\cosh\left(g-\frac{(d+f)^2}{4c}\right)C\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(g-\frac{(d+f)^2}{4c}\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.1517.01

$$\int \sinh(d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\left(-\frac{1}{(-i\,d+i\,f)^{3/2}}\left(c\sqrt{2\pi}\cosh\left(\frac{c^2}{4(f-d)}-g\right)C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4(f-d)}-g\right)+2\sqrt{-i\,d+i\,f}\,i\sinh\left(\sqrt{z}\,c+g+(f-d)\,z\right)\right)-\frac{1}{(-i\,d-i\,f)^{3/2}}\left(-c\sqrt{2\pi}\cosh\left(g-\frac{c^2}{4(d+f)}\right)C\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\,\sqrt{2\pi}}\right)\sinh\left(g-\frac{c^2}{4(d+f)}\right)+2\sqrt{-i\,d-i\,f}\,i\sinh\left(\sqrt{z}\,c+g+(d+f)\,z\right)\right)\right)$$

Involving $\sinh(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1518.01

$$\int \sinh(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{(f-d)^2}{4c}+e-g\right)C\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{-d+f+2\,c\,z}{\sqrt{i\,c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(f-d)^2}{4c}+e-g\right)}{\sqrt{i\,c}}+\frac{i\cosh\left(-\frac{(d+f)^2}{4c}+e+g\right)C\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)+S\left(\frac{d+f+2\,c\,z}{\sqrt{-i\,c}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(d+f)^2}{4c}+e+g\right)}{\sqrt{-i\,c}}\right)$$

01.19.21.1519.01

$$\int \sinh(e+d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\left(-\frac{1}{(-i\,d-i\,f)^{3/2}}\left(-c\sqrt{2\pi}\cosh\left(-\frac{c^2}{4(d+f)}+e+g\right)C\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\sqrt{2\pi}}\right)+c\,i\sqrt{2\pi}\,S\left(\frac{c+2(d+f)\sqrt{z}}{\sqrt{-i\,d-i\,f}\sqrt{2\pi}}\right)\sinh\left(-\frac{c^2}{4(d+f)}+e+g\right)+2\sqrt{-i\,d-i\,f}\,i\sinh\left(\sqrt{z}\,c+e+g+(d+f)z\right)\right)-\frac{1}{(-i\,d+i\,f)^{3/2}}\left(c\sqrt{2\pi}\cosh\left(\frac{c^2}{4(f-d)}+e-g\right)C\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\sqrt{2\pi}}\right)-i\,c\sqrt{2\pi}\,S\left(\frac{c+2(f-d)\sqrt{z}}{\sqrt{-i\,d+i\,f}\sqrt{2\pi}}\right)\sinh\left(\frac{c^2}{4(f-d)}+e-g\right)-2\,i\sqrt{-i\,d+i\,f}\sinh\left(-\sqrt{z}\,c+e-g-(f-d)z\right)\right)\right)$$

Involving $\sinh(b\,z^r)\sinh(c\,z^r+f\,z+g)$

01.19.21.1520.01

$$\int \sinh(b\,z^2)\sinh(c\,z^2+f\,z+g)\,dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i\cosh\left(\frac{f^2}{4(c-b)}-g\right)C\left(\frac{f+2(c-b)z}{\sqrt{-i\,b+i\,c}\sqrt{2\pi}}\right)+S\left(\frac{f+2(c-b)z}{\sqrt{-i\,b+i\,c}\sqrt{2\pi}}\right)\sinh\left(\frac{f^2}{4(c-b)}-g\right)}{\sqrt{-i\,b+i\,c}}+\frac{i\cosh\left(g-\frac{f^2}{4(b+c)}\right)C\left(\frac{f+2(b+c)z}{\sqrt{-i\,b-i\,c}\sqrt{2\pi}}\right)+S\left(\frac{f+2(b+c)z}{\sqrt{-i\,b-i\,c}\sqrt{2\pi}}\right)\sinh\left(g-\frac{f^2}{4(b+c)}\right)}{\sqrt{-i\,b-i\,c}}\right)$$

01.19.21.1521.01

$$\int \sinh\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{1}{4}\left(-\frac{1}{(i\,f)^{3/2}}\left((c-b)\sqrt{2\pi}\cosh\left(\frac{(c-b)^2}{4f}-g\right)C\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i\,f}\sqrt{2\pi}}\right)-i(c-b)\sqrt{2\pi}\,S\left(\frac{-b+c+2f\sqrt{z}}{\sqrt{i\,f}\sqrt{2\pi}}\right)\sinh\left(\frac{(c-b)^2}{4f}-g\right)+2\sqrt{i\,f}\,i\sinh\left(\sqrt{z}\,(c-b)+g+f\,z\right)\right)-\frac{1}{(-i\,f)^{3/2}}\left(-(b+c)\sqrt{2\pi}\cosh\left(g-\frac{(b+c)^2}{4f}\right)C\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i\,f}\sqrt{2\pi}}\right)+(b+c)\,i\sqrt{2\pi}\,S\left(\frac{b+c+2f\sqrt{z}}{\sqrt{-i\,f}\sqrt{2\pi}}\right)\sinh\left(g-\frac{(b+c)^2}{4f}\right)+2\sqrt{-i\,f}\,i\sinh\left(\sqrt{z}\,(b+c)+g+f\,z\right)\right)\right)$$

Involving $\sinh(b z^r + e) \sinh(c z^r + f z + g)$

01.19.21.1522.01

$$\int \sinh(b z^2 + e) \sinh(c z^2 + f z + g)\, dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{i \cosh\left(\frac{f^2}{4(c-b)} + e - g\right) C\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) + S\left(\frac{f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) \sinh\left(\frac{f^2}{4(c-b)} + e - g\right)}{\sqrt{-i b + i c}} + \frac{i \cosh\left(-\frac{f^2}{4(b+c)} + e + g\right) C\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) + S\left(\frac{f+2(b+c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) \sinh\left(-\frac{f^2}{4(b+c)} + e + g\right)}{\sqrt{-i b - i c}} \right)$$

01.19.21.1523.01

$$\int \sinh(\sqrt{z}\, b + e) \sinh(\sqrt{z}\, c + g + f z)\, dz = \frac{1}{4}\left(-\frac{1}{(-i f)^{3/2}} \left(-(b+c)\sqrt{2\pi} \cosh\left(-\frac{(b+c)^2}{4 f} + e + g\right) C\left(\frac{b+c+2 f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right) + (b+c)\, i \sqrt{2\pi}\, S\left(\frac{b+c+2 f\sqrt{z}}{\sqrt{-i f}\sqrt{2\pi}}\right) \sinh\left(-\frac{(b+c)^2}{4 f} + e + g\right) + 2\sqrt{-i f}\, i \sinh(\sqrt{z}\,(b+c) + e + g + f z) \right) - \frac{1}{(i f)^{3/2}} \left((c-b)\sqrt{2\pi} \cosh\left(\frac{(c-b)^2}{4 f} + e - g\right) C\left(\frac{-b+c+2 f\sqrt{z}}{\sqrt{i f}\sqrt{2\pi}}\right) - i (c-b)\sqrt{2\pi}\, S\left(\frac{-b+c+2 f\sqrt{z}}{\sqrt{i f}\sqrt{2\pi}}\right) \sinh\left(\frac{(c-b)^2}{4 f} + e - g\right) - 2 i \sqrt{i f} \sinh(-\sqrt{z}\,(c-b) + e - g - f z) \right) \right)$$

Involving $\sinh(b z^r + d z) \sinh(c z^r + f z + g)$

01.19.21.1524.01

$$\int \sinh(b z^2 + d z) \sinh(c z^2 + f z + g)\, dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}} \left(\frac{i \cosh\left(\frac{(f-d)^2}{4(c-b)} - g\right) C\left(\frac{-d+f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) + S\left(\frac{-d+f+2(c-b)z}{\sqrt{-i b+i c}\sqrt{2\pi}}\right) \sinh\left(\frac{(f-d)^2}{4(c-b)} - g\right)}{\sqrt{-i b + i c}} + \frac{-i \cosh\left(-\frac{(d+f)^2}{4(b+c)} + g\right) C\left(\frac{-d-f+2(-b-c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) - S\left(\frac{-d-f+2(-b-c)z}{\sqrt{-i b-i c}\sqrt{2\pi}}\right) \sinh\left(-\frac{(d+f)^2}{4(b+c)} + g\right)}{\sqrt{-i b - i c}} \right)$$

01.19.21.1525.01

$$\int \sinh\left(\sqrt{z}\, b + d\, z\right) \sinh\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{4}\left(-\frac{1}{(-i\, d + i\, f)^{3/2}}\left(-(b-c)\sqrt{2\pi}\cosh\left(\frac{(c-b)^2}{4(f-d)} - g\right) C\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{-i\, d + i\, f}\,\sqrt{2\pi}}\right) - i\,(c-b)\sqrt{2\pi}\, S\left(\frac{-b+c+2(f-d)\sqrt{z}}{\sqrt{-i\, d + i\, f}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(c-b)^2}{4(f-d)} - g\right) + 2\sqrt{-i\, d + i\, f}\; i \sinh\left(\sqrt{z}\,(c-b) + g + (f-d)\, z\right)\right) - \frac{1}{(-i\, d - i\, f)^{3/2}}\left(-(b+c)\sqrt{2\pi}\cosh\left(g - \frac{(b+c)^2}{4(d+f)}\right) C\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{-i\, d - i\, f}\,\sqrt{2\pi}}\right) + (b+c)\, i \sqrt{2\pi}\, S\left(\frac{b+c+2(d+f)\sqrt{z}}{\sqrt{-i\, d - i\, f}\,\sqrt{2\pi}}\right)\sinh\left(g - \frac{(b+c)^2}{4(d+f)}\right) + 2\sqrt{-i\, d - i\, f}\; i \sinh\left(\sqrt{z}\,(b+c) + g + (d+f)\, z\right)\right)\right)$$

Involving $\sinh\left(b\, z^r + d\, z + e\right) \sinh\left(c\, z^r + f\, z + g\right)$

01.19.21.1526.01

$$\int \sinh\left(b\, z^2 + d\, z + e\right) \sinh\left(c\, z^2 + f\, z + g\right) dz = -\frac{1}{2}\sqrt{\frac{\pi}{2}}\left(\frac{i \cosh\left(\frac{(f-d)^2}{4(c-b)} + e - g\right) C\left(\frac{-d+f+2(c-b)\, z}{\sqrt{-i\, b + i\, c}\,\sqrt{2\pi}}\right) + S\left(\frac{-d+f+2(c-b)\, z}{\sqrt{-i\, b + i\, c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(f-d)^2}{4(c-b)} + e - g\right)}{\sqrt{-i\, b + i\, c}} + \frac{-i \cosh\left(\frac{(-d-f)^2}{4(-b-c)} + e + g\right) C\left(\frac{-d-f+2(-b-c)\, z}{\sqrt{-i\, b - i\, c}\,\sqrt{2\pi}}\right) - S\left(\frac{-d-f+2(-b-c)\, z}{\sqrt{-i\, b - i\, c}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(-d-f)^2}{4(-b-c)} + e + g\right)}{\sqrt{-i\, b - i\, c}}\right)$$

01.19.21.1527.01

$$\int \sinh\left(b\, z^2 + d\, z + e\right) \sinh\left(c\, z^2 + f\, z + g\right) dz = \frac{1}{8}\sqrt{\pi}\left(\frac{e^{\frac{d^2+2 f d+f^2-4 c e-4 c g-4 b (e+g)}{4(b+c)}} \operatorname{erf}\left(\frac{d+f+2(b+c)\, z}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} + \frac{e^{-\frac{(d+f)^2}{4(b+c)}+e+g} \operatorname{erfi}\left(\frac{d+f+2(b+c)\, z}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} - \frac{e^{-\frac{(d-f)^2}{4(b-c)}+e-g} \operatorname{erfi}\left(\frac{d-f+2 b\, z-2 c\, z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}} - \frac{e^{\frac{(d-f)^2}{4(b-c)}-e+g} \operatorname{erf}\left(\frac{d-f+2 b\, z-2 c\, z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}}\right)$$

01.19.21.1528.01

$$\int \sinh\left(\sqrt{z}\ b + e + d\,z\right) \sinh\left(\sqrt{z}\ c + g + f\,z\right) dz ==$$

$$\frac{1}{4}\left(-\frac{1}{(-i\,d - i\,f)^{3/2}}\left(-(b+c)\sqrt{2\pi}\ \cosh\left(-\frac{(b+c)^2}{4\,(d+f)} + e + g\right) C\left(\frac{b+c+2\,(d+f)\sqrt{z}}{\sqrt{-i\,d - i\,f}\ \sqrt{2\pi}}\right) + (b+c)\,i\sqrt{2\pi}\ S\left(\frac{b+c+2\,(d+f)\sqrt{z}}{\sqrt{-i\,d - i\,f}\ \sqrt{2\pi}}\right) \sinh\left(-\frac{(b+c)^2}{4\,(d+f)} + e + g\right) + 2\sqrt{-i\,d - i\,f}\ i \sinh\left(\sqrt{z}\ (b+c) + e + g + (d+f)\,z\right)\right) - \frac{1}{(-i\,d + i\,f)^{3/2}}\left(-(b-c)\sqrt{2\pi}\ \cosh\left(\frac{(c-b)^2}{4\,(f-d)} + e - g\right) C\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{-i\,d + i\,f}\ \sqrt{2\pi}}\right) - i\,(c-b)\sqrt{2\pi}\ S\left(\frac{-b+c+2\,(f-d)\sqrt{z}}{\sqrt{-i\,d + i\,f}\ \sqrt{2\pi}}\right) \sinh\left(\frac{(c-b)^2}{4\,(f-d)} + e - g\right) - 2\,i\sqrt{-i\,d + i\,f}\ \sinh\left(-\sqrt{z}\ (c-b) + e - g - (f-d)\,z\right)\right)\right)$$

01.19.21.1529.01

$$\int \sinh\left(\sqrt{z}\ b + d\,z + e\right) \sinh\left(\sqrt{z}\ c + f\,z + g\right) dz ==$$

$$\frac{1}{4}\,e^{-e-g}\left(\frac{e^{\sqrt{z}\ (b+c)+2\,e+2\,g+(d+f)\,z}}{d+f} - \frac{e^{-(d+f)\,z-(b+c)\sqrt{z}}}{d+f} - \frac{e^{\sqrt{z}\ (b-c)+2\,e+(d-f)\,z}}{d-f} + \frac{e^{-\sqrt{z}\ b+2\,g-d\,z+f\,z+c\sqrt{z}}}{d-f}\right) + \frac{\sqrt{\pi}\ (b-c)}{8\,(d-f)^{3/2}}\,e^{-\frac{b^2+2\,c\,b+c^2+4\,(d-f)\,(e+g)}{4\,(d-f)}}\left(e^{\frac{b^2+c^2+4\,d\,g-4\,f\,g}{2\,d-2\,f}} \operatorname{erf}\left(\frac{b-c+2\,(d-f)\sqrt{z}}{2\sqrt{d-f}}\right) + e^{\frac{b\,c}{d-f}+2\,e} \operatorname{erfi}\left(\frac{b-c+2\,(d-f)\sqrt{z}}{2\sqrt{d-f}}\right)\right) - \frac{\sqrt{\pi}\ (b+c)}{8\,(d+f)^{3/2}}\,e^{-\frac{b^2+2\,c\,b+c^2+4\,(d+f)\,(e+g)}{4\,(d+f)}}\left(e^{\frac{(b+c)^2}{2\,(d+f)}} \operatorname{erf}\left(\frac{b+c+2\,(d+f)\sqrt{z}}{2\sqrt{d+f}}\right) + e^{2\,(e+g)} \operatorname{erfi}\left(\frac{b+c+2\,(d+f)\sqrt{z}}{2\sqrt{d+f}}\right)\right)$$

Involving products of several direct functions

Involving $\sinh(a\,z+\alpha)\sinh(b\,z+\beta)\sinh(c\,z+\gamma)$

01.19.21.1530.01

$$\int \sinh(a\,z)\sinh(b\,z)\sinh(c\,z)\,dz == \frac{1}{4}\left(\frac{\cosh((a-b-c)\,z)}{a-b-c} + \frac{\cosh((a+b+c)\,z)}{a+b+c} - \frac{\cosh((a+b-c)\,z)}{a+b-c} - \frac{\cosh((a-b+c)\,z)}{a-b+c}\right)$$

01.19.21.1531.01

$$\int \sinh(a\,z+\alpha)\sinh(b\,z+\beta)\sinh(c\,z+\gamma)\,dz ==$$

$$\frac{1}{4}\left(\frac{\cosh((a-b-c)\,z)\cosh(\alpha-\beta-\gamma)}{a-b-c} + \frac{\cosh((a+b+c)\,z)\cosh(\alpha+\beta+\gamma)}{a+b+c} + \frac{\sinh((a-b-c)\,z)\sinh(\alpha-\beta-\gamma)}{a-b-c} + \frac{\sinh((a+b+c)\,z)\sinh(\alpha+\beta+\gamma)}{a+b+c} - \frac{\cosh((a+b-c)\,z)\cosh(\alpha+\beta-\gamma)}{a+b-c} - \frac{\sinh((a+b-c)\,z)\sinh(\alpha+\beta-\gamma)}{a+b-c} - \frac{\cosh((a-b+c)\,z)\cosh(\alpha-\beta+\gamma)}{a-b+c} - \frac{\sinh((a-b+c)\,z)\sinh(\alpha-\beta+\gamma)}{a-b+c}\right)$$

01.19.21.1532.01

$$\int \sinh(z)\sinh(a+z)\sinh(b+z)\,dz = \frac{1}{12}(-3\cosh(a-b-z)-3\cosh(a-b+z)-3\cosh(a+b+z)+\cosh(a+b+3z))$$

Involving $\prod_{k=1}^{n}\sinh(a_k z)$

01.19.21.1533.01

$$\int \prod_{k=1}^{n}\sinh(a_k z)\,dz = 2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\left(\frac{(-1)^{\sum_{j=1}^{n}\frac{1}{4}(2k_j+2)}\sinh\left(z\sum_{j=1}^{n}k_j a_j\right)}{\sum_{j=1}^{n}k_j a_j}\right)$$

Involving products of powers of the direct function

Involving product of power of the direct function and the direct function

Involving $\sinh(c z)\sinh^{\nu}(a z)$

01.19.21.1534.01

$$\int \sinh(cz)\sinh^{\nu}(az)\,dz = -\frac{1}{2(a^2\nu^2-c^2)}e^{cz}\left(1-e^{2az}\right)^{-\nu}$$
$$\left(e^{-2cz}(c-a\nu)\,{}_2F_1\left(-\frac{c}{2a}-\frac{\nu}{2},-\nu;-\frac{c}{2a}-\frac{\nu}{2}+1;e^{2az}\right)+(c+a\nu)\,{}_2F_1\left(-\frac{a\nu-c}{2a},-\nu;\frac{c}{2a}-\frac{\nu}{2}+1;e^{2az}\right)\right)\sinh^{\nu}(az)$$

01.19.21.1535.01

$$\int \sinh(cz)\sinh^{\nu}(az)\,dz = \frac{2^{-\nu}\cosh(cz)(1-\nu\bmod 2)}{c}e^{\frac{i\pi\nu}{2}}\binom{\nu}{\frac{\nu}{2}}+$$
$$2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{i\pi\nu+(-c+2ak-a\nu)z}}{c-(2ak-a\nu)}+\frac{e^{(-c-2ak+a\nu)z}}{c+(2ak-a\nu)}+\frac{e^{i\pi\nu+(c+2ak-a\nu)z}}{c+(2ak-a\nu)}+\frac{e^{(c-2ak+a\nu)z}}{c-2ak+a\nu}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1536.01

$$\int \sinh(cz)\sinh^{\frac{1}{2}}(az)\,dz =$$
$$\frac{e^{-cz}\sqrt{-e^{-az}+e^{az}}}{(a^2-4c^2)\sqrt{2-2e^{2az}}}\left((a-2c)\,{}_2F_1\left(-\frac{a+2c}{4a},-\frac{1}{2};\frac{3}{4}-\frac{c}{2a};e^{2az}\right)-(a+2c)e^{2cz}\,{}_2F_1\left(\frac{c}{2a}-\frac{1}{4},-\frac{1}{2};\frac{c}{2a}+\frac{3}{4};e^{2az}\right)\right)$$

01.19.21.1537.01

$$\int \frac{\sinh(cz)}{\sinh^{\frac{1}{2}}(az)}\,dz = \frac{e^{-\frac{az}{2}}\sqrt{2-2e^{2az}}}{(a^2-4c^2)\sqrt{-e^{-az}+e^{az}}}$$
$$\left((a-2c)e^{\frac{1}{2}(a+2c)z}\,{}_2F_1\left(\frac{a+2c}{4a},\frac{1}{2};\frac{c}{2a}+\frac{5}{4};e^{2az}\right)-(a+2c)e^{\frac{1}{2}(a-2c)z}\,{}_2F_1\left(\frac{a-2c}{4a},\frac{1}{2};\frac{5}{4}-\frac{c}{2a};e^{2az}\right)\right)$$

01.19.21.1538.01

$$\int \sinh((\nu+2)z)\sinh^{\nu}(z)\,dz = \frac{\sinh^{\nu+1}(z)\sinh(z(\nu+1))}{\nu+1}$$

01.19.21.1539.01

$$\int \sinh(a z) \sinh^{\frac{1}{2}}(2 a z) \, dz = \frac{\cosh(a z) \sinh^{\frac{1}{2}}(2 a z)}{2 a} - \frac{\left(\tanh^{-1}\left(\coth^{\frac{1}{2}}(a z)\right) - \tan^{-1}\left(\coth^{\frac{1}{2}}(a z)\right)\right) \operatorname{csch}(a z) \sinh^{\frac{1}{2}}(2 a z)}{4 a \coth^{\frac{1}{2}}(a z)}$$

01.19.21.1540.01

$$\int \frac{\sinh(a z)}{\sinh^{\frac{1}{2}}(2 a z)} \, dz = \frac{1}{2 a \tanh^{\frac{1}{2}}(a z)} \left(\coth^{-1}\left(\tanh^{\frac{1}{2}}(a z)\right) - \tan^{-1}\left(\tanh^{\frac{1}{2}}(a z)\right)\right) \operatorname{sech}(a z) \sinh^{\frac{1}{2}}(2 a z)$$

01.19.21.1541.01

$$\int \sinh(2 a z) \sinh^{\nu}(a z) \, dz = \frac{2 \sinh^{\nu+2}(a z)}{\nu a + 2 a}$$

Involving $\sinh(c z + d) \sinh^{\nu}(a z)$

01.19.21.1542.01

$$\int \sinh(d + c z) \sinh^{\nu}(a z) \, dz = \frac{1}{2 \left(c^2 - a^2 \nu^2\right)} \left(e^{-(d+c z)} \sinh^{\nu}(a z) \left(1 - e^{2 a z}\right)^{-\nu} \left(e^{2 (d+c z)} (c + a \nu) \, {}_2F_1\left(\frac{c - a \nu}{2 a}, -\nu; \frac{1}{2} \left(\frac{c}{a} - \nu + 2\right); e^{2 a z}\right) + (c - a \nu) \, {}_2F_1\left(-\frac{c + a \nu}{2 a}, -\nu; -\frac{c + a (\nu - 2)}{2 a}; e^{2 a z}\right)\right)\right)$$

01.19.21.1543.01

$$\int \sinh(d + c z) \sinh^{\nu}(a z) \, dz = \frac{2^{-\nu} e^{\frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} \cosh(d + c z) (1 - \nu \bmod 2)}{c} + 2^{-\nu-1} e^{d} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{-2 d + i \pi \nu + (-c + 2 a k - a \nu) z}}{c - (2 a k - a \nu)} + \frac{e^{(-c - 2 a k + a \nu) z - 2 d}}{c + (2 a k - a \nu)} + \frac{e^{i \pi \nu + (c + 2 a k - a \nu) z}}{c + (2 a k - a \nu)} + \frac{e^{(c - 2 a k + a \nu) z}}{c - 2 a k + a \nu}\right) \binom{\nu}{k} \text{ /; } \nu \in \mathbb{N}^+$$

Involving $\sinh(c z) \sinh^{\nu}(a z + b)$

01.19.21.1544.01

$$\int \sinh(c z) \sinh^{\nu}(b + a z) \, dz = \frac{1}{2 \left(c^2 - a^2 \nu^2\right)} \left(e^{-c z} \sinh^{\nu}(b + a z) \left(1 - e^{2 (b + a z)}\right)^{-\nu} \left(e^{2 c z} (c + a \nu) \, {}_2F_1\left(\frac{c - a \nu}{2 a}, -\nu; \frac{1}{2} \left(\frac{c}{a} - \nu + 2\right); e^{2 (b + a z)}\right) + (c - a \nu) \, {}_2F_1\left(-\frac{c + a \nu}{2 a}, -\nu; -\frac{c + a (\nu - 2)}{2 a}; e^{2 (b + a z)}\right)\right)\right)$$

01.19.21.1545.01

$$\int \sinh(c z) \sinh^{\nu}(b + a z) \, dz = \frac{2^{-\nu} e^{\frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} \cosh(c z) (1 - \nu \bmod 2)}{c} + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \left(\frac{e^{4 b k + i \pi \nu + (-c + 2 a k - a \nu) z}}{c - 2 a k + a \nu} + \frac{e^{2 b \nu + (-c - 2 a k + a \nu) z}}{c + 2 a k - a \nu} + \frac{e^{4 b k + i \pi \nu + (c + 2 a k - a \nu) z}}{c + 2 a k - a \nu} + \frac{e^{2 b \nu + (c - 2 a k + a \nu) z}}{c - 2 a k + a \nu}\right) \binom{\nu}{k} \text{ /; } \nu \in \mathbb{N}^+$$

Involving $\sinh(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.1546.01

$$\int \sinh(d+c z)\sinh^{\nu}(b+a z)\,dz = \frac{1}{2\left(c^2-a^2\nu^2\right)}\left(e^{-(d+c z)}\sinh^{\nu}(b+a z)\left(1-e^{2(b+a z)}\right)^{-\nu}\right.$$
$$\left.\left(e^{2(d+c z)}(c+a\nu)\,{}_2F_1\left(\frac{c-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{c}{a}-\nu+2\right);e^{2(b+a z)}\right)+(c-a\nu)\,{}_2F_1\left(-\frac{c+a\nu}{2a},-\nu;-\frac{c+a(\nu-2)}{2a};e^{2(b+a z)}\right)\right)\right)$$

01.19.21.1547.01

$$\int \sinh(d+c z)\sinh^{\nu}(b+a z)\,dz = \frac{2^{-\nu}\cosh(d+c z)(1-\nu \bmod 2)}{c}\,e^{\frac{i\pi\nu}{2}}\binom{\nu}{\frac{\nu}{2}}+2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{d-2bk-b\nu}$$
$$\left(\frac{e^{-2d+4bk+i\pi\nu+(-c+2ak-a\nu)z}}{c-(2ak-a\nu)}+\frac{e^{-2d+2b\nu+(-c-2ak+a\nu)z}}{c+(2ak-a\nu)}+\frac{e^{4bk+i\pi\nu+(c+2ak-a\nu)z}}{c+(2ak-a\nu)}+\frac{e^{2b\nu+(c-2ak+a\nu)z}}{c-2ak+a\nu}\right)/;\ \nu\in\mathbb{N}^+$$

Involving $\sinh\left(b z^r\right)\sinh^{\nu}(c z)$

01.19.21.1548.01

$$\int \sinh\left(b z^2\right)\sinh^{\nu}(c z)\,dz = -\frac{i^{1-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,S\left(\sqrt{i b}\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{i b}}+$$
$$i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{-i b}}\left(C\left(\frac{-2cs+c\nu-2bz}{\sqrt{-i b}\sqrt{2\pi}}\right)\sinh\left(\frac{i\pi\nu}{2}-\frac{(c\nu-2cs)^2}{4b}\right)-\right.\right.$$
$$\left. i\cosh\left(\frac{i\pi\nu}{2}-\frac{(c\nu-2cs)^2}{4b}\right)S\left(\frac{-2cs+c\nu-2bz}{\sqrt{-i b}\sqrt{2\pi}}\right)\right)-\frac{1}{\sqrt{-i b}}\left(i\cosh\left(\frac{(2cs-c\nu)^2}{4b}+\frac{i\pi\nu}{2}\right)\right.$$
$$\left.\left.S\left(\frac{2cs-c\nu-2bz}{\sqrt{-i b}\sqrt{2\pi}}\right)+C\left(\frac{2cs-c\nu-2bz}{\sqrt{-i b}\sqrt{2\pi}}\right)\sinh\left(\frac{(2cs-c\nu)^2}{4b}+\frac{i\pi\nu}{2}\right)\right)\right)/;\ \nu\in\mathbb{N}^+$$

01.19.21.1549.01

$$\int \sinh\left(b\sqrt{z}\right)\sinh^{\nu}(c z)\,dz = -\frac{i^{-\nu}\,2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\left(b\sqrt{z}\cosh\left(b\sqrt{z}\right)-\sinh\left(b\sqrt{z}\right)\right)}{b^2}+\left(\frac{i}{2}\right)^{\nu+1}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(i c\nu-2ics)^{3/2}}\left(-2\sqrt{i c\nu-2ics}\cosh\left(\sqrt{z}\,b+\frac{i\pi\nu}{2}-(c\nu-2cs)z\right)+b\sqrt{2\pi}\cosh\left(\frac{b^2}{4(c\nu-2cs)}+\right.\right.\right.$$
$$\left.\left.\frac{i\pi\nu}{2}\right)S\left(\frac{2(c\nu-2cs)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c\nu-2ics}}\right)+b\,i\sqrt{2\pi}\,C\left(\frac{2(c\nu-2cs)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c\nu-2ics}}\right)\sinh\left(\frac{b^2}{4(c\nu-2cs)}+\frac{i\pi\nu}{2}\right)\right)+$$
$$\frac{1}{(2ics-ic\nu)^{3/2}}\left(-2\sqrt{2ics-ic\nu}\cosh\left(\sqrt{z}\,b-(2cs-c\nu)z-\frac{i\pi\nu}{2}\right)+b\sqrt{2\pi}\cosh\left(\frac{b^2}{4(2cs-c\nu)}-\frac{i\pi\nu}{2}\right)\right.$$
$$\left.\left.S\left(\frac{2(2cs-c\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2ics-ic\nu}}\right)+b\,i\sqrt{2\pi}\,C\left(\frac{2(2cs-c\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2ics-ic\nu}}\right)\sinh\left(\frac{b^2}{4(2cs-c\nu)}-\frac{i\pi\nu}{2}\right)\right)\right)/;\ \nu\in\mathbb{N}^+$$

Involving $\sinh(b z^r + e)\sinh^\nu(c z)$

01.19.21.1550.01

$$\int \sinh(b z^2 + e)\sinh^\nu(c z)\,dz = -\frac{1}{\sqrt{i b}}\left(i^{1-\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cosh(e)\, S\left(\sqrt{i b}\,\sqrt{\frac{2}{\pi}}\, z\right) + i\, C\left(\sqrt{i b}\,\sqrt{\frac{2}{\pi}}\, z\right)\sinh(e)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{-i b}}\left(C\left(\frac{-2 c s + c \nu - 2 b z}{\sqrt{-i b}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(c\nu - 2 c s)^2}{4 b} + e + \frac{i\pi\nu}{2}\right) - i\cosh\left(-\frac{(c\nu - 2 c s)^2}{4 b} + e + \frac{i\pi\nu}{2}\right) S\left(\frac{-2 c s + c\nu - 2 b z}{\sqrt{-i b}\,\sqrt{2\pi}}\right)\right) + \frac{1}{\sqrt{-i b}}\left(C\left(\frac{2 c s - c\nu - 2 b z}{\sqrt{-i b}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(2 c s - c\nu)^2}{4 b} + e - \frac{i\pi\nu}{2}\right) - i\cosh\left(-\frac{(2 c s - c\nu)^2}{4 b} + e - \frac{i\pi\nu}{2}\right) S\left(\frac{2 c s - c\nu - 2 b z}{\sqrt{-i b}\,\sqrt{2\pi}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1551.01

$$\int \sinh(\sqrt{z}\, b + e)\sinh^\nu(c z)\,dz = -\frac{i^{-\nu} 2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2 - 1)\left(b\sqrt{z}\cosh(\sqrt{z}\, b + e) - \sinh(\sqrt{z}\, b + e)\right)}{b^2} + \left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(i c\nu - 2 i c s)^{3/2}}\left(-2\sqrt{i c\nu - 2 i c s}\,\cosh\left(\sqrt{z}\, b + e + \frac{i\pi\nu}{2} - (c\nu - 2 c s) z\right) + b\sqrt{2\pi}\,\cosh\left(\frac{b^2}{4(c\nu - 2 c s)} + e + \frac{i\pi\nu}{2}\right) S\left(\frac{2(c\nu - 2 c s)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{i c\nu - 2 i c s}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{2(c\nu - 2 c s)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{i c\nu - 2 i c s}}\right)\sinh\left(\frac{b^2}{4(c\nu - 2 c s)} + e + \frac{i\pi\nu}{2}\right)\right) + \frac{1}{(2 i c s - i c\nu)^{3/2}}\left(-2\sqrt{2 i c s - i c\nu}\,\cosh\left(\sqrt{z}\, b + e - (2 c s - c\nu) z - \frac{i\pi\nu}{2}\right) + b\sqrt{2\pi}\,\cosh\left(\frac{b^2}{4(2 c s - c\nu)} + e - \frac{i\pi\nu}{2}\right) S\left(\frac{2(2 c s - c\nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{2 i c s - i c\nu}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{2(2 c s - c\nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{2 i c s - i c\nu}}\right)\sinh\left(\frac{b^2}{4(2 c s - c\nu)} + e - \frac{i\pi\nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + d z)\sinh^\nu(c z)$

01.19.21.1552.01

$$\int \sinh\left(b z^2 + d z\right) \sinh^{\nu}(c z)\, dz = \frac{i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b}\right) S\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) - C\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{i b}} + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(-i \cosh\left(\frac{(-d + 2 c s - c \nu)^2}{4 b} + \frac{i \pi \nu}{2}\right) S\left(\frac{-d + 2 c s - c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) - C\left(\frac{-d + 2 c s - c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{(-d + 2 c s - c \nu)^2}{4 b} + \frac{i \pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d - 2 c s + c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{i \pi \nu}{2} - \frac{(-d - 2 c s + c \nu)^2}{4 b}\right) - i \cosh\left(\frac{i \pi \nu}{2} - \frac{(-d - 2 c s + c \nu)^2}{4 b}\right) S\left(\frac{-d - 2 c s + c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1553.01

$$\int \sinh\left(\sqrt{z}\, b + d z\right) \sinh^{\nu}(c z)\, dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i d} \cosh\left(\sqrt{z}\, b + d z\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 d}\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 d}\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(-2 \sqrt{-i d - 2 i c s + i c \nu} \cosh\left(\sqrt{z}\, b + \frac{i \pi \nu}{2} - (-d - 2 c s + c \nu) z\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (-d - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d - 2 c s + c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d - 2 i c s + i c \nu}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{2 (-d - 2 c s + c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d - 2 i c s + i c \nu}}\right) \sinh\left(\frac{b^2}{4 (-d - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right)\right) \Big/ (-i d - 2 i c s + i c \nu)^{3/2} + \left(-2 \sqrt{-i d + 2 i c s - i c \nu} \cosh\left(\sqrt{z}\, b - (-d + 2 c s - c \nu) z - \frac{i \pi \nu}{2}\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (-d + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d + 2 c s - c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d + 2 i c s - i c \nu}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{2 (-d + 2 c s - c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d + 2 i c s - i c \nu}}\right) \sinh\left(\frac{b^2}{4 (-d + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right)\right) \Big/ (-i d + 2 i c s - i c \nu)^{3/2}\right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + d z + e\right) \sinh^{\nu}(c z)$

01.19.21.1554.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^{\nu}(c z)\, dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{d^2}{4 b} - e\right)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d - 2 c s + c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-d - 2 c s + c \nu)^2}{4 b} + e + \frac{i \pi \nu}{2}\right) - i \cosh\left(-\frac{(-d - 2 c s + c \nu)^2}{4 b} + e + \frac{i \pi \nu}{2}\right) S\left(\frac{-d - 2 c s + c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right)\right) + \frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d + 2 c s - c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-d + 2 c s - c \nu)^2}{4 b} + e - \frac{i \pi \nu}{2}\right) - i \cosh\left(-\frac{(-d + 2 c s - c \nu)^2}{4 b} + e - \frac{i \pi \nu}{2}\right) S\left(\frac{-d + 2 c s - c \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1555.01

$$\int \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^{\nu}(c z)\, dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i d} \cosh\left(\sqrt{z}\, b + e + d z\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 d} - e\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 d} - e\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(-2 \sqrt{-i d - 2 i c s + i c \nu} \cosh\left(\sqrt{z}\, b + e + \frac{i \pi \nu}{2} - (-d - 2 c s + c \nu) z\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (-d - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d - 2 c s + c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d - 2 i c s + i c \nu}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{2 (-d - 2 c s + c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d - 2 i c s + i c \nu}}\right) \sinh\left(\frac{b^2}{4 (-d - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2}\right)\right) \bigg/ (-i d - 2 i c s + i c \nu)^{3/2} + \left(-2 \sqrt{-i d + 2 i c s - i c \nu} \cosh\left(\sqrt{z}\, b + e - (-d + 2 c s - c \nu) z - \frac{i \pi \nu}{2}\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (-d + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d + 2 c s - c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d + 2 i c s - i c \nu}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{2 (-d + 2 c s - c \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{-i d + 2 i c s - i c \nu}}\right) \sinh\left(\frac{b^2}{4 (-d + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2}\right)\right) \bigg/ (-i d + 2 i c s - i c \nu)^{3/2} \right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r\right) \sinh^{\nu}(f z + g)$

01.19.21.1556.01

$$\int \sinh(b z^2) \sinh^\nu(g + f z)\, dz = -\frac{i^{1-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\sqrt{i b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{i b}} +$$
$$i^{\nu+1}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(-i \cosh\left(\frac{(2 f s - f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{2 f s - f \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) -\right.\right.$$
$$\left. C\left(\frac{2 f s - f \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{(2 f s - f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right)\right) +$$
$$\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-2 f s + f \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right) \sinh\left(-\frac{(f \nu - 2 f s)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) -\right.$$
$$\left.\left.\left. i \cosh\left(-\frac{(f \nu - 2 f s)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{-2 f s + f \nu - 2 b z}{\sqrt{-i b} \sqrt{2 \pi}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1557.01

$$\int \sinh\left(b \sqrt{z}\right) \sinh^\nu(g + f z)\, dz = -\frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(b \sqrt{z} \cosh\left(b \sqrt{z}\right) - \sinh\left(b \sqrt{z}\right)\right)}{b^2} +$$
$$\left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(-2 \sqrt{i f \nu - 2 i f s} \cosh\left(\sqrt{z}\, b + 2 g s - g \nu + \frac{i \pi \nu}{2} - (f \nu - 2 f s) z\right) +\right.\right.$$
$$b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right) S\left(\frac{2 (f \nu - 2 f s) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) +$$
$$\left. b\, i \sqrt{2 \pi}\, C\left(\frac{2 (f \nu - 2 f s) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) \sinh\left(\frac{b^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right)\right) +$$
$$\frac{1}{(2 i f s - i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s - i f \nu} \cosh\left(\sqrt{z}\, b - 2 g s + g \nu - (2 f s - f \nu) z - \frac{i \pi \nu}{2}\right) +\right.$$
$$b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 (2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right) S\left(\frac{2 (2 f s - f \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) +$$
$$\left.\left.\left. b\, i \sqrt{2 \pi}\, C\left(\frac{2 (2 f s - f \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) \sinh\left(\frac{b^2}{4 (2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + e\right) \sinh^\nu(f z + g)$

01.19.21.1558.01

$$\int \sinh\left(b z^2 + e\right) \sinh^{\nu}(g + f z)\, dz = -\frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cosh(e)\, S\left(\sqrt{i b} \sqrt{\frac{2}{\pi}}\, z\right) + i\, C\left(\sqrt{i b} \sqrt{\frac{2}{\pi}}\, z\right) \sinh(e) \right) \right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-2 f s + f \nu - 2 b z}{\sqrt{-i b} \sqrt{2\pi}} \right) \sinh\left(-\frac{(f \nu - 2 f s)^2}{4 b} + e + g(2 s - \nu) + \frac{i \pi \nu}{2} \right) - i \cosh\left(-\frac{(f \nu - 2 f s)^2}{4 b} + e + g(2 s - \nu) + \frac{i \pi \nu}{2} \right) S\left(\frac{-2 f s + f \nu - 2 b z}{\sqrt{-i b} \sqrt{2\pi}} \right) \right) + \frac{1}{\sqrt{-i b}} \left(C\left(\frac{2 f s - f \nu - 2 b z}{\sqrt{-i b} \sqrt{2\pi}} \right) \sinh\left(-\frac{(2 f s - f \nu)^2}{4 b} + e - g(2 s - \nu) - \frac{i \pi \nu}{2} \right) - i \cosh\left(-\frac{(2 f s - f \nu)^2}{4 b} + e - g(2 s - \nu) - \frac{i \pi \nu}{2} \right) S\left(\frac{2 f s - f \nu - 2 b z}{\sqrt{-i b} \sqrt{2\pi}} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.1559.01

$$\int \sinh\left(\sqrt{z}\, b + e\right) \sinh^{\nu}(g + f z)\, dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(b \sqrt{z} \cosh\left(\sqrt{z}\, b + e\right) - \sinh\left(\sqrt{z}\, b + e\right) \right)}{b^2} + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(-2 \sqrt{i f \nu - 2 i f s} \cosh\left(\sqrt{z}\, b + e + 2 g s - g \nu + \frac{i \pi \nu}{2} - (f \nu - 2 f s) z \right) + b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 (f \nu - 2 f s)} + e + 2 g s - g \nu + \frac{i \pi \nu}{2} \right) S\left(\frac{2 (f \nu - 2 f s) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{i f \nu - 2 i f s}} \right) + b\, i \sqrt{2\pi}\, C\left(\frac{2 (f \nu - 2 f s) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{i f \nu - 2 i f s}} \right) \sinh\left(\frac{b^2}{4 (f \nu - 2 f s)} + e + 2 g s - g \nu + \frac{i \pi \nu}{2} \right) \right) + \frac{1}{(2 i f s - i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s - i f \nu} \cosh\left(\sqrt{z}\, b + e - 2 g s + g \nu - (2 f s - f \nu) z - \frac{i \pi \nu}{2} \right) + b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 (2 f s - f \nu)} + e - 2 g s + g \nu - \frac{i \pi \nu}{2} \right) S\left(\frac{2 (2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{2 i f s - i f \nu}} \right) + b\, i \sqrt{2\pi}\, C\left(\frac{2 (2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{2 i f s - i f \nu}} \right) \sinh\left(\frac{b^2}{4 (2 f s - f \nu)} + e - 2 g s + g \nu - \frac{i \pi \nu}{2} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + d z\right) \sinh^{\nu}(f z + g)$

01.19.21.1560.01

$$\int \sinh\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = \frac{i^{1-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b}\right) S\left(\frac{d+2 b z}{\sqrt{i b}\, \sqrt{2\pi}}\right) - C\left(\frac{d+2 b z}{\sqrt{i b}\, \sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{i b}} + i^{\nu+1}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2\pi}}\right) \sinh\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) - i \cosh\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2\pi}}\right)\right) - \frac{1}{\sqrt{-i b}} \left(i \cosh\left(\frac{(-d + 2 f s - f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2\pi}}\right) + C\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2\pi}}\right) \sinh\left(\frac{(-d + 2 f s - f \nu)^2}{4 b} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1561.01

$$\int \sinh\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z)\, dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i d}\, \cosh\left(\sqrt{z}\, b + d z\right) + b \sqrt{2\pi}\, \cosh\left(\frac{b^2}{4 d}\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d}\, \sqrt{2\pi}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4 d}\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(-2 \sqrt{-i d - 2 i f s + i f \nu}\, \cosh\left(\sqrt{z}\, b + 2 g s - g \nu + \frac{i \pi \nu}{2} - (-d - 2 f s + f \nu) z\right) + b \sqrt{2\pi}\, \cosh\left(\frac{b^2}{4 (-d - 2 f s + f \nu)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d - 2 f s + f \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-i d - 2 i f s + i f \nu}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{2 (-d - 2 f s + f \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-i d - 2 i f s + i f \nu}}\right) \sinh\left(\frac{b^2}{4 (-d - 2 f s + f \nu)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right)\right) \Big/ (-i d - 2 i f s + i f \nu)^{3/2} + \left(-2 \sqrt{-i d + 2 i f s - i f \nu}\, \cosh\left(\sqrt{z}\, b - 2 g s + g \nu - (-d + 2 f s - f \nu) z - \frac{i \pi \nu}{2}\right) + b \sqrt{2\pi}\, \cosh\left(\frac{b^2}{4 (-d + 2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-d + 2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-i d + 2 i f s - i f \nu}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{2 (-d + 2 f s - f \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-i d + 2 i f s - i f \nu}}\right) \sinh\left(\frac{b^2}{4 (-d + 2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right)\right) \Big/ (-i d + 2 i f s - i f \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + d z + e) \sinh^\nu(f z + g)$

01.19.21.1562.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^\nu(g + f z)\, dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{i b}\, \sqrt{2 \pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{i b}\, \sqrt{2 \pi}}\right) \sinh\left(\frac{d^2}{4 b} - e\right)\right)\right) +$$

$$i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) - \right.\right.$$

$$\left. i \cosh\left(-\frac{(-d - 2 f s + f \nu)^2}{4 b} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{-d - 2 f s + f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2 \pi}}\right)\right) +$$

$$\frac{1}{\sqrt{-i b}} \left(C\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-d + 2 f s - f \nu)^2}{4 b} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) - \right.$$

$$\left.\left.\left. i \cosh\left(-\frac{(-d + 2 f s - f \nu)^2}{4 b} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) S\left(\frac{-d + 2 f s - f \nu - 2 b z}{\sqrt{-i b}\, \sqrt{2 \pi}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1563.01

$$\int \sinh\left(\sqrt{z}\, b+e+d\, z\right) \sinh^{\nu}(g+f\, z)\, dz = \frac{1}{(i\, d)^{3/2}} \left(i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(2\sqrt{i\, d}\, \cosh\left(\sqrt{z}\, b+e+d\, z\right)+b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, d}-e\right) S\left(\frac{b+2\, d\sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right)+ b\, i\sqrt{2\pi}\, C\left(\frac{b+2\, d\sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, d}-e\right)\right)\right)+ \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(-2\sqrt{-i\, d-2\, i\, f\, s+i\, f\, \nu}\, \cosh\left(\sqrt{z}\, b+e+2\, g\, s-g\, \nu+\frac{i\,\pi\,\nu}{2}-(-d-2\, f\, s+f\, \nu)\, z\right)+ b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, (-d-2\, f\, s+f\, \nu)}+e+2\, g\, s-g\, \nu+\frac{i\,\pi\,\nu}{2}\right) S\left(\frac{2\, (-d-2\, f\, s+f\, \nu)\sqrt{z}-b}{\sqrt{2\pi}\, \sqrt{-i\, d-2\, i\, f\, s+i\, f\, \nu}}\right)+ b\, i\sqrt{2\pi}\, C\left(\frac{2\, (-d-2\, f\, s+f\, \nu)\sqrt{z}-b}{\sqrt{2\pi}\, \sqrt{-i\, d-2\, i\, f\, s+i\, f\, \nu}}\right) \sinh\left(\frac{b^2}{4\, (-d-2\, f\, s+f\, \nu)}+e+2\, g\, s-g\, \nu+\frac{i\,\pi\,\nu}{2}\right)\right)\Big/ (-i\, d-2\, i\, f\, s+i\, f\, \nu)^{3/2}+\left(-2\sqrt{-i\, d+2\, i\, f\, s-i\, f\, \nu}\, \cosh\left(\sqrt{z}\, b+e-2\, g\, s+g\, \nu- (-d+2\, f\, s-f\, \nu)\, z-\frac{i\,\pi\,\nu}{2}\right)+b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, (-d+2\, f\, s-f\, \nu)}+e-2\, g\, s+g\, \nu-\frac{i\,\pi\,\nu}{2}\right) S\left(\frac{2\, (-d+2\, f\, s-f\, \nu)\sqrt{z}-b}{\sqrt{2\pi}\, \sqrt{-i\, d+2\, i\, f\, s-i\, f\, \nu}}\right)+b\, i\sqrt{2\pi}\, C\left(\frac{2\, (-d+2\, f\, s-f\, \nu)\sqrt{z}-b}{\sqrt{2\pi}\, \sqrt{-i\, d+2\, i\, f\, s-i\, f\, \nu}}\right) \sinh\left(\frac{b^2}{4\, (-d+2\, f\, s-f\, \nu)}+e-2\, g\, s+g\, \nu-\frac{i\,\pi\,\nu}{2}\right)\right)\Big/ (-i\, d+2\, i\, f\, s-i\, f\, \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(b\, z) \sinh^{\nu}(c\, z^r)$

01.19.21.1564.01

$$\int \sinh(b\, z) \sinh^{\nu}(c\, z^2)\, dz = \frac{i^{-\nu}\, 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \cosh(b\, z)}{b}+ i^{\nu+1}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{i\, c\, \nu-2\, i\, c\, s}} \left(\sinh\left(\frac{b^2}{4\, (c\, \nu-2\, c\, s)}+\frac{i\,\pi\,\nu}{2}\right) C\left(\frac{2\, (c\, \nu-2\, c\, s)\, z-b}{\sqrt{2\pi}\, \sqrt{i\, c\, \nu-2\, i\, c\, s}}\right)- i\, S\left(\frac{2\, (c\, \nu-2\, c\, s)\, z-b}{\sqrt{2\pi}\, \sqrt{i\, c\, \nu-2\, i\, c\, s}}\right) \cosh\left(\frac{b^2}{4\, (c\, \nu-2\, c\, s)}+\frac{i\,\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\, i\, c\, s-i\, c\, \nu}} \left(\sinh\left(\frac{b^2}{4\, (2\, c\, s-c\, \nu)}-\frac{i\,\pi\,\nu}{2}\right) C\left(\frac{2\, (2\, c\, s-c\, \nu)\, z-b}{\sqrt{2\pi}\, \sqrt{2\, i\, c\, s-i\, c\, \nu}}\right)-i\, S\left(\frac{2\, (2\, c\, s-c\, \nu)\, z-b}{\sqrt{2\pi}\, \sqrt{2\, i\, c\, s-i\, c\, \nu}}\right) \cosh\left(\frac{b^2}{4\, (2\, c\, s-c\, \nu)}-\frac{i\,\pi\,\nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1565.01

$$\int \sinh(b\,z)\sinh^{\nu}\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(b\,z)\,(1-\nu \bmod 2)}{b} + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\frac{1}{(-i\,b)^{3/2}}\Bigg(-2\sqrt{-i\,b}\,\cosh\left(\frac{i\,\pi\,\nu}{2}+b\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\,b-2\,c\,s+c\,\nu}{\sqrt{-i\,b}\,\sqrt{2\,\pi}}\right)\cosh\left(\frac{i\,\pi\,\nu}{2}-\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)+i\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\sqrt{z}\,b-2\,c\,s+c\,\nu}{\sqrt{-i\,b}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{i\,\pi\,\nu}{2}-\frac{(c\,\nu-2\,c\,s)^2}{4\,b}\right)\Bigg)+\frac{1}{(-i\,b)^{3/2}}\Bigg(-2\sqrt{-i\,b}\,\cosh\left(-\frac{1}{2}\,i\,\pi\,\nu+b\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)-\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\,b+2\,c\,s-c\,\nu}{\sqrt{-i\,b}\,\sqrt{2\,\pi}}\right)\cosh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}+\frac{i\,\pi\,\nu}{2}\right)-i\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{-2\sqrt{z}\,b+2\,c\,s-c\,\nu}{\sqrt{-i\,b}\,\sqrt{2\,\pi}}\right)\sinh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,b}+\frac{i\,\pi\,\nu}{2}\right)\Bigg)\Bigg)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\sinh(d\,z+e)\sinh^{\nu}(c\,z^r)$

01.19.21.1566.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(c\,z^2\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cosh(e+d\,z)}{d} + i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\Bigg(\sinh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-i\,S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cosh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+\frac{i\,\pi\,\nu}{2}\right)\Bigg)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\Bigg(\sinh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-i\,S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cosh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)\Bigg)\Bigg)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.1567.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(1-\nu \bmod 2)}{d} + \left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(e+\frac{i\,\pi\,\nu}{2}+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\cosh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e+\frac{i\,\pi\,\nu}{2}\right)+i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e+\frac{i\,\pi\,\nu}{2}\right)\right)+\frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(e-\frac{i\,\pi\,\nu}{2}+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\cosh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e-\frac{i\,\pi\,\nu}{2}\right)+i\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e-\frac{i\,\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sinh(a\,z^r)\sinh^{\nu}(c\,z^r)$

01.19.21.1568.01

$$\int \sinh(b\,z^r)\sinh^{\nu}(c\,z^r)\,dz = -\frac{i^{-\nu}\,2^{-\nu-1}\,z\binom{\nu}{\frac{\nu}{2}}\left((-b\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},-b\,z^r\right)-(b\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},b\,z^r\right)\right)(1-\nu \bmod 2)}{r} - \frac{2^{-\nu-1}\,z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{\nu}\,\Gamma\left(\frac{1}{r},(-b-2\,c\,s+c\,\nu)\,z^r\right)((-b-2\,c\,s+c\,\nu)\,z^r)^{-1/r}+(-1)^{\nu+1}\,((b-2\,c\,s+c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b-2\,c\,s+c\,\nu)\,z^r\right)+((-b+2\,c\,s-c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-b+2\,c\,s-c\,\nu)\,z^r\right)-((b+2\,c\,s-c\,\nu)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(b+2\,c\,s-c\,\nu)\,z^r\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1569.01

$$\int \sinh\left(b z^2\right) \sinh^{\nu}\left(c z^2\right) dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{\pi \nu}{2}\right) S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\; z\right) + C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\; z\right) \sin\left(\frac{\pi \nu}{2}\right)\right) \Big/\right.$$
$$\left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\; z\right) \cos\left(\frac{\pi \nu}{2}\right) - \right.$$
$$\left.\left.\sin\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\; z\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1570.01

$$\int \sinh\left(b \sqrt{z}\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz =$$
$$-\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sinh\left(b \sqrt{z}\right) - b \sqrt{z} \cosh\left(b \sqrt{z}\right)\right)}{b^2} - i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(c(\nu - 2s) - b)^2}\right.$$
$$\left((c(\nu-2s)-b)\sqrt{z} \cosh\left(\frac{i \pi \nu}{2} + (c(\nu-2s)-b)\sqrt{z}\right) - \sinh\left(\frac{i \pi \nu}{2} + (c(\nu-2s)-b)\sqrt{z}\right)\right) + \frac{1}{(b + c(\nu-2s))^2}$$
$$\left.\left((-b - c(\nu-2s))\sqrt{z} \cosh\left(\frac{i \pi \nu}{2} + (b + c(\nu-2s))\sqrt{z}\right) + \sinh\left(\frac{i \pi \nu}{2} + (b + c(\nu-2s))\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(a z^r + e\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.1571.01

$$\int \sinh(b z^r + e) \sinh^{\nu}(c z^r)\, dz = -\frac{i^{-\nu} 2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^e (-b z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, -b z^r\right) - e^{-e} (b z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, b z^r\right)\right) (1 - \nu \bmod 2)}{r} -$$
$$\frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} e^e\, \Gamma\left(\frac{1}{r}, (-b - 2 c s + c \nu) z^r\right) ((-b - 2 c s + c \nu) z^r)^{-1/r} + \right.$$
$$(-1)^{\nu+1} e^{-e} ((b - 2 c s + c \nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (b - 2 c s + c \nu) z^r\right) + e^e ((-b + 2 c s - c \nu) z^r)^{-1/r}$$
$$\left.\Gamma\left(\frac{1}{r}, (-b + 2 c s - c \nu) z^r\right) - e^{-e} ((b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (b + 2 c s - c \nu) z^r\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1572.01

$$\int \sinh\left(b z^2 + e\right) \sinh^{\nu}\left(c z^2\right) dz = \frac{i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh(e) S\left(\frac{b \sqrt{\frac{2}{\pi}} z}{\sqrt{i b}} \right) + C\left(\frac{b \sqrt{\frac{2}{\pi}} z}{\sqrt{i b}} \right) \sinh(e) \right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\, z \right) \cosh\left(e + \frac{i \pi \nu}{2} \right) - i \sinh\left(e + \frac{i \pi \nu}{2} \right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\, z \right) \right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu} \right) + \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\, z \right) \cosh\left(e - \frac{i \pi \nu}{2} \right) - i \sinh\left(e - \frac{i \pi \nu}{2} \right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\, z \right) \right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu} \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1573.01

$$\int \sinh\left(\sqrt{z}\, b + e\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sinh\left(\sqrt{z}\, b + e\right) - b \sqrt{z} \cosh\left(\sqrt{z}\, b + e\right) \right)}{b^2} - i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(c (\nu - 2 s) - b)^2} \left((c (\nu - 2 s) - b) \sqrt{z} \cosh\left(e - \frac{i \pi \nu}{2} - (c (\nu - 2 s) - b) \sqrt{z} \right) + \sinh\left(e - \frac{i \pi \nu}{2} - (c (\nu - 2 s) - b) \sqrt{z} \right) \right) + \frac{1}{(b + c (\nu - 2 s))^2} \left((-b - c (\nu - 2 s)) \sqrt{z} \cosh\left(e + \frac{i \pi \nu}{2} - (-b - c (\nu - 2 s)) \sqrt{z} \right) + \sinh\left(e + \frac{i \pi \nu}{2} - (-b - c (\nu - 2 s)) \sqrt{z} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + d z\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.1574.01

$$\int \sinh\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2\right) dz = \frac{i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b}\right) S\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) - C\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{i b}} + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(C\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \sinh\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4(-b - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right) S\left(\frac{2(-b - 2 c s + c \nu) z - d}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(C\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \sinh\left(\frac{d^2}{4(-b + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4(-b + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right) S\left(\frac{2(-b + 2 c s - c \nu) z - d}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1575.01

$$\int \sinh\left(\sqrt{z}\, b + d z\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i d} \cosh\left(\sqrt{z}\, b + d z\right) + b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 d}\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2\pi}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4 d}\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(-\frac{1}{2} i \pi \nu + d z - (-b + 2 c s - c \nu) \sqrt{z}\right) - \sqrt{2\pi} (-b + 2 c s - c \nu) \cosh\left(\frac{(-b + 2 c s - c \nu)^2}{4 d} + \frac{i \pi \nu}{2}\right) S\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) - i \sqrt{2\pi} (b - 2 c s + c \nu) C\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) \sinh\left(\frac{(-b + 2 c s - c \nu)^2}{4 d} + \frac{i \pi \nu}{2}\right)\right) + \frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(\frac{i \pi \nu}{2} + d z - (-b - 2 c s + c \nu) \sqrt{z}\right) - \sqrt{2\pi} (-b - 2 c s + c \nu) \cosh\left(\frac{i \pi \nu}{2} - \frac{(-b - 2 c s + c \nu)^2}{4 d}\right) S\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) + i \sqrt{2\pi} (b + 2 c s - c \nu) C\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) \sinh\left(\frac{i \pi \nu}{2} - \frac{(-b - 2 c s + c \nu)^2}{4 d}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + d z + e\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.1576.01

$$\int \sinh\left(b z^2+d z+e\right) \sinh^{\nu}\left(c z^2\right) dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b}-e\right) S\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) - C\left(\frac{d+2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 b}-e\right)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(C\left(\frac{2(-b-2 c s+c \nu) z-d}{\sqrt{2\pi} \sqrt{-i b-2 i c s+i c \nu}}\right) \sinh\left(\frac{d^2}{4(-b-2 c s+c \nu)}+e+\frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4(-b-2 c s+c \nu)}+e+\frac{i \pi \nu}{2}\right) S\left(\frac{2(-b-2 c s+c \nu) z-d}{\sqrt{2\pi} \sqrt{-i b-2 i c s+i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b-2 i c s+i c \nu}\right) + \left(C\left(\frac{2(-b+2 c s-c \nu) z-d}{\sqrt{2\pi} \sqrt{-i b+2 i c s-i c \nu}}\right) \sinh\left(\frac{d^2}{4(-b+2 c s-c \nu)}+e-\frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4(-b+2 c s-c \nu)}+e-\frac{i \pi \nu}{2}\right) S\left(\frac{2(-b+2 c s-c \nu) z-d}{\sqrt{2\pi} \sqrt{-i b+2 i c s-i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b+2 i c s-i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1577.01

$$\int \sinh\left(\sqrt{z}\, b+e+d z\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(2 \sqrt{i d} \cosh\left(\sqrt{z}\, b+e+d z\right) + b \sqrt{2\pi} \cosh\left(\frac{b^2}{4 d}-e\right) S\left(\frac{b+2 d \sqrt{z}}{\sqrt{i d} \sqrt{2\pi}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{b+2 d \sqrt{z}}{\sqrt{i d} \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4 d}-e\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(e+\frac{i \pi \nu}{2}+d z-(-b-2 c s+c \nu) \sqrt{z}\right) - \sqrt{2\pi} (-b-2 c s+c \nu) \cosh\left(-\frac{(-b-2 c s+c \nu)^2}{4 d}+e+\frac{i \pi \nu}{2}\right) S\left(\frac{-b-2 c s+c \nu-2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) + i \sqrt{2\pi} (b+2 c s-c \nu)\, C\left(\frac{-b-2 c s+c \nu-2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) \sinh\left(-\frac{(-b-2 c s+c \nu)^2}{4 d}+e+\frac{i \pi \nu}{2}\right)\right) + \frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(e+d z-(-b+2 c s-c \nu) \sqrt{z}-\frac{i \pi \nu}{2}\right) - \sqrt{2\pi} (-b+2 c s-c \nu) \cosh\left(-\frac{(-b+2 c s-c \nu)^2}{4 d}+e-\frac{i \pi \nu}{2}\right) S\left(\frac{-b+2 c s-c \nu-2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) + i \sqrt{2\pi} (b-2 c s+c \nu)\, C\left(\frac{-b+2 c s-c \nu-2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2\pi}}\right) \sinh\left(-\frac{(-b+2 c s-c \nu)^2}{4 d}+e-\frac{i \pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh(d z) \sinh^{\nu}\left(c z^r+g\right)$

01.19.21.1578.01

$$\int \sinh(d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cosh(d\,z)}{d} + i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\sinh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-i\,S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cosh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\sinh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-i\,S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cosh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.1579.01

$$\int \sinh(d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(d\,z)\,(1-\nu \bmod 2)}{d} + \left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\cosh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)+i\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)\right)+\frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)-\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\cosh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)+i\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\sinh(d\,z+e)\sinh^{\nu}\left(c\,z^r+g\right)$

01.19.21.1580.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cosh(e+d\,z)}{d} + i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\sinh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)- i\,S\left(\frac{2\,(c\,\nu-2\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cosh\left(\frac{d^2}{4\,(c\,\nu-2\,c\,s)}+e+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)\right)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\sinh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)- i\,S\left(\frac{2\,(2\,c\,s-c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cosh\left(\frac{d^2}{4\,(2\,c\,s-c\,\nu)}+e-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1581.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(1-\nu \bmod 2)}{d} + \left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}+d\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)- \sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\cosh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)+ i\,\sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,c\,s+c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,d}+e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)\right)+ \frac{1}{(-i\,d)^{3/2}}\left(-2\sqrt{-i\,d}\,\cosh\left(e-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}+d\,z-(2\,c\,s-c\,\nu)\sqrt{z}\right)- \sqrt{2\,\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\cosh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)+ i\,\sqrt{2\,\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,c\,s-c\,\nu}{\sqrt{-i\,d}\,\sqrt{2\,\pi}}\right)\sinh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,d}+e-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sinh\left(a\,z^r\right)\sinh^{\nu}\left(c\,z^r+g\right)$

01.19.21.1582.01

$$\int \sinh(b z^r) \sinh^v(c z^r + g)\, dz = -\frac{i^{-v} 2^{-v-1} z \binom{v}{\frac{v}{2}} \left((-b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -b z^r\right) - (b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, b z^r\right)\right) (1 - v \bmod 2)}{r} - \frac{2^{-v-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{2 g s - g v} \Gamma\left(\frac{1}{r}, (-b - 2 c s + c v) z^r\right) ((-b - 2 c s + c v) z^r)^{-1/r} + (-1)^{v+1} e^{2 g s - g v} ((b - 2 c s + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (b - 2 c s + c v) z^r\right) + e^{-2 g s + g v} ((-b + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + 2 c s - c v) z^r\right) - e^{-2 g s + g v} ((b + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (b + 2 c s - c v) z^r\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.1583.01

$$\int \sinh(b z^2) \sinh^v(c z^2 + g)\, dz = -\frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right) + i^{v+1} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c v}\, z\right) \cosh\left(g (2 s - v) + \frac{i \pi v}{2}\right) - i \sinh\left(g (2 s - v) + \frac{i \pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c v}\, z\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c v}\right) + \left(i S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c v}\, z\right) \sinh\left(-g (2 s - v) - \frac{1}{2} i \pi (v + 1)\right) - i \sinh\left(-g (2 s - v) - \frac{i \pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c v}\, z\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c v}\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.1584.01

$$\int \sinh\left(b \sqrt{z}\right) \sinh^v\left(\sqrt{z}\, c + g\right) dz = -\frac{i^{-v} 2^{1-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sinh\left(b \sqrt{z}\right) - b \sqrt{z} \cosh\left(b \sqrt{z}\right)\right)}{b^2} - i^{-v} 2^{1-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{(c (v - 2 s) - b)^2} \left((c (v - 2 s) - b) \sqrt{z} \cosh\left(\frac{i \pi v}{2} + g (v - 2 s) + (c (v - 2 s) - b) \sqrt{z}\right) - \sinh\left(\frac{i \pi v}{2} + g (v - 2 s) + (c (v - 2 s) - b) \sqrt{z}\right)\right) + \frac{1}{(b + c (v - 2 s))^2} \left((-b - c (v - 2 s)) \sqrt{z} \cosh\left(\frac{i \pi v}{2} + g (v - 2 s) + (b + c (v - 2 s)) \sqrt{z}\right) + \sinh\left(\frac{i \pi v}{2} + g (v - 2 s) + (b + c (v - 2 s)) \sqrt{z}\right)\right)\right) /; v \in \mathbb{N}^+$$

Involving $\sinh(a z^r + e) \sinh^v(c z^r + g)$

01.19.21.1585.01

$$\int \sinh(b z^r + e) \sinh^\nu(c z^r + g)\, dz = -\frac{i^{-\nu} 2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^e (-b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, -b z^r\right) - e^{-e} (b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, b z^r\right)\right) (1 - \nu \bmod 2)}{r} - \frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Big((-1)^\nu e^{e+2 g s-g \nu} \Gamma\left(\frac{1}{r}, (-b - 2 c s + c \nu) z^r\right) ((-b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^{\nu+1} e^{-e+2 g s-g \nu} ((b - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (b - 2 c s + c \nu) z^r\right) + e^{e-2 g s+g \nu} ((-b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b + 2 c s - c \nu) z^r\right) - e^{-e-2 g s+g \nu} ((b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (b + 2 c s - c \nu) z^r\right)\Big) /; \nu \in \mathbb{N}^+$$

01.19.21.1586.01

$$\int \sinh\left(b z^2 + e\right) \sinh^\nu\left(c z^2 + g\right) dz = \frac{i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh(e) S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right) + C\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right) \sinh(e)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\, z\right) \cosh\left(e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) - i \sinh\left(e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b - 2 i c s + i c \nu}\, z\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\, z\right) \cosh\left(e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) - i \sinh\left(e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-i b + 2 i c s - i c \nu}\, z\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\Bigg) /; \nu \in \mathbb{N}^+$$

01.19.21.1587.01

$$\int \sinh\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sinh\left(\sqrt{z}\, b + e\right) - b \sqrt{z} \cosh\left(\sqrt{z}\, b + e\right)\right)}{b^2} - i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\frac{1}{(c (\nu - 2 s) - b)^2} \left((c (\nu - 2 s) - b) \sqrt{z} \cosh\left(e - \frac{i \pi \nu}{2} - g (\nu - 2 s) - (c (\nu - 2 s) - b) \sqrt{z}\right) + \sinh\left(e - \frac{i \pi \nu}{2} - g (\nu - 2 s) - (c (\nu - 2 s) - b) \sqrt{z}\right)\right) + \frac{1}{(b + c (\nu - 2 s))^2} \left((-b - c (\nu - 2 s)) \sqrt{z} \cosh\left(e + \frac{i \pi \nu}{2} + g (\nu - 2 s) - (-b - c (\nu - 2 s)) \sqrt{z}\right) + \sinh\left(e + \frac{i \pi \nu}{2} + g (\nu - 2 s) - (-b - c (\nu - 2 s)) \sqrt{z}\right)\right)\Bigg) /; \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + d z)\sinh^\nu(c z^r + g)$

01.19.21.1588.01

$$\int \sinh(b z^2 + d z)\sinh^\nu(c z^2 + g)\,dz = \frac{i^{1-\nu}\, 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(i\cosh\left(\frac{d^2}{4b}\right)S\left(\frac{d+2bz}{\sqrt{ib}\sqrt{2\pi}}\right) - C\left(\frac{d+2bz}{\sqrt{ib}\sqrt{2\pi}}\right)\sinh\left(\frac{d^2}{4b}\right)\right)}{\sqrt{ib}} + i^{\nu+1}\, 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(C\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-ib-2ics+ic\nu}}\right)\sinh\left(\frac{d^2}{4(-b-2cs+c\nu)} + g(2s-\nu) + \frac{i\pi\nu}{2}\right) - i\cosh\left(\frac{d^2}{4(-b-2cs+c\nu)} + g(2s-\nu) + \frac{i\pi\nu}{2}\right)S\left(\frac{2(-b-2cs+c\nu)z-d}{\sqrt{2\pi}\sqrt{-ib-2ics+ic\nu}}\right)\right)\Big/\left(\sqrt{-ib-2ics+ic\nu}\right) + \left(C\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-ib+2ics-ic\nu}}\right)\sinh\left(\frac{d^2}{4(-b+2cs-c\nu)} - g(2s-\nu) - \frac{i\pi\nu}{2}\right) - i\cosh\left(\frac{d^2}{4(-b+2cs-c\nu)} - g(2s-\nu) - \frac{i\pi\nu}{2}\right)S\left(\frac{2(-b+2cs-c\nu)z-d}{\sqrt{2\pi}\sqrt{-ib+2ics-ic\nu}}\right)\right)\Big/\left(\sqrt{-ib+2ics-ic\nu}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1589.01

$$\int \sinh(\sqrt{z}\, b + d z)\sinh^\nu(\sqrt{z}\, c + g)\,dz = \frac{1}{(id)^{3/2}}\left(i^{1-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(2\sqrt{id}\cosh(\sqrt{z}\, b + d z) + b\sqrt{2\pi}\cosh\left(\frac{b^2}{4d}\right)S\left(\frac{b+2d\sqrt{z}}{\sqrt{id}\sqrt{2\pi}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{b+2d\sqrt{z}}{\sqrt{id}\sqrt{2\pi}}\right)\sinh\left(\frac{b^2}{4d}\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-id)^{3/2}}\left(-2\sqrt{-id}\cosh\left(2gs - g\nu + \frac{i\pi\nu}{2} + dz - (-b-2cs+c\nu)\sqrt{z}\right) - \sqrt{2\pi}(-b-2cs+c\nu)\cosh\left(-\frac{(-b-2cs+c\nu)^2}{4d} + 2gs - g\nu + \frac{i\pi\nu}{2}\right)S\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right) + i\sqrt{2\pi}(b+2cs-c\nu)C\left(\frac{-b-2cs+c\nu-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)\sinh\left(-\frac{(-b-2cs+c\nu)^2}{4d} + 2gs - g\nu + \frac{i\pi\nu}{2}\right)\right) + \frac{1}{(-id)^{3/2}}\left(-2\sqrt{-id}\cosh\left(-2gs + g\nu + dz - (-b+2cs-c\nu)\sqrt{z} - \frac{i\pi\nu}{2}\right) - \sqrt{2\pi}(-b+2cs-c\nu)\cosh\left(-\frac{(-b+2cs-c\nu)^2}{4d} - 2gs + g\nu - \frac{i\pi\nu}{2}\right)S\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right) + i\sqrt{2\pi}(b-2cs+c\nu)C\left(\frac{-b+2cs-c\nu-2d\sqrt{z}}{\sqrt{-id}\sqrt{2\pi}}\right)\sinh\left(-\frac{(-b+2cs-c\nu)^2}{4d} - 2gs + g\nu - \frac{i\pi\nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + d z + e)\sinh^\nu(c z^r + g)$

01.19.21.1590.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + g\right) dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{d^2}{4 b} - e\right)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(C\left(\frac{2 (-b - 2 c s + c \nu) z - d}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \sinh\left(\frac{d^2}{4 (-b - 2 c s + c \nu)} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4 (-b - 2 c s + c \nu)} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-b - 2 c s + c \nu) z - d}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(C\left(\frac{2 (-b + 2 c s - c \nu) z - d}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \sinh\left(\frac{d^2}{4 (-b + 2 c s - c \nu)} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) - i \cosh\left(\frac{d^2}{4 (-b + 2 c s - c \nu)} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) S\left(\frac{2 (-b + 2 c s - c \nu) z - d}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1591.01

$$\int \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g\right) dz = \frac{1}{(i d)^{3/2}} \left(i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i d} \cosh\left(\sqrt{z}\, b + e + d z\right) + b \sqrt{2 \pi} \cosh\left(\frac{b^2}{4 d} - e\right) S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) + b\, i \sqrt{2 \pi}\, C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{i d} \sqrt{2 \pi}}\right) \sinh\left(\frac{b^2}{4 d} - e\right)\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(e + 2 g s - g \nu + \frac{i \pi \nu}{2} + d z - (-b - 2 c s + c \nu) \sqrt{z}\right) - \sqrt{2 \pi} (-b - 2 c s + c \nu) \cosh\left(-\frac{(-b - 2 c s + c \nu)^2}{4 d} + e + 2 g s - g \nu + \frac{i \pi \nu}{2}\right) S\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2 \pi}}\right) + i \sqrt{2 \pi} (b + 2 c s - c \nu)\, C\left(\frac{-b - 2 c s + c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-b - 2 c s + c \nu)^2}{4 d} + e + 2 g s - g \nu + \frac{i \pi \nu}{2}\right)\right) + \frac{1}{(-i d)^{3/2}} \left(-2 \sqrt{-i d} \cosh\left(e - 2 g s + g \nu + d z - (-b + 2 c s - c \nu) \sqrt{z} - \frac{i \pi \nu}{2}\right) - \sqrt{2 \pi} (-b + 2 c s - c \nu) \cosh\left(-\frac{(-b + 2 c s - c \nu)^2}{4 d} + e - 2 g s + g \nu - \frac{i \pi \nu}{2}\right) S\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2 \pi}}\right) + i \sqrt{2 \pi} (b - 2 c s + c \nu)\, C\left(\frac{-b + 2 c s - c \nu - 2 d \sqrt{z}}{\sqrt{-i d} \sqrt{2 \pi}}\right) \sinh\left(-\frac{(-b + 2 c s - c \nu)^2}{4 d} + e - 2 g s + g \nu - \frac{i \pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh(d z) \sinh^{\nu}\left(c z^r + f z\right)$

01.19.21.1592.01

$$\int \sinh(d\,z)\sinh^{\nu}\left(c\,z^2+f\,z\right)dz = i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sinh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)-\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(d\,z)\,(\nu\bmod 2-1)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1593.01

$$\int \sinh(d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(d\,z)\,(1-\nu\bmod 2)}{d}+\left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(-2\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}\cosh\left(\frac{i\,\pi\,\nu}{2}-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cosh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\right)+i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\right)\sinh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+\frac{i\,\pi\,\nu}{2}\right)\right)\Big/(-i\,d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(-2\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}\cosh\left(\frac{i\,\pi\,\nu}{2}+(-d+2\,f\,s-f\,\nu)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cosh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)+i\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)\sinh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}-\frac{i\,\pi\,\nu}{2}\right)\right)\Big/(-i\,d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sinh(d\,z+e)\sinh^{\nu}\left(c\,z^r+f\,z\right)$

01.19.21.1594.01

$$\int \sinh(e+d\,z)\sinh^{\nu}(c\,z^2+f\,z)\,dz = i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sinh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)-\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(\nu\bmod 2-1)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1595.01

$$\int \sinh(e+d\,z)\sinh^{\nu}(\sqrt{z}\,c+f\,z)\,dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(1-\nu\bmod 2)}{d}+\left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(-2\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}\cosh\left(e+\frac{i\,\pi\,\nu}{2}-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cosh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\right)+i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\right)\sinh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+\frac{i\,\pi\,\nu}{2}\right)\right)\Big/(-i\,d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(-2\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}\cosh\left(e-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right)-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cosh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)+i\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)\sinh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-\frac{i\,\pi\,\nu}{2}\right)\right)\Big/(-i\,d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sinh(b\,z^r)\sinh^{\nu}(c\,z^r+f\,z)$

01.19.21.1596.01

$$\int \sinh\left(b z^2\right) \sinh^\nu\left(c z^2 + f z\right) dz = -\frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right) + i^{\nu+1}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\sinh\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right) C\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) - i\, S\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \cosh\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(\sinh\left(\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right) C\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) - i\, S\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \cosh\left(\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} - \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1597.01

$$\int \sinh\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = -\frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(b \sqrt{z} \cosh\left(b \sqrt{z}\right) - \sinh\left(b \sqrt{z}\right)\right)}{b^2} + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(-2 \sqrt{i f \nu - 2 i f s} \cosh\left(\frac{i \pi \nu}{2} - (f \nu - 2 f s) z - (-b - 2 c s + c \nu) \sqrt{z}\right) - \sqrt{2 \pi}\, (-b - 2 c s + c \nu)\, S\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) \cosh\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + \frac{i \pi \nu}{2}\right) + i \sqrt{2 \pi}\, (b + 2 c s - c \nu)\, C\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) \sinh\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + \frac{i \pi \nu}{2}\right)\right) + \frac{1}{(2 i f s - i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s - i f \nu} \cosh\left(-\frac{1}{2} i \pi \nu - (2 f s - f \nu) z - (-b + 2 c s - c \nu) \sqrt{z}\right) - \sqrt{2 \pi}\, (-b + 2 c s - c \nu)\, S\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) \cosh\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - \frac{i \pi \nu}{2}\right) + i \sqrt{2 \pi}\, (b - 2 c s + c \nu)\, C\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) \sinh\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - \frac{i \pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b z^r + e\right) \sinh^\nu\left(c z^r + f z\right)$

01.19.21.1598.01

$$\int \sinh(b z^2 + e) \sinh^\nu(c z^2 + f z) \, dz = \frac{i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh(e) S\left(\frac{b \sqrt{\frac{2}{\pi}} z}{\sqrt{i b}} \right) + C\left(\frac{b \sqrt{\frac{2}{\pi}} z}{\sqrt{i b}} \right) \sinh(e) \right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\sinh\left(\frac{(f \nu - 2 f s)^2}{4(-b - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2} \right) C\left(\frac{-2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}} \right) - i S\left(\frac{-2 f s + f \nu + 2(-b - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}} \right) \cosh\left(\frac{(f \nu - 2 f s)^2}{4(-b - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2} \right) \right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu} \right) + \left(\sinh\left(\frac{(2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2} \right) C\left(\frac{2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}} \right) - i S\left(\frac{2 f s - f \nu + 2(-b + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}} \right) \cosh\left(\frac{(2 f s - f \nu)^2}{4(-b + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2} \right) \right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu} \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.1599.01

$$\int \sinh(\sqrt{z} \, b + e) \sinh^\nu(\sqrt{z} \, c + f z) \, dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(b \sqrt{z} \cosh(\sqrt{z} \, b + e) - \sinh(\sqrt{z} \, b + e) \right)}{b^2} + \left(\frac{i}{2} \right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(-2 \sqrt{i f \nu - 2 i f s} \cosh\left(e + \frac{i \pi \nu}{2} - (f \nu - 2 f s) z - (-b - 2 c s + c \nu) \sqrt{z} \right) - \sqrt{2\pi} (-b - 2 c s + c \nu) S\left(\frac{-b - 2 c s + c \nu + 2(f \nu - 2 f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i f \nu - 2 i f s}} \right) \cosh\left(\frac{(-b - 2 c s + c \nu)^2}{4(f \nu - 2 f s)} + e + \frac{i \pi \nu}{2} \right) + i \sqrt{2\pi} (b + 2 c s - c \nu) C\left(\frac{-b - 2 c s + c \nu + 2(f \nu - 2 f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i f \nu - 2 i f s}} \right) \sinh\left(\frac{(-b - 2 c s + c \nu)^2}{4(f \nu - 2 f s)} + e + \frac{i \pi \nu}{2} \right) \right) + \frac{1}{(2 i f s - i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s - i f \nu} \cosh\left(e - \frac{i \pi \nu}{2} - (2 f s - f \nu) z - (-b + 2 c s - c \nu) \sqrt{z} \right) - \sqrt{2\pi} (-b + 2 c s - c \nu) S\left(\frac{-b + 2 c s - c \nu + 2(2 f s - f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s - i f \nu}} \right) \cosh\left(\frac{(-b + 2 c s - c \nu)^2}{4(2 f s - f \nu)} + e - \frac{i \pi \nu}{2} \right) + i \sqrt{2\pi} (b - 2 c s + c \nu) C\left(\frac{-b + 2 c s - c \nu + 2(2 f s - f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s - i f \nu}} \right) \sinh\left(\frac{(-b + 2 c s - c \nu)^2}{4(2 f s - f \nu)} + e - \frac{i \pi \nu}{2} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + d z) \sinh^v(c z^r + f z)$

01.19.21.1600.01

$$\int \sinh(b z^2 + d z) \sinh^v(c z^2 + f z) \, dz = \frac{i^{1-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(i \cosh\left(\frac{d^2}{4b}\right) S\left(\frac{d+2bz}{\sqrt{ib} \sqrt{2\pi}}\right) - C\left(\frac{d+2bz}{\sqrt{ib}\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4b}\right)\right)}{\sqrt{ib}} +$$

$$i^{v+1} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(\left(\sinh\left(\frac{(-d-2fs+fv)^2}{4(-b-2cs+cv)} + \frac{i\pi v}{2} \right) C\left(\frac{-d-2fs+fv+2(-b-2cs+cv)z}{\sqrt{2\pi}\sqrt{-ib-2ics+icv}} \right) - \right.\right.\right.$$

$$\left. i S\left(\frac{-d-2fs+fv+2(-b-2cs+cv)z}{\sqrt{2\pi}\sqrt{-ib-2ics+icv}} \right) \cosh\left(\frac{(-d-2fs+fv)^2}{4(-b-2cs+cv)} + \frac{i\pi v}{2} \right) \right) \Big/ \left(\sqrt{-ib-2ics+icv} \right) +$$

$$\left(\sinh\left(\frac{(-d+2fs-fv)^2}{4(-b+2cs-cv)} - \frac{i\pi v}{2} \right) C\left(\frac{-d+2fs-fv+2(-b+2cs-cv)z}{\sqrt{2\pi}\sqrt{-ib+2ics-icv}} \right) - \right.$$

$$i S\left(\frac{-d+2fs-fv+2(-b+2cs-cv)z}{\sqrt{2\pi}\sqrt{-ib+2ics-icv}} \right)$$

$$\left.\left. \cosh\left(\frac{(-d+2fs-fv)^2}{4(-b+2cs-cv)} - \frac{i\pi v}{2} \right) \right) \Big/ \left(\sqrt{-ib+2ics-icv} \right) \right) /; v \in \mathbb{N}^+$$

01.19.21.1601.01

$$\int \sinh\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, d)^{3/2}} \left(i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2 \sqrt{i\, d}\, \cosh\left(\sqrt{z}\, b + d\, z\right) + b \sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, d}\right) S\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right) + b\, i \sqrt{2\pi}\, C\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, d}\right)\right) + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(-2 \sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}\, \cosh\left(\frac{i\, \pi\, \nu}{2} - (-d - 2\, f\, s + f\, \nu)\, z - (-b - 2\, c\, s + c\, \nu) \sqrt{z}\right) - \sqrt{2\pi}\, (-b - 2\, c\, s + c\, \nu)\, S\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cosh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + \frac{i\, \pi\, \nu}{2}\right) + i \sqrt{2\pi}\, (b + 2\, c\, s - c\, \nu)\, C\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right) \sinh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + \frac{i\, \pi\, \nu}{2}\right)\right) \Big/ (-i\, d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(-2 \sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}\, \cosh\left(-\frac{1}{2}\, i\, \pi\, \nu - (-d + 2\, f\, s - f\, \nu)\, z - (-b + 2\, c\, s - c\, \nu) \sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, c\, s - c\, \nu)\, S\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cosh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} - \frac{i\, \pi\, \nu}{2}\right) + i \sqrt{2\pi}\, (b - 2\, c\, s + c\, \nu)\, C\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sinh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} - \frac{i\, \pi\, \nu}{2}\right)\right) \Big/ (-i\, d + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b\, z^r + d\, z + e\right) \sinh^{\nu}\left(c\, z^r + f\, z\right)$

01.19.21.1602.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z\right) dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4 b} - e\right)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\sinh\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2}\right) C\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) - i S\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \cosh\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(\sinh\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2}\right) C\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) - i S\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \cosh\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1603.01

$$\int \sinh\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{(i\, d)^{3/2}} \left(i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{i\, d}\, \cosh\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, d} - e\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{i\, d}\, \sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, d} - e\right)\right)\right) +$$

$$\left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\Bigg(-2\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}\, \cosh\left(e + \frac{i\, \pi\, \nu}{2} - (-d - 2\, f\, s + f\, \nu)\, z - (-b - 2\, c\, s + c\, \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (-b - 2\, c\, s + c\, \nu)\, S\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cosh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + e + \frac{i\, \pi\, \nu}{2}\right) + i\sqrt{2\pi}\, (b + 2\, c\, s - c\, \nu)\, C\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right) \sinh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + e + \frac{i\, \pi\, \nu}{2}\right) \Bigg) \Big/ (-i\, d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} +$$

$$\Bigg(-2\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}\, \cosh\left(e - \frac{i\, \pi\, \nu}{2} - (-d + 2\, f\, s - f\, \nu)\, z - (-b + 2\, c\, s - c\, \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, c\, s - c\, \nu)\, S\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cosh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} + e - \frac{i\, \pi\, \nu}{2}\right) + i\sqrt{2\pi}\, (b - 2\, c\, s + c\, \nu)\, C\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sinh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} + e - \frac{i\, \pi\, \nu}{2}\right) \Bigg) \Big/ (-i\, d + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \Bigg) /;\, \nu \in \mathbb{N}^+$$

Involving $\sinh(d\, z)\, \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.1604.01

$$\int \sinh(d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sinh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)-i\cosh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)-\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(d\,z)\,(\nu\bmod 2-1)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1605.01

$$\int \sinh(d z)\sinh^{\nu}\left(\sqrt{z}\, c+g+f z\right) dz = \frac{i^{-\nu}\, 2^{-\nu} \binom{\nu}{\frac{\nu}{2}} \cosh(d z)\,(1-\nu \bmod 2)}{d} + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\Bigg(\Bigg(-2\sqrt{-i d-2 i f s+i f \nu}\, \cosh\left(2 g s-g \nu+\frac{i \pi \nu}{2}-(-d-2 f s+f \nu) z-(c \nu-2 c s)\sqrt{z}\right) - \sqrt{2\pi}\,(c \nu-2 c s) \cosh\left(\frac{(c \nu-2 c s)^2}{4(-d-2 f s+f \nu)}+2 g s-g \nu+\frac{i \pi \nu}{2}\right) S\left(\frac{-2 c s+c \nu+2(-d-2 f s+f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i d-2 i f s+i f \nu}}\right) + i\sqrt{2\pi}\,(2 c s-c \nu)\, C\left(\frac{-2 c s+c \nu+2(-d-2 f s+f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i d-2 i f s+i f \nu}}\right) \sinh\left(\frac{(c \nu-2 c s)^2}{4(-d-2 f s+f \nu)}+2 g s-g \nu+\frac{i \pi \nu}{2}\right)\Bigg)\Bigg/ (-i d-2 i f s+i f \nu)^{3/2} + \Bigg(-2\sqrt{-i d+2 i f s-i f \nu}\, \cosh\left(-2 g s+g \nu-(-d+2 f s-f \nu) z-(2 c s-c \nu)\sqrt{z}-\frac{i \pi \nu}{2}\right) - \sqrt{2\pi}\,(2 c s-c \nu) \cosh\left(\frac{(2 c s-c \nu)^2}{4(-d+2 f s-f \nu)}-2 g s+g \nu-\frac{i \pi \nu}{2}\right) S\left(\frac{2 c s-c \nu+2(-d+2 f s-f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i d+2 i f s-i f \nu}}\right) + i\sqrt{2\pi}\,(c \nu-2 c s)\, C\left(\frac{2 c s-c \nu+2(-d+2 f s-f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i d+2 i f s-i f \nu}}\right) \sinh\left(\frac{(2 c s-c \nu)^2}{4(-d+2 f s-f \nu)}-2 g s+g \nu-\frac{i \pi \nu}{2}\right)\Bigg)\Bigg/ (-i d+2 i f s-i f \nu)^{3/2}\Bigg) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(d z+e)\sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.1606.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = i^{\nu+1}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(C\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)-\right.\right.$$
$$\left.i\cosh\left(\frac{(-d-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e+g\,(2\,s-\nu)+\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(C\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sinh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)-\right.$$
$$\left.\left.i\cosh\left(\frac{(-d+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e-g\,(2\,s-\nu)-\frac{i\,\pi\,\nu}{2}\right)S\left(\frac{-d+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)-$$
$$\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(\nu\bmod 2-1)}{d}\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1607.01

$$\int \sinh(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g+f\,z\right)dz = \frac{i^{-\nu}\,2^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cosh(e+d\,z)\,(1-\nu \bmod 2)}{d}+$$

$$\left(\frac{i}{2}\right)^{\nu+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\Bigg(\Bigg(-2\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}\;\cosh\left(e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}-(-d-2\,f\,s+f\,\nu)\,z-(c\,\nu-2\,c\,s)\sqrt{z}\right)-$$

$$\sqrt{2\pi}\;(c\,\nu-2\,c\,s)\cosh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)S\Bigg($$

$$\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\Bigg)+i\sqrt{2\pi}\;(2\,c\,s-c\,\nu)\,C\left(\frac{-2\,c\,s+c\,\nu+2\,(-d-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-i\,d-2\,i\,f\,s+i\,f\,\nu}}\right)$$

$$\sinh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(-d-2\,f\,s+f\,\nu)}+e+2\,g\,s-g\,\nu+\frac{i\,\pi\,\nu}{2}\right)\Bigg)\Bigg/(-i\,d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+$$

$$\Bigg(-2\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}\;\cosh\left(e-2\,g\,s+g\,\nu-(-d+2\,f\,s-f\,\nu)\,z-(2\,c\,s-c\,\nu)\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right)-$$

$$\sqrt{2\pi}\;(2\,c\,s-c\,\nu)\cosh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)$$

$$S\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)+i\sqrt{2\pi}\;(c\,\nu-2\,c\,s)\,C\left(\frac{2\,c\,s-c\,\nu+2\,(-d+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\;\sqrt{-i\,d+2\,i\,f\,s-i\,f\,\nu}}\right)$$

$$\sinh\left(\frac{(2\,c\,s-c\,\nu)^2}{4\,(-d+2\,f\,s-f\,\nu)}+e-2\,g\,s+g\,\nu-\frac{i\,\pi\,\nu}{2}\right)\Bigg)\Bigg/(-i\,d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sinh\left(b\,z^r\right)\sinh^{\nu}\left(c\,z^r+f\,z+g\right)$

01.19.21.1608.01

$$\int \sinh\left(b z^2\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}}\right)}{\sqrt{i b}} + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-i b - 2 i c s + i c \nu}} \left(\sinh\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) C\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) - i\, S\left(\frac{-2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \cosh\left(\frac{(f \nu - 2 f s)^2}{4 (-b - 2 c s + c \nu)} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right)\right) - \frac{1}{\sqrt{-i b + 2 i c s - i c \nu}} \left(i \cosh\left(-\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) S\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) + C\left(\frac{2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \sinh\left(-\frac{(2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + g (2 s - \nu) + \frac{i \pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1609.01

$$\int \sinh\left(b \sqrt{z}\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f z\right) dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(b \sqrt{z} \cosh\left(b \sqrt{z}\right) - \sinh\left(b \sqrt{z}\right)\right)}{b^2} + \left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(-2 \sqrt{i f \nu - 2 i f s} \cosh\left(2 g s - g \nu + \frac{i \pi \nu}{2} - (f \nu - 2 f s) z - (-b - 2 c s + c \nu) \sqrt{z}\right) - \sqrt{2 \pi} (-b - 2 c s + c \nu)\, S\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) \cosh\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right) + i \sqrt{2 \pi} (b + 2 c s - c \nu)\, C\left(\frac{-b - 2 c s + c \nu + 2 (f \nu - 2 f s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i f \nu - 2 i f s}}\right) \sinh\left(\frac{(-b - 2 c s + c \nu)^2}{4 (f \nu - 2 f s)} + 2 g s - g \nu + \frac{i \pi \nu}{2}\right)\right) + \frac{1}{(2 i f s - i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s - i f \nu} \cosh\left(-2 g s + g \nu - \frac{i \pi \nu}{2} - (2 f s - f \nu) z - (-b + 2 c s - c \nu) \sqrt{z}\right) - \sqrt{2 \pi} (-b + 2 c s - c \nu)\, S\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) \cosh\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right) + i \sqrt{2 \pi} (b - 2 c s + c \nu)\, C\left(\frac{-b + 2 c s - c \nu + 2 (2 f s - f \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2 i f s - i f \nu}}\right) \sinh\left(\frac{(-b + 2 c s - c \nu)^2}{4 (2 f s - f \nu)} - 2 g s + g \nu - \frac{i \pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh(b z^r + e) \sinh^v(c z^r + f z + g)$

01.19.21.1610.01

$$\int \sinh(b z^2 + e) \sinh^v(c z^2 + f z + g)\, dz = \frac{i^{1-v} 2^{-v-\frac{1}{2}} \sqrt{\pi}}{\sqrt{i b}} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(i \cosh(e) S\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}} \right) + C\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b}} \right) \sinh(e) \right) + i^{v+1} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(\sinh\left(\frac{(f v - 2 f s)^2}{4(-b - 2 c s + c v)} + e + g(2 s - v) + \frac{i \pi v}{2} \right) C\left(\frac{-2 f s + f v + 2(-b - 2 c s + c v) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c v}} \right) - i\, S\left(\frac{-2 f s + f v + 2(-b - 2 c s + c v) z}{\sqrt{2\pi} \sqrt{-i b - 2 i c s + i c v}} \right) \cosh\left(\frac{(f v - 2 f s)^2}{4(-b - 2 c s + c v)} + e + g(2 s - v) + \frac{i \pi v}{2} \right) \right) \Big/ \left(\sqrt{-i b - 2 i c s + i c v} \right) + \left(\sinh\left(\frac{(2 f s - f v)^2}{4(-b + 2 c s - c v)} + e - g(2 s - v) - \frac{i \pi v}{2} \right) C\left(\frac{2 f s - f v + 2(-b + 2 c s - c v) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c v}} \right) - i\, S\left(\frac{2 f s - f v + 2(-b + 2 c s - c v) z}{\sqrt{2\pi} \sqrt{-i b + 2 i c s - i c v}} \right) \cosh\left(\frac{(2 f s - f v)^2}{4(-b + 2 c s - c v)} + e - g(2 s - v) - \frac{i \pi v}{2} \right) \right) \Big/ \left(\sqrt{-i b + 2 i c s - i c v} \right) \right) /;\ v \in \mathbb{N}^+$$

01.19.21.1611.01

$$\int \sinh\left(\sqrt{z}\, b+e\right) \sinh^{v}\left(\sqrt{z}\, c+g+f\, z\right) dz = -\frac{i^{-v}\, 2^{1-v} \binom{v}{\frac{v}{2}} (v \bmod 2-1) \left(b \sqrt{z} \cosh\left(\sqrt{z}\, b+e\right)-\sinh\left(\sqrt{z}\, b+e\right)\right)}{b^2} + \left(\frac{i}{2}\right)^{v+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s}$$

$$\left(\frac{1}{(i\, f\, v-2\, i\, f\, s)^{3/2}} \left(-2 \sqrt{i\, f\, v-2\, i\, f\, s} \cosh\left(e+2\, g\, s-g\, v+\frac{i\, \pi\, v}{2}-(f\, v-2\, f\, s)\, z-(-b-2\, c\, s+c\, v) \sqrt{z}\right)-\right.\right.$$

$$\sqrt{2\pi}\, (-b-2\, c\, s+c\, v)\, S\left(\frac{-b-2\, c\, s+c\, v+2\, (f\, v-2\, f\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i\, f\, v-2\, i\, f\, s}}\right)$$

$$\cosh\left(\frac{(-b-2\, c\, s+c\, v)^2}{4\, (f\, v-2\, f\, s)}+e+2\, g\, s-g\, v+\frac{i\, \pi\, v}{2}\right)+i \sqrt{2\pi}\, (b+2\, c\, s-c\, v)$$

$$\left. C\left(\frac{-b-2\, c\, s+c\, v+2\, (f\, v-2\, f\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i\, f\, v-2\, i\, f\, s}}\right) \sinh\left(\frac{(-b-2\, c\, s+c\, v)^2}{4\, (f\, v-2\, f\, s)}+e+2\, g\, s-g\, v+\frac{i\, \pi\, v}{2}\right)\right)+$$

$$\frac{1}{(2\, i\, f\, s-i\, f\, v)^{3/2}} \left(-2 \sqrt{2\, i\, f\, s-i\, f\, v} \cosh\left(e-2\, g\, s+g\, v-\frac{i\, \pi\, v}{2}-(2\, f\, s-f\, v)\, z-(-b+2\, c\, s-c\, v) \sqrt{z}\right)-\right.$$

$$\sqrt{2\pi}\, (-b+2\, c\, s-c\, v)\, S\left(\frac{-b+2\, c\, s-c\, v+2\, (2\, f\, s-f\, v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, i\, f\, s-i\, f\, v}}\right)$$

$$\cosh\left(\frac{(-b+2\, c\, s-c\, v)^2}{4\, (2\, f\, s-f\, v)}+e-2\, g\, s+g\, v-\frac{i\, \pi\, v}{2}\right)+i \sqrt{2\pi}\, (b-2\, c\, s+c\, v)$$

$$\left.\left. C\left(\frac{-b+2\, c\, s-c\, v+2\, (2\, f\, s-f\, v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, i\, f\, s-i\, f\, v}}\right) \sinh\left(\frac{(-b+2\, c\, s-c\, v)^2}{4\, (2\, f\, s-f\, v)}+e-2\, g\, s+g\, v-\frac{i\, \pi\, v}{2}\right)\right)\right) /;\, v \in \mathbb{N}^+$$

Involving $\sinh\left(b\, z^r+d\, z\right) \sinh^{v}\left(c\, z^r+f\, z+g\right)$

01.19.21.1612.01

$$\int \sinh\left(b z^2 + d z\right) \sinh^v\left(c z^2 + f z + g\right) dz = \frac{i^{1-v}\, 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(i \cosh\left(\frac{d^2}{4b}\right) S\left(\frac{d+2bz}{\sqrt{ib}\sqrt{2\pi}}\right) - C\left(\frac{d+2bz}{\sqrt{ib}\sqrt{2\pi}}\right) \sinh\left(\frac{d^2}{4b}\right)\right)}{\sqrt{ib}} +$$

$$i^{v+1}\, 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(\left(\sinh\left(\frac{(-d-2fs+fv)^2}{4(-b-2cs+cv)} + g(2s-v) + \frac{i\pi v}{2}\right) C\left(\frac{-d-2fs+fv+2(-b-2cs+cv)z}{\sqrt{2\pi}\sqrt{-ib-2ics+icv}}\right) - \right.\right.\right.$$

$$\left. i\, S\left(\frac{-d-2fs+fv+2(-b-2cs+cv)z}{\sqrt{2\pi}\sqrt{-ib-2ics+icv}}\right) \cosh\left(\frac{(-d-2fs+fv)^2}{4(-b-2cs+cv)} + g(2s-v) + \frac{i\pi v}{2}\right)\right) \Big/$$

$$\left(\sqrt{-ib-2ics+icv}\right) + \left(\sinh\left(\frac{(-d+2fs-fv)^2}{4(-b+2cs-cv)} - g(2s-v) - \frac{i\pi v}{2}\right)\right.$$

$$C\left(\frac{-d+2fs-fv+2(-b+2cs-cv)z}{\sqrt{2\pi}\sqrt{-ib+2ics-icv}}\right) - i\, S\left(\frac{-d+2fs-fv+2(-b+2cs-cv)z}{\sqrt{2\pi}\sqrt{-ib+2ics-icv}}\right)$$

$$\left.\left.\cosh\left(\frac{(-d+2fs-fv)^2}{4(-b+2cs-cv)} - g(2s-v) - \frac{i\pi v}{2}\right)\right) \Big/ \left(\sqrt{-ib+2ics-icv}\right)\right) /;\ v \in \mathbb{N}^+$$

01.19.21.1613.01

$$\int \sinh\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i\, d)^{3/2}} \left(i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{i\, d}\, \cosh\left(\sqrt{z}\, b + d\, z\right) + b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4d}\right) S\left(\frac{b + 2d\sqrt{z}}{\sqrt{i\, d}\,\sqrt{2\pi}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{b + 2d\sqrt{z}}{\sqrt{i\, d}\,\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4d}\right)\right)\right) +$$

$$\left(\frac{i}{2}\right)^{\nu+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(-2\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}\, \cosh\left(2\, g\, s - g\, \nu + \frac{i\, \pi\, \nu}{2} - (-d - 2\, f\, s + f\, \nu)\, z - (-b - 2\, c\, s + c\, \nu)\sqrt{z}\right) - \right.\right.\right.$$

$$\sqrt{2\pi}\, (-b - 2\, c\, s + c\, \nu)\, S\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cosh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + \right.$$

$$\left. 2\, g\, s - g\, \nu + \frac{i\, \pi\, \nu}{2}\right) + + i\sqrt{2\pi}\, (b + 2\, c\, s - c\, \nu)\, C\left(\frac{-b - 2\, c\, s + c\, \nu + 2\, (-d - 2\, f\, s + f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, \nu}}\right)$$

$$\left.\left. \sinh\left(\frac{(-b - 2\, c\, s + c\, \nu)^2}{4\, (-d - 2\, f\, s + f\, \nu)} + 2\, g\, s - g\, \nu + \frac{i\, \pi\, \nu}{2}\right)\right)\right/ (-i\, d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} +$$

$$\left(-2\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}\, \cosh\left(-2\, g\, s + g\, \nu - \frac{i\, \pi\, \nu}{2} - (-d + 2\, f\, s - f\, \nu)\, z - (-b + 2\, c\, s - c\, \nu)\sqrt{z}\right) - \right.$$

$$\sqrt{2\pi}\, (-b + 2\, c\, s - c\, \nu)\, S\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cosh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} - \right.$$

$$\left. 2\, g\, s + g\, \nu - \frac{i\, \pi\, \nu}{2}\right) + i\sqrt{2\pi}\, (b - 2\, c\, s + c\, \nu)\, C\left(\frac{-b + 2\, c\, s - c\, \nu + 2\, (-d + 2\, f\, s - f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, \nu}}\right)$$

$$\left.\left.\left. \sinh\left(\frac{(-b + 2\, c\, s - c\, \nu)^2}{4\, (-d + 2\, f\, s - f\, \nu)} - 2\, g\, s + g\, \nu - \frac{i\, \pi\, \nu}{2}\right)\right)\right/ (-i\, d + 2\, i\, f\, s - i\, f\, \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sinh\left(b\, z^r + d\, z + e\right) \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.1614.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{1}{\sqrt{i b}} \left(i^{1-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(i \cosh\left(\frac{d^2}{4 b} - e\right) S\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) - C\left(\frac{d + 2 b z}{\sqrt{i b} \sqrt{2 \pi}}\right) \sinh\left(\frac{d^2}{4 b} - e\right)\right)\right) + i^{\nu+1} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\sinh\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right) C\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) - i S\left(\frac{-d - 2 f s + f \nu + 2 (-b - 2 c s + c \nu) z}{\sqrt{2 \pi} \sqrt{-i b - 2 i c s + i c \nu}}\right) \cosh\left(\frac{(-d - 2 f s + f \nu)^2}{4 (-b - 2 c s + c \nu)} + e + g (2 s - \nu) + \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b - 2 i c s + i c \nu}\right) + \left(\sinh\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right) C\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) - i S\left(\frac{-d + 2 f s - f \nu + 2 (-b + 2 c s - c \nu) z}{\sqrt{2 \pi} \sqrt{-i b + 2 i c s - i c \nu}}\right) \cosh\left(\frac{(-d + 2 f s - f \nu)^2}{4 (-b + 2 c s - c \nu)} + e - g (2 s - \nu) - \frac{i \pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-i b + 2 i c s - i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1615.01

$$\int \sinh\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = -\frac{i^{\nu} 2^{-\nu-2} \sqrt{\pi}}{\sqrt{i b}} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt[4]{-1}\, e^{\frac{d^2}{4 b} - e} \operatorname{erf}\left(\frac{\sqrt[4]{-1}\, (d + 2 b z)}{2 \sqrt{i b}}\right) + (-1)^{3/4} e^{e - \frac{d^2}{4 b}} \operatorname{erf}\left(\frac{(-1)^{3/4} (d + 2 b z)}{2 \sqrt{i b}}\right)\right) (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{\frac{(f (\nu - 2 k) - d)^2}{4 b - 4 c (\nu - 2 k)} - e - 2 g k + g \nu} \operatorname{erfi}\left(\frac{d + 2 f k - f \nu + 2 b z + 4 c k z - 2 c \nu z}{2 \sqrt{-b - 2 c k + c \nu}}\right)}{\sqrt{c (\nu - 2 k) - b}} + \frac{e^{\frac{(d + f (\nu - 2 k))^2}{-4 b - 4 c (\nu - 2 k)} + e + g (\nu - 2 k)} \operatorname{erfi}\left(\frac{d - 2 f k + f \nu + 2 b z - 4 c k z + 2 c \nu z}{2 \sqrt{b - 2 c k + c \nu}}\right)}{\sqrt{b + c (\nu - 2 k)}} - \frac{i (-1)^{\nu} e^{-\frac{(d + 2 f k - f \nu)^2}{4 (b + 2 c k - c \nu)} + e + 2 g k - g \nu} \operatorname{erfi}\left(\frac{-i d - 2 i f k + i f \nu - 2 i b z - 4 i c k z + 2 i c \nu z}{2 \sqrt{-b - 2 c k + c \nu}}\right)}{\sqrt{-b - 2 c k + c \nu}} - \frac{i (-1)^{\nu} e^{-\frac{(-d + 2 f k - f \nu)^2}{4 (-b + 2 c k - c \nu)} - e + 2 g k - g \nu} \operatorname{erfi}\left(\frac{-i d + 2 i f k - i f \nu - 2 i b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{b - 2 c k + c \nu}}\right)}{\sqrt{b - 2 c k + c \nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.1616.01

$$\int \sinh\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{v}\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{(i\, d)^{3/2}} \left(i^{1-v}\, 2^{-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(2\sqrt{i\, d}\, \cosh\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi}\, \cosh\left(\frac{b^2}{4\, d} - e\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{i\, d}\,\sqrt{2\pi}}\right) + b\, i\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{i\, d}\,\sqrt{2\pi}}\right) \sinh\left(\frac{b^2}{4\, d} - e\right)\right) + \left(\frac{i}{2}\right)^{v+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(-2\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, v}\, \cosh\left(e + 2\, g\, s - g\, v + \frac{i\,\pi\, v}{2} - (-d - 2\, f\, s + f\, v)\, z - (-b - 2\, c\, s + c\, v)\sqrt{z}\right) - \sqrt{2\pi}\, (-b - 2\, c\, s + c\, v)\, S\left(\frac{-b - 2\, c\, s + c\, v + 2\, (-d - 2\, f\, s + f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, v}}\right) \cosh\left(\frac{(-b - 2\, c\, s + c\, v)^2}{4\, (-d - 2\, f\, s + f\, v)} + e + 2\, g\, s - g\, v + \frac{i\,\pi\, v}{2}\right) + +i\sqrt{2\pi}\, (b + 2\, c\, s - c\, v)\, C\left(\frac{-b - 2\, c\, s + c\, v + 2\, (-d - 2\, f\, s + f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d - 2\, i\, f\, s + i\, f\, v}}\right) \sinh\left(\frac{(-b - 2\, c\, s + c\, v)^2}{4\, (-d - 2\, f\, s + f\, v)} + e + 2\, g\, s - g\, v + \frac{i\,\pi\, v}{2}\right)\right) \Big/ (-i\, d - 2\, i\, f\, s + i\, f\, v)^{3/2} + \left(-2\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, v}\, \cosh\left(e - 2\, g\, s + g\, v - \frac{i\,\pi\, v}{2} - (-d + 2\, f\, s - f\, v)\, z - (-b + 2\, c\, s - c\, v)\sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, c\, s - c\, v)\, S\left(\frac{-b + 2\, c\, s - c\, v + 2\, (-d + 2\, f\, s - f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, v}}\right) \cosh\left(\frac{(-b + 2\, c\, s - c\, v)^2}{4\, (-d + 2\, f\, s - f\, v)} + e - 2\, g\, s + g\, v - \frac{i\,\pi\, v}{2}\right) + i\sqrt{2\pi}\, (b - 2\, c\, s + c\, v)\, C\left(\frac{-b + 2\, c\, s - c\, v + 2\, (-d + 2\, f\, s - f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-i\, d + 2\, i\, f\, s - i\, f\, v}}\right) \sinh\left(\frac{(-b + 2\, c\, s - c\, v)^2}{4\, (-d + 2\, f\, s - f\, v)} + e - 2\, g\, s + g\, v - \frac{i\,\pi\, v}{2}\right)\right) \Big/ (-i\, d + 2\, i\, f\, s - i\, f\, v)^{3/2} \right) \right) /;\, v \in \mathbb{N}^+$$

01.19.21.1617.01

$$\int \sinh\left(\sqrt{z}\, b+d\, z+e\right)\sinh^{\nu}\left(\sqrt{z}\, c+f\, z+g\right)dz = \\ i^{\nu}\, 2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}\left(\frac{4\cosh\left(\sqrt{z}\, b+e+d\, z\right)}{d}+\frac{b\, e^{e-\frac{b^2}{4d}}\, i\sqrt{\pi}\, \operatorname{erf}\left(\frac{i\, b+2\, i\, d\sqrt{z}}{2\sqrt{d}}\right)}{d^{3/2}}-\frac{i\, b\, e^{\frac{b^2}{4d}-e}\sqrt{\pi}\, \operatorname{erf}\left(\frac{i\, b+2\, i\, d\sqrt{z}}{2\sqrt{-d}}\right)}{(-d)^{3/2}}\right)(1-\nu \bmod 2)+ \\ 2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\sqrt{\pi}\left(\frac{1}{(-d+2\, f\, k-f\, \nu)^{3/2}}\left((-1)^{\nu}\, e^{-\frac{(-b+2\, c\, k-c\, \nu)^2}{4(-d+2\, f\, k-f\, \nu)}-e+2\, g\, k-g\, \nu}(-b+2\, c\, k-c\, \nu)\right.\right.\right. \\ \left.\operatorname{erfi}\left(\frac{-b+2\, c\, k-c\, \nu-2\, d\sqrt{z}+4\, f\, k\sqrt{z}-2\, f\, \nu\sqrt{z}}{2\sqrt{-d+2\, f\, k-f\, \nu}}\right)\right)+\frac{1}{(d+2\, f\, k-f\, \nu)^{3/2}} \\ \left((-1)^{\nu}\, e^{\frac{(i\, b+i\, (2\, c\, k-c\, \nu))^2}{4(d+2\, f\, k-f\, \nu)}+e+2\, g\, k-g\, \nu}(b+2\, c\, k-c\, \nu)\operatorname{erfi}\left(\frac{-b-2\, c\, k+c\, \nu-2\, d\sqrt{z}-4\, f\, k\sqrt{z}+2\, f\, \nu\sqrt{z}}{2\sqrt{d+2\, f\, k-f\, \nu}}\right)\right)+ \\ \frac{1}{(d+f\, (\nu-2\, k))^{3/2}}\left(e^{\frac{(i\, b+i\, c\, (\nu-2\, k))^2}{4(d+f\, (\nu-2\, k))}+e+g\, (\nu-2\, k)}(b+c\, (\nu-2\, k))\right. \\ \left.\operatorname{erfi}\left(\frac{-b+2\, c\, k-c\, \nu-2\, d\sqrt{z}+4\, f\, k\sqrt{z}-2\, f\, \nu\sqrt{z}}{2\sqrt{d+f\, (\nu-2\, k)}}\right)\right)-\frac{1}{(f\, (\nu-2\, k)-d)^{3/2}} \\ \left.\left(e^{\frac{(i\, b-i\, c\, (\nu-2\, k))^2}{4(f\, (\nu-2\, k)-d)}-e-2\, g\, k+g\, \nu}(b+2\, c\, k-c\, \nu)\operatorname{erfi}\left(\frac{-b-2\, c\, k+c\, \nu-2\, d\sqrt{z}-4\, f\, k\sqrt{z}+2\, f\, \nu\sqrt{z}}{2\sqrt{f\, (\nu-2\, k)-d}}\right)\right)\right)- \\ \frac{2\, e^{\sqrt{z}\, (-b-2\, c\, k+c\, \nu)+\frac{1}{2}(-2\, e-4\, g\, k+2\, g\, \nu)+(-d-2\, f\, k+f\, \nu)\, z}}{-d-2\, f\, k+f\, \nu}-\frac{2\, (-1)^{\nu}\, e^{\sqrt{z}\, (b+2\, c\, k-c\, \nu)+\frac{1}{2}(2\, e+4\, g\, k-2\, g\, \nu)+(d+2\, f\, k-f\, \nu)\, z}}{-d-2\, f\, k+f\, \nu}- \\ \left.\frac{2\, e^{\sqrt{z}\, (b-2\, c\, k+c\, \nu)+\frac{1}{2}(2\, e-4\, g\, k+2\, g\, \nu)+(d-2\, f\, k+f\, \nu)\, z}}{-d+2\, f\, k-f\, \nu}-\frac{2\, (-1)^{\nu}\, e^{\sqrt{z}\, (-b+2\, c\, k-c\, \nu)+\frac{1}{2}(-2\, e+4\, g\, k-2\, g\, \nu)+(-d+2\, f\, k-f\, \nu)\, z}}{-d+2\, f\, k-f\, \nu}\right)\, /;\, \nu\in\mathbb{N}^+$$

Involving product of powers of two direct functions

Involving $\sinh^{\mu}(c\, z)\sinh^{\nu}(a\, z)$

01.19.21.1618.01

$$\int \sinh^{\mu}(c z) \sinh^{\nu}(a z) \, dz = -\frac{\cosh(c z)\ (1 - \nu \bmod 2) \sinh^{\mu+1}(c z) \left(-\sinh^2(c z)\right)^{\frac{1}{2}(-\mu-1)}}{c} \left(\frac{i}{2}\right)^{\nu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(\frac{1}{2}, \frac{1-\mu}{2}; \frac{3}{2}; \cosh^2(c z)\right) - 2^{-\nu} e^{-a \nu z} \left(1 - e^{-2 c z}\right)^{-\mu} \sinh^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{a^2 (\nu - 2k)^2 - c^2 \mu^2} \binom{\nu}{k} \left(e^{2 a (\nu-k) z} (2 a k - a \nu + c \mu) \, {}_2F_1\left(\frac{2 a k - a \nu - c \mu}{2 c}, -\mu; \frac{a (2k - \nu)}{2 c} - \frac{\mu}{2} + 1; e^{-2 c z}\right) + e^{i \pi \nu + 2 a k z} (a (\nu - 2k) + c \mu) \, {}_2F_1\left(-\frac{2 a k - a \nu + c \mu}{2 c}, -\mu; \frac{-\mu c + 2c - 2 a k + a \nu}{2 c}; e^{-2 c z}\right)\right) \ /; \nu \in \mathbb{N}^+$$

01.19.21.1619.01

$$\int \sinh^{m}(c z) \sinh^{\nu}(a z) \, dz = i^{\nu-m} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - \frac{i^{\nu} 2^{-m-\nu} (1 - \nu \bmod 2)}{c} \binom{\nu}{\frac{\nu}{2}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \left((-1)^m e^{-c (m-2k) z} - e^{-(2 c k - c m) z}\right)}{m - 2k} \binom{m}{k} - \frac{i^{-m} 2^{-m-\nu} (1 - m \bmod 2)}{a} \binom{m}{\frac{m}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^s \left(-e^{a (\nu-2s) z} + (-1)^{\nu} e^{-(a \nu - 2 a s) z}\right)}{\nu - 2s} \binom{\nu}{s} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{m+s} \left(\frac{e^{i \pi m + i \pi \nu - (2 c k - c m - 2 a s + a \nu) z}}{2 c k - c m - 2 a s + a \nu} + \frac{e^{-(-2 c k + c m + 2 a s - a \nu) z}}{-2 c k + c m + 2 a s - a \nu} + \frac{e^{i m \pi - (2 c k - c m + 2 a s - a \nu) z}}{2 c k - c m + 2 a s - a \nu} + \frac{e^{i \pi \nu - (-2 c k + c m - 2 a s + a \nu) z}}{-2 c k + c m - 2 a s + a \nu}\right) \binom{\nu}{s} \ /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.1620.01

$$\int \sinh^{\mu}(c z) \sinh^{\nu}(2 c z) \, dz = -\frac{1}{c (\nu + 1)} \left(\cosh(c z) \, {}_2F_1\left(\frac{\nu + 1}{2}, \frac{1}{2}(-\mu - \nu + 1); \frac{\nu + 3}{2}; \cosh^2(c z)\right) \sinh^{\mu+1}(c z) \left(-\sinh^2(c z)\right)^{\frac{1}{2}(-\mu-\nu-1)} \sinh^{\nu}(2 c z)\right)$$

01.19.21.1621.01

$$\int \sinh^2(c z) \sinh^{\frac{1}{2}}(a z) \, dz = \left(-a (a - 4c) e^{-(a+2c) z} \left(-1 + e^{2 a z}\right) {}_2F_1\left(-\frac{c}{a} - \frac{1}{4}, -\frac{1}{2}; \frac{3}{4} - \frac{c}{a}; e^{2 a z}\right) - (a + 4c) e^{-(a-2c) z} \left(4 (a - 4c) e^{(a-2c) z} \sqrt{1 - e^{2 a z}} \sqrt{i \sinh(a z)} \, E\left(\frac{1}{4}(\pi - 2 i a z) \middle| 2\right) + a \left(-1 + e^{2 a z}\right) {}_2F_1\left(\frac{c}{a} - \frac{1}{4}, -\frac{1}{2}; \frac{c}{a} + \frac{3}{4}; e^{2 a z}\right)\right)\right) \Big/ \left(4 \left(a^3 - 16 a c^2\right) \sqrt{1 - e^{2 a z}} \sinh^{\frac{1}{2}}(a z)\right)$$

01.19.21.1622.01

$$\int \sinh^2(c z) \sinh^{\frac{1}{2}}(2 c z) \, dz = \frac{\sinh^2(2 c z) - 3 E\left(\frac{\pi}{4} - i c z \middle| 2\right) \sqrt{i \sinh(2 c z)}}{6 c \sinh^{\frac{1}{2}}(2 c z)}$$

01.19.21.1623.01

$$\int \frac{\sinh^2(c z)}{\sinh^{\frac{1}{2}}(a z)} \, dz = \frac{1}{\sqrt{2}\, a (a-4c)(a+4c)\left(-1+e^{2az}\right)} \left(e^{\frac{az}{2}} \sqrt{-e^{-az}+e^{az}} \left(a \sqrt{1-e^{2az}} \left((a-4c)\, e^{\frac{1}{2}(a+4c)z} \, {}_2F_1\left(\frac{c}{a}+\frac{1}{4}, \frac{1}{2}; \frac{c}{a}+\frac{5}{4}; e^{2az}\right) + (a+4c)\, e^{\frac{1}{2}(a-4c)z} \, {}_2F_1\left(\frac{1}{4}-\frac{c}{a}, \frac{1}{2}; \frac{5}{4}-\frac{c}{a}; e^{2az}\right)\right) - i\sqrt{2}\left(a^2-16c^2\right) e^{\frac{az}{2}} \sqrt{i\, e^{-az}\left(-1+e^{2az}\right)} \, F\left(\frac{1}{4}(\pi-2iaz) \,\middle|\, 2\right)\right)\right)$$

01.19.21.1624.01

$$\int \frac{\sinh^2(c z)}{\sinh^{\frac{1}{2}}(2 c z)} \, dz = \frac{\sinh(2cz) - i F\left(\frac{\pi}{4} - i c z \,\middle|\, 2\right) \sqrt{i \sinh(2cz)}}{2 c \sinh^{\frac{1}{2}}(2cz)}$$

01.19.21.1625.01

$$\int \frac{\sinh^7(c z)}{\sqrt{\sinh^7(2 c z)}} \, dz = \left(\left(-5 \tan^{-1}\left(\coth^{\frac{1}{2}}(cz)\right) \operatorname{csch}(cz) + 5 \tanh^{-1}\left(\coth^{\frac{1}{2}}(cz)\right) \operatorname{csch}(cz) + 2 \coth^{\frac{1}{2}}(cz) \operatorname{sech}(cz) \left(\operatorname{sech}^2(cz) - 6\right)\right) \sinh^4(2cz)\right) \Big/ \left(80\, c \coth^{\frac{1}{2}}(cz) \sqrt{\sinh^7(2cz)}\right)$$

Involving $\sinh^{\mu}(c z) \sinh^{\nu}(a z + b)$

01.19.21.1626.01

$$\int \sinh^{\mu}(cz) \sinh^{\nu}(b+az) \, dz = 2^{-\nu} \left(1-e^{2cz}\right)^{-\mu} \sinh^{\mu}(cz) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b(\nu-2k)} \binom{\nu}{k} \left(\frac{e^{2i\left(\frac{\pi\nu}{2}+b i(\nu-2k)\right)-a(\nu-2k)z}}{-a(\nu-2k)-c\mu} \, {}_2F_1\left(\frac{-a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(-\frac{a(\nu-2k)}{c}-\mu+2\right); e^{2cz}\right) + \frac{e^{a(\nu-2k)z}}{a(\nu-2k)-c\mu} \, {}_2F_1\left(\frac{a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{a(\nu-2k)}{c}-\mu+2\right); e^{2cz}\right)\right) - \frac{\left(\frac{i}{2}\right)^{\nu} \left(1-e^{2cz}\right)^{-\mu} (1-\nu \bmod 2) \sinh^{\mu}(cz)}{c\mu} \binom{\nu}{\frac{\nu}{2}} \, {}_2F_1\left(-\frac{\mu}{2}, -\mu; \frac{2-\mu}{2}; e^{2cz}\right) \;/;\; \nu \in \mathbb{N}^+$$

01.19.21.1627.01

$$\int \sinh^{m}(cz) \sinh^{\nu}(b+az) \, dz = \frac{1}{a\nu} 2^{-m} \left(1-e^{-2(b+az)}\right)^{-\nu} \sinh^{\nu}(b+az) \left(i^{-m} \binom{m}{\frac{m}{2}} \, {}_2F_1\left(-\frac{\nu}{2}, -\nu; 1-\frac{\nu}{2}; e^{-2(b+az)}\right) (1-m \bmod 2) + a\nu \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \left(\frac{e^{c(2k-m)z}}{2ck-cm+a\nu} \, {}_2F_1\left(-\frac{2ck-cm+a\nu}{2a}, -\nu; \frac{1}{2}\left(\frac{c(m-2k)}{a}-\nu+2\right); e^{-2(b+az)}\right) + \frac{e^{czm+i\pi m-2ckz}}{c(m-2k)+a\nu} \, {}_2F_1\left(-\frac{c(m-2k)+a\nu}{2a}, -\nu; \frac{1}{2}\left(\frac{c(2k-m)}{a}-\nu+2\right); e^{-2(b+az)}\right)\right)\right) \;/;\; \nu \in \mathbb{N}^+$$

01.19.21.1628.01

$$\int \sinh^m(c\,z)\sinh^\nu(b+a\,z)\,dz = i^{\nu-m}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{2^{-m-\nu}\,i^\nu}{c}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\left((-1)^m e^{-c(m-2k)z} - e^{-(2ck-cm)z}\right)\binom{m}{k}}{m-2k} - \frac{2^{-m-\nu}\,i^{-m}}{a}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{\left((-1)^s e^{-2bs-b\nu}\right)\left(-e^{2b\nu+a(\nu-2s)z} + (-1)^\nu e^{4bs-(a\nu-2as)z}\right)\binom{\nu}{s}}{\nu-2s} - 2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{m+s}e^{-2bs-b\nu}\left(e^{2b\nu}\left(\frac{e^{i m\pi-(2ck-cm+2as-a\nu)z}}{2ck-cm+2as-a\nu} + \frac{e^{-(-2ck+cm+2as-a\nu)z}}{-2ck+cm+2as-a\nu}\right) + \frac{e^{4bs+i\pi\nu-(-2ck+cm-2as+a\nu)z}}{-2ck+cm-2as+a\nu} + \frac{e^{i\pi m+4bs+i\pi\nu-(2ck-cm-2as+a\nu)z}}{2ck-cm-2as+a\nu}\right)\binom{\nu}{s} /;\ m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

Involving $\sinh^\mu(c\,z+d)\sinh^\nu(a\,z+b)$

01.19.21.1629.01

$$\int \sinh^\mu(d+c\,z)\sinh^\nu(b+a\,z)\,dz = 2^{-\nu}\left(1-e^{2(d+cz)}\right)^{-\mu}\sinh^\mu(d+c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{b(\nu-2k)}\binom{\nu}{k}\left(\frac{e^{2i\left(\frac{\pi\nu}{2}+b\,i(\nu-2k)\right)-a(\nu-2k)z}}{-a(\nu-2k)-c\mu}\,{}_2F_1\!\left(\frac{-a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(-\frac{a(\nu-2k)}{c}-\mu+2\right); e^{2(d+cz)}\right) + \frac{e^{a(\nu-2k)z}}{a(\nu-2k)-c\mu}\,{}_2F_1\!\left(\frac{a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{a(\nu-2k)}{c}-\mu+2\right); e^{2(d+cz)}\right)\right) - \left(\frac{i}{2}\right)^\nu\frac{\left(1-e^{2(d+cz)}\right)^{-\mu}(1-\nu \bmod 2)\sinh^\mu(d+c\,z)}{c\,\mu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2}, -\mu; \frac{2-\mu}{2}; e^{2(d+cz)}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1630.01

$$\int \sinh^m(c\,z+d)\sinh^\nu(a\,z+b)\,dz = i^{\nu-m}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{2^{-m-\nu}\,i^\nu(1-\nu \bmod 2)}{c}\binom{\nu}{\frac{\nu}{2}}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k e^{2dk+dm}\left((-1)^m e^{-2dm-c(m-2k)z} - e^{-4dk-(2ck-cm)z}\right)}{m-2k}\binom{m}{k} - \frac{2^{-m-\nu}\,i^{-m}(1-m \bmod 2)}{a}\binom{m}{\frac{m}{2}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^s e^{-2bs-b\nu}\left(-e^{2b\nu+a(\nu-2s)z} + (-1)^\nu e^{4bs-(a\nu-2as)z}\right)}{\nu-2s}\binom{\nu}{s} - 2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{m+s}e^{2dk+dm-2bs-b\nu}\left(e^{2b\nu}\left(\frac{e^{-4dk-(2ck-cm+2as-a\nu)z+i m\pi}}{2ck-cm+2as-a\nu} + \frac{e^{-2dm-(-2ck+cm+2as-a\nu)z}}{-2ck+cm+2as-a\nu}\right) + \frac{e^{-2dm+4bs+i\pi\nu-(-2ck+cm-2as+a\nu)z}}{-2ck+cm-2as+a\nu} + \frac{e^{-4dk+4bs+i\pi\nu-(2ck-cm-2as+a\nu)z+i m\pi}}{2ck-cm-2as+a\nu}\right)\binom{\nu}{s} /;\ m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

Involving $\sinh^m(b\,z)\sinh^\nu(c\,z^r)$

01.19.21.1631.01

$$\int \sinh^m(b\,z)\sinh^\nu(c\,z^2)\,dz = 2^{-m-\nu}\,i^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)+2^{-m-\nu+\frac{1}{2}}\,i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}$$
$$(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(\nu-2\,k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{b}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(2\,b\,k\,z+\frac{1}{2}\,i\,m\,(2\,i\,b\,z+\pi)\right)}{2\,k-m}+2^{-m-\nu+\frac{1}{2}}\,i^{m+\nu}\sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(i\cosh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-\frac{(2\,b\,k-b\,m)^2}{4\,(c\,\nu-2\,c\,s)}\right)C\left(\frac{2\,b\,k-b\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.\right.$$
$$\left.S\left(\frac{2\,b\,k-b\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-\frac{(2\,b\,k-b\,m)^2}{4\,(c\,\nu-2\,c\,s)}\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(i\cosh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,c\,s-c\,\nu)}\right)C\left(\frac{2\,b\,k-b\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-\right.$$
$$\left.\left.S\left(\frac{2\,b\,k-b\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,b\,k-b\,m)^2}{4\,(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.1632.01

$$\int \sinh^m(b\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)(2\,i)^{-m-\nu} - \frac{i^{\nu-m}\,2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)\right)+$$
$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{b}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(b\,(m-2k)\,z-\frac{i\,m\,\pi}{2}\right)}{m-2k}+$$
$$\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,i\,b\,k-i\,b\,m)^{3/2}}\right.$$
$$\left(-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cosh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,b\,k-b\,m)}+\frac{1}{2}\,i\,\pi\,(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,b\,k-i\,b\,m}\,\sqrt{2\pi}}\right)-\right.$$
$$i\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,b\,k-i\,b\,m}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,b\,k-b\,m)}+\frac{1}{2}\,i\,\pi\,(\nu-m)\right)+$$
$$\left.2\,i\sqrt{2\,i\,b\,k-i\,b\,m}\,\sinh\left(-\frac{1}{2}\,i\,\pi\,(\nu-m)+(2\,b\,k-b\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,i\,b\,k-i\,b\,m)^{3/2}}$$
$$\left(-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cosh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,b\,k-b\,m)}\right)C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,b\,k-i\,b\,m}\,\sqrt{2\pi}}\right)+\right.$$
$$i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,b\,k-i\,b\,m}\,\sqrt{2\pi}}\right)\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,b\,k-b\,m)}\right)+$$
$$\left.\left.2\,i\sqrt{2\,i\,b\,k-i\,b\,m}\,\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)+(2\,b\,k-b\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m(d\,z+e)\sinh^\nu\left(c\,z^r\right)$

01.19.21.1633.01

$$\int \sinh^m(e+d\,z)\sinh^\nu\left(c\,z^2\right)dz = 2^{-m-\nu}\,i^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}}\,i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}$$
$$(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(\nu-2\,k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(e\,(2\,k-m)+2\,d\,k\,z+\frac{1}{2}\,i\,m\,(2\,i\,d\,z+\pi)\right)}{2\,k-m}+$$
$$2^{-m-\nu+\frac{1}{2}}\,i^{m+\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,\nu-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)C\left(\frac{2\,d\,k-d\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.\right.$$
$$\left.S\left(\frac{2\,d\,k-d\,m+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,\nu-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,\nu)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)\right.$$
$$C\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)$$
$$\left.\left.\sinh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,\nu)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.1634.01

$$\int \sinh^m(e+d\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)(2\,i)^{-m-\nu} - \frac{i^{\nu-m}\,2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)\right)+$$
$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(-\frac{1}{2}i\pi m+e(m-2k)+d(m-2k)z\right)}{m-2k}+$$
$$\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(2cs-c\nu)\right.\right.$$
$$\cosh\left(-\frac{(c\nu-2cs)^2}{4(2dk-dm)}+2ek-em-\frac{1}{2}i\pi(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+c\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}$$
$$(c\nu-2cs)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)-2cs+c\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(c\nu-2cs)^2}{4(2dk-dm)}+2ek-em-\frac{1}{2}i\pi(\nu-m)\right)+$$
$$\left.2\,i\sqrt{2\,i\,d\,k-i\,d\,m}\,\sinh\left(2ek-em-\frac{1}{2}i\pi(\nu-m)+(2dk-dm)z+(c\nu-2cs)\sqrt{z}\right)\right)+$$
$$\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(c\nu-2cs)\cosh\left(-\frac{(2cs-c\nu)^2}{4(2dk-dm)}+2ek-em+\frac{1}{2}i\pi(m+\nu)\right)\right.$$
$$C\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-c\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}\,(2cs-c\nu)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)+2cs-c\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)$$
$$\sinh\left(-\frac{(2cs-c\nu)^2}{4(2dk-dm)}+2ek-em+\frac{1}{2}i\pi(m+\nu)\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m}$$
$$\left.\left.\sinh\left(2ek-em+\frac{1}{2}i\pi(m+\nu)+(2dk-dm)z+(2cs-c\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m(a\,z^r)\sinh^\nu(c\,z^r)$

01.19.21.1635.01

$$\int \sinh^m(b z^r)\sinh^\nu(c z^r)\,dz = i^{m-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{i^{-\nu} 2^{-m-\nu} z}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m \Gamma\left(\frac{1}{r},(b m-2 b k) z^r\right)((b m-2 b k) z^r)^{-1/r} + ((2 b k-b m) z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2 b k-b m) z^r\right)\right) - \frac{i^m 2^{-m-\nu} z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu \Gamma\left(\frac{1}{r},(c\nu-2ck) z^r\right)((c\nu-2ck) z^r)^{-1/r} + ((2ck-c\nu) z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2ck-c\nu) z^r\right)\right) - \frac{2^{-m-\nu} z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}\Gamma\left(\frac{1}{r},(-2bk+bm-2cs+c\nu) z^r\right)((-2bk+bm-2cs+c\nu) z^r)^{-1/r} + (-1)^\nu((2bk-bm-2cs+c\nu) z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2bk-bm-2cs+c\nu) z^r\right) + (-1)^m((-2bk+bm+2cs-c\nu) z^r)^{-1/r}\Gamma\left(\frac{1}{r},(-2bk+bm+2cs-c\nu) z^r\right) + ((2bk-bm+2cs-c\nu) z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2bk-bm+2cs-c\nu) z^r\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1636.01

$$\int \sinh^m(b z^2)\sinh^\nu(c z^2)\,dz = 2^{-m-\nu} i^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i c(\nu-2k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}\right)\right) + 2^{-m-\nu+\frac{1}{2}} i^{m-\nu+1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i b(m-2k)}}\binom{m}{k}\left(\cos\left(\frac{m\pi}{2}\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}} z}{\sqrt{i b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}} z}{\sqrt{i b(m-2k)}}\right)\sin\left(\frac{m\pi}{2}\right)\right) + 2^{-m-\nu+\frac{1}{2}} i^{m+\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(\frac{1}{2}\pi(m-\nu)\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2ibk-ibm-2ics+ic\nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}}\sqrt{2ibk-ibm-2ics+ic\nu}\, z\right)\sin\left(\frac{1}{2}\pi(m-\nu)\right)\right)\Big/\left(\sqrt{2ibk-ibm-2ics+ic\nu}\right) + \left(\cos\left(\frac{1}{2}\pi(m+\nu)\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2ibk-ibm+2ics-ic\nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}}\sqrt{2ibk-ibm+2ics-ic\nu}\, z\right)\sin\left(\frac{1}{2}\pi(m+\nu)\right)\right)\Big/\left(\sqrt{2ibk-ibm+2ics-ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1637.01

$$\int \sinh^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = 2^{-m-\nu}\, i^{-m-\nu}\, z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{i^{-m-\nu}\, 2^{-m-\nu+2}}{c^2}\binom{m}{\frac{m}{2}}$$
$$(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cos\left(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)+c\, i\,(2k-\nu)\sqrt{z}\,\sin\left(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)\right)}{(2k-\nu)^2} -$$
$$\frac{i^{-m-\nu}\, 2^{-m-\nu+2}}{b^2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\left((-1)^k\binom{m}{k}\left(\cosh\left(\frac{i\, m\,\pi}{2}-b\,(2k-m)\sqrt{z}\right)+b\,(2k-m)\sqrt{z}\,\sinh\left(\frac{i\, m\,\pi}{2}-b\,(2k-m)\sqrt{z}\right)\right)\right) -$$
$$2^{-m-\nu+2}\, i^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cosh\left(\frac{1}{2}\, i\,\pi\,(m-\nu)-(b\,(2k-m)+c\,(\nu-2s))\sqrt{z}\right)+(b\,(2k-m)+\right.\right.$$
$$\left.\left. c\,(\nu-2s))\sqrt{z}\,\sinh\left(\frac{1}{2}\, i\,\pi\,(m-\nu)-(b\,(2k-m)+c\,(\nu-2s))\sqrt{z}\right)\right)\Big/(b\,(2k-m)+c\,(\nu-2s))^2 +$$
$$\left(\cosh\left(\frac{1}{2}\, i\,\pi\,(m+\nu)-(b\,(2k-m)-c\,(\nu-2s))\sqrt{z}\right)+(b\,(2k-m)-c\,(\nu-2s))\sqrt{z}\right.$$
$$\left.\left.\sinh\left(\frac{1}{2}\, i\,\pi\,(m+\nu)-(b\,(2k-m)-c\,(\nu-2s))\sqrt{z}\right)\right)\Big/(b\,(2k-m)-c\,(\nu-2s))^2\right)\, /;\, m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sinh^m(d\, z)\sinh^\nu\left(c\, z^r+g\right)$

01.19.21.1638.01

$$\int \sinh^m(d z)\sinh^\nu(c z^2+g)\,dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}+g i(\nu-2k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}(\nu-2k)z}{\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}(\nu-2k)z}{\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}+g i(\nu-2k)\right)\right)\right)+$$

$$\frac{i^{m-\nu}2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(2dkz+\frac{1}{2}i m(2 i d z+\pi)\right)}{2k-m}+$$

$$2^{-m-\nu+\frac{1}{2}} i^{m+\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i c\nu-2 i c s}}\left(i\cosh\left(-\frac{(2dk-dm)^2}{4(c\nu-2cs)}+\frac{1}{2}i\pi(m-\nu)-g(2s-\nu)\right)C\left(\frac{2dk-dm+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{i c\nu-2 i c s}}\right)-S\left(\frac{2dk-dm+2(c\nu-2cs)z}{\sqrt{2\pi}\sqrt{i c\nu-2 i c s}}\right)\sinh\left(-\frac{(2dk-dm)^2}{4(c\nu-2cs)}+\frac{1}{2}i\pi(m-\nu)-g(2s-\nu)\right)\right)+\frac{1}{\sqrt{2 i c s-i c\nu}}\left(i\cosh\left(-\frac{(2dk-dm)^2}{4(2cs-c\nu)}+g(2s-\nu)+\frac{1}{2}i\pi(m+\nu)\right)C\left(\frac{2dk-dm+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2 i c s-i c\nu}}\right)-S\left(\frac{2dk-dm+2(2cs-c\nu)z}{\sqrt{2\pi}\sqrt{2 i c s-i c\nu}}\right)\sinh\left(-\frac{(2dk-dm)^2}{4(2cs-c\nu)}+g(2s-\nu)+\frac{1}{2}i\pi(m+\nu)\right)\right)\right)\; /;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.1639.01

$$\int \sinh^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)(2\,i)^{-m-\nu} - \frac{1}{c^2}\left(i^{\nu-m}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2\,k-\nu)\sqrt{z}\right)-c\,(2\,k-\nu)\sqrt{z}\,\sinh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2\,k-\nu)\sqrt{z}\right)\right)\right)\right)+$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(d\,(m-2\,k)\,z-\frac{i\,m\,\pi}{2}\right)}{m-2\,k}}{d}+\left(\frac{i}{2}\right)^{m+\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\right.\right.$$

$$\cosh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}$$

$$(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)\right)+$$

$$\left.2\,i\sqrt{2\,i\,d\,k-i\,d\,m}\,\sinh\left(-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)+(2\,d\,k-d\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cosh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)\right.$$

$$C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)$$

$$\sinh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m}$$

$$\left.\left.\sinh\left(2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m(d\,z+e)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.1640.01

$$\int \sinh^m(e+d\,z)\sinh^v\left(c\,z^2+g\right)dz = 2^{-m-v}\,i^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)+2^{-m-v+\frac{1}{2}}\,i^{-m+v+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,k)\,z}{\sqrt{i\,c\,(v-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,k)\,z}{\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)\right)+$$

$$\frac{i^{m-v}\,2^{-m-v+1}}{d}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(e\,(2\,k-m)+2\,d\,k\,z+\frac{1}{2}\,i\,m\,(2\,i\,d\,z+\pi)\right)}{2\,k-m}+$$

$$2^{-m-v+\frac{1}{2}}\,i^{m+v}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,v-2\,i\,c\,s}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(2\,s-v)\right)C\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)\sinh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(c\,v-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(2\,s-v)\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,v}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+e\,(2\,k-m)+g\,(2\,s-v)+\frac{1}{2}\,i\,\pi\,(m+v)\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)\sinh\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,c\,s-c\,v)}+e\,(2\,k-m)+g\,(2\,s-v)+\frac{1}{2}\,i\,\pi\,(m+v)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.1641.01

$$\int \sinh^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)(2\,i)^{-m-\nu} - \frac{1}{c^2}\left(i^{\nu-m}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2\,k-\nu)\sqrt{z}\right)-c\,(2\,k-\nu)\sqrt{z}\,\sinh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2\,k-\nu)\sqrt{z}\right)\right)\right)\right)+$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(-\frac{1}{2}\,i\,\pi\,m+e\,(m-2\,k)+d\,(m-2\,k)\,z\right)}{m-2\,k}}{d}+$$

$$\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\cosh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,c\,s+c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(c\,\nu-2\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m}\,\sinh\left(2\,e\,k-e\,m-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)+(2\,d\,k-d\,m)\,z+(c\,\nu-2\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,i\,d\,k-i\,d\,m)^{3/2}}\left(-\sqrt{2\pi}\,(c\,\nu-2\,c\,s)\cosh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)+i\sqrt{2\pi}\,(2\,c\,s-c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,c\,s-c\,\nu}{\sqrt{2\,i\,d\,k-i\,d\,m}\,\sqrt{2\pi}}\right)\sinh\left(-\frac{(2\,c\,s-c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m}\,\sinh\left(2\,e\,k-e\,m+2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)+(2\,d\,k-d\,m)\,z+(2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m(a\,z^r)\sinh^\nu(c\,z^r+g)$

01.19.21.1642.01

$$\int \sinh^m(b z^r) \sinh^v(c z^r + g) \, dz = i^{m-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) - \frac{i^{-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{1}{r}, (b m - 2 b k) z^r\right) ((b m - 2 b k) z^r)^{-1/r} + ((2 b k - b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m) z^r\right) \right) - \frac{i^m 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{2 g k - g v} \Gamma\left(\frac{1}{r}, (c v - 2 c k) z^r\right) ((c v - 2 c k) z^r)^{-1/r} + e^{g v - 2 g k} ((2 c k - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - c v) z^r\right) \right) - \frac{2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{2 g s - g v} \Gamma\left(\frac{1}{r}, (-2 b k + b m - 2 c s + c v) z^r\right) ((-2 b k + b m - 2 c s + c v) z^r)^{-1/r} + (-1)^v e^{2 g s - g v} ((2 b k - b m - 2 c s + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m - 2 c s + c v) z^r\right) + (-1)^m e^{g v - 2 g s} ((-2 b k + b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b k + b m + 2 c s - c v) z^r\right) + e^{g v - 2 g s} ((2 b k - b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m + 2 c s - c v) z^r\right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.1643.01

$$\int \sinh^m(b z^2) \sinh^\nu(c z^2 + g) \, dz ==$$

$$2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} i^{\nu-m} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}}$$

$$\left((-1)^k \binom{\nu}{k} \left(i \cos\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}} \right) + i S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}} \right) \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) \right) \right) +$$

$$2^{-m-\nu+\frac{1}{2}} i^{m-\nu+1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{i b (m - 2k)}} \binom{m}{k}$$

$$\left(\cos\left(\frac{m \pi}{2} \right) C\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{i b (m - 2k)}} \right) + S\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{i b (m - 2k)}} \right) \sin\left(\frac{m \pi}{2} \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{m+\nu} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cosh\left(\frac{1}{2} i \pi (m - \nu) - g (2s - \nu) \right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m - 2 i c s + i c \nu} \; z \right) - \right. \right.$$

$$\left. i S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m - 2 i c s + i c \nu} \; z \right) \sinh\left(\frac{1}{2} i \pi (m - \nu) - g (2s - \nu) \right) \right) \Big/$$

$$\left(\sqrt{2 i b k - i b m - 2 i c s + i c \nu} \right) + \left(\cosh\left(g (2s - \nu) + \frac{1}{2} i \pi (m + \nu) \right) \right.$$

$$C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m + 2 i c s - i c \nu} \; z \right) - i S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m + 2 i c s - i c \nu} \; z \right)$$

$$\left. \left. \sinh\left(g (2s - \nu) + \frac{1}{2} i \pi (m + \nu) \right) \right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c \nu} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1644.01

$$\int \sinh^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = 2^{-m-\nu}\,i^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)-$$
$$\frac{1}{c^2}\left(i^{-m-\nu}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(2k-\nu)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g\,(\nu-2k)\right)+\right.\right.\right.$$
$$\left.\left.\left.c\,i\,(2k-\nu)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g\,(\nu-2k)\right)\right)\right)\right)-\frac{i^{-m-\nu}\,2^{-m-\nu+2}}{b^2}\binom{\nu}{\frac{\nu}{2}}$$
$$(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cosh\left(\frac{i\,m\,\pi}{2}-b\,(2k-m)\sqrt{z}\right)+b\,(2k-m)\sqrt{z}\,\sinh\left(\frac{i\,m\,\pi}{2}-b\,(2k-m)\sqrt{z}\right)\right)}{(2k-m)^2}-$$
$$2^{-m-\nu+2}\,i^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(b\,(2k-m)+c\,(\nu-2s))^2}\right.$$
$$\left(\cosh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-g\,(\nu-2s)-(b\,(2k-m)+c\,(\nu-2s))\sqrt{z}\right)+(b\,(2k-m)+c\,(\nu-2s))\sqrt{z}\right.$$
$$\left.\sinh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-g\,(\nu-2s)-(b\,(2k-m)+c\,(\nu-2s))\sqrt{z}\right)\right)+\frac{1}{(b\,(2k-m)-c\,(\nu-2s))^2}$$
$$\left(\cosh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)+g\,(\nu-2s)-(b\,(2k-m)-c\,(\nu-2s))\sqrt{z}\right)+(b\,(2k-m)-c\,(\nu-2s))\right.$$
$$\left.\left.\sqrt{z}\,\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)+g\,(\nu-2s)-(b\,(2k-m)-c\,(\nu-2s))\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m\left(a\,z^r+e\right)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.1645.01

$$\int \sinh^m(b z^r + e) \sinh^v(c z^r + g) \, dz = i^{m-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) - \frac{i^{-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2ek-em} \Gamma\left(\frac{1}{r}, (b m - 2 b k) z^r\right) ((b m - 2 b k) z^r)^{-1/r} + e^{em-2ek} ((2 b k - b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m) z^r\right) \right) - \frac{i^m 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{2gk-gv} \Gamma\left(\frac{1}{r}, (c v - 2 c k) z^r\right) ((c v - 2 c k) z^r)^{-1/r} + e^{gv-2gk} ((2 c k - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - c v) z^r\right) \right) - \frac{2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{2ek-em+2gs-gv} \Gamma\left(\frac{1}{r}, (-2 b k + b m - 2 c s + c v) z^r\right) ((-2 b k + b m - 2 c s + c v) z^r)^{-1/r} + (-1)^v e^{-2ek+em+2gs-gv} ((2 b k - b m - 2 c s + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m - 2 c s + c v) z^r\right) + (-1)^m e^{2ek-em-2gs+gv} ((-2 b k + b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b k + b m + 2 c s - c v) z^r\right) + e^{-2ek+em-2gs+gv} ((2 b k - b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 b k - b m + 2 c s - c v) z^r\right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.1646.01

$$\int \sinh^m(b z^2 + e)\sinh^\nu(c z^2 + g)\,dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} i^{\nu-m} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}} \left((-1)^k \binom{\nu}{k} \left(i \cos\left(\frac{\pi \nu}{2} + g i (\nu - 2k)\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}}\right) + i S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k)\right)\right)\right) +$$

$$2^{-m-\nu+\frac{1}{2}} i^{m-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{i b (m - 2k)}} \left((-1)^k \binom{m}{k} \left(i \cosh\left(e (m - 2k) - \frac{i m \pi}{2}\right) C\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{i b (m - 2k)}}\right) - S\left(\frac{b (m - 2k) \sqrt{\frac{2}{\pi}} z}{\sqrt{i b (m - 2k)}}\right) \sinh\left(e (m - 2k) - \frac{i m \pi}{2}\right)\right)\right) +$$

$$2^{-m-\nu+\frac{1}{2}} i^{m+\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cosh\left(e (2k - m) + \frac{1}{2} i \pi (m - \nu) - g (2s - \nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m - 2 i c s + i c \nu}\; z\right) - i S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m - 2 i c s + i c \nu}\; z\right) \sinh\left(e (2k - m) + \frac{1}{2} i \pi (m - \nu) - g (2s - \nu)\right)\right) \Big/ \left(\sqrt{2 i b k - i b m - 2 i c s + i c \nu}\right) + \left(\cosh\left(e (2k - m) + g (2s - \nu) + \frac{1}{2} i \pi (m + \nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m + 2 i c s - i c \nu}\; z\right) - i S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 i b k - i b m + 2 i c s - i c \nu}\; z\right) \sinh\left(e (2k - m) + g (2s - \nu) + \frac{1}{2} i \pi (m + \nu)\right)\right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c \nu}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1647.01

$$\int \sinh^m\left(\sqrt{z}\, b+e\right) \sinh^v\left(\sqrt{z}\, c+g\right) dz = 2^{-m-v} i^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) - \frac{1}{c^2}\left(i^{-m-v} 2^{-m-v+2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(2k-v)^2} \left((-1)^k \binom{v}{k} \left(\cos\left(c\, i \sqrt{z}\,(2k-v)+\frac{\pi v}{2} - i\, g\,(v-2k)\right) + c\, i\,(2k-v)\sqrt{z} \sin\left(c\, i\sqrt{z}\,(2k-v)+\frac{\pi v}{2} - i\, g\,(v-2k)\right)\right)\right)\right) - \frac{1}{b^2}\left(i^{-m-v} 2^{-m-v+2} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^2} \left((-1)^k \binom{m}{k} \left(\cosh\left(-b\sqrt{z}\,(2k-m)+e\,(m-2k)+\frac{i\, m\, \pi}{2}\right) + b\,(2k-m)\sqrt{z} \sinh\left(-b\sqrt{z}\,(2k-m)+e\,(m-2k)+\frac{i\, m\,\pi}{2}\right)\right)\right)\right) - 2^{-m-v+2} i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{(b\,(2k-m)+c\,(v-2s))^2} \left(\cosh\left(e\,(m-2k)+\frac{1}{2} i\, \pi\,(m-v) - g\,(v-2s) - (b\,(2k-m)+c\,(v-2s))\sqrt{z}\right) + (b\,(2k-m)+c\,(v-2s)) \sqrt{z} \sinh\left(e\,(m-2k)+\frac{1}{2} i\,\pi\,(m-v) - g\,(v-2s) - (b\,(2k-m)+c\,(v-2s))\sqrt{z}\right)\right) + \frac{1}{(b\,(2k-m)-c\,(v-2s))^2} \left(\cosh\left(e\,(m-2k)+\frac{1}{2} i\,\pi\,(m+v) + g\,(v-2s) - (b\,(2k-m)-c\,(v-2s))\sqrt{z}\right) + (b\,(2k-m)-c\,(v-2s))\sqrt{z} \sinh\left(e\,(m-2k)+\frac{1}{2} i\,\pi\,(m+v) + g\,(v-2s) - (b\,(2k-m)-c\,(v-2s))\sqrt{z}\right)\right)\right) \;/;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sinh^m(d\,z)\sin^{hv}\left(c\,z^r + f\,z\right)$

01.19.21.1648.01

$$\int \sinh^m(d\,z)\sinh^\nu\left(c\,z^2+f\,z\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)(2\,i)^{-m-\nu}+$$

$$2^{-m-\nu+\frac{1}{2}}\,i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2\,k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,f^2\,(\nu-2\,k)}{4\,c}\right)\right.\right.$$

$$\left.\left.C\left(\frac{f\,(\nu-2\,k)+2\,c\,z\,(\nu-2\,k)}{\sqrt{2\pi}\,\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\left(\frac{f\,(\nu-2\,k)+2\,c\,z\,(\nu-2\,k)}{\sqrt{2\pi}\,\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,f^2\,(\nu-2\,k)}{4\,c}\right)\right)\right)+$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(-d\,z\,m+\frac{i\,\pi\,m}{2}+2\,d\,k\,z\right)}{2\,k-m}+$$

$$2^{-m-\nu+\frac{1}{2}}\,i^{m+\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right.$$

$$\left(i\cosh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}\right)C\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.$$

$$\left.S\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sinh\left(\frac{1}{2}\,i\,\pi\,(m-\nu)-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(i\cosh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}\right)\right.$$

$$C\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)$$

$$\left.\left.\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.1649.01

$$\int \sinh^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\,(2\,i)^{-m-\nu} + 2^{-m-\nu}\,i^{\nu-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(c\sqrt{2\,\pi}\,(\nu-2\,k)\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)C\left(\frac{c\,(\nu-2\,k)+2\,f\sqrt{z}\,(\nu-2\,k)}{\sqrt{2\,\pi}\sqrt{i\,f\,(\nu-2\,k)}}\right)+c\sqrt{2\,\pi}\,(\nu-2\,k)\,S\left(-\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)+2\sqrt{i\,f\,(\nu-2\,k)}\,\sin\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\sqrt{z}\right)\right)\right)+\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(d\,(m-2\,k)\,z-\frac{i\,m\,\pi}{2}\right)}{m-2\,k}+\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(-c\sqrt{2\,\pi}\,(2\,s-\nu)\cosh\left(\frac{c^2\,(\nu-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,\nu}+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)C\left(\frac{c\,(\nu-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}}\right)-i\,c\sqrt{2\,\pi}\,(2\,s-\nu)\,S\left(\frac{c\,(\nu-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}}\right)\sinh\left(\frac{c^2\,(\nu-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,\nu}+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,\nu}\,\sinh\left(-d\,z\,m+\frac{i\,\pi\,m}{2}+2\,d\,k\,z-2\,f\,s\,z+f\,\nu\,z-2\,c\,s\sqrt{z}+c\,\nu\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right)\right)\Big/(2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(c\sqrt{2\,\pi}\,(2\,s-\nu)\cosh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{c^2\,(\nu-2\,s)^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,\nu}\right)C\left(\frac{c\,(2\,s-\nu)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}}\right)+c\,i\sqrt{2\,\pi}\,(2\,s-\nu)\,S\left(\frac{c\,(2\,s-\nu)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}}\right)\sinh\left(\frac{1}{2}\,i\,\pi\,(m+\nu)-\frac{c^2\,(\nu-2\,s)^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,\nu}\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,\nu}\,\sinh\left(\frac{1}{2}\left(-2\,d\,z\,m+i\,\pi\,m+i\,\pi\,\nu+4\,d\,k\,z+4\,f\,s\,z-2\,f\,\nu\,z+4\,c\,s\sqrt{z}-2\,c\,\nu\sqrt{z}\right)\right)\right)\Big/(2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sinh^m(d\,z+e)\,\sin^{hv}\!\left(c\,z^r+f\,z\right)$

01.19.21.1650.01

$$\int \sinh^m(e+d\,z)\,\sinh^\nu\!\left(c\,z^2+f\,z\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\,(2\,i)^{-m-\nu}+$$

$$2^{-m-\nu+\frac{1}{2}}\,i^{-m+\nu+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2\,k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\!\left(\frac{\pi\,\nu}{2}-\frac{i\,f^2\,(\nu-2\,k)}{4\,c}\right)\right.\right.$$

$$\left.\left.C\!\left(\frac{f\,(\nu-2\,k)+2\,c\,z\,(\nu-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\!\left(\frac{f\,(\nu-2\,k)+2\,c\,z\,(\nu-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\!\left(\frac{\pi\,\nu}{2}-\frac{i\,f^2\,(\nu-2\,k)}{4\,c}\right)\right)\right)+$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\!\left(e\,(2\,k-m)-d\,z\,m+2\,d\,k\,z+\frac{i\,m\,\pi}{2}\right)}{2\,k-m}+2^{-m-\nu+\frac{1}{2}}\,i^{m+\nu}$$

$$\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(i\cosh\!\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)\right.\right.$$

$$C\!\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-S\!\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,\nu+2\,(c\,\nu-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)$$

$$\left.\sinh\!\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,\nu)^2}{4\,(c\,\nu-2\,c\,s)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m-\nu)\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(i\cosh\!\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)\right.$$

$$C\!\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\!\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,\nu+2\,(2\,c\,s-c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)$$

$$\left.\left.\sinh\!\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,\nu)^2}{4\,(2\,c\,s-c\,\nu)}+e\,(2\,k-m)+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.1651.01

$$\int \sinh^m(e+d\,z)\,\sinh^\nu\!\left(\sqrt{z}\,c+f\,z\right)dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\,(2\,i)^{-m-\nu}+$$

$$2^{-m-\nu}\,i^{\nu-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(c\,\sqrt{2\,\pi}\,(\nu-2\,k)\cos\!\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right.\right.$$

$$C\!\left(\frac{c\,(\nu-2\,k)+2\,f\,\sqrt{z}\,(\nu-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)-c\,\sqrt{2\,\pi}\,(\nu-2\,k)\,S\!\left(\frac{(2\,k-\nu)\left(c+2\,f\,\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\!\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)+$$

$$\left.\left.2\,\sqrt{i\,f\,(\nu-2\,k)}\,\sin\!\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\,\sqrt{z}\right)\right)\right)+$$

$$\frac{i^{m-v}\, 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \sinh\left(-\frac{1}{2}\, i\, \pi\, m + e\,(m-2\,k) + d\,(m-2\,k)\,z\right)}{m-2\,k}}{d} +$$

$$\left(\frac{i}{2}\right)^{m+v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(\left(-c\,\sqrt{2\,\pi}\;(2\,s-v)\cosh\left(\frac{c^2\,(v-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,v} +\right.\right.\right.\right.$$

$$\left.2\,e\,k-e\,m+\frac{1}{2}\,i\,\pi\,(m-v)\right) C\left(\frac{c\,(v-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}}\right) -$$

$$i\,c\,\sqrt{2\,\pi}\;(2\,s-v)\,S\left(\frac{c\,(v-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,v)}}\right)$$

$$\sinh\left(\frac{c^2\,(v-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,v}+2\,e\,k-e\,m+\frac{1}{2}\,i\,\pi\,(m-v)\right)+2\,i\,\sqrt{2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,v}$$

$$\left.\sinh\left(2\,e\,k+2\,d\,z\,k-e\,m+\frac{1}{2}\,i\,\pi\,(m-v)-d\,m\,z-2\,f\,s\,z+f\,v\,z-2\,c\,s\,\sqrt{z}\,+c\,v\,\sqrt{z}\right)\right) \Big/$$

$$(2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,v)^{3/2} + \left(c\,\sqrt{2\,\pi}\;(2\,s-v)\cosh\left(-\frac{c^2\,(v-2\,s)^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,v}+\right.\right.$$

$$\left.2\,e\,k-e\,m+\frac{1}{2}\,i\,\pi\,(m+v)\right) C\left(\frac{c\,(2\,s-v)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}}\right) +$$

$$c\,i\,\sqrt{2\,\pi}\;(2\,s-v)\,S\left(\frac{c\,(2\,s-v)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}}\right)$$

$$\sinh\left(-\frac{c^2\,(v-2\,s)^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,v}+2\,e\,k-e\,m+\frac{1}{2}\,i\,\pi\,(m+v)\right)+2\,i\,\sqrt{2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v}$$

$$\left.\sinh\left(\frac{1}{2}\left(4\,e\,k+4\,d\,z\,k-2\,e\,m+i\,\pi\,v-2\,d\,m\,z+4\,f\,s\,z-2\,f\,v\,z+4\,c\,s\,\sqrt{z}\,-2\,c\,v\,\sqrt{z}\,+i\,m\,\pi\right)\right)\right) \Big/$$

$$\left.(2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right) /;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sinh^m(b\,z^r)\sinh^v(c\,z^r+f\,z)$

01.19.21.1652.01

$$\int \sinh^m(b z^2) \sinh^\nu(c z^2 + f z)\, dz = z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)(2 i)^{-m-\nu} + 2^{-m-\nu+\frac{1}{2}} i^{m-\nu+1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i\, b(m-2k)}} \right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i\, b(m-2k)}} \right) \sin\left(\frac{m\pi}{2}\right) \right)}{\sqrt{i\, b(m-2k)}} + 2^{-m-\nu+\frac{1}{2}} i^{-m+\nu+1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i\, c(\nu - 2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2} - \frac{i f^2 (\nu - 2k)}{4c} \right) C\left(\frac{f(\nu-2k) + 2cz(\nu-2k)}{\sqrt{2\pi}\sqrt{i\, c(\nu-2k)}} \right) + S\left(\frac{f(\nu-2k) + 2cz(\nu-2k)}{\sqrt{2\pi}\sqrt{i\, c(\nu-2k)}} \right) \sin\left(\frac{\pi\nu}{2} - \frac{i f^2(\nu-2k)}{4c} \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{m+\nu+1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\cos\left(\frac{1}{4} \left(\frac{f^2 i (\nu - 2s)^2}{2bk - bm - 2cs + c\nu} + 2\pi(m - \nu) \right) \right) C\left(\frac{f(\nu-2s) + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi}\sqrt{i(2bk - bm - 2cs + c\nu)}} \right) - S\left(\frac{f(\nu-2s) + 2(2bk - bm - 2cs + c\nu) z}{\sqrt{2\pi}\sqrt{i(2bk - bm - 2cs + c\nu)}} \right) \sin\left(\frac{1}{4} \left(\frac{f^2 i(\nu-2s)^2}{2bk - bm - 2cs + c\nu} + 2\pi(m-\nu) \right) \right) \right) \Big/ \left(\sqrt{2 i bk - i bm - 2 i cs + i c\nu} \right) + \left(\cos\left(\frac{1}{4} \left(\frac{f^2 i(\nu-2s)^2}{2bk - bm + 2cs - c\nu} + 2\pi(m+\nu) \right) \right) C\left(\frac{2fs + 4czs - f\nu + 4bkz - 2bmz - 2c\nu z}{\sqrt{2\pi}\sqrt{i(2bk - bm + 2cs - c\nu)}} \right) - S\left(\frac{2fs + 4czs - f\nu + 4bkz - 2bmz - 2c\nu z}{\sqrt{2\pi}\sqrt{i(2bk - bm + 2cs - c\nu)}} \right) \sin\left(\frac{1}{4} \left(\frac{f^2 i(\nu-2s)^2}{2bk - bm + 2cs - c\nu} + 2\pi(m+\nu) \right) \right) \right) \Big/ \left(\sqrt{2 i bk - i bm + 2 i cs - i c\nu} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1653.01

$$\int \sinh^m(b\sqrt{z}) \sinh^\nu(\sqrt{z}\, c + f z)\, dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} i^{\nu-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i f(\nu-2k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c\sqrt{2\pi}(\nu-2k) \cos\left(\frac{\pi\nu}{2} - \frac{i c^2(\nu-2k)}{4f} \right) C\left(\frac{c(\nu-2k) + 2f\sqrt{z}(\nu-2k)}{\sqrt{2\pi}\sqrt{i f(\nu-2k)}} \right) + c\sqrt{2\pi}(\nu-2k) S\left(\frac{c(\nu-2k) + 2f\sqrt{z}(\nu-2k)}{\sqrt{2\pi}\sqrt{i f(\nu-2k)}} \right) \sin\left(\frac{\pi\nu}{2} - \frac{i c^2(\nu-2k)}{4f} \right) + 2\sqrt{i f(\nu-2k)} \sin\left(\frac{\pi\nu}{2} + f i(\nu-2k) z + c i(\nu-2k)\sqrt{z} \right) \right) \right) - \frac{1}{b^2} \left(2^{-m-\nu+2} i^{m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \right.$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cosh\left(b\sqrt{z}\,(2k-m)+\frac{i m\pi}{2}\right)-b(2k-m)\sqrt{z}\,\sinh\left(b\sqrt{z}\,(2k-m)+\frac{i m\pi}{2}\right)\right)\right)+$$

$$2^{-m-v}\,i^{m+v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i f v-2 i f s)^{3/2}}\left(i\sqrt{2\pi}\,(-2 b i k+i b m+2 i c s-i c v)\cosh\left(\right.\right.\right.$$

$$\left.\frac{i(2 i b k-i b m-2 i c s+i c v)^2}{4(i f v-2 i f s)}-\frac{1}{2}i\pi(v-m)\right)C\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)+$$

$$\sqrt{2\pi}\,(2 i b k-i b m-2 i c s+i c v)\,S\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)$$

$$\sinh\left(\frac{i(2 i b k-i b m-2 i c s+i c v)^2}{4(i f v-2 i f s)}-\frac{1}{2}i\pi(v-m)\right)+$$

$$\left.2i\sqrt{i f v-2 i f s}\,\sinh\left(-\frac{1}{2}i\pi(v-m)-i(i f v-2 i f s)z-i(2 i b k-i b m-2 i c s+i c v)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2 i f s-i f v)^{3/2}}\left(i\sqrt{2\pi}\,(-2 b i k+i b m-2 i c s+i c v)\cosh\left(\frac{1}{2}i\pi(m+v)+\right.\right.$$

$$\left.\frac{i(2 i b k-i b m+2 i c s-i c v)^2}{4(2 i f s-i f v)}\right)C\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)+$$

$$\sqrt{2\pi}\,(2 i b k-i b m+2 i c s-i c v)\,S\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)$$

$$\sinh\left(\frac{1}{2}i\pi(m+v)+\frac{i(2 i b k-i b m+2 i c s-i c v)^2}{4(2 i f s-i f v)}\right)+2i\sqrt{2 i f s-i f v}$$

$$\left.\left.\sinh\left(\frac{1}{2}i\pi(m+v)-i(2 i f s-i f v)z-i(2 i b k-i b m+2 i c s-i c v)\sqrt{z}\right)\right)\right)\text{/; } m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sinh^m(b z^r+e)\sinh^v(c z^r+f z)$

01.19.21.1654.01

$$\int \sinh^m(b z^2+e)\sinh^v(c z^2+f z)\,dz = 2^{-m-v} i^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) + 2^{-m-v+\frac{1}{2}} i^{-m+v+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\lfloor\frac{v-1}{2}\rfloor}\frac{1}{\sqrt{i c (v-2k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(\frac{\pi v}{2}-\frac{i f^2 (v-2k)}{4c}\right)C\left(\frac{f(v-2k)+2 c z (v-2k)}{\sqrt{2\pi}\sqrt{i c (v-2k)}}\right)+S\left(\frac{f(v-2k)+2 c z (v-2k)}{\sqrt{2\pi}\sqrt{i c (v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i f^2 (v-2k)}{4c}\right)\right)\right) + 2^{-m-v+\frac{1}{2}} i^{m-v}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\frac{1}{\sqrt{i b (m-2k)}}\left((-1)^k\binom{m}{k}\left(i\cosh\left(e(m-2k)-\frac{i m\pi}{2}\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b (m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{i b (m-2k)}}\right)\sinh\left(e(m-2k)-\frac{i m\pi}{2}\right)\right)\right) + 2^{-m-v+\frac{1}{2}} i^{m+v}\sqrt{\pi}\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\lfloor\frac{v-1}{2}\rfloor}(-1)^s\binom{v}{s}\left(\left(i\cosh\left(e(2k-m)+\frac{1}{2} i\pi(m-v)+\frac{i(i f v-2 i f s)^2}{4(2 i b k-i b m-2 i c s+i c v)}\right)C\left(\frac{-2 f s+f v+2(2 b k-b m-2 c s+c v) z}{\sqrt{2\pi}\sqrt{2 i b k-i b m-2 i c s+i c v}}\right)-S\left(\frac{-2 f s+f v+2(2 b k-b m-2 c s+c v) z}{\sqrt{2\pi}\sqrt{2 i b k-i b m-2 i c s+i c v}}\right)\sinh\left(e(2k-m)+\frac{1}{2} i\pi(m-v)+\frac{i(i f v-2 i f s)^2}{4(2 i b k-i b m-2 i c s+i c v)}\right)\right)\Big/\left(\sqrt{2 i b k-i b m-2 i c s+i c v}\right)+\left(i\cosh\left(e(2k-m)+\frac{1}{2} i\pi(m+v)+\frac{i(2 i f s-i f v)^2}{4(2 i b k-i b m+2 i c s-i c v)}\right)C\left(\frac{2 f s-f v+2(2 b k-b m+2 c s-c v) z}{\sqrt{2\pi}\sqrt{2 i b k-i b m+2 i c s-i c v}}\right)-S\left(\frac{2 f s-f v+2(2 b k-b m+2 c s-c v) z}{\sqrt{2\pi}\sqrt{2 i b k-i b m+2 i c s-i c v}}\right)\sinh\left(e(2k-m)+\frac{1}{2} i\pi(m+v)+\frac{i(2 i f s-i f v)^2}{4(2 i b k-i b m+2 i c s-i c v)}\right)\right)\Big/\left(\sqrt{2 i b k-i b m+2 i c s-i c v}\right)\right) /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.1655.01

$$\int \sinh^m(\sqrt{z}\, b+e)\sinh^v(\sqrt{z}\, c+f z)\,dz = 2^{-m-v} i^{-m-v} z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+2^{-m-v} i^{v-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\lfloor\frac{v-1}{2}\rfloor}\frac{1}{(i f (v-2k))^{3/2}}\left((-1)^k\binom{v}{k}\left(c\sqrt{2\pi}\,(v-2k)\cos\left(\frac{\pi v}{2}-\frac{i c^2(v-2k)}{4f}\right)C\left(\frac{c(v-2k)+2 f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\sqrt{i f (v-2k)}}\right)+\right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\,S\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\,\sqrt{i f (v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i c^2 (v-2k)}{4f}\right)+$$

$$2\sqrt{i f (v-2k)}\,\sin\left(\frac{\pi v}{2}+f\,i\,(v-2k)\,z+c\,i\,(v-2k)\sqrt{z}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{b^2}\Bigg(2^{-m-v+2}\,i^{m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cosh\left(2ek-em+b(2k-m)\sqrt{z}+\frac{i m\pi}{2}\right)-\right.\right.$$

$$\left.\left.b(2k-m)\sqrt{z}\,\sinh\left(2ek-em+b(2k-m)\sqrt{z}+\frac{i m\pi}{2}\right)\right)\right)\Bigg)+2^{-m-v}\,i^{m+v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(\frac{1}{(i f v-2 i f s)^{3/2}}\Bigg(i\sqrt{2\pi}\,(-2 b i k+i b m+2 i c s-i c v)\cosh\Bigg(2ek-em-\frac{1}{2}\,i$$

$$\pi(v-m)+\frac{i(2 i b k-i b m-2 i c s+i c v)^2}{4(i f v-2 i f s)}\Bigg)C\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)+$$

$$\sqrt{2\pi}\,(2 i b k-i b m-2 i c s+i c v)\,S\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)$$

$$\sinh\left(2ek-em-\frac{1}{2}\,i\pi(v-m)+\frac{i(2 i b k-i b m-2 i c s+i c v)^2}{4(i f v-2 i f s)}\right)+2i\sqrt{i f v-2 i f s}$$

$$\sinh\left(2ek-em-\frac{1}{2}\,i\pi(v-m)-i(i f v-2 i f s)z-i(2 i b k-i b m-2 i c s+i c v)\sqrt{z}\right)\Bigg)+$$

$$\frac{1}{(2 i f s-i f v)^{3/2}}\Bigg(i\sqrt{2\pi}\,(-2 b i k+i b m-2 i c s+i c v)\cosh\Bigg(2ek-em+\frac{1}{2}\,i\pi(m+v)+$$

$$\frac{i(2 i b k-i b m+2 i c s-i c v)^2}{4(2 i f s-i f v)}\Bigg)C\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)+$$

$$\sqrt{2\pi}\,(2 i b k-i b m+2 i c s-i c v)\,S\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)\sinh\Bigg(2ek-$$

$$em+\frac{1}{2}\,i\pi(m+v)+\frac{i(2 i b k-i b m+2 i c s-i c v)^2}{4(2 i f s-i f v)}\Bigg)+2i\sqrt{2 i f s-i f v}\,\sinh\Bigg(2ek-em+$$

$$\frac{1}{2}\,i\pi(m+v)-i(2 i f s-i f v)z-i(2 i b k-i b m+2 i c s-i c v)\sqrt{z}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sinh^m(b z^r + d z) \sinh^v(c z^r + f z)$

01.19.21.1656.01

$$\int \sinh^m(b z^2 + d z) \sinh^v(c z^2 + f z) \, dz = z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)(2 i)^{-m-v} + 2^{-m-v+\frac{1}{2}} i^{m-v} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \frac{1}{\sqrt{i b (m-2k)}} \left((-1)^k \binom{m}{k} \left(i \cosh\left(\frac{(m-2k) d^2}{4b} + \frac{i m \pi}{2} \right) C\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{d(m-2k) + 2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}} \right) \sinh\left(\frac{(m-2k) d^2}{4b} + \frac{i m \pi}{2} \right) \right) \right) + 2^{-m-v+\frac{1}{2}} i^{-m+v+1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{v-1}{2} \rfloor} \frac{1}{\sqrt{i c (v-2k)}} \left((-1)^k \binom{v}{k} \left(\cos\left(\frac{\pi v}{2} - \frac{i f^2 (v-2k)}{4c} \right) C\left(\frac{f(v-2k) + 2 c z (v-2k)}{\sqrt{2\pi} \sqrt{i c (v-2k)}} \right) + S\left(\frac{f(v-2k) + 2 c z (v-2k)}{\sqrt{2\pi} \sqrt{i c (v-2k)}} \right) \sin\left(\frac{\pi v}{2} - \frac{i f^2 (v-2k)}{4c} \right) \right) \right) + 2^{-m-v+\frac{1}{2}} i^{m+v} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\lfloor \frac{v-1}{2} \rfloor} (-1)^s \binom{v}{s} \left(\left(\left(i \cosh\left(\frac{1}{2} i \pi (m-v) + \frac{i (2 i d k - i d m - 2 i f s + i f v)^2}{4(2 i b k - i b m - 2 i c s + i c v)} \right) C\left(\frac{2dk - dm - 2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c v}} \right) - S\left(\frac{2dk - dm - 2fs + fv + 2(2bk - bm - 2cs + cv) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c v}} \right) \sinh\left(\frac{1}{2} i \pi (m-v) + \frac{i (2 i d k - i d m - 2 i f s + i f v)^2}{4(2 i b k - i b m - 2 i c s + i c v)} \right) \right) \Big/ \left(\sqrt{2 i b k - i b m - 2 i c s + i c v} \right) + \left(i \cosh\left(\frac{1}{2} i \pi (m+v) + \frac{i (2 i d k - i d m + 2 i f s - i f v)^2}{4(2 i b k - i b m + 2 i c s - i c v)} \right) C\left(\frac{2dk - dm + 2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c v}} \right) - S\left(\frac{2dk - dm + 2fs - fv + 2(2bk - bm + 2cs - cv) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c v}} \right) \sinh\left(\frac{1}{2} i \pi (m+v) + \frac{i (2 i d k - i d m + 2 i f s - i f v)^2}{4(2 i b k - i b m + 2 i c s - i c v)} \right) \right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c v} \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.1657.01

$$\int \sinh^m(\sqrt{z}\, b + d z) \sinh^v(\sqrt{z}\, c + f z) \, dz = 2^{-m-v} i^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + 2^{-m-v} i^{v-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{v-1}{2} \rfloor} \frac{1}{(i f (v-2k))^{3/2}} \left((-1)^k \binom{v}{k} \left(c \sqrt{2\pi} (v-2k) \cos\left(\frac{\pi v}{2} - \frac{i c^2 (v-2k)}{4f} \right) C\left(\frac{c(v-2k) + 2 f \sqrt{z} (v-2k)}{\sqrt{2\pi} \sqrt{i f (v-2k)}} \right) + \right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\,S\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\,\sqrt{i f(v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i c^2(v-2k)}{4f}\right)+$$

$$2\sqrt{i f(v-2k)}\,\sin\left(\frac{\pi v}{2}+f\,i\,(v-2k)\,z+c\,i\,(v-2k)\sqrt{z}\right)\Bigg)\Bigg)\Bigg)+2^{-m-v}\,i^{m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(i\,d\,(m-2k))^{3/2}}\left((-1)^k\binom{m}{k}\left(b(m-2k)\sqrt{2\pi}\,\cosh\left(\frac{(m-2k)\,b^2}{4d}+\frac{i\,m\,\pi}{2}\right)C\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{i\,d\,(m-2k)}\,\sqrt{2\pi}}\right)-\right.\right.$$

$$i\,b\,(m-2k)\sqrt{2\pi}\,S\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{i\,d\,(m-2k)}\,\sqrt{2\pi}}\right)\sinh\left(\frac{(m-2k)\,b^2}{4d}+\frac{i\,m\,\pi}{2}\right)+$$

$$\left.\left.2\,i\sqrt{i\,d\,(m-2k)}\,\sinh\left(-\frac{1}{2}\,i\,\pi\,m+d\,(m-2k)\,z+b\,(m-2k)\sqrt{z}\right)\right)\right)+$$

$$2^{-m-v}\,i^{m+v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(2bk-bm-2cs+cv)\cos\left(\frac{1}{2}\pi(v-m)-\frac{i\,(2bk-bm-2cs+cv)^2}{8dk-4dm-8fs+4fv}\right)\right.\right.\right.$$

$$C\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2cs+cv)\,S\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,v}}\right)$$

$$\sin\left(\frac{1}{2}\pi(v-m)-\frac{i\,(2bk-bm-2cs+cv)^2}{8dk-4dm-8fs+4fv}\right)+2\sqrt{i\,(2dk-dm-2fs+fv)}$$

$$\left.\sin\left(\frac{1}{2}\pi(v-m)+i\,(2dk-dm-2fs+fv)\,z+i\,(2bk-bm-2cs+cv)\sqrt{z}\right)\right)\Bigg/$$

$$(2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,v)^{3/2}+\left(\sqrt{2\pi}\,(2bk-bm+2cs-cv)\cos\left(\frac{1}{4}\left(\frac{i\,(b(m-2k)+c(v-2s))^2}{2dk-dm+2fs-fv}+\right.\right.\right.$$

$$\left.\left.2\pi(m+v)\right)\right)C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v}}\right)-$$

$$\sqrt{2\pi}\,(2bk-bm+2cs-cv)\,S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(\frac{1}{4}\left(\frac{i\,(b\,(m-2\,k)+c\,(v-2\,s))^2}{2\,d\,k-d\,m+2\,f\,s-f\,v}+2\,\pi\,(m+v)\right)\right)-2\,\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,v)}$$
$$\left.\left.\sin\left(\frac{1}{2}\,\pi\,(m+v)-i\,(2\,d\,k-d\,m+2\,f\,s-f\,v)\,z-i\,(2\,b\,k-b\,m+2\,c\,s-c\,v)\,\sqrt{z}\right)\right)\right/$$
$$\left.(2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sinh^m(d\,z)\,\sin^{hv}(c\,z^r+f\,z+g)$

01.19.21.1658.01

$$\int\sinh^m(d\,z)\,\sinh^v\left(c\,z^2+f\,z+g\right)dz=$$
$$z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\,(2\,i\,)^{-m-v}+2^{-m-v+\frac{1}{2}}\,i^{-m+v+1}\,\sqrt{\pi}\,\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)C\left(\frac{f\,(v-2\,k)+2\,c\,z\,(v-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)+\right.\right.$$
$$\left.\left.S\left(\frac{f\,(v-2\,k)+2\,c\,z\,(v-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)\right)+$$
$$\frac{i^{m-v}\,2^{-m-v+1}}{d}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(-d\,z\,m+\frac{i\,\pi\,m}{2}+2\,d\,k\,z\right)}{2\,k-m}+2^{-m-v+\frac{1}{2}}\,i^{m+v}\,\sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,v-2\,i\,c\,s}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(2\,s-v)\right)\right.\right.$$
$$C\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m-2\,f\,s+f\,v+2\,(c\,v-2\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)$$
$$\left.\sinh\left(-\frac{(2\,d\,k-d\,m-2\,f\,s+f\,v)^2}{4\,(c\,v-2\,c\,s)}+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(2\,s-v)\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,v}}\left(i\cosh\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+g\,(2\,s-v)+\frac{1}{2}\,i\,\pi\,(m+v)\right)\right.$$
$$C\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,f\,s-f\,v+2\,(2\,c\,s-c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)$$
$$\left.\left.\left.\sinh\left(-\frac{(2\,d\,k-d\,m+2\,f\,s-f\,v)^2}{4\,(2\,c\,s-c\,v)}+g\,(2\,s-v)+\frac{1}{2}\,i\,\pi\,(m+v)\right)\right)\right)\right)/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.1659.01

$$\int \sinh^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+g+f\,z\right)dz ==$$

$$z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)(2\,i)^{-m-\nu}+2^{-m-\nu}\,i^{\nu-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}$$

$$\left((-1)^k\binom{\nu}{k}\left(c\sqrt{2\pi}\,(\nu-2\,k)\cos\left(-\frac{i\,(\nu-2\,k)\,c^2}{4\,f}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2\,k)\right)C\left(\frac{c\,(\nu-2\,k)+2\,f\sqrt{z}\,(\nu-2\,k)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2\,k)}}\right)+\right.\right.$$

$$c\sqrt{2\pi}\,(\nu-2\,k)\,S\left(-\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(-\frac{i\,(\nu-2\,k)\,c^2}{4\,f}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2\,k)\right)+$$

$$\left.\left.2\sqrt{i\,f\,(\nu-2\,k)}\,\sin\left(\frac{\pi\,\nu}{2}+g\,i\,(\nu-2\,k)+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\sqrt{z}\right)\right)\right)+$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(d\,(m-2\,k)\,z-\frac{i\,m\,\pi}{2}\right)}{m-2\,k}+$$

$$\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(-c\sqrt{2\pi}\,(2\,s-\nu)\cosh\left(\frac{c^2\,(\nu-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,\nu}-2\,g\,s+\frac{1}{2}\,i\,\pi\,(m-\nu)+g\,\nu\right)\right.\right.\right.$$

$$C\left(\frac{c\,(\nu-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}}\right)-$$

$$i\,c\sqrt{2\pi}\,(2\,s-\nu)\,S\left(\frac{c\,(\nu-2\,s)+2\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k-d\,m-2\,f\,s+f\,\nu)}}\right)$$

$$\sinh\left(\frac{c^2\,(\nu-2\,s)^2}{-8\,d\,k+4\,d\,m+8\,f\,s-4\,f\,\nu}-2\,g\,s+\frac{1}{2}\,i\,\pi\,(m-\nu)+g\,\nu\right)+2\,i\sqrt{2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,\nu}$$

$$\left.\left.\sinh\left(-d\,z\,m+\frac{i\,\pi\,m}{2}-2\,g\,s+g\,\nu+2\,d\,k\,z-2\,f\,s\,z+f\,\nu\,z-2\,c\,s\sqrt{z}+c\,\nu\sqrt{z}-\frac{i\,\pi\,\nu}{2}\right)\right)\right/$$

$$(2\,i\,d\,k-i\,d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(c\sqrt{2\pi}\,(2\,s-\nu)\cosh\left(-\frac{c^2\,(\nu-2\,s)^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,\nu}+\right.\right.$$

$$\left.2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)C\left(\frac{c\,(2\,s-\nu)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}}\right)+$$

$$c\,i\sqrt{2\pi}\,(2\,s-\nu)\,S\left(\frac{c\,(2\,s-\nu)+2\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k-d\,m+2\,f\,s-f\,\nu)}}\right)$$

$$\sinh\left(-\frac{c^2 (v-2s)^2}{8dk-4dm+8fs-4fv}+2gs-gv+\frac{1}{2}i\pi(m+v)\right)+2i\sqrt{2idk-idm+2ifs-ifv}\,\sinh\left(\frac{1}{2}\left(-2dzm+i\pi m+4gs-2gv+i\pi v+4dkz+4fsz-2fvz+4cs\sqrt{z}-2cv\sqrt{z}\right)\right)\Bigg)\Bigg/\left(2idk-idm+2ifs-ifv\right)^{3/2}\Bigg)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sinh^m(d\,z+e)\sin^{hv}\left(c\,z^r+f\,z+g\right)$

01.19.21.1660.01

$$\int\sinh^m(dz+e)\sinh^v\left(cz^2+fz+g\right)dz= z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)(2i)^{-m-v}+2^{-m-v+\frac{1}{2}}i^{-m+v+1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{ic(v-2k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(-\frac{i(v-2k)f^2}{4c}+\frac{\pi v}{2}+gi(v-2k)\right)C\left(\frac{f(v-2k)+2cz(v-2k)}{\sqrt{2\pi}\sqrt{ic(v-2k)}}\right)+S\left(\frac{f(v-2k)+2cz(v-2k)}{\sqrt{2\pi}\sqrt{ic(v-2k)}}\right)\sin\left(-\frac{i(v-2k)f^2}{4c}+\frac{\pi v}{2}+gi(v-2k)\right)\right)\right)+\frac{i^{m-v}2^{-m-v+1}}{d}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\left(e(2k-m)-dzm+2dkz+\frac{im\pi}{2}\right)}{2k-m}+2^{-m-v+\frac{1}{2}}i^{m+v}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{\sqrt{icv-2ics}}\left(i\cosh\left(-\frac{(2dk-dm-2fs+fv)^2}{4(cv-2cs)}+e(2k-m)+\frac{1}{2}i\pi(m-v)-g(2s-v)\right)C\left(\frac{2dk-dm-2fs+fv+2(cv-2cs)z}{\sqrt{2\pi}\sqrt{icv-2ics}}\right)-S\left(\frac{2dk-dm-2fs+fv+2(cv-2cs)z}{\sqrt{2\pi}\sqrt{icv-2ics}}\right)\sinh\left(-\frac{(2dk-dm-2fs+fv)^2}{4(cv-2cs)}+e(2k-m)+\frac{1}{2}i\pi(m-v)-g(2s-v)\right)\right)+\frac{1}{\sqrt{2ics-icv}}\left(i\cosh\left(-\frac{(2dk-dm+2fs-fv)^2}{4(2cs-cv)}+e(2k-m)+g(2s-v)+\frac{1}{2}i\pi(m+v)\right)C\left(\frac{2dk-dm+2fs-fv+2(2cs-cv)z}{\sqrt{2\pi}\sqrt{2ics-icv}}\right)-S\left(\frac{2dk-dm+2fs-fv+2(2cs-cv)z}{\sqrt{2\pi}\sqrt{2ics-icv}}\right)\sinh\left(-\frac{(2dk-dm+2fs-fv)^2}{4(2cs-cv)}+e(2k-m)+g(2s-v)+\frac{1}{2}i\pi(m+v)\right)\right)\right)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.1661.01

$$\int \sinh^m(e + d\,z)\sinh^\nu\!\left(\sqrt{z}\;c + g + f\,z\right) dz = z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2)(2\,i)^{-m-\nu} + 2^{-m-\nu}\,i^{\nu-m}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2k))^{3/2}}$$

$$\left((-1)^k\binom{\nu}{k}\left(c\sqrt{2\pi}\,(\nu-2k)\cos\!\left(-\frac{i\,(\nu-2k)\,c^2}{4f} + \frac{\pi\nu}{2} + g\,i\,(\nu-2k)\right)C\!\left(\frac{c\,(\nu-2k) + 2\,f\sqrt{z}\,(\nu-2k)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right) + \right.\right.$$

$$c\sqrt{2\pi}\,(\nu-2k)\,S\!\left(-\frac{(2k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right)\sin\!\left(-\frac{i\,(\nu-2k)\,c^2}{4f} + \frac{\pi\nu}{2} + g\,i\,(\nu-2k)\right) +$$

$$\left.\left.2\sqrt{i\,f\,(\nu-2k)}\,\sin\!\left(\frac{\pi\nu}{2} + g\,i\,(\nu-2k) + f\,i\,(\nu-2k)\,z + c\,i\,(\nu-2k)\sqrt{z}\right)\right)\right) +$$

$$\frac{i^{m-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\sinh\!\left(-\frac{1}{2}\,i\,\pi\,m + e\,(m-2k) + d\,(m-2k)\,z\right)}{m-2k} +$$

$$\left(\frac{i}{2}\right)^{m+\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(-c\sqrt{2\pi}\,(2s-\nu)\cosh\!\left(\frac{c^2\,(\nu-2s)^2}{-8\,d\,k + 4\,d\,m + 8\,f\,s - 4\,f\,\nu} + 2\,e\,k - \right.\right.\right.\right.$$

$$\left. e\,m - 2\,g\,s + \frac{1}{2}\,i\,\pi\,(m-\nu) + g\,\nu\right)C\!\left(\frac{c\,(\nu-2s) + 2\,(2\,d\,k - d\,m - 2\,f\,s + f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k - d\,m - 2\,f\,s + f\,\nu)}}\right) -$$

$$i\,c\sqrt{2\pi}\,(2s-\nu)\,S\!\left(\frac{c\,(\nu-2s) + 2\,(2\,d\,k - d\,m - 2\,f\,s + f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k - d\,m - 2\,f\,s + f\,\nu)}}\right)\sinh\!\left(\frac{c^2\,(\nu-2s)^2}{-8\,d\,k + 4\,d\,m + 8\,f\,s - 4\,f\,\nu} + \right.$$

$$\left. 2\,e\,k - e\,m - 2\,g\,s + \frac{1}{2}\,i\,\pi\,(m-\nu) + g\,\nu\right) + 2\,i\sqrt{2\,i\,d\,k - i\,d\,m - 2\,i\,f\,s + i\,f\,\nu}$$

$$\left.\sinh\!\left(2\,e\,k + 2\,d\,z\,k - e\,m - 2\,g\,s + g\,\nu - d\,m\,z - 2\,f\,s\,z + f\,\nu\,z - 2\,c\,s\sqrt{z} + c\,\nu\sqrt{z} - \frac{i\,\pi\,\nu}{2} + \frac{i\,m\,\pi}{2}\right)\right) \Big/$$

$$(2\,i\,d\,k - i\,d\,m - 2\,i\,f\,s + i\,f\,\nu)^{3/2} + \left(c\sqrt{2\pi}\,(2s-\nu)\cosh\!\left(-\frac{c^2\,(\nu-2s)^2}{8\,d\,k - 4\,d\,m + 8\,f\,s - 4\,f\,\nu} + \right.\right.$$

$$\left. 2\,e\,k - e\,m + 2\,g\,s - g\,\nu + \frac{1}{2}\,i\,\pi\,(m+\nu)\right)C\!\left(\frac{c\,(2s-\nu) + 2\,(2\,d\,k - d\,m + 2\,f\,s - f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k - d\,m + 2\,f\,s - f\,\nu)}}\right) +$$

$$c\,i\sqrt{2\pi}\,(2s-\nu)\,S\!\left(\frac{c\,(2s-\nu) + 2\,(2\,d\,k - d\,m + 2\,f\,s - f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,(2\,d\,k - d\,m + 2\,f\,s - f\,\nu)}}\right)\sinh\!\left(-\frac{c^2\,(\nu-2s)^2}{8\,d\,k - 4\,d\,m + 8\,f\,s - 4\,f\,\nu} + \right.$$

$$2\,e\,k - e\,m + 2\,g\,s - g\,v + \frac{1}{2}\,i\,\pi\,(m+v)\Bigg) + 2\,i\,\sqrt{2\,i\,d\,k - i\,d\,m + 2\,i\,f\,s - i\,f\,v}$$

$$\sinh\!\left(\frac{1}{2}\left(4\,e\,k + 4\,d\,z\,k - 2\,e\,m + 4\,g\,s - 2\,g\,v + i\,\pi\,v - 2\,d\,m\,z + 4\,f\,s\,z - 2\,f\,v\,z + 4\,c\,s\,\sqrt{z} - \right.\right.$$

$$\left.\left.\left.\left. 2\,c\,v\,\sqrt{z} + i\,m\,\pi\right)\right)\right) \Big/ \left(2\,i\,d\,k - i\,d\,m + 2\,i\,f\,s - i\,f\,v\right)^{3/2}\right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\sinh^m(b\,z^r)\,\sinh^v(c\,z^r + f\,z + g)$

01.19.21.1662.01

$$\int \sinh^m\!\left(b\,z^2\right)\sinh^v\!\left(c\,z^2 + f\,z + g\right)dz =$$

$$2^{-m-v}\,i^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)\,(1 - v \bmod 2) + 2^{-m-v+\frac{1}{2}}\,i^{-m+v+1}\,\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\!\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c} + \frac{\pi\,v}{2} + g\,i\,(v-2\,k)\right)C\!\left(\frac{f\,(v-2\,k) + 2\,c\,z\,(v-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right) + \right.\right.$$

$$\left.\left. S\!\left(\frac{f\,(v-2\,k) + 2\,c\,z\,(v-2\,k)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)\sin\!\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c} + \frac{\pi\,v}{2} + g\,i\,(v-2\,k)\right)\right)\right) +$$

$$2^{-m-v+\frac{1}{2}}\,i^{m-v+1}\,\sqrt{\pi}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cos\!\left(\frac{m\,\pi}{2}\right)C\!\left(\frac{b\,(m-2\,k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,b\,(m-2\,k)}}\right) + S\!\left(\frac{b\,(m-2\,k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{i\,b\,(m-2\,k)}}\right)\sin\!\left(\frac{m\,\pi}{2}\right)\right)}{\sqrt{i\,b\,(m-2\,k)}} +$$

$$2^{-m-v+\frac{1}{2}}\,i^{m+v}\,\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(i\cosh\!\left(\frac{1}{2}\,i\,\pi\,(m-v) - g\,(2\,s-v) + \frac{i\,(i\,f\,v - 2\,i\,f\,s)^2}{4\,(2\,i\,b\,k - i\,b\,m - 2\,i\,c\,s + i\,c\,v)}\right)\right.\right.\right.$$

$$C\!\left(\frac{-2\,f\,s + f\,v + 2\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,b\,k - i\,b\,m - 2\,i\,c\,s + i\,c\,v}}\right) - S\!\left(\frac{-2\,f\,s + f\,v + 2\,(2\,b\,k - b\,m - 2\,c\,s + c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,b\,k - i\,b\,m - 2\,i\,c\,s + i\,c\,v}}\right)$$

$$\left.\left.\sinh\!\left(\frac{1}{2}\,i\,\pi\,(m-v) - g\,(2\,s-v) + \frac{i\,(i\,f\,v - 2\,i\,f\,s)^2}{4\,(2\,i\,b\,k - i\,b\,m - 2\,i\,c\,s + i\,c\,v)}\right)\right)\right) \Big/$$

$$\left(\sqrt{2\,i\,b\,k - i\,b\,m - 2\,i\,c\,s + i\,c\,v}\right) + \left(i\cosh\!\left(g\,(2\,s-v) + \frac{1}{2}\,i\,\pi\,(m+v) + \frac{i\,(2\,i\,f\,s - i\,f\,v)^2}{4\,(2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v)}\right)\right.$$

$$C\!\left(\frac{2\,f\,s - f\,v + 2\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v}}\right) - S\!\left(\frac{2\,f\,s - f\,v + 2\,(2\,b\,k - b\,m + 2\,c\,s - c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v}}\right)$$

$$\left.\left.\sinh\!\left(g\,(2\,s-v) + \frac{1}{2}\,i\,\pi\,(m+v) + \frac{i\,(2\,i\,f\,s - i\,f\,v)^2}{4\,(2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v)}\right)\right)\right) \Big/$$

$$\left.\left(\sqrt{2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v}\right)\right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.1663.01

$$\int \sinh^m(b\sqrt{z})\sinh^\nu(\sqrt{z}\,c+g+f\,z)\,dz =$$

$$2^{-m-\nu}\,i^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+2^{-m-\nu}\,i^{\nu-m}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2k))^{3/2}}$$

$$\Bigg((-1)^k\binom{\nu}{k}\Bigg(c\sqrt{2\pi}\,(\nu-2k)\cos\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)C\left(\frac{c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)}{\sqrt{2\pi}\,\sqrt{i\,f\,(\nu-2k)}}\right)+$$

$$c\sqrt{2\pi}\,(\nu-2k)\,S\left(\frac{c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)}{\sqrt{2\pi}\,\sqrt{i\,f\,(\nu-2k)}}\right)\sin\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)+$$

$$2\sqrt{i\,f\,(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+g\,i\,(\nu-2k)+f\,i\,(\nu-2k)\,z+c\,i\,(\nu-2k)\sqrt{z}\right)\Bigg)\Bigg)-$$

$$\frac{1}{b^2}\Bigg(2^{-m-\nu+2}\,i^{m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cosh\left(b\sqrt{z}\,(2k-m)+\frac{i\,m\,\pi}{2}\right)-\right.\right.$$

$$\left.\left.b\,(2k-m)\sqrt{z}\,\sinh\left(b\sqrt{z}\,(2k-m)+\frac{i\,m\,\pi}{2}\right)\right)\right)\Bigg)+2^{-m-\nu}\,i^{m+\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\frac{1}{(i\,f\,\nu-2\,i\,f\,s)^{3/2}}\Bigg(i\sqrt{2\pi}\,(-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,\nu)\cosh\Bigg(-2\,g\,s+g\,\nu-\frac{1}{2}\,i$$

$$\pi\,(\nu-m)+\frac{i\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(i\,f\,\nu-2\,i\,f\,s)}\Bigg)C\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,\nu)\,S\left(\frac{2\,b\,k-b\,m-2\,c\,s+c\,\nu+2\,(f\,\nu-2\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)$$

$$\sinh\left(-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)+\frac{i\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(i\,f\,\nu-2\,i\,f\,s)}\right)+2\,i\sqrt{i\,f\,\nu-2\,i\,f\,s}$$

$$\sinh\left(-2\,g\,s+g\,\nu-\frac{1}{2}\,i\,\pi\,(\nu-m)-i\,(i\,f\,\nu-2\,i\,f\,s)\,z-i\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,\nu)\sqrt{z}\right)\Bigg)+$$

$$\frac{1}{(2\,i\,f\,s-i\,f\,\nu)^{3/2}}\Bigg(i\sqrt{2\pi}\,(-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,\nu)\cosh\Bigg(2\,g\,s-g\,\nu+\frac{1}{2}\,i\,\pi\,(m+\nu)+$$

$$\frac{i\,(2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,i\,f\,s-i\,f\,\nu)}\Bigg)C\left(\frac{2\,b\,k-b\,m+2\,c\,s-c\,\nu+2\,(2\,f\,s-f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,\nu}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v)\,S\!\left(\frac{2\,b\,k - b\,m + 2\,c\,s - c\,v + 2\,(2\,f\,s - f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s - i\,f\,v}}\right)\sinh\!\Bigg(2\,g\,s -$$

$$g\,v + \frac{1}{2}\,i\,\pi\,(m+v) + \frac{i\,(2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v)^2}{4\,(2\,i\,f\,s - i\,f\,v)}\Bigg) + 2\,i\,\sqrt{2\,i\,f\,s - i\,f\,v}\,\sinh\!\Bigg(2\,g\,s - g\,v +$$

$$\frac{1}{2}\,i\,\pi\,(m+v) - i\,(2\,i\,f\,s - i\,f\,v)\,z - i\,(2\,i\,b\,k - i\,b\,m + 2\,i\,c\,s - i\,c\,v)\sqrt{z}\Bigg)\Bigg)\Bigg)\;/;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sinh^m(b\,z^r + e)\,\sinh^v(c\,z^r + f\,z + g)$

01.19.21.1664.01

$$\int \sinh^m(b z^2 + e) \sinh^\nu(c z^2 + f z + g) \, dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu+\frac{1}{2}} i^{-m+\nu+1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(-\frac{i (\nu - 2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k) \right) C\left(\frac{f(\nu - 2k) + 2 c z (\nu - 2k)}{\sqrt{2\pi} \sqrt{i c (\nu - 2k)}} \right) + S\left(\frac{f(\nu - 2k) + 2 c z (\nu - 2k)}{\sqrt{2\pi} \sqrt{i c (\nu - 2k)}} \right) \sin\left(-\frac{i (\nu - 2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k) \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{m-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{i b (m - 2k)}} \left((-1)^k \binom{m}{k} \left(i \cosh\left(e(m - 2k) - \frac{i m \pi}{2} \right) C\left(\frac{b(m - 2k) \sqrt{\frac{2}{\pi}} \, z}{\sqrt{i b (m - 2k)}} \right) - S\left(\frac{b(m - 2k) \sqrt{\frac{2}{\pi}} \, z}{\sqrt{i b (m - 2k)}} \right) \sinh\left(e(m - 2k) - \frac{i m \pi}{2} \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{m+\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(i \cosh\left(e(2k - m) + \frac{1}{2} i \pi (m - \nu) - g(2s - \nu) + \frac{i (i f \nu - 2 i f s)^2}{4(2 i b k - i b m - 2 i c s + i c \nu)} \right) C\left(\frac{-2 f s + f \nu + 2(2 b k - b m - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c \nu}} \right) - S\left(\frac{-2 f s + f \nu + 2(2 b k - b m - 2 c s + c \nu) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c \nu}} \right) \sinh\left(e(2k - m) + \frac{1}{2} i \pi (m - \nu) - g(2s - \nu) + \frac{i (i f \nu - 2 i f s)^2}{4(2 i b k - i b m - 2 i c s + i c \nu)} \right) \right) \Big/ \left(\sqrt{2 i b k - i b m - 2 i c s + i c \nu} \right) + \left(i \cosh\left(e(2k - m) + g(2s - \nu) + \frac{1}{2} i \pi (m + \nu) + \frac{i (2 i f s - i f \nu)^2}{4(2 i b k - i b m + 2 i c s - i c \nu)} \right) C\left(\frac{2 f s - f \nu + 2(2 b k - b m + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c \nu}} \right) - S\left(\frac{2 f s - f \nu + 2(2 b k - b m + 2 c s - c \nu) z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c \nu}} \right) \sinh\left(e(2k - m) + g(2s - \nu) + \frac{1}{2} i \pi (m + \nu) + \frac{i (2 i f s - i f \nu)^2}{4(2 i b k - i b m + 2 i c s - i c \nu)} \right) \right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c \nu} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1665.01

$$\int \sinh^m(\sqrt{z} \, b + e) \sinh^\nu(\sqrt{z} \, c + f z + g) \, dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} i^{\nu-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i f (\nu - 2k))^{3/2}}$$

$$\left((-1)^k \binom{v}{k} \left(c\sqrt{2\pi}\,(v-2k)\cos\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i\,(v-2k)\right) C\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)+\right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\,S\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)\sin\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i\,(v-2k)\right)+$$

$$\left.\left.2\sqrt{i\,f\,(v-2k)}\,\sin\left(\frac{\pi v}{2}+g\,i\,(v-2k)+f\,i\,(v-2k)\,z+c\,i\,(v-2k)\sqrt{z}\right)\right)\right)-$$

$$\frac{1}{b^2}\left(2^{-m-v+2}\,i^{m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cosh\left(2ek-em+b(2k-m)\sqrt{z}+\frac{i\,m\,\pi}{2}\right)-\right.\right.\right.$$

$$\left.\left.\left.b(2k-m)\sqrt{z}\,\sinh\left(2ek-em+b(2k-m)\sqrt{z}+\frac{i\,m\,\pi}{2}\right)\right)\right)\right)+2^{-m-v}\,i^{m+v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i\,f\,v-2\,i\,f\,s)^{3/2}}\left(i\sqrt{2\pi}\,(-2\,b\,i\,k+i\,b\,m+2\,i\,c\,s-i\,c\,v)\cosh\left(2ek-em-2gs+gv-\frac{1}{2}\,i\right.\right.\right.$$

$$\left.\pi(v-m)+\frac{i(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)^2}{4(i\,f\,v-2\,i\,f\,s)}\right)C\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\,S\left(\frac{2bk-bm-2cs+cv+2(fv-2fs)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)\sinh\left(2ek-\right.$$

$$\left.em-2gs+gv-\frac{1}{2}\,i\,\pi(v-m)+\frac{i(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)^2}{4(i\,f\,v-2\,i\,f\,s)}\right)+2\,i\sqrt{i\,f\,v-2\,i\,f\,s}\,\sinh\left(\right.$$

$$\left.\left.2ek-em-2gs+gv-\frac{1}{2}\,i\,\pi(v-m)-i(i\,f\,v-2\,i\,f\,s)\,z-i(2\,i\,b\,k-i\,b\,m-2\,i\,c\,s+i\,c\,v)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2\,i\,f\,s-i\,f\,v)^{3/2}}\left(i\sqrt{2\pi}\,(-2\,b\,i\,k+i\,b\,m-2\,i\,c\,s+i\,c\,v)\cosh\left(2ek-em+2gs-gv+\frac{1}{2}\,i\,\pi(m+v)+\right.\right.$$

$$\left.\frac{i(2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)^2}{4(2\,i\,f\,s-i\,f\,v)}\right)C\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,b\,k-i\,b\,m+2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2bk-bm+2cs-cv+2(2fs-fv)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sinh\left(2 e k - e m + 2 g s - g v + \frac{1}{2} i \pi (m + v) + \frac{i (2 i b k - i b m + 2 i c s - i c v)^2}{4 (2 i f s - i f v)}\right) +$$
$$2 i \sqrt{2 i f s - i f v} \sinh\left(2 e k - e m + 2 g s - g v + \frac{1}{2} i \pi (m + v) - i (2 i f s - i f v) z -\right.$$
$$\left.\left.\left. i (2 i b k - i b m + 2 i c s - i c v) \sqrt{z}\right)\right)\right) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\sinh^m(b z^r + d z) \sinh^v(c z^r + f z + g)$

01.19.21.1666.01

$$\int \sinh^m(b z^2 + d z) \sinh^\nu(c z^2 + f z + g) \, dz = z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)(2 i)^{-m-\nu} + 2^{-m-\nu+\frac{1}{2}} i^{m-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\sqrt{i b (m - 2k)}} \left((-1)^k \binom{m}{k} \left(i \cosh\left(\frac{(m-2k) d^2}{4b} + \frac{i m \pi}{2} \right) C\left(\frac{d (m-2k) + 2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{d (m-2k) + 2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}} \right) \sinh\left(\frac{(m-2k) d^2}{4b} + \frac{i m \pi}{2} \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{-m+\nu+1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(-\frac{i (\nu-2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k) \right) C\left(\frac{f (\nu-2k) + 2 c z (\nu-2k)}{\sqrt{2\pi} \sqrt{i c (\nu-2k)}} \right) + S\left(\frac{f (\nu-2k) + 2 c z (\nu-2k)}{\sqrt{2\pi} \sqrt{i c (\nu-2k)}} \right) \sin\left(-\frac{i (\nu-2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k) \right) \right) \right) + 2^{-m-\nu+\frac{1}{2}} i^{m+\nu} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(i \cosh\left(-\frac{(2 d k - d m - 2 f s + f \nu)^2}{8 b k - 4 b m - 8 c s + 4 c \nu} + \frac{1}{2} i \pi (m - \nu) + g (\nu - 2s) \right) C\left(\frac{2 d k + 4 b z k - d m - 2 f s + f \nu - 2 b m z - 4 c s z + 2 c \nu z}{\sqrt{2\pi} \sqrt{i (2 b k - b m - 2 c s + c \nu)}} \right) - S\left(\frac{2 d k + 4 b z k - d m - 2 f s + f \nu - 2 b m z - 4 c s z + 2 c \nu z}{\sqrt{2\pi} \sqrt{i (2 b k - b m - 2 c s + c \nu)}} \right) \sinh\left(-\frac{(2 d k - d m - 2 f s + f \nu)^2}{8 b k - 4 b m - 8 c s + 4 c \nu} + \frac{1}{2} i \pi (m - \nu) + g (\nu - 2s) \right) \right) \Big/ \left(\sqrt{2 i b k - i b m - 2 i c s + i c \nu} \right) + \left(i \cosh\left(-\frac{(d (m-2k) + f (\nu - 2s))^2}{8 b k - 4 b m + 8 c s - 4 c \nu} + g (2s - \nu) + \frac{1}{2} i \pi (m + \nu) \right) C\left(\frac{2 d k + 4 b z k - d m + 2 f s - f \nu - 2 b m z + 4 c s z - 2 c \nu z}{\sqrt{2\pi} \sqrt{i (2 b k - b m + 2 c s - c \nu)}} \right) - S\left(\frac{2 d k + 4 b z k - d m + 2 f s - f \nu - 2 b m z + 4 c s z - 2 c \nu z}{\sqrt{2\pi} \sqrt{i (2 b k - b m + 2 c s - c \nu)}} \right) \sinh\left(-\frac{(d (m-2k) + f (\nu - 2s))^2}{8 b k - 4 b m + 8 c s - 4 c \nu} + g (2s - \nu) + \frac{1}{2} i \pi (m + \nu) \right) \right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c \nu} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.1667.01

$$\int \sinh^m\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-m-\nu} i^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + 2^{-m-\nu} i^{\nu-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{(i f (\nu - 2k))^{3/2}}$$

$$\left((-1)^k \binom{v}{k} \left(c\sqrt{2\pi}\,(v-2k)\cos\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)C\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\sqrt{i f(v-2k)}}\right)+\right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\,S\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{\sqrt{2\pi}\sqrt{i f(v-2k)}}\right)\sin\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)+$$

$$\left.\left.2\sqrt{i f(v-2k)}\,\sin\left(\frac{\pi v}{2}+g\,i(v-2k)+f\,i(v-2k)z+c\,i(v-2k)\sqrt{z}\right)\right)\right)+2^{-m-v}\,i^{m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(i\,d(m-2k))^{3/2}}\left((-1)^k\binom{m}{k}\left(b(m-2k)\sqrt{2\pi}\,\cosh\left(\frac{(m-2k)b^2}{4d}+\frac{i\,m\pi}{2}\right)C\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{i\,d(m-2k)}\sqrt{2\pi}}\right)-\right.\right.$$

$$i\,b(m-2k)\sqrt{2\pi}\;S\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{i\,d(m-2k)}\sqrt{2\pi}}\right)\sinh\left(\frac{(m-2k)b^2}{4d}+\frac{i\,m\pi}{2}\right)+$$

$$\left.\left.2\,i\sqrt{i\,d(m-2k)}\,\sinh\left(-\frac{1}{2}\,i\,\pi\,m+d(m-2k)z+b(m-2k)\sqrt{z}\right)\right)\right)+$$

$$2^{-m-v}\,i^{m+v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(2bk-bm-2cs+cv)\cosh\left(-\frac{(2bk-bm-2cs+cv)^2}{8dk-4dm-8fs+4fv}-\right.\right.\right.\right.$$

$$\left.2gs+gv-\frac{1}{2}\,i\,\pi(v-m)\right)C\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,dk-i\,dm-2\,i\,fs+i\,fv}}\right)+$$

$$i\sqrt{2\pi}\,(2bk-bm-2cs+cv)\,S\left(\frac{2bk-bm-2cs+cv+2(2dk-dm-2fs+fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,dk-i\,dm-2\,i\,fs+i\,fv}}\right)\sinh\left(\right.$$

$$\left.-\frac{(2bk-bm-2cs+cv)^2}{8dk-4dm-8fs+4fv}-2gs+gv-\frac{1}{2}\,i\,\pi(v-m)\right)+2\,i\sinh\left(b\sqrt{z}\,(2k-m)-2gs+gv-\right.$$

$$\left.\left.\frac{1}{2}\,i\,\pi(v-m)+(2dk-dm-2fs+fv)z+c(v-2s)\sqrt{z}\right)\sqrt{2\,i\,dk-i\,dm-2\,i\,fs+i\,fv}\right)\Big/$$

$$(2\,i\,dk-i\,dm-2\,i\,fs+i\,fv)^{3/2}+\left(\sqrt{2\pi}\,(2bk-bm+2cs-cv)\cosh\left(-\frac{(b(m-2k)+c(v-2s))^2}{8dk-4dm+8fs-4fv}+\right.\right.$$

$$\left.2gs-gv+\frac{1}{2}\,i\,\pi(m+v)\right)C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,dk-i\,dm+2\,i\,fs-i\,fv}}\right)+$$

$$i\sqrt{2\pi}\,(2bk-bm+2cs-cv)\,S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,dk-i\,dm+2\,i\,fs-i\,fv}}\right)$$

$$\sinh\left(-\frac{(b\,(m-2\,k)+c\,(v-2\,s))^2}{8\,d\,k-4\,d\,m+8\,f\,s-4\,f\,v}+2\,g\,s-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)\right)+2\,i\,\sinh\left(\frac{1}{2}\left(4\,d\,z\,k+4\,b\,\sqrt{z}\,k+4\,g\,s-2\,g\,v+i\,\pi\,v+4\,f\,s\,z-2\,f\,v\,z+m\left(i\,\pi-2\left(\sqrt{z}\,b+d\,z\right)\right)+4\,c\,s\,\sqrt{z}-2\,c\,v\,\sqrt{z}\right)\right)$$

$$\left.\sqrt{2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v}\right)\Big/(2\,i\,d\,k-i\,d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sinh^m\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.1668.01

$$\int \sinh^m\left(b z^2+d z+e\right) \sinh^v\left(c z^2+f z+g\right) dz = z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)(2 i)^{-m-v} + 2^{-m-v+\frac{1}{2}} i^{m-v} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\sqrt{i b (m-2k)}} \left((-1)^k \binom{m}{k} \left(i \cosh\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{i m \pi}{2}\right) C\left(\frac{d(m-2k)+2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{d(m-2k)+2 b z (m-2k)}{\sqrt{i b (m-2k)} \sqrt{2\pi}}\right) \sinh\left(\frac{(m-2k) d^2}{4b} - e(m-2k) + \frac{i m \pi}{2}\right)\right)\right) + 2^{-m-v+\frac{1}{2}} i^{-m+v+1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \frac{1}{\sqrt{i c (v-2k)}} \left((-1)^k \binom{v}{k} \left(\cos\left(-\frac{i (v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k)\right) C\left(\frac{f(v-2k)+2 c z (v-2k)}{\sqrt{2\pi} \sqrt{i c (v-2k)}}\right) + S\left(\frac{f(v-2k)+2 c z (v-2k)}{\sqrt{2\pi} \sqrt{i c (v-2k)}}\right) \sin\left(-\frac{i (v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k)\right)\right)\right) + 2^{-m-v+\frac{1}{2}} i^{m+v} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left(\left(i \cosh\left(-\frac{(-2dk+dm+f(v-2s))^2}{4b(2k-m)+8cs-4cv} + e(2k-m) + g(2s-v) + \frac{1}{2} i \pi (m+v)\right) C\left(\frac{2dk-dm+2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c v}}\right) - S\left(\frac{2dk-dm+2fs-fv+2(2bk-bm+2cs-cv)z}{\sqrt{2\pi} \sqrt{2 i b k - i b m + 2 i c s - i c v}}\right) \sinh\left(-\frac{(-2dk+dm+f(v-2s))^2}{4b(2k-m)+8cs-4cv} + e(2k-m) + g(2s-v) + \frac{1}{2} i \pi (m+v)\right)\right) \Big/ \left(\sqrt{2 i b k - i b m + 2 i c s - i c v}\right) + \left(i \cosh\left(-\frac{(d(2k-m)+f(v-2s))^2}{4b(2k-m)+4c(v-2s)} + e(2k-m) + \frac{1}{2} i \pi (m-v) - g(2s-v)\right) C\left(\frac{2dk-dm-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c v}}\right) - S\left(\frac{2dk-dm-2fs+fv+2(2bk-bm-2cs+cv)z}{\sqrt{2\pi} \sqrt{2 i b k - i b m - 2 i c s + i c v}}\right) \sinh\left(-\frac{(d(2k-m)+f(v-2s))^2}{4b(2k-m)+4c(v-2s)} + e(2k-m) + \frac{1}{2} i \pi (m-v) - g(2s-v)\right)\right) \Big/ \left(\sqrt{2 i b k - i b m - 2 i c s + i c v}\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.1669.01

$$\int \sinh^m\left(b z^2+d z+e\right) \sinh^v\left(c z^2+f z+g\right) dz = i^{m+v} 2^{-m-v} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) z + \frac{1}{b} \left(\left(i^{m+v} 2^{-m-v-1} \sqrt{\pi}\right) \binom{v}{\frac{v}{2}} (1-v \bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2s}\left((-1)^s\binom{m}{s}\left(e^{\frac{d^2(m-2s)^2+4b\left(\frac{i m\pi}{2}-e(m-2s)\right)(m-2s)}{4b(m-2s)}}\sqrt{-b(m-2s)}\,\operatorname{erfi}\left(\frac{d(m-2s)+2bz(m-2s)}{2\sqrt{-b(m-2s)}}\right)+\right.\right.$$

$$\left.\left.e^{-\frac{d^2(m-2s)^2-4b\left(e(m-2s)-\frac{i m\pi}{2}\right)(m-2s)}{4b(m-2s)}}\sqrt{b(m-2s)}\,\operatorname{erfi}\left(\frac{d(m-2s)+2bz(m-2s)}{2\sqrt{b(m-2s)}}\right)\right)\right)+$$

$$\frac{1}{c}\left(\left(i^{m+v}\,2^{-m-v-1}\sqrt{\pi}\right)\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{v-2k}\left((-1)^k\binom{v}{k}\left(e^{\frac{f^2(v-2k)^2+4c\left(\frac{i\pi v}{2}-g(v-2k)\right)(v-2k)}{4c(v-2k)}}\right.\right.\right.$$

$$\sqrt{-c(v-2k)}\,\operatorname{erfi}\left(\frac{f(v-2k)+2cz(v-2k)}{2\sqrt{-c(v-2k)}}\right)+$$

$$\left.\left.\left.e^{-\frac{f^2(v-2k)^2-4c(v-2k)\left(g(v-2k)-\frac{i\pi v}{2}\right)}{4c(v-2k)}}\sqrt{c(v-2k)}\,\operatorname{erfi}\left(\frac{f(v-2k)+2cz(v-2k)}{2\sqrt{c(v-2k)}}\right)\right)\right)\right)+$$

$$i^{m+v}\,2^{-m-v-1}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\left(\left(\left(e^{-\frac{(d(m-2s)+f(2k-v))^2-4(b(m-2s)+c(2k-v))\left(e(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)}{4(b(m-2s)+c(2k-v))}}\sqrt{b(m-2s)+c(2k-v)}\right.\right.\right.$$

$$(-b(m-2s)-c(2k-v))\operatorname{erfi}\left(\frac{d(m-2s)+f(2k-v)+2(b(m-2s)+c(2k-v))z}{2\sqrt{b(m-2s)+c(2k-v)}}\right)+$$

$$e^{-\frac{(-d(m-2s)-f(2k-v))^2-4(-b(m-2s)-c(2k-v))\left(-e(m-2s)-g(2k-v)-\frac{1}{2}i\pi(v-m)\right)}{4(-b(m-2s)-c(2k-v))}}(b(m-2s)+c(2k-v))$$

$$\left.\sqrt{-b(m-2s)-c(2k-v)}\,\operatorname{erfi}\left(\frac{-d(m-2s)-f(2k-v)-2(b(m-2s)+c(2k-v))z}{2\sqrt{-b(m-2s)-c(2k-v)}}\right)\right)\Big/$$

$$((-b(m-2s)-c(2k-v))(b(m-2s)+c(2k-v)))+$$

$$\left(e^{-\frac{(d(m-2s)+f(v-2k))^2-4(b(m-2s)+c(v-2k))\left(e(m-2s)+g(v-2k)-\frac{1}{2}i\pi(m+v)\right)}{4(b(m-2s)+c(v-2k))}}\sqrt{b(m-2s)+c(v-2k)}\right.$$

$$(-b(m-2s)-c(v-2k))\operatorname{erfi}\left(\frac{d(m-2s)+f(v-2k)+2(b(m-2s)+c(v-2k))z}{2\sqrt{b(m-2s)+c(v-2k)}}\right)+$$

$$e^{-\frac{(-d(m-2s)-f(v-2k))^2-4(-b(m-2s)-c(v-2k))\left(-e(m-2s)-g(v-2k)+\frac{1}{2}i\pi(m+v)\right)}{4(-b(m-2s)-c(v-2k))}}(b(m-2s)+c(v-2k))$$

$$\left.\sqrt{-b(m-2s)-c(v-2k)}\,\operatorname{erfi}\left(\frac{-d(m-2s)-f(v-2k)-2(b(m-2s)+c(v-2k))z}{2\sqrt{-b(m-2s)-c(v-2k)}}\right)\right)\Big/$$

$$\left.((-b(m-2s)-c(v-2k))(b(m-2s)+c(v-2k)))\right)/;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.1670.01

$$\int \sinh^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu\left(\sqrt{z}\, c + f\, z + g\right) dz = 2^{-m-\nu}\, i^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2) + 2^{-m-\nu}\, i^{\nu-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i\, f\, (\nu - 2\, k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c\, (\nu - 2\, k) \sqrt{2\, \pi}\, \cos\left(-\frac{i\, (\nu - 2\, k)\, c^2}{4\, f} + g\, i\, (\nu - 2\, k) + \frac{\pi\, \nu}{2}\right) C\left(\frac{c\, (\nu - 2\, k) + 2\, f\, \sqrt{z}\, (\nu - 2\, k)}{\sqrt{2\, \pi}\, \sqrt{i\, f\, (\nu - 2\, k)}}\right) + c\, (\nu - 2\, k) \sqrt{2\, \pi}\, S\left(\frac{c\, (\nu - 2\, k) + 2\, f\, \sqrt{z}\, (\nu - 2\, k)}{\sqrt{2\, \pi}\, \sqrt{i\, f\, (\nu - 2\, k)}}\right) \sin\left(-\frac{i\, (\nu - 2\, k)\, c^2}{4\, f} + g\, i\, (\nu - 2\, k) + \frac{\pi\, \nu}{2}\right) + 2 \sqrt{i\, f\, (\nu - 2\, k)}\, \sin\left(g\, i\, (\nu - 2\, k) + f\, i\, z\, (\nu - 2\, k) + c\, i\, \sqrt{z}\, (\nu - 2\, k) + \frac{\pi\, \nu}{2}\right)\right)\right) + 2^{-m-\nu}\, i^{m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(i\, d\, (m - 2\, k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b\, (m - 2\, k) \sqrt{2\, \pi}\, \cosh\left(\frac{(m - 2\, k)\, b^2}{4\, d} - e\, (m - 2\, k) + \frac{i\, m\, \pi}{2}\right) C\left(\frac{b\, (m - 2\, k) + 2\, d\, \sqrt{z}\, (m - 2\, k)}{\sqrt{i\, d\, (m - 2\, k)}\, \sqrt{2\, \pi}}\right) - i\, b\, (m - 2\, k) \sqrt{2\, \pi}\, S\left(\frac{b\, (m - 2\, k) + 2\, d\, \sqrt{z}\, (m - 2\, k)}{\sqrt{i\, d\, (m - 2\, k)}\, \sqrt{2\, \pi}}\right) \sinh\left(\frac{(m - 2\, k)\, b^2}{4\, d} - e\, (m - 2\, k) + \frac{i\, m\, \pi}{2}\right) + 2\, i\, \sqrt{i\, d\, (m - 2\, k)}\, \sinh\left(e\, (m - 2\, k) + d\, z\, (m - 2\, k) + b\, \sqrt{z}\, (m - 2\, k) - \frac{i\, m\, \pi}{2}\right)\right)\right) + 2^{-m-\nu}\, i^{m+\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\sqrt{2\, \pi}\, (2\, b\, k - b\, m - 2\, c\, s + c\, \nu) \cosh\left(-\frac{(2\, b\, k - b\, m - 2\, c\, s + c\, \nu)^2}{8\, d\, k - 4\, d\, m - 8\, f\, s + 4\, f\, \nu} + 2\, e\, k - \frac{1}{2}\, i\, \pi\, (\nu - m) - e\, m - 2\, g\, s + g\, \nu\right) C\left(\frac{2\, b\, k - b\, m - 2\, c\, s + c\, \nu + 2\, (2\, d\, k - d\, m - 2\, f\, s + f\, \nu) \sqrt{z}}{\sqrt{2\, \pi}\, \sqrt{2\, i\, d\, k - i\, d\, m - 2\, i\, f\, s + i\, f\, \nu}}\right) + i\, \sqrt{2\, \pi}\, (2\, b\, k - b\, m - 2\, c\, s + c\, \nu)\, S\left(\frac{2\, b\, k - b\, m - 2\, c\, s + c\, \nu + 2\, (2\, d\, k - d\, m - 2\, f\, s + f\, \nu) \sqrt{z}}{\sqrt{2\, \pi}\, \sqrt{2\, i\, d\, k - i\, d\, m - 2\, i\, f\, s + i\, f\, \nu}}\right) \sinh\left(-\frac{(2\, b\, k - b\, m - 2\, c\, s + c\, \nu)^2}{8\, d\, k - 4\, d\, m - 8\, f\, s + 4\, f\, \nu} + 2\, e\, k - \frac{1}{2}\, i\, \pi\, (\nu - m) - e\, m - 2\, g\, s + g\, \nu\right) + 2\, i\, \sqrt{2\, i\, d\, k - i\, d\, m - 2\, i\, f\, s + i\, f\, \nu}\, \sinh\left(2\, e\, k - \frac{1}{2}\, i\, \pi\, (\nu - m) - e\, m - 2\, g\, s + g\, \nu + (2\, d\, k - d\, m - 2\, f\, s + f\, \nu)\, z + b\, (2\, k - m) \sqrt{z} + c\, (\nu - 2\, s) \sqrt{z}\right)\right) \Big/ (2\, i\, d\, k - i\, d\, m - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \right.$$

$$\left(\sqrt{2\pi}\,(2bk-bm+2cs-cv)\cosh\left(-\frac{(b(m-2k)+c(v-2s))^2}{8dk-4dm+8fs-4fv}+2ek-em+2gs-gv+\frac{1}{2}i\pi(m+v)\right)\right.$$

$$C\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2idk-idm+2ifs-ifv}}\right)+i\sqrt{2\pi}\,(2bk-bm+2cs-cv)$$

$$S\left(\frac{2bk-bm+2cs-cv+2(2dk-dm+2fs-fv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2idk-idm+2ifs-ifv}}\right)\sinh\left(-\frac{(b(m-2k)+c(v-2s))^2}{8dk-4dm+8fs-4fv}+\right.$$

$$\left.2ek-em+2gs-gv+\frac{1}{2}i\pi(m+v)\right)+2i\sqrt{2idk-idm+2ifs-ifv}$$

$$\sinh\left(2ek-em+2gs-gv+\frac{1}{2}i\pi(m+v)+(2dk-dm+2fs-fv)z+b(2k-m)\sqrt{z}+\right.$$

$$\left.\left.\left.c(2s-v)\sqrt{z}\right)\right)\Big/(2idk-idm+2ifs-ifv)^{3/2}\right)/;\, m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.1671.01

$$\int\sinh^m\left(\sqrt{z}\,b+dz+e\right)\sinh^v\left(\sqrt{z}\,c+fz+g\right)dz=$$

$$2^{-m-v}i^{-m-v}z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{m+s}e^{-e(m-2s)}\binom{m}{s}\left(\frac{2e^{dz(m-2s)+b\sqrt{z}\,(m-2s)+2\left(e(m-2s)-\frac{im\pi}{2}\right)}}{d(m-2s)}-\frac{2e^{-dz(m-2s)-b\sqrt{z}\,(m-2s)}}{d(m-2s)}-\right.$$

$$\frac{b\,e^{\frac{b^2(m-2s)}{4d}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b(m-2s)+2d\sqrt{z}\,(m-2s)}{2\sqrt{-d(m-2s)}}\right)}{(-d(m-2s))^{3/2}}-$$

$$\left.\frac{b\,e^{2\left(e(m-2s)-\frac{im\pi}{2}\right)-\frac{b^2(m-2s)}{4d}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b(m-2s)+2d\sqrt{z}\,(m-2s)}{2\sqrt{d(m-2s)}}\right)}{(d(m-2s))^{3/2}}\right)+$$

$$i^m\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+v}e^{-g(v-2k)}\binom{v}{k}\left(\frac{2e^{fz(v-2k)+c\sqrt{z}\,(v-2k)+2\left(g(v-2k)-\frac{i\pi v}{2}\right)}}{f(v-2k)}-\right.$$

$$\frac{2e^{-fz(v-2k)-c\sqrt{z}\,(v-2k)}}{f(v-2k)}-\frac{c\,e^{\frac{c^2(v-2k)}{4f}}\sqrt{\pi}\,(v-2k)\operatorname{erfi}\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{2\sqrt{-f(v-2k)}}\right)}{(-f(v-2k))^{3/2}}-$$

$$\left.\frac{c\, e^{2\left(g(v-2k)-\frac{i\pi v}{2}\right)-\frac{c^2(v-2k)}{4f}}\sqrt{\pi}\,(v-2k)\operatorname{erfi}\left(\frac{c(v-2k)+2f\sqrt{z}\,(v-2k)}{2\sqrt{f(v-2k)}}\right)}{(f(v-2k))^{3/2}}\right) + i^{m+v}\,2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\left(e^{-e(m-2s)-g(2k-v)-\frac{1}{2}i\pi(v-m)}\left(\frac{2\, e^{\sqrt{z}\,(b(m-2s)+c(2k-v))+2\left(e(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)+(d(m-2s)+f(2k-v))z}}{d(m-2s)+f(2k-v)} -\right.\right.$$

$$\left(e^{2\left(e(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)-\frac{(b(m-2s)+c(2k-v))^2}{4(d(m-2s)+f(2k-v))}}\sqrt{\pi}\,(b(m-2s)+c(2k-v))\right.$$

$$\left.\operatorname{erfi}\left(\frac{b(m-2s)+c(2k-v)+2(d(m-2s)+f(2k-v))\sqrt{z}}{2\sqrt{d(m-2s)+f(2k-v)}}\right)\right)\Big/(d(m-2s)+f(2k-v))^{3/2} +$$

$$\frac{2\, e^{\sqrt{z}\,(-b(m-2s)-c(2k-v))+(-d(m-2s)-f(2k-v))z}}{-d(m-2s)-f(2k-v)} - \left(e^{-\frac{(-b(m-2s)-c(2k-v))^2}{4(-d(m-2s)-f(2k-v))}}\sqrt{\pi}\,(b(m-2s)+c(2k-v))\right.$$

$$\left.\left.\operatorname{erfi}\left(\frac{b(m-2s)+c(2k-v)+2(d(m-2s)+f(2k-v))\sqrt{z}}{2\sqrt{-d(m-2s)-f(2k-v)}}\right)\right)\Big/(-d(m-2s)-f(2k-v))^{3/2}\right) +$$

$$e^{-e(m-2s)-g(v-2k)+\frac{1}{2}i\pi(m+v)}\left(\frac{2\, e^{\sqrt{z}\,(b(m-2s)+c(v-2k))+2\left(e(m-2s)+g(v-2k)-\frac{1}{2}i\pi(m+v)\right)+(d(m-2s)+f(v-2k))z}}{d(m-2s)+f(v-2k)} -\right.$$

$$\left(e^{2\left(e(m-2s)+g(v-2k)-\frac{1}{2}i\pi(m+v)\right)-\frac{(b(m-2s)+c(v-2k))^2}{4(d(m-2s)+f(v-2k))}}\sqrt{\pi}\,(b(m-2s)+c(v-2k))\right.$$

$$\left.\operatorname{erfi}\left(\frac{b(m-2s)+c(v-2k)+2(d(m-2s)+f(v-2k))\sqrt{z}}{2\sqrt{d(m-2s)+f(v-2k)}}\right)\right)\Big/(d(m-2s)+f(v-2k))^{3/2} +$$

$$\frac{2\, e^{\sqrt{z}\,(-b(m-2s)-c(v-2k))+(-d(m-2s)-f(v-2k))z}}{-d(m-2s)-f(v-2k)} - \left(e^{-\frac{(-b(m-2s)-c(v-2k))^2}{4(-d(m-2s)-f(v-2k))}}\sqrt{\pi}\,(b(m-2s)+c(v-2k))\right.$$

$$\left.\operatorname{erfi}\left(\frac{b(m-2s)+c(v-2k)+2(d(m-2s)+f(v-2k))\sqrt{z}}{2\sqrt{-d(m-2s)-f(v-2k)}}\right)\right)\Big/$$

$$\left.\left.(-d(m-2s)-f(v-2k))^{3/2}\right)\right) /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving rational functions of the direct function

Involving $\frac{1}{a+b\sinh(c z)}$

01.19.21.1672.01

$$\int \frac{1}{a+b\sinh(c z)}\,dz = \frac{2}{\sqrt{-a^2-b^2}\;c}\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c z}{2}\right)}{\sqrt{-a^2-b^2}}\right)$$

01.19.21.1673.01

$$\int \frac{1}{i+\sinh(z)}\,dz = i\tanh\left(\frac{1}{4}(\pi i-2z)\right)$$

01.19.21.1674.01

$$\int \frac{1}{i-\sinh(z)}\,dz = i\coth\left(\frac{1}{4}(\pi i-2z)\right)$$

Involving $(a+b\sinh(c z))^{-n}$

01.19.21.1675.01

$$\int \frac{1}{(a+b\sinh(c z))^2}\,dz = -\frac{1}{\left(-a^2-b^2\right)^{3/2} c\,(a+b\sinh(c z))}\left(2a\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c z}{2}\right)}{\sqrt{-a^2-b^2}}\right)(a+b\sinh(c z))-b\sqrt{-a^2-b^2}\cosh(c z)\right)$$

01.19.21.1676.01

$$\int \frac{1}{(i+\sinh(z))^2}\,dz = \frac{\cosh\left(\frac{3z}{2}\right)+3i\sinh\left(\frac{z}{2}\right)}{3\left(i\cosh\left(\frac{z}{2}\right)+\sinh\left(\frac{z}{2}\right)\right)^3}$$

01.19.21.1677.01

$$\int \frac{1}{(i-\sinh(z))^2}\,dz = \frac{\cosh\left(\frac{3z}{2}\right)-3i\sinh\left(\frac{z}{2}\right)}{3\left(\sinh\left(\frac{z}{2}\right)-i\cosh\left(\frac{z}{2}\right)\right)^3}$$

01.19.21.1678.01

$$\int \frac{1}{(a+b\sinh(c z))^3}\,dz = \frac{1}{2\left(a^2+b^2\right)^2 c}\left(\frac{2\left(2a^2-b^2\right)}{\sqrt{-a^2-b^2}}\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c z}{2}\right)}{\sqrt{-a^2-b^2}}\right)-\frac{b\cosh(c z)\left(4a^2+3b\sinh(c z)\,a+b^2\right)}{(a+b\sinh(c z))^2}\right)$$

01.19.21.1679.01

$$\int \frac{1}{(a+b\sinh(c z))^4}\,dz = \frac{1}{6\left(a^2+b^2\right)^3 c}\left(\frac{6a\left(2a^2-3b^2\right)}{\sqrt{-a^2-b^2}}\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c z}{2}\right)}{\sqrt{-a^2-b^2}}\right)+\frac{b\cosh(c z)\left(-36a^4+b^2a^2+6b\left(b^2-9a^2\right)\sinh(c z)\,a-8b^4+\left(4b^4-11a^2b^2\right)\cosh(2 c z)\right)}{2(a+b\sinh(c z))^3}\right)$$

Involving $\frac{1}{a+b\sinh^n(c z)}$

01.19.21.1680.01

$$\int \frac{1}{a+b\sinh^2(c z)}\,dz = \frac{\tanh^{-1}\left(\frac{\sqrt{a-b}\,\tanh(c z)}{\sqrt{a}}\right)}{\sqrt{a}\,\sqrt{a-b}\,c}$$

01.19.21.1681.01

$$\int \frac{1}{\sinh^2(z)+1}\,dz = \tanh(z)$$

01.19.21.1682.01

$$\int \frac{1}{1-\sinh^2(z)}\,dz = \frac{\tanh^{-1}\left(\sqrt{2}\,\tanh(z)\right)}{\sqrt{2}}$$

01.19.21.1683.01

$$\int \frac{1}{a+b\sinh^4(c z)}\,dz = \frac{i\tan^{-1}\left(\frac{\left(b-i\sqrt{a}\sqrt{b}\right)\tanh(c z)}{\sqrt{a+i\sqrt{b}\sqrt{a}}\,\sqrt{b}}\right)}{2\sqrt{a}\,\sqrt{a+i\sqrt{b}\sqrt{a}}\,c} - \frac{i\tan^{-1}\left(\frac{\left(b+i\sqrt{a}\sqrt{b}\right)\tanh(c z)}{\sqrt{a-i\sqrt{a}\sqrt{b}}\,\sqrt{b}}\right)}{2\sqrt{a}\,\sqrt{a-i\sqrt{a}\sqrt{b}}\,c}$$

Involving $\left(a+b\sinh^2(c z)\right)^{-n}$

01.19.21.1684.01

$$\int \frac{1}{\left(a+b\sinh^2(c z)\right)^2}\,dz = \frac{(2a-b)\tanh^{-1}\left(\frac{\sqrt{a-b}\,\tanh(c z)}{\sqrt{a}}\right)}{2a^{3/2}(a-b)^{3/2}c} - \frac{b\sinh(2cz)}{2a(a-b)c(2a-b+b\cosh(2cz))}$$

01.19.21.1685.01

$$\int \frac{1}{\left(a+b\sinh^2(c z)\right)^3}\,dz = \frac{1}{8a^{5/2}c}\left(\frac{8a^2-8ba+3b^2}{(a-b)^{5/2}}\tanh^{-1}\left(\frac{\sqrt{a-b}\,\tanh(c z)}{\sqrt{a}}\right) + \frac{\sqrt{a}\,b\left(-16a^2+16ba-3b^2-3(2a-b)b\cosh(2cz)\right)\sinh(2cz)}{(a-b)^2(2a-b+b\cosh(2cz))^2}\right)$$

Involving $\frac{\sinh(d z)}{a+b\sinh(c z)}$

01.19.21.1686.01

$$\int \frac{\sinh(d z)}{a+b\sinh(c z)}\,dz = \frac{1}{2b\sqrt{a^2+b^2}}\left(\frac{e^{(c-d)z}}{c-d}\left(\left(a+\sqrt{a^2+b^2}\right)\,{}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right)\,{}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)-\frac{e^{(c+d)z}}{c+d}\left(\left(a+\sqrt{a^2+b^2}\right)\,{}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right)\,{}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)$$

01.19.21.1687.01

$$\int \frac{\sinh(c\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{b}\left(z - \frac{2\,a}{\sqrt{-a^2-b^2}\;c}\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c\,z}{2}\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

01.19.21.1688.01

$$\int \frac{\sinh(z)}{i+\sinh(z)}\,dz = z+\tanh\left(\frac{1}{4}(\pi\,i-2\,z)\right)$$

01.19.21.1689.01

$$\int \frac{\sinh(z)}{i-\sinh(z)}\,dz = -z-\coth\left(\frac{1}{4}(\pi\,i-2\,z)\right)$$

01.19.21.1690.01

$$\int \frac{A+B\sinh(c\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{b\sqrt{-a^2-b^2}\;c}\left(\sqrt{-a^2-b^2}\;B\,c\,z+2\,(A\,b-a\,B)\tan^{-1}\left(\frac{b-a\tanh\left(\frac{c\,z}{2}\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

Involving $\sinh(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.1691.01

$$\int \frac{\sinh(d\,z)}{(a+b\sinh(c\,z))^2}\,dz =$$

$$\frac{1}{2\,b\left(a^2+b^2\right)^{3/2}}\left(\frac{1}{c+d}\left(e^{(c+d)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+a\left(a-\sqrt{a^2+b^2}\right)\right.\right.\right.$$
$${}_2F_1\left(\frac{c+d}{c},1;\frac{d}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+\left(a^2+\sqrt{a^2+b^2}\;a+b^2\right){}_2F_1\left(\frac{c+d}{c},2;\frac{d}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left.\left.\left(-a^2+\sqrt{a^2+b^2}\;a-b^2\right){}_2F_1\left(\frac{c+d}{c},2;\frac{d}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-$$
$$\frac{1}{c-d}\left(e^{(c-d)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+a\left(a-\sqrt{a^2+b^2}\right)\right.\right.$$
$${}_2F_1\left(1-\frac{d}{c},1;2-\frac{d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+\left(a^2+\sqrt{a^2+b^2}\;a+b^2\right){}_2F_1\left(1-\frac{d}{c},2;2-\frac{d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left.\left.\left.\left(-a^2+\sqrt{a^2+b^2}\;a-b^2\right){}_2F_1\left(1-\frac{d}{c},2;2-\frac{d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)\right)$$

01.19.21.1692.01

$$\int \frac{A+B\sinh(z)}{(a+b\sinh(z))^2}\,dz = \frac{1}{a^2+b^2}\left(\frac{(a\,B-A\,b)\cosh(z)}{a+b\sinh(z)}-\frac{2\,(a\,A+b\,B)}{\sqrt{a^2+b^2}}\tanh^{-1}\left(\frac{b-a\tanh\left(\frac{z}{2}\right)}{\sqrt{a^2+b^2}}\right)\right)$$

01.19.21.1693.01

$$\int \frac{A+B\sinh(z)}{(a+b\sinh(z))^3}\,dz = \frac{1}{2\left(a^2+b^2\right)^2}\left(-\frac{2\left(2Aa^2+3bBa-Ab^2\right)\tanh^{-1}\left(\frac{b-a\tanh\left(\frac{z}{2}\right)}{\sqrt{a^2+b^2}}\right)}{\sqrt{a^2+b^2}}+\frac{\left(Ba^2-3Aba-2b^2B\right)\cosh(z)}{a+b\sinh(z)}+\frac{\left(a^2+b^2\right)(aB-Ab)\cosh(z)}{(a+b\sinh(z))^2}\right)$$

01.19.21.1694.01

$$\int \frac{A+B\sinh(z)+C\sinh^2(z)}{(a+b\sinh(z))^3}\,dz = \frac{1}{2\left(a^2+b^2\right)^2}\left(\frac{2\left((2A-C)a^2+3bBa-b^2(A-2C)\right)}{\sqrt{-a^2-b^2}}\tan^{-1}\left(\frac{b-a\tanh\left(\frac{z}{2}\right)}{\sqrt{-a^2-b^2}}\right)+\frac{\left(Ca^3+bBa^2+b^2(4C-3A)a-2b^3B\right)\cosh(z)}{b(a+b\sinh(z))}-\frac{\left(a^2+b^2\right)\left(Ab^2+a(aC-bB)\right)\cosh(z)}{b(a+b\sinh(z))^2}\right)$$

Involving $\frac{\sinh(dz)}{a+b\sinh^2(cz)}$

01.19.21.1695.01

$$\int \frac{\sinh(dz)}{a+b\sinh^2(cz)}\,dz = \frac{1}{2\sqrt{a}\sqrt{a-b}\,b}\left(\frac{1}{2c+d}\left(e^{-(2c+d)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d}{2c}+1,1;\frac{d}{2c}+2;\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{d-2c}\left(e^{(d-2c)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{d}{2c},1;2-\frac{d}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{d}{2c},1;2-\frac{d}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)$$

01.19.21.1696.01

$$\int \frac{\sinh(cz)}{a+b\sinh^2(cz)}\,dz = -\frac{1}{\sqrt{b}\sqrt{b-a}\,c}\tanh^{-1}\left(\frac{\sqrt{b}\cosh(cz)}{\sqrt{b-a}}\right)$$

01.19.21.1697.01

$$\int \frac{\sinh(2cz)}{a+b\sinh^2(cz)}\,dz = \frac{\log(2a-b+b\cosh(2cz))}{bc}$$

Involving $\frac{\sinh^m(cz)}{a+b\sinh^n(cz)}$

01.19.21.1698.01

$$\int \frac{\sinh^m(c z)}{a+b\sinh^2(c z)}\,dz = \frac{\sqrt{\cosh^2(c z)}\,\operatorname{sech}(c z)\sinh^{m+1}(c z)}{a c (m+1)} F_1\left(\frac{m+1}{2}; \frac{1}{2}, 1; \frac{m+3}{2}; -\sinh^2(c z), -\frac{b\sinh^2(c z)}{a}\right)$$

01.19.21.1699.01

$$\int \frac{\sinh^2(c z)}{a+b\sinh^2(c z)}\,dz = \frac{1}{b}\left(z - \frac{\sqrt{a}}{\sqrt{a-b}\,c}\tanh^{-1}\left(\frac{\sqrt{a-b}\,\tanh(c z)}{\sqrt{a}}\right)\right)$$

01.19.21.1700.01

$$\int \frac{\sinh^2(c z)}{a+b\sinh^4(c z)}\,dz = \frac{1}{2\sqrt{b}\,c}\left(\frac{\tan^{-1}\left(\frac{\left(-i\sqrt{a}+\sqrt{b}\right)\tanh(c z)}{\sqrt{a+i\sqrt{b}\sqrt{a}}}\right)}{\sqrt{a+i\sqrt{b}\sqrt{a}}} + \frac{\tan^{-1}\left(\frac{\left(i\sqrt{a}+\sqrt{b}\right)\tanh(c z)}{\sqrt{a-i\sqrt{a}\sqrt{b}}}\right)}{\sqrt{a-i\sqrt{a}\sqrt{b}}}\right)$$

Involving $\sinh(d z)\left(a+b\sinh^2(c z)\right)^{-n}$

01.19.21.1701.01

$$\int \frac{\sinh(d z)}{\left(a+b\sinh^2(c z)\right)^2}\,dz = \frac{1}{4 a^{3/2}(a-b)^{3/2} b}$$

$$\left(\frac{1}{2c+d}\left(e^{(2c+d)z}\left((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d}{2c}+1, 1; \frac{d}{2c}+2; \frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.\right.\right.$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d}{2c}+1, 1; \frac{d}{2c}+2; \frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d}{2c}+1, 2; \frac{d}{2c}+2; \frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.$$

$$\left.\left.\left.\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d}{2c}+1, 2; \frac{d}{2c}+2; \frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)-$$

$$\frac{1}{2c-d}\left(e^{(2c-d)z}\left((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{d}{2c}, 1; 2-\frac{d}{2c}; \frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.\right.$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{d}{2c}, 1; 2-\frac{d}{2c}; \frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(1-\frac{d}{2c}, 2; 2-\frac{d}{2c}; \frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.$$

$$\left.\left.\left.\left.\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(1-\frac{d}{2c}, 2; 2-\frac{d}{2c}; \frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $\sinh^m(c z)\left(a+b\sinh^2(c z)\right)^{-n}$

01.19.21.1702.01

$$\int \frac{\sinh^m(c\,z)}{\left(a+b\sinh^2(c\,z)\right)^n}\,dz = \frac{a^{-n}\sqrt{\cosh^2(c\,z)}\,\operatorname{sech}(c\,z)\sinh^{m+1}(c\,z)}{c\,(m+1)}\,F_1\!\left(\frac{m+1}{2};\frac{1}{2},n;\frac{m+3}{2};-\sinh^2(c\,z),-\frac{b\sinh^2(c\,z)}{a}\right)\,/;\,v\in\mathbb{N}^+$$

01.19.21.1703.01

$$\int \frac{\sinh^2(c\,z)}{\left(a+b\sinh^2(c\,z)\right)^2}\,dz = \frac{1}{2\,c}\left(\frac{\sinh(2\,c\,z)}{(a-b)\,(2\,a-b+b\cosh(2\,c\,z))}-\frac{1}{\sqrt{a}\,(a-b)^{3/2}}\tanh^{-1}\!\left(\frac{\sqrt{a-b}\,\tanh(c\,z)}{\sqrt{a}}\right)\right)$$

Involving $\frac{\sinh(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}$

01.19.21.1704.01

$$\int \frac{\sinh(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{4\,b\sqrt{a^2+b^2}}\left(-\frac{1}{c-d-e}\left(e^{(c-d-e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d-e}{c},1;2-\frac{d+e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c-d-e}{c},1;2-\frac{d+e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+\frac{1}{c+d-e}\left(e^{(c+d-e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c+d-e}{c},1;\frac{d-e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c+d-e}{c},1;\frac{d-e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+\frac{1}{c-d+e}\left(e^{(c-d+e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d+e}{c},1;\frac{e-d}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c-d+e}{c},1;\frac{e-d}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-\frac{1}{c+d+e}\left(e^{(c+d+e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c+d+e}{c},1;\frac{d+e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c+d+e}{c},1;\frac{d+e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)\right)$$

Involving $\sinh(e\,z)\sinh(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.1705.01

$$\int \frac{\sinh(e\,z)\sinh(d\,z)}{(a+b\sinh(c\,z))^2}\,dz = \frac{1}{4}\Bigg(\frac{1}{b\left(a^2+b^2\right)^{3/2}(c-d-e)}\Bigg(e^{(c-d-e)z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-e}{c},1;\frac{-d-e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-e}{c},1;\frac{-d-e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d-e}{c},2;\frac{-d-e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right){}_2F_1\left(\frac{c-d-e}{c},2;\frac{-d-e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)+$$

$$\frac{1}{b\left(a^2+b^2\right)^{3/2}(c+d+e)}\Bigg(e^{(c+d+e)z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{d+e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+e}{c},1;\frac{d+e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d+e}{c},2;\frac{d+e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right){}_2F_1\left(\frac{c+d+e}{c},2;\frac{d+e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)-$$

$$\frac{1}{b\left(a^2+b^2\right)^{3/2}(c+d-e)}\Bigg(e^{(c+d-e)z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{d-e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-e}{c},1;\frac{d-e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d-e}{c},2;\frac{d-e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right){}_2F_1\left(\frac{c+d-e}{c},2;\frac{d-e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)-$$

$$\frac{1}{b\left(a^2+b^2\right)^{3/2}(c-d+e)}\left(e^{(c-d+e)z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{e-d}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$
$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+e}{c},1;\frac{e-d}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)+$$
$$\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d+e}{c},2;\frac{e-d}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left.\left.\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right){}_2F_1\left(\frac{c-d+e}{c},2;\frac{e-d}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)$$

Involving $\frac{\sinh(e\,z)\sinh(d\,z)}{a+b\sinh^2(c\,z)}$

01.19.21.1706.01

$$\int\frac{\sinh(e\,z)\sinh(d\,z)}{a+b\sinh^2(c\,z)}\,dz=$$
$$\frac{1}{4}\left(\left(e^{(-2c-d-e)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{-d-e}{2c},1;2-\frac{-d-e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.\right.\right.$$
$$\left.\left.\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{-d-e}{2c},1;2-\frac{-d-e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\Big/$$
$$\left(\sqrt{a}\sqrt{a-b}\,b(-2c-d-e)\right)+\left(e^{(-2c+d+e)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)\right.\right.$$
$${}_2F_1\left(1-\frac{d+e}{2c},1;2-\frac{d+e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)$$
$$\left.\left.{}_2F_1\left(1-\frac{d+e}{2c},1;2-\frac{d+e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\Big/\left(\sqrt{a}\sqrt{a-b}\,b(-2c+d+e)\right)-$$
$$\left(e^{(-2c+d-e)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{d-e}{2c},1;2-\frac{d-e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.\right.$$
$$\left.\left.\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{d-e}{2c},1;2-\frac{d-e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\Big/$$
$$\left(\sqrt{a}\sqrt{a-b}\,b(-2c+d-e)\right)-\left(e^{(-2c-d+e)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)\right.\right.$$
$${}_2F_1\left(1-\frac{e-d}{2c},1;2-\frac{e-d}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)$$
$$\left.\left.\left.{}_2F_1\left(1-\frac{e-d}{2c},1;2-\frac{e-d}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\Big/\left(\sqrt{a}\sqrt{a-b}\,b(-2c-d+e)\right)\right)$$

Involving $\sinh(e\,z)\sinh(d\,z)\left(a+b\sinh^2(c\,z)\right)^{-n}$

01.19.21.1707.01

$$\int \frac{\sinh(e\,z)\sinh(d\,z)}{\left(a+b\sinh^2(c\,z)\right)^2}\,dz =$$

$$\frac{1}{4}\Bigg(\Bigg(e^{(2c-d-e)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{-d-e}{2c}+1,1;\frac{-d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{-d-e}{2c}+1,1;\frac{-d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\,\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\Bigg(\frac{-d-e}{2c}+1,2;\frac{-d-e}{2c}+$$

$$2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)$$

$${}_2F_1\left(\frac{-d-e}{2c}+1,2;\frac{-d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(2a^{3/2}(a-b)^{3/2}\,b\,(2c-d-e)\right)+$$

$$\Bigg(e^{(2c+d+e)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d+e}{2c}+1,1;\frac{d+e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d+e}{2c}+1,1;\frac{d+e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+2\sqrt{a}$$

$$\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+e}{2c}+1,2;\frac{d+e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)$$

$${}_2F_1\left(\frac{d+e}{2c}+1,2;\frac{d+e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(2a^{3/2}(a-b)^{3/2}\,b\,(2c+d+e)\right)-$$

$$\Bigg(e^{(2c+d-e)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d-e}{2c}+1,1;\frac{d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d-e}{2c}+1,1;\frac{d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+2\sqrt{a}$$

$$\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d-e}{2c}+1,2;\frac{d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)$$

$${}_2F_1\left(\frac{d-e}{2c}+1,2;\frac{d-e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg/\left(2a^{3/2}(a-b)^{3/2}\,b\,(2c+d-e)\right)-$$

$$\Bigg(e^{(2c-d+e)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{e-d}{2c}+1,1;\frac{e-d}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{e-d}{2c}+1,1;\frac{e-d}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+2\sqrt{a}$$
$$\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{e-d}{2c}+1,2;\frac{e-d}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.$$
$$\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)$$
$$\left.{}_2F_1\left(\frac{e-d}{2c}+1,2;\frac{e-d}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)\Bigg/\left(2a^{3/2}(a-b)^{3/2}b(2c-d+e)\right)$$

Involving algebraic functions of the direct function

Involving $(a+b\sinh(cz))^\beta$

01.19.21.1708.01

$$\int(a+b\sinh(cz))^\beta\,dz=\frac{1}{bc(\beta+1)}\operatorname{sech}(cz)\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}$$
$$\sqrt{\frac{i\sinh(cz)\,b+b}{b-ia}}\,(a+b\sinh(cz))^{\beta+1}F_1\left(\beta+1;\frac{1}{2},\frac{1}{2};\beta+2;\frac{a+b\sinh(cz)}{a+ib},\frac{a+b\sinh(cz)}{a-ib}\right)$$

01.19.21.1709.01

$$\int(a+b\sinh(cz))^{5/2}\,dz=$$
$$\frac{1}{30c\sqrt{a+b\sinh(cz)}}\left(4\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\left(23ia^3+23ba^2-9ib^2a-9b^3\right)E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+2b\cosh(cz)\right.$$
$$\left.\left(22a^2+28b\sinh(cz)\,a-3b^2+3b^2\cosh(2cz)\right)-32ia\left(a^2+b^2\right)F\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\right)$$

01.19.21.1710.01

$$\int(a+b\sinh(cz))^{3/2}\,dz=\frac{1}{3c\sqrt{a+b\sinh(cz)}}\left(8a(b+ia)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\,E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+\right.$$
$$\left.2b\cosh(cz)(a+b\sinh(cz))-2i\left(a^2+b^2\right)F\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\right)$$

01.19.21.1711.01

$$\int\sqrt{a+b\sinh(cz)}\,dz=\frac{2(b+ia)}{c\sqrt{a+b\sinh(cz)}}E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}$$

01.19.21.1712.01

$$\int \frac{1}{\sqrt{a+b\sinh(c\,z)}}\,dz = \frac{2\,i}{c\,\sqrt{a+b\sinh(c\,z)}}\,F\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}$$

01.19.21.1713.01

$$\int \frac{1}{(a+b\sinh(c\,z))^{3/2}}\,dz = \frac{2\,(b+i\,a)\,E\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}-2\,b\cosh(c\,z)}{\left(a^2+b^2\right)c\,\sqrt{a+b\sinh(c\,z)}}$$

01.19.21.1714.01

$$\int \frac{1}{(a+b\sinh(c\,z))^{5/2}}\,dz = -2\left(\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}\,\left(a^2+b^2\right)i\,F\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)(a+b\sinh(c\,z)) - \frac{4\,i\,a\,E\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)(a+b\sinh(c\,z))^2}{\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}} + b\cosh(c\,z)\left(5\,a^2+4\,b\sinh(c\,z)\,a+b^2\right)\right)\Big/\left(3\left(a^2+b^2\right)^2c\,(a+b\sinh(c\,z))^{3/2}\right)$$

Involving $((a+b\sinh(c\,z))^\nu)^\beta$

01.19.21.1715.01

$$\int ((a+b\sinh(c\,z))^\nu)^\beta\,dz = \frac{1}{b\,c\,(\beta\,\nu+1)}\left(F_1\!\left(\beta\,\nu+1;\,\frac{1}{2},\,\frac{1}{2};\,\beta\,\nu+2;\,\frac{a+b\sinh(c\,z)}{a+i\,b},\,\frac{a+b\sinh(c\,z)}{a-i\,b}\right)\operatorname{sech}(c\,z)\sqrt{\frac{b-i\,b\sinh(c\,z)}{b+i\,a}}\,\sqrt{\frac{i\sinh(c\,z)\,b+b}{b-i\,a}}\,(a+b\sinh(c\,z))\,((a+b\sinh(c\,z))^\nu)^\beta\right)$$

01.19.21.1716.01

$$\int \sqrt{(a+b\sinh(c\,z))^5}\,dz = \frac{\sqrt{(a+b\sinh(c\,z))^5}}{30\,c\,(a+b\sinh(c\,z))^3}\left(4\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}\,\left(23\,i\,a^3+23\,b\,a^2-9\,i\,b^2\,a-9\,b^3\right)E\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)+2\,b\cosh(c\,z)\left(22\,a^2+28\,b\sinh(c\,z)\,a-3\,b^2+3\,b^2\cosh(2\,c\,z)\right)-32\,i\,a\left(a^2+b^2\right)F\!\left(\frac{1}{4}\,(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}\right)$$

01.19.21.1717.01

$$\int \sqrt{(a+b\sinh(c\,z))^3}\,dz = \frac{\sqrt{(a+b\sinh(c\,z))^3}}{3\,c\,(a+b\sinh(c\,z))^2}\left(8\,a\,(b+i\,a)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}\;E\!\left(\frac{1}{4}(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)+2\,b\cosh(c\,z)\,(a+b\sinh(c\,z))-2\,i\left(a^2+b^2\right)F\!\left(\frac{1}{4}(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}\right)$$

01.19.21.1718.01

$$\int \frac{1}{\sqrt{(a+b\sinh(c\,z))^3}}\,dz = \frac{2\,(a+b\sinh(c\,z))}{\left(a^2+b^2\right)c\sqrt{(a+b\sinh(c\,z))^3}}\left((b+i\,a)\,E\!\left(\frac{1}{4}(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\sqrt{\frac{a+b\sinh(c\,z)}{a-i\,b}}-b\cosh(c\,z)\right)$$

01.19.21.1719.01

$$\int \frac{1}{\sqrt{(a+b\sinh(c\,z))^5}}\,dz = \frac{2\,(a+b\sinh(c\,z))}{3\,c\sqrt{(a+b\sinh(c\,z))^5}}\left(\frac{1}{(a+i\,b)^2}\left(4\,a\,i\,E\!\left(\frac{1}{4}(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)+(b-i\,a)\,F\!\left(\frac{1}{4}(\pi-2\,i\,c\,z)\,\middle|\,-\frac{2\,i\,b}{a-i\,b}\right)\right)\left(\frac{a+b\sinh(c\,z)}{a-i\,b}\right)^{3/2}-\frac{b\cosh(c\,z)\left(5\,a^2+4\,b\sinh(c\,z)\,a+b^2\right)}{\left(a^2+b^2\right)^2}\right)$$

Involving $(a+b\sinh(c\,z))^{\beta}\sinh(d\,z)$

01.19.21.1720.01

$$\int (a+b\sinh(c\,z))^{\beta}\sinh(d\,z)\,dz = \frac{1}{2\,(d-c\,\beta)\,(d+c\,\beta)}\left(e^{-d\,z}\left(\frac{e^{c\,z}\,b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{c\,z}\,b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-c\,z}\left(-1+e^{2\,c\,z}\right)\right)^{\beta}\left((d-c\,\beta)\,F_1\!\left(-\frac{d+c\,\beta}{c};-\beta,-\beta;-\frac{d}{c}-\beta+1;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+e^{2\,d\,z}\,(d+c\,\beta)\,F_1\!\left(\frac{d}{c}-\beta;-\beta,-\beta;\frac{d}{c}-\beta+1;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)\right)\right)$$

01.19.21.1721.01

$$\int (a + b\sinh(c z))^{\beta} \sinh(c z)\, dz = \frac{1}{2 c (\beta - 1)(\beta + 1)} \left(e^{-c z} \left(\frac{e^{c z} b}{a - \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} \left(\frac{e^{c z} b}{a + \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} \left(a + \frac{1}{2} b\, e^{-c z} \left(-1 + e^{2 c z}\right)\right)^{\beta} \left((\beta - 1) F_1\left(-\beta - 1; -\beta, -\beta; -\beta; -\frac{b\, e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b\, e^{c z}}{\sqrt{a^2 + b^2} - a}\right) - e^{2 c z} (\beta + 1) F_1\left(1 - \beta; -\beta, -\beta; 2 - \beta; -\frac{b\, e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b\, e^{c z}}{\sqrt{a^2 + b^2} - a}\right)\right)\right)$$

01.19.21.1722.01

$$\int \sqrt{a + b\sinh(c z)}\, \sinh(c z)\, dz = \frac{1}{3 b c \sqrt{a + b\sinh(c z)}} \left(2 a (b + i a) \sqrt{\frac{a + b\sinh(c z)}{a - i b}}\, E\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) + 2 b \cosh(c z)(a + b\sinh(c z)) - 2 i \left(a^2 + b^2\right) F\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) \sqrt{\frac{a + b\sinh(c z)}{a - i b}} \right)$$

01.19.21.1723.01

$$\int \frac{\sinh(c z)}{\sqrt{a + b\sinh(c z)}}\, dz = \frac{2}{b c \sqrt{a + b\sinh(c z)}} \left((b + i a) E\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) - i a F\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right)\right) \sqrt{\frac{a + b\sinh(c z)}{a - i b}}$$

01.19.21.1724.01

$$\int \frac{\sinh(c z)}{(a + b\sinh(c z))^{3/2}}\, dz = \left(2 a b \cosh(c z) + 2 \sqrt{\frac{a + b\sinh(c z)}{a - i b}} \left(a^2 + b^2\right) i F\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) - 2 i a (a - i b) E\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) \sqrt{\frac{a + b\sinh(c z)}{a - i b}} \right) \Big/ \left(b c \left(a^2 + b^2\right) \sqrt{a + b\sinh(c z)} \right)$$

01.19.21.1725.01

$$\int \frac{\sinh(c z)}{(a + b\sinh(c z))^{5/2}}\, dz = \frac{2}{3 c (a + b\sinh(c z))^{3/2}} \left(\frac{\cosh(c z)\left(2 a \left(a^2 - b^2\right) + b \left(a^2 - 3 b^2\right) \sinh(c z)\right)}{\left(a^2 + b^2\right)^2} - \frac{1}{(a + i b)^2 b} \left(i \left(\left(a^2 - 3 b^2\right) E\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right) - a (a + i b) F\left(\frac{1}{4}(\pi - 2 i c z) \middle| -\frac{2 i b}{a - i b}\right)\right) \left(\frac{a + b\sinh(c z)}{a - i b}\right)^{3/2}\right)\right)$$

Involving $((a+b\sinh(c z))^{\nu})^{\beta}\sinh(d z)$

01.19.21.1726.01

$$\int\left((a+b\sinh(c z))^{\nu}\right)^{\beta}\sinh(d z)\,dz = \frac{1}{2(d-c\beta\nu)(d+c\beta\nu)}\left(e^{-dz}\left(\frac{e^{cz}b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta\nu}\left(\frac{e^{cz}b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta\nu}\left(a+\frac{1}{2}b\,e^{-cz}\left(-1+e^{2cz}\right)\right)^{\beta\nu}\left((d-c\beta\nu)F_1\left(-\frac{d+c\beta\nu}{c};-\beta\nu,-\beta\nu;-\frac{d}{c}-\beta\nu+1;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+e^{2dz}(d+c\beta\nu)F_1\left(\frac{d}{c}-\beta\nu;-\beta\nu,-\beta\nu;\frac{d}{c}-\beta\nu+1;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)\right)(a+b\sinh(cz))^{-\beta\nu}\left((a+b\sinh(cz))^{\nu}\right)^{\beta}\right)$$

01.19.21.1727.01

$$\int\sqrt{(a+b\sinh(cz))^5}\,\sinh(cz)\,dz = \frac{\sqrt{(a+b\sinh(cz))^5}}{84\,b\,c\,(a+b\sinh(cz))^3}\left(8a\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\left(3ia^3+3ba^2-29ib^2a-29b^3\right)E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+2b\cosh(cz)\left(36a^3-44b^2a+24b^2\cosh(2cz)a+b\left(72a^2-29b^2\right)\sinh(cz)+3b^3\sinh(3cz)\right)-8i\left(3a^4-2b^2a^2-5b^4\right)F\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\right)$$

01.19.21.1728.01

$$\int\sqrt{(a+b\sinh(cz))^3}\,\sinh(cz)\,dz = \frac{\sqrt{(a+b\sinh(cz))^3}}{10\,b\,c\,(a+b\sinh(cz))^2}\left(4\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\left(ia^3+ba^2-3ib^2a-3b^3\right)E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+2b\cosh(cz)\left(4a^2+6b\sinh(cz)a-b^2+b^2\cosh(2cz)\right)-4ia\left(a^2+b^2\right)F\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\right)$$

01.19.21.1729.01

$$\int\frac{\sinh(cz)}{\sqrt{(a+b\sinh(cz))^3}}\,dz = 2(a+b\sinh(cz))\left(a\,b\cosh(cz)+\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\left(a^2+b^2\right)i\,F\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)-i\,a(a-ib)E\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}\right)\Big/\left(b\left(a^2+b^2\right)c\sqrt{(a+b\sinh(cz))^3}\right)$$

01.19.21.1730.01

$$\int \frac{\sinh(c z)}{\sqrt{(a+b\sinh(c z))^5}}\, dz = \frac{2(a+b\sinh(c z))}{3c\sqrt{(a+b\sinh(c z))^5}} \left(\frac{\cosh(c z)\left(2a\left(a^2-b^2\right)+b\left(a^2-3b^2\right)\sinh(c z)\right)}{\left(a^2+b^2\right)^2} - \frac{1}{(a+i b)^2 b}\left(i\left(\left(a^2-3b^2\right)E\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right) - a(a+i b) F\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right)\right)\left(\frac{a+b\sinh(c z)}{a-i b}\right)^{3/2}\right)\right)$$

Involving $(a+b\sinh(c z))^\beta \sinh^\nu(c z)$

01.19.21.1731.01

$$\int \frac{\sinh^2(c z)}{\sqrt{a+b\sinh(c z)}}\, dz = \frac{1}{3b^2 c\sqrt{a+b\sinh(c z)}}\left(-4 i a(a-i b)\sqrt{\frac{a+b\sinh(c z)}{a-i b}}\; E\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right) + 2\sqrt{\frac{a+b\sinh(c z)}{a-i b}}\;\left(2a^2-b^2\right) i F\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right) + 2b\cosh(c z)(a+b\sinh(c z))\right)$$

01.19.21.1732.01

$$\int \frac{\sinh^{\frac{1}{2}}(c z)}{a+b\sinh(c z)}\, dz = \frac{2\left(a\,\Pi\left(-\frac{2 i b}{a-i b}; \frac{1}{4}(\pi-2 i c z) \,\middle|\, 2\right) - (a-i b) F\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, 2\right)\right)\sqrt{i\sinh(c z)}}{b(b+i a) c \sinh^{\frac{1}{2}}(c z)}$$

Involving $(a+b\sinh(c z))^\beta$ and rational function of $\sinh(c z)$

01.19.21.1733.01

$$\int \frac{\sqrt{a+b\sinh(c z)}}{d+e\sinh(c z)}\, dz = -\frac{2}{c e(e+i d)\sqrt{a+b\sinh(c z)}} \left(b(d-i e) F\left(\frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right) + (a e-b d)\,\Pi\left(-\frac{2 i e}{d-i e}; \frac{1}{4}(\pi-2 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right)\right)\sqrt{\frac{a+b\sinh(c z)}{a-i b}}$$

01.19.21.1734.01

$$\int \frac{\sqrt{a+b\sinh(cz)}}{(d+e\sinh(cz))^2}\,dz = \frac{1}{4c\left(d^2+e^2\right)}\left(\frac{1}{\sqrt{\frac{1}{ib-a}}\; b\,e\,(a e-b d)}\right.$$

$$\left((\cosh(cz)+\cosh(3cz))\left(2(a+ib)\,e\,(a e-b d)\,i\,E\!\left(i\sinh^{-1}\!\left(\sqrt{\frac{1}{ib-a}}\,\sqrt{a+b\sinh(cz)}\right)\middle|\,\frac{a-ib}{a+ib}\right)+\right.\right.$$

$$b\left(i\,b\left(2d^2+e^2\right)\Pi\!\left(\frac{(a-ib)\,e}{a e-b d};\, i\sinh^{-1}\!\left(\sqrt{\frac{1}{ib-a}}\,\sqrt{a+b\sinh(cz)}\right)\middle|\,\frac{a-ib}{a+ib}\right)-\right.$$

$$\left.\left.2\,i\,(d-ie)(b d-a e)\,F\!\left(i\sinh^{-1}\!\left(\sqrt{\frac{1}{ib-a}}\,\sqrt{a+b\sinh(cz)}\right)\middle|\,\frac{a-ib}{a+ib}\right)\right)\right)$$

$$\left.\operatorname{sech}^2(cz)\operatorname{sech}(2cz)\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}\,\sqrt{\frac{i\sinh(cz)\,b+b}{b-ia}}\right)-\frac{1}{\sqrt{\frac{1}{ib-a}}\; e\,(a e-b d)}$$

$$\left(8\,i\,d\left((a e-b d)\,F\!\left(i\sinh^{-1}\!\left(\sqrt{\frac{1}{ib-a}}\,\sqrt{a+b\sinh(cz)}\right)\middle|\,\frac{a-ib}{a+ib}\right)+b\,d\,\Pi\!\left(\frac{(a-ib)\,e}{a e-b d};\right.\right.\right.$$

$$\left.\left.\left. i\sinh^{-1}\!\left(\sqrt{\frac{1}{ib-a}}\,\sqrt{a+b\sinh(cz)}\right)\middle|\,\frac{a-ib}{a+ib}\right)\right)\operatorname{sech}(cz)\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}\,\sqrt{\frac{i\sinh(cz)\,b+b}{b-ia}}\right)+$$

$$\left.\frac{2\,i\,(4 a d+b e)\,\Pi\!\left(-\frac{2ie}{d-ie};\,\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}}{(d-ie)\sqrt{a+b\sinh(cz)}}-\frac{4\,e\cosh(cz)\sqrt{a+b\sinh(cz)}}{d+e\sinh(cz)}\right)$$

01.19.21.1735.01

$$\int \frac{A+B\sinh(cz)}{\sqrt{a+b\sinh(cz)}}\,dz =$$

$$\frac{2}{b\,c\sqrt{a+b\sinh(cz)}}\left((b+ia)\,B\,E\!\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+(A b-a B)\,i\,F\!\left(\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}$$

01.19.21.1736.01

$$\int \frac{1}{(d+e\sinh(cz))\sqrt{a+b\sinh(cz)}}\,dz =$$

$$\frac{2\,i}{(c d-i c e)\sqrt{a+b\sinh(cz)}}\,\Pi\!\left(-\frac{2ie}{d-ie};\,\frac{1}{4}(\pi-2icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}$$

01.19.21.1737.01

$$\int \frac{1}{(d+e\sinh(cz))^2\sqrt{a+b\sinh(cz)}}\,dz = \frac{1}{4c(ae-bd)\left(d^2+e^2\right)}\left(-\frac{4\cosh(cz)\sqrt{a+b\sinh(cz)}\;e^2}{d+e\sinh(cz)} - \frac{8di\operatorname{sech}(cz)}{\sqrt{\frac{1}{ib-a}}\;(ae-bd)}\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}\right.$$
$$\sqrt{\frac{i\sinh(cz)b+b}{b-ia}}\left((ae-bd)F\left(i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)+\right.$$
$$\left.bd\,\Pi\left(\frac{(a-ib)e}{ae-bd};i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)\right)+\frac{\cosh(cz)+\cosh(3cz)}{\sqrt{\frac{1}{ib-a}}\;b(ae-bd)}\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}$$
$$\sqrt{\frac{i\sinh(cz)b+b}{b-ia}}\left(2(a+ib)e(ae-bd)iE\left(i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)+\right.$$
$$b\left(ib\left(2d^2+e^2\right)\Pi\left(\frac{(a-ib)e}{ae-bd};i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)-\right.$$
$$\left.\left.2i(d-ie)(bd-ae)F\left(i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)\right)\right)$$
$$\left.\operatorname{sech}^2(cz)\operatorname{sech}(2cz)-\frac{2i\left(4bd^2-4aed+3be^2\right)\Pi\left(-\frac{2ie}{d-ie};\frac{1}{4}(\pi-2icz)\middle|-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(cz)}{a-ib}}}{(d-ie)\sqrt{a+b\sinh(cz)}}\right)$$

01.19.21.1738.01

$$\int \frac{\sinh(cz)}{(d+e\sinh(cz))\sqrt{a+b\sinh(cz)}}\,dz = -\frac{2i\operatorname{sech}(cz)}{\sqrt{\frac{1}{ib-a}}\;bce(ae-bd)}\left((ae-bd)F\left(i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)+\right.$$
$$\left.bd\,\Pi\left(\frac{(a-ib)e}{ae-bd};i\sinh^{-1}\left(\sqrt{\frac{1}{ib-a}}\;\sqrt{a+b\sinh(cz)}\right)\middle|\frac{a-ib}{a+ib}\right)\right)\sqrt{\frac{b-ib\sinh(cz)}{b+ia}}\;\sqrt{\frac{i\sinh(cz)b+b}{b-ia}}$$

Involving $(a+b\sinh(2cz))^\beta\sinh(cz)$

01.19.21.1739.01

$$\int (a+b\sinh(2cz))^{5/2}\sinh(cz)\,dz = \frac{1}{96c}\left(\frac{15}{\sqrt{-ib}}\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)(a-ib)^3+\left(3a^2b-b^3\right)i\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\cos\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+ a\left(a^2-3b^2\right)\log\left(\sqrt{-ib}\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)\right)+ 2\sqrt{a+b\sinh(2cz)}\left(\left(33a^2-14b^2\right)\cosh(cz)+b(-3b\cosh(3cz)+2b\cosh(5cz)-27a\sinh(cz)+13a\sinh(3cz))\right)\right)$$

01.19.21.1740.01

$$\int (a+b\sinh(2cz))^{3/2}\sinh(cz)\,dz = \frac{1}{8c}\left(\frac{3}{2\sqrt{-ib}}\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)(a-ib)^2+2abi\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\cos\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+ \left(a^2-b^2\right)\log\left(\sqrt{-ib}\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)\right)+ \sqrt{a+b\sinh(2cz)}\,(5a\cosh(cz)+b(\sinh(3cz)-2\sinh(cz)))\right)$$

01.19.21.1741.01

$$\int \sqrt{a+b\sinh(2cz)}\,\sinh(cz)\,dz = \frac{1}{4\sqrt{-ib}\,c}\left(a\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)-ib\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+ b\,i\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\cos\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+a\log\left(\sqrt{-ib}\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)+ 2\sqrt{-ib}\cosh(cz)\sqrt{a+b\sinh(2cz)}\right)$$

01.19.21.1742.01

$$\int \frac{\sinh(cz)}{\sqrt{a+b\sinh(2cz)}}\,dz = \frac{1}{2\sqrt{-ib}\,c}\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+\log\left(\sqrt{-ib}\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)\right)$$

01.19.21.1743.01

$$\int \frac{\sinh(c\,z)}{(a+b\sinh(2\,c\,z))^{3/2}}\,dz = \frac{a\cosh(c\,z)+b\sinh(c\,z)}{\left(a^2+b^2\right)c\sqrt{a+b\sinh(2\,c\,z)}}$$

01.19.21.1744.01

$$\int \frac{\sinh(c\,z)}{(a+b\sinh(2\,c\,z))^{5/2}}\,dz = \frac{3\,a\left(a^2-b^2\right)\cosh(c\,z)+b\left(6\sinh(c\,z)\,a^2+2\,b\cosh(3\,c\,z)\,a+\left(a^2-b^2\right)\sinh(3\,c\,z)\right)}{3\left(a^2+b^2\right)^2 c\,(a+b\sinh(2\,c\,z))^{3/2}}$$

Involving $((a+b\sinh(2\,c\,z))^m)^{\pm\frac{1}{2}}\sinh(c\,z)$

01.19.21.1745.01

$$\int \sqrt{(a+b\sinh(2\,c\,z))^5}\,\sinh(c\,z)\,dz = \frac{1}{16\,c}\sqrt{(a+b\sinh(2\,c\,z))^5}\left(\frac{\left(33\,a^2-14\,b^2\right)\cosh(c\,z)+b\,(-3\,b\cosh(3\,c\,z)+2\,b\cosh(5\,c\,z)-27\,a\sinh(c\,z)+13\,a\sinh(3\,c\,z))}{3\,(a+b\sinh(2\,c\,z))^2}+\right.$$
$$5\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-i\,b}\,\sin\left(\frac{1}{4}(\pi-4\,i\,c\,z)\right)}{\sqrt{a+b\sinh(2\,c\,z)}}\right)(a-i\,b)^3+\left(3\,a^2\,b-b^3\right)i\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-i\,b}\,\cos\left(\frac{1}{4}(\pi-4\,i\,c\,z)\right)}{\sqrt{a+b\sinh(2\,c\,z)}}\right)+\right.$$
$$\left.\left.a\left(a^2-3\,b^2\right)\log\left(\sqrt{-i\,b}\,\cosh(c\,z)+\frac{b\sinh(c\,z)}{\sqrt{-i\,b}}+\sqrt{a+b\sinh(2\,c\,z)}\right)\right)\Big/\left(2\sqrt{-i\,b}\,(a+b\sinh(2\,c\,z))^{5/2}\right)\right)$$

01.19.21.1746.01

$$\int \sqrt{(a+b\sinh(2\,c\,z))^3}\,\sinh(c\,z)\,dz = \frac{\sqrt{(a+b\sinh(2\,c\,z))^3}}{8\,c}\left(3\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-i\,b}\,\sin\left(\frac{1}{4}(\pi-4\,i\,c\,z)\right)}{\sqrt{a+b\sinh(2\,c\,z)}}\right)(a-i\,b)^2+2\,a\,b\,i\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-i\,b}\,\cos\left(\frac{1}{4}(\pi-4\,i\,c\,z)\right)}{\sqrt{a+b\sinh(2\,c\,z)}}\right)+\right.\right.$$
$$\left.\left(a^2-b^2\right)\log\left(\sqrt{-i\,b}\,\cosh(c\,z)+\frac{b\sinh(c\,z)}{\sqrt{-i\,b}}+\sqrt{a+b\sinh(2\,c\,z)}\right)\right)\Big/$$
$$\left.\left(2\sqrt{-i\,b}\,(a+b\sinh(2\,c\,z))^{3/2}\right)+\frac{5\,a\cosh(c\,z)+b\,(\sinh(3\,c\,z)-2\sinh(c\,z))}{a+b\sinh(2\,c\,z)}\right)$$

01.19.21.1747.01

$$\int \frac{\sinh(c\,z)}{\sqrt{(a+b\sinh(2\,c\,z))^3}}\,dz = \frac{(a\cosh(c\,z)+b\sinh(c\,z))\,(a+b\sinh(2\,c\,z))}{\left(a^2+b^2\right)c\sqrt{(a+b\sinh(2\,c\,z))^3}}$$

01.19.21.1748.01

$$\int \frac{\sinh(c z)}{\sqrt{(a+b\sinh(2 c z))^5}}\, dz = \left((a+b\sinh(2 c z))\left(3 a \left(a^2-b^2\right)\cosh(c z)+b\left(6\sinh(c z) a^2+2 b\cosh(3 c z) a+\left(a^2-b^2\right)\sinh(3 c z)\right)\right)\right) \Big/ \left(3\left(a^2+b^2\right)^2 c \sqrt{(a+b\sinh(2 c z))^5}\right)$$

Involving $(a+b\sinh(2 c z))^\beta \sinh^\nu(c z)$

01.19.21.1749.01

$$\int (a+b\sinh(2 c z))^{3/2}\sinh^2(c z)\, dz = \frac{1}{60 c\sqrt{a+b\sinh(2 c z)}} \left(-\frac{6\left(b^2-2 a^2\right)(\cosh(c z)+1)^2\left(\frac{a+b\sinh(2 c z)}{(\cosh(c z)+1)^2}\right)^{3/2}}{b\sqrt{\operatorname{sech}^4\left(\frac{c z}{2}\right)(a+b\sinh(2 c z))}} + (-10 b\cosh(2 c z)+3 b\cosh(4 c z)+12 a\sinh(2 c z))(a+b\sinh(2 c z)) - 10 i\left(3 a^2-b^2\right) F\left(\frac{1}{4}(\pi-4 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right)\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}} - 40 i a\left((a-i b) E\left(\frac{1}{4}(\pi-4 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right) - a F\left(\frac{1}{4}(\pi-4 i c z) \,\middle|\, -\frac{2 i b}{a-i b}\right)\right)\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\right)$$

01.19.21.1750.01

$$\int (a+b\sinh(2 c z))^{3/2}\sinh^3(c z)\, dz = \frac{1}{32 c}\left(\frac{1}{3 b}\left(\left(-45 a b\cosh(c z)+7 a b\cosh(3 c z)+\left(-14\cosh(2 c z) b^2+4\cosh(4 c z) b^2+3\left(a^2+b^2\right)\right)\sinh(c z)\right)\sqrt{a+b\sinh(2 c z)}\right) - \frac{b}{2(-i b)^{5/2}}\left(-i(a-7 i b)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-i b}\sin\left(\frac{1}{4}(\pi-4 i c z)\right)}{\sqrt{a+b\sinh(2 c z)}}\right)(a-i b)^2 + \left(a^3-15 a b^2\right) i \tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-i b}\cos\left(\frac{1}{4}(\pi-4 i c z)\right)}{\sqrt{a+b\sinh(2 c z)}}\right) + b\left(7 b^2-9 a^2\right)\log\left(\sqrt{-i b}\cosh(c z)+\frac{b\sinh(c z)}{\sqrt{-i b}}+\sqrt{a+b\sinh(2 c z)}\right)\right)\right)$$

01.19.21.1751.01

$$\int (a+b\sinh(2cz))^{3/2}\sinh^4(cz)\,dz = \frac{1}{560\,b\,c\sqrt{a+b\sinh(2cz)}}\left(4\left(-\frac{14\left(2a^2-b^2\right)(\cosh(cz)+1)^2}{\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}}\left(\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}\right)^{3/2}+b\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\right.\right.$$

$$\left(53a^2-15b^2\right)i\,F\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)-$$

$$\left.\frac{1}{b}\left(2ia\left(a^2-33b^2\right)\right)\left((a-ib)E\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)-aF\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\right)\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\right)+$$

$$\left.(a+b\sinh(2cz))\left(\left(4a^2+55b^2\right)\cosh(2cz)+b(-28b\cosh(4cz)+5b\cosh(6cz)+16a(\sinh(4cz)-7\sinh(2cz)))\right)\right)$$

01.19.21.1752.01

$$\int\sqrt{a+b\sinh(2cz)}\,\sinh^2(cz)\,dz = \frac{1}{24\,b\,c\sqrt{a+b\sinh(2cz)}}$$

$$\left(2\cosh(4cz)b^2-2b^2+4a\sinh(2cz)b-12i(a-ib)E\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\,b+\right.$$

$$a\sqrt{\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}}\cosh(2cz)\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}+3a\sqrt{\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}}$$

$$\left.\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}+4a\cosh(cz)\sqrt{\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}}\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}\right)$$

01.19.21.1753.01

$$\int\sqrt{a+b\sinh(2cz)}\,\sinh^3(cz)\,dz =$$

$$\frac{1}{16c}\left(\frac{1}{2(-ib)^{3/2}}\left(\left(-a^2+6iba+5b^2\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+\left(a^2-5b^2\right)\right.\right.$$

$$\left.\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\cos\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+6abi\log\left(\sqrt{-ib}\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)\right)+$$

$$\left.\frac{(-6b\cosh(cz)+b\cosh(3cz)+a\sinh(cz))\sqrt{a+b\sinh(2cz)}}{b}\right)$$

01.19.21.1754.01

$$\int \sqrt{a+b\sinh(2cz)}\,\sinh^4(cz)\,dz = \frac{1}{120\,b\,c\sqrt{a+b\sinh(2cz)}}$$
$$\left(2\left(-\frac{20\,a\,(\cosh(cz)+1)^2}{\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}}\left(\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}\right)^{3/2}+23\,a\,b\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\;i\,F\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)+\right.\right.$$
$$\left.\frac{21\,b^2-2\,a^2}{b}\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\left((b+ia)\,E\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)-i\,a\,F\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\right)\right)+$$
$$\left.(a+b\sinh(2cz))\,(2\,a\cosh(2cz)-20\,b\sinh(2cz)+3\,b\sinh(4cz))\right)$$

01.19.21.1755.01

$$\int \frac{\sinh^2(cz)}{\sqrt{a+b\sinh(2cz)}}\,dz = \frac{1}{2\,b\,c\sqrt{a+b\sinh(2cz)}}$$
$$\left(2\cosh^4\left(\frac{cz}{2}\right)\sqrt{\frac{a+b\sinh(2cz)}{(\cosh(cz)+1)^2}}\sqrt{\operatorname{sech}^4\left(\frac{cz}{2}\right)(a+b\sinh(2cz))}-i\,b\,F\left(\frac{1}{4}(\pi-4icz)\,\middle|\,-\frac{2ib}{a-ib}\right)\sqrt{\frac{a+b\sinh(2cz)}{a-ib}}\right)$$

01.19.21.1756.01

$$\int \frac{\sinh^3(cz)}{\sqrt{a+b\sinh(2cz)}}\,dz = \frac{1}{8\,(-ib)^{3/2}\,c}\left(-a\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\,\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+\right.$$
$$3\,b\,i\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\,\sin\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+a\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-ib}\,\cos\left(\frac{1}{4}(\pi-4icz)\right)}{\sqrt{a+b\sinh(2cz)}}\right)+$$
$$\left.3\,b\,i\log\left(\sqrt{-ib}\,\cosh(cz)+\frac{b\sinh(cz)}{\sqrt{-ib}}+\sqrt{a+b\sinh(2cz)}\right)-2\,i\sqrt{-ib}\,\sinh(cz)\sqrt{a+b\sinh(2cz)}\right)$$

01.19.21.1757.01

$$\int \frac{\sinh^4(c z)}{\sqrt{a+b\sinh(2 c z)}}\,dz = \frac{1}{12 b c\sqrt{a+b\sinh(2 c z)}}\left(-\frac{12(\cosh(c z)+1)^2}{\sqrt{\operatorname{sech}^4\left(\frac{c z}{2}\right)(a+b\sinh(2 c z))}}\left(\frac{a+b\sinh(2 c z)}{(\cosh(c z)+1)^2}\right)^{3/2}+5 b\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\,i F\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)+\cosh(2 c z)(a+b\sinh(2 c z))-\frac{2 i a}{b}\left((a-i b)E\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)-a F\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)\right)\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\right)$$

01.19.21.1758.01

$$\int \frac{\sinh^2(c z)}{(a+b\sinh(2 c z))^{3/2}}\,dz = \frac{1}{2 b\left(a^2+b^2\right)c\sqrt{a+b\sinh(2 c z)}}\left(-a^2-b^2+b^2\cosh(2 c z)-i(a-i b)\,b\,E\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\right)$$

01.19.21.1759.01

$$\int \frac{\sinh^3(c z)}{(a+b\sinh(2 c z))^{3/2}}\,dz = \frac{1}{4 b c}\left(\frac{b}{(-i b)^{3/2}}\left(\tan^{-1}\left(\frac{\sqrt{2}\sqrt{-i b}\sin\left(\frac{1}{4}(\pi-4 i c z)\right)}{\sqrt{a+b\sinh(2 c z)}}\right)-\tanh^{-1}\left(\frac{\sqrt{2}\sqrt{-i b}\cos\left(\frac{1}{4}(\pi-4 i c z)\right)}{\sqrt{a+b\sinh(2 c z)}}\right)\right)-\frac{2\left(a b\cosh(c z)+\left(a^2+2 b^2\right)\sinh(c z)\right)}{\left(a^2+b^2\right)\sqrt{a+b\sinh(2 c z)}}\right)$$

01.19.21.1760.01

$$\int \frac{\sinh^4(c z)}{(a+b\sinh(2 c z))^{3/2}}\,dz = \left(-2\cosh(2 c z)\,b^3+2 b^3+2 a^2 b-a^2\cosh(2 c z)\,b+\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\left(2 i a^3+2 b a^2+3 b^2 i a+3 b^3\right)E\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)-2 i a\left(a^2+b^2\right)F\left(\frac{1}{4}(\pi-4 i c z)\,\middle|\,-\frac{2 i b}{a-i b}\right)\sqrt{\frac{a+b\sinh(2 c z)}{a-i b}}\right)\Big/\left(4 b^2\left(a^2+b^2\right)c\sqrt{a+b\sinh(2 c z)}\right)$$

Involving $\sinh(e z)\sinh(d z)(a+b\sinh(c z))^{\beta}$

01.19.21.1761.01

$$\int \sinh(e\,z)\sinh(d\,z)\,(a+b\sinh(c\,z))^{\beta}\,dz = \frac{1}{4}\left(\frac{e^{c\,z}\,b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{c\,z}\,b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-c\,z}\left(-1+e^{2\,c\,z}\right)\right)^{\beta}\left(\frac{1}{(d+e)^2-c^2\,\beta^2}\left(e^{-(d+e)\,z}\left(e^{2\,(d+e)\,z}\,(d+e+c\,\beta)\,F_1\left(\frac{d+e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d+e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)-(d+e-c\,\beta)\,F_1\left(-\frac{d+e+c\,\beta}{c};-\beta,-\beta;-\frac{d+e}{c}-\beta+1;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)\right)\right)-\frac{1}{(d-e)^2-c^2\,\beta^2}\left(e^{(e-d)\,z}\left(e^{2\,(d-e)\,z}\,(d-e+c\,\beta)\,F_1\left(\frac{d-e-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+d-e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+(-d+e+c\,\beta)\,F_1\left(-\frac{d-e+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-d+e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)\right)\right)\right)$$

Involving $\left(a+b\sinh^2(c\,z)\right)^{\beta}$

01.19.21.1762.01

$$\int \left(a+b\sinh^2(c\,z)\right)^{\beta}\,dz = \frac{\left(a+b\sinh^2(c\,z)\right)^{\beta}}{c}\left(\frac{a+b\sinh^2(c\,z)}{a-b}\right)^{-\beta}\coth(c\,z)\,\sqrt{-\sinh^2(c\,z)}\;F_1\left(\frac{1}{2};\frac{1}{2},-\beta;\frac{3}{2};\cosh^2(c\,z),\frac{b\cosh^2(c\,z)}{b-a}\right)$$

01.19.21.1763.01

$$\int \left(a+b\sinh^2(c\,z)\right)^{5/2}\,dz = \left(-16\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\;a\left(23\,a^2-23\,b\,a+8\,b^2\right)i\,E\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+64\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\;a\left(2\,a^2-3\,b\,a+b^2\right)i\,F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\;b\left(88\,a^2-88\,b\,a+25\,b^2+28\,(2\,a-b)\,b\cosh(2\,c\,z)+3\,b^2\cosh(4\,c\,z)\right)\sinh(2\,c\,z)\right)\Big/\left(240\,c\,\sqrt{2\,a-b+b\cosh(2\,c\,z)}\right)$$

01.19.21.1764.01

$$\int \left(a+b\sinh^2(c\,z)\right)^{3/2} dz = \left(-16\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\; a(2a-b)\, i\, E\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right) + 8\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\; a(a-b)\, i\, F\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right) + 2\sqrt{2}\, b\,(2a-b+b\cosh(2cz))\sinh(2cz)\right) \Big/ \left(24\,c\,\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1765.01

$$\int \sqrt{a+b\sinh^2(c\,z)}\, dz = -\frac{i\sqrt{2a-b+b\cosh(2cz)}\; E\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)}{c\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}$$

01.19.21.1766.01

$$\int \frac{1}{\sqrt{a+b\sinh^2(c\,z)}}\, dz = -\frac{i}{c\sqrt{2a-b+b\cosh(2cz)}}\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\; F\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)$$

01.19.21.1767.01

$$\int \frac{1}{\left(a+b\sinh^2(c\,z)\right)^{3/2}}\, dz = \frac{1}{2a(a-b)\,c\sqrt{2a-b+b\cosh(2cz)}}\left(-2\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\; a\, i\, E\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right) - \sqrt{2}\, b\sinh(2cz)\right)$$

01.19.21.1768.01

$$\int \frac{1}{\left(a+b\sinh^2(c\,z)\right)^{5/2}}\, dz = \left(-2a^2(2a-b)\, i\, E\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2cz)}{a}\right)^{3/2} + a^2(a-b)\, i\, F\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2cz)}{a}\right)^{3/2} + \sqrt{2}\, b\left(-5a^2+5ba-b^2+b(b-2a)\cosh(2cz)\right)\sinh(2cz)\right) \Big/ \left(3a^2(a-b)^2\, c\,(2a-b+b\cosh(2cz))^{3/2}\right)$$

Involving $\left(a+b\sinh^2(c\,z)\right)^{\beta}\sinh(d\,z)$

01.19.21.1769.01

$$\int \left(a+b\sinh^2(c z)\right)^{\beta} \sinh(d z)\, dz = \frac{1}{d^2-4c^2\beta^2}\left(2^{-2\beta-1} e^{-dz}\left(\frac{e^{2cz}b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(b\,e^{-2cz}\left(-1+e^{2cz}\right)^2+4a\right)^{\beta}\right.$$
$$\left((d-2c\beta)F_1\left(-\frac{d+2c\beta}{2c};-\beta,-\beta;-\frac{d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)+\right.$$
$$\left.\left.e^{2dz}(d+2c\beta)F_1\left(\frac{d}{2c}-\beta;-\beta,-\beta;\frac{d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)$$

01.19.21.1770.01

$$\int \left(a+b\sinh^2(c z)\right)^{\beta} \sinh(c z)\, dz = \frac{\cosh(cz)\left(b\cosh^2(cz)+a-b\right)^{\beta}}{c}\left(\frac{b\cosh^2(cz)}{a-b}+1\right)^{-\beta} {}_2F_1\left(\frac{1}{2},-\beta;\frac{3}{2};\frac{b\cosh^2(cz)}{b-a}\right)$$

01.19.21.1771.01

$$\int \left(a\sinh^2(c z)+a\right)^{\beta} \sinh(d z)\, dz = \frac{1}{d^2-4c^2\beta^2}\left(2^{-2\beta-1} e^{-dz}\left(1+e^{2cz}\right)^{-2\beta}\left(a\,e^{-2cz}\left(1+e^{2cz}\right)^2\right)^{\beta}\right.$$
$$\left.\left((d-2c\beta)\,{}_2F_1\left(-\frac{d+2c\beta}{2c},-2\beta;-\frac{d}{2c}-\beta+1;-e^{2cz}\right)+e^{2dz}(d+2c\beta)\,{}_2F_1\left(\frac{d}{2c}-\beta,-2\beta;\frac{d}{2c}-\beta+1;-e^{2cz}\right)\right)\right)$$

01.19.21.1772.01

$$\int \sqrt{a+b\sinh^2(cz)}\,\sinh(cz)\,dz = \frac{1}{4\sqrt{b}\,c}\left(\sqrt{2}\sqrt{b}\sqrt{2a-b+b\cosh(2cz)}\cosh(cz)+2(a-b)\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)\right)$$

01.19.21.1773.01

$$\int \sqrt{a+a\sinh^2(cz)}\,\sinh(cz)\,dz = \frac{\cosh(cz)\sqrt{a\cosh^2(cz)}}{2c}$$

01.19.21.1774.01

$$\int \sqrt{a-a\sinh^2(cz)}\,\sinh(cz)\,dz = \frac{\left(\cosh(cz)\sqrt{\cosh(2cz)-3}-2\sqrt{2}\log\left(\sqrt{2}\cosh(cz)+\sqrt{\cosh(2cz)-3}\right)\right)\sqrt{a-a\sinh^2(cz)}}{2c\sqrt{\cosh(2cz)-3}}$$

01.19.21.1775.01

$$\int \frac{\sinh(cz)}{\sqrt{a+b\sinh^2(cz)}}\,dz = \frac{\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)}{\sqrt{b}\,c}$$

01.19.21.1776.01

$$\int \frac{\sinh(cz)}{\sqrt{a+a\sinh^2(cz)}}\,dz = \frac{\cosh(cz)\log(\cosh(cz))}{c\sqrt{a\cosh^2(cz)}}$$

01.19.21.1777.01

$$\int \frac{\sinh(c\,z)}{\sqrt{a - a\sinh^2(c\,z)}}\,dz = \frac{\sqrt{\cosh(2\,c\,z)-3}\,\log\left(\sqrt{2}\,\cosh(c\,z)+\sqrt{\cosh(2\,c\,z)-3}\right)}{c\sqrt{-a\,(\cosh(2\,c\,z)-3)}}$$

01.19.21.1778.01

$$\int \frac{\sinh(c\,z)}{\left(a+b\sinh^2(c\,z)\right)^{3/2}}\,dz = \frac{\cosh(c\,z)}{(a-b)\,c\sqrt{a+\frac{1}{2}\,b\cosh(2\,c\,z)-\frac{b}{2}}}$$

01.19.21.1779.01

$$\int \frac{\sinh(c\,z)}{\left(a+b\sinh^2(c\,z)\right)^{5/2}}\,dz = \frac{2\sqrt{2}\,\cosh(c\,z)\,(3\,a-2\,b+b\cosh(2\,c\,z))}{3\,(a-b)^2\,c\,(2\,a-b+b\cosh(2\,c\,z))^{3/2}}$$

01.19.21.1780.01

$$\int \left(a+b\sinh^2(c\,z)\right)^{\beta}\sinh(2\,c\,z)\,dz = \frac{(2\,a-b+b\cosh(2\,c\,z))\left(a+b\sinh^2(c\,z)\right)^{\beta}}{2\,b\,c\,(\beta+1)}$$

Involving $\left(\left(a+b\sinh^2(c\,z)\right)^{\nu}\right)^{\beta}$

01.19.21.1781.01

$$\int \left(\left(a+b\sinh^2(c\,z)\right)^{\nu}\right)^{\beta}\,dz = \frac{1}{b\,c\,(\beta\,\nu+1)}\left(2^{-\beta\,\nu-1}\,F_1\left(\beta\,\nu+1;\,\frac{1}{2},\,\frac{1}{2};\,\beta\,\nu+2;\,\frac{2\,a-b+b\cosh(2\,c\,z)}{2\,(a-b)},\,\frac{2\,a-b+b\cosh(2\,c\,z)}{2\,a}\right)\sqrt{-\frac{b\cosh^2(c\,z)}{a-b}}\right.$$
$$\left.(2\,a-b+b\cosh(2\,c\,z))^{\beta\,\nu+1}\,\operatorname{csch}(2\,c\,z)\sqrt{-\frac{b\sinh^2(c\,z)}{a}}\,\left(b\sinh^2(c\,z)+a\right)^{-\beta\,\nu}\left(\left(b\sinh^2(c\,z)+a\right)^{\nu}\right)^{\beta}\right)$$

01.19.21.1782.01

$$\int \sqrt{\left(a+b\sinh^2(c\,z)\right)^5}\,dz = \left(\sqrt{(2\,a-b+b\cosh(2\,c\,z))^5}\left(-32\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\,a\left(23\,a^2-23\,b\,a+8\,b^2\right)i\,E\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\right.\right.$$
$$128\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\,a\left(2\,a^2-3\,b\,a+b^2\right)i\,F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+2\sqrt{2}\,b$$
$$\left.\left.\left(88\,a^2-88\,b\,a+25\,b^2+28\,(2\,a-b)\,b\cosh(2\,c\,z)+3\,b^2\cosh(4\,c\,z)\right)\sinh(2\,c\,z)\right)\right)\Big/\left(480\,c\,(2\,a-b+b\cosh(2\,c\,z))^3\right)$$

01.19.21.1783.01

$$\int \sqrt{\left(a+b\sinh^2(c\,z)\right)^3}\,dz = \left(\sqrt{\left(b\sinh^2(c\,z)+a\right)^3}\left(-16\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\;a\,(2\,a-b)\,i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+8\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\;a\,(a-b)\,i\,F\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+2\sqrt{2}\;b\,(2\,a-b+b\cosh(2\,c\,z))\sinh(2\,c\,z)\right)\right)\Big/\left(6\sqrt{2}\;c\,(2\,a-b+b\cosh(2\,c\,z))^2\right)$$

01.19.21.1784.01

$$\int \frac{1}{\sqrt{\left(a+b\sinh^2(c\,z)\right)^3}}\,dz = -\frac{(2\,a-b+b\cosh(2\,c\,z))\left(2\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\;a\,i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\;b\sinh(2\,c\,z)\right)}{2\,a\,(a-b)\,c\sqrt{(2\,a-b+b\cosh(2\,c\,z))^3}}$$

01.19.21.1785.01

$$\int \frac{1}{\sqrt{\left(a+b\sinh^2(c\,z)\right)^5}}\,dz = \left(\left(b\sinh^2(c\,z)+a\right)^{5/2}\left(-2\,a^2\,(2\,a-b)\,i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)\left(\frac{2\,a-b+b\cosh(2\,c\,z)}{a}\right)^{3/2}+a^2\,(a-b)\,i\,F\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)\left(\frac{2\,a-b+b\cosh(2\,c\,z)}{a}\right)^{3/2}+\sqrt{2}\;b\left(-5\,a^2+5\,b\,a-b^2+b\,(b-2\,a)\cosh(2\,c\,z)\right)\sinh(2\,c\,z)\right)\right)\Big/\left(3\,a^2\,(a-b)^2\,c\,(2\,a-b+b\cosh(2\,c\,z))^{3/2}\sqrt{\left(b\sinh^2(c\,z)+a\right)^5}\right)$$

Involving $\left(\left(a+b\sinh^2(c\;z)\right)^{\nu}\right)^{\beta}\sinh(d\,z)$

01.19.21.1786.01

$$\int\left(\left(a+b\sinh^2(c z)\right)^{\nu}\right)^{\beta}\sinh(d z)\,dz = \frac{1}{d^2-4c^2\beta^2\nu^2}\left(2^{-2\beta\nu-1}e^{-dz}\left(\frac{e^{2cz}b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta\nu}\left(1-\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta\nu}\left(b\,e^{-2cz}\left(-1+e^{2cz}\right)^2+4a\right)^{\beta\nu}\left((d-2c\beta\nu)F_1\left(-\frac{d+2c\beta\nu}{2c};-\beta\nu,-\beta\nu;-\frac{d}{2c}-\beta\nu+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)+e^{2dz}(d+2c\beta\nu)F_1\left(\frac{d}{2c}-\beta\nu;-\beta\nu,-\beta\nu;\frac{d}{2c}-\beta\nu+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\left(a+\frac{1}{2}b\cosh(2cz)-\frac{b}{2}\right)^{-\beta\nu}\left(\left(b\sinh^2(cz)+a\right)^{\nu}\right)^{\beta}\right)$$

01.19.21.1787.01

$$\int\left(\left(a+b\sinh^2(cz)\right)^{\nu}\right)^{\beta}\sinh(cz)\,dz = \frac{\cosh(cz)\left(\left(a+b\sinh^2(cz)\right)^{\nu}\right)^{\beta}}{c}\left(\frac{b\cosh^2(cz)}{a-b}+1\right)^{-\nu\beta}{}_2F_1\left(\frac{1}{2},-\nu\beta;\frac{3}{2};\frac{b\cosh^2(cz)}{b-a}\right)$$

01.19.21.1788.01

$$\int\sqrt{\left(a+b\sinh^2(cz)\right)^5}\,\sinh(cz)\,dz = \frac{1}{16c\left(b\sinh^2(cz)+a\right)^{5/2}}\left(\left(\frac{5\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)(a-b)^3}{\sqrt{b}}+\frac{1}{6}\cosh(cz)\sqrt{4a-2b+2b\cosh(2cz)}\left(33a^2-53ba+23b^2+b(13a-9b)\cosh(2cz)+b^2\cosh(4cz)\right)\right)\sqrt{\left(b\sinh^2(cz)+a\right)^5}\right)$$

01.19.21.1789.01

$$\int\sqrt{\left(a+b\sinh^2(cz)\right)^3}\,\sinh(cz)\,dz = \frac{1}{32\sqrt{b}\,c\left(b\sinh^2(cz)+a\right)^{3/2}}\left(\left(\sqrt{4a-2b+2b\cosh(2cz)}\cosh(3cz)b^{3/2}+\sqrt{2}(10a-7b)\cosh(cz)\sqrt{2a-b+b\cosh(2cz)}\sqrt{b}+12(a-b)^2\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)\right)\sqrt{\left(b\sinh^2(cz)+a\right)^3}\right)$$

01.19.21.1790.01

$$\int\frac{\sinh(cz)}{\sqrt{\left(a+b\sinh^2(cz)\right)^3}}\,dz = \frac{\sqrt{2}\cosh(cz)(2a-b+b\cosh(2cz))}{(a-b)c\sqrt{(2a-b+b\cosh(2cz))^3}}$$

01.19.21.1791.01

$$\int \frac{\sinh(c z)}{\sqrt{\left(a+b\sinh^2(c z)\right)^5}} \, dz = \frac{\cosh(c z)\,(3 a - 2 b + b \cosh(2 c z))\,(2 a - b + b\cosh(2 c z))}{6\,(a-b)^2\, c \sqrt{\left(a+b\sinh^2(c z)\right)^5}}$$

01.19.21.1792.01

$$\int \left(\left(a+b\sinh^2(c z)\right)^\nu\right)^\beta \sinh(2 c z)\, dz = \frac{(2 a - b + b\cosh(2 c z))\left(\left(a+b\sinh^2(c z)\right)^\nu\right)^\beta}{2\, b\, c\,(\beta\nu+1)}$$

01.19.21.1793.01

$$\int \left(\left(a+b\sinh^2(c z)\right)^\nu\right)^\beta \sinh(4 c z)\, dz = \frac{(2 a - b + b\cosh(2 c z))\,(-2 a + b + b\,(\beta\nu+1)\cosh(2 c z))\left(\left(a+b\sinh^2(c z)\right)^\nu\right)^\beta}{b^2\, c\,(\beta\nu+1)\,(\beta\nu+2)}$$

Involving $\left(a+b\sinh^2(c z)\right)^\beta \sinh^\nu(c z)$

01.19.21.1794.01

$$\int \left(a+b\sinh^2(c z)\right)^\beta \sinh^\nu(c z)\, dz = \frac{1}{\nu c + c}\, 2^\beta F_1\!\left(\frac{\nu+1}{2}; \frac{1}{2}, -\beta; \frac{\nu+3}{2}; -\sinh^2(c z), -\frac{b\sinh^2(c z)}{a}\right)$$
$$\sqrt{\cosh^2(c z)}\, \operatorname{sech}(c z) \sinh^{\nu+1}(c z)\left(b\sinh^2(c z)+a\right)^\beta \left(\frac{2 b \sinh^2(c z)}{a}+2\right)^{-\beta}$$

01.19.21.1795.01

$$\int \left(a+b\sinh^2(c z)\right)^{3/2} \sinh^2(c z)\, dz = \left(-16\sqrt{\frac{2 a - b + b\cosh(2 c z)}{a}}\; a\left(3 a^2 - 13 b a + 8 b^2\right) i\, E\!\left(i c z \,\middle|\, \frac{b}{a}\right) + \right.$$
$$16\sqrt{\frac{2 a - b + b\cosh(2 c z)}{a}}\; a\left(3 a^2 - 7 b a + 4 b^2\right) i\, F\!\left(i c z \,\middle|\, \frac{b}{a}\right) + \sqrt{2}\, b$$
$$\left.\left(48 a^2 - 68 b a + 25 b^2 + 4 b\,(9 a - 7 b)\cosh(2 c z) + 3 b^2\cosh(4 c z)\right)\sinh(2 c z)\right) \Big/ \left(240\, b\, c\sqrt{2 a - b + b\cosh(2 c z)}\right)$$

01.19.21.1796.01

$$\int \left(a+b\sinh^2(c z)\right)^{3/2} \sinh^3(c z)\, dz =$$
$$\frac{1}{96\, b^{3/2}\, c}\left(\sqrt{b}\,\cosh(c z)\sqrt{4 a - 2 b + 2 b\cosh(2 c z)}\,\left(3 a^2 - 29 b a + 23 b^2 + b\,(7 a - 9 b)\cosh(2 c z) + b^2\cosh(4 c z)\right) - \right.$$
$$\left. 6\,(a-b)^2\,(a + 5 b)\log\!\left(\sqrt{2}\,\sqrt{b}\,\cosh(c z) + \sqrt{2 a - b + b\cosh(2 c z)}\right)\right)$$

01.19.21.1797.01

$$\int \left(a+b\sinh^2(c\,z)\right)^{3/2}\sinh^4(c\,z)\,dz = \left(128\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a\left(a^3+2ba^2-12b^2a+8b^3\right)i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)-64\,i\,a\left(2a^3+3ba^2-13b^2a+8b^3\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,F\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\,b\left(32a^3-496ba^2+684b^2a-250b^3+b\left(144a^2-480ba+299b^2\right)\cosh(2cz)+2b^2(26a-27b)\cosh(4cz)+5b^3\cosh(6cz)\right)\sinh(2cz)\right)\Big/\left(2240\,b^2\,c\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1798.01

$$\int \sqrt{a+b\sinh^2(c\,z)}\,\sinh^2(c\,z)\,dz = \left(-8\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a(a-2b)\,i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+8\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a(a-b)\,i\,F\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+2\sqrt{2}\,b\,(2a-b+b\cosh(2cz))\sinh(2cz)\right)\Big/\left(24\,b\,c\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1799.01

$$\int \sqrt{a+b\sinh^2(c\,z)}\,\sinh^3(c\,z)\,dz = \frac{1}{8c}\left(\frac{\cosh(cz)\sqrt{4a-2b+2b\cosh(2cz)}\,(a-4b+b\cosh(2cz))}{2b}+\frac{(b-a)(a+3b)\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)}{b^{3/2}}\right)$$

01.19.21.1800.01

$$\int \sqrt{a+b\sinh^2(c\,z)}\,\sinh^4(c\,z)\,dz = \left(16\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a\left(2a^2+3ba-8b^2\right)i\,E\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)-32\,i\,a\left(a^2+ba-2b^2\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,F\!\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\,b\left(8a^2-48ba+25b^2+4b(4a-7b)\cosh(2cz)+3b^2\cosh(4cz)\right)\sinh(2cz)\right)\Big/\left(240\,b^2\,c\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1801.01

$$\int \sqrt{a+b\sinh^2(c\,z)}\,\sinh^5(c\,z)\,dz = \frac{1}{16\,c}\left(\frac{(a-b)\left(a^2+2\,b\,a+5\,b^2\right)\log\left(\sqrt{2}\,\sqrt{b}\,\cosh(c\,z)+\sqrt{2\,a-b+b\cosh(2\,c\,z)}\right)}{b^{5/2}} - \frac{1}{6\,b^2}\left(\cosh(c\,z)\sqrt{4\,a-2\,b+2\,b\cosh(2\,c\,z)}\,\left(3\,a^2+5\,b\,a-23\,b^2-(a-9\,b)\,b\cosh(2\,c\,z)-b^2\cosh(4\,c\,z)\right)\right)\right)$$

01.19.21.1802.01

$$\int \frac{\sinh^{\nu}(c\,z)}{\sqrt{a+b\sinh^2(c\,z)}}\,dz = \left(F_1\left(\frac{\nu+1}{2};\frac{1}{2},\frac{1}{2};\frac{\nu+3}{2};-\sinh^2(c\,z),-\frac{b\sinh^2(c\,z)}{a}\right)\sqrt{\cosh^2(c\,z)}\,\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\,\operatorname{sech}(c\,z)\sinh^{\nu+1}(c\,z)\right)\Big/\left(c\,(\nu+1)\sqrt{2\,b\sinh^2(c\,z)+2\,a}\right)$$

01.19.21.1803.01

$$\int \frac{\sinh^2(c\,z)}{\sqrt{a+b\sinh^2(c\,z)}}\,dz = -\frac{i\sqrt{2\,a-b+b\cosh(2\,c\,z)}\,\left(E\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)-F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)\right)}{b\,c\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}}$$

01.19.21.1804.01

$$\int \frac{\sinh^3(c\,z)}{\sqrt{a+b\sinh^2(c\,z)}}\,dz = \frac{1}{4\,b^{3/2}\,c}\left(\sqrt{2}\,\sqrt{b}\,\cosh(c\,z)\sqrt{2\,a-b+b\cosh(2\,c\,z)}-2\,(a+b)\log\left(\sqrt{2}\,\sqrt{b}\,\cosh(c\,z)+\sqrt{2\,a-b+b\cosh(2\,c\,z)}\right)\right)$$

01.19.21.1805.01

$$\int \frac{\sinh^4(c\,z)}{\sqrt{a+b\sinh^2(c\,z)}}\,dz = \left(8\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\,a\,(a+b)\,i\,E\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)-4\,i\,a\,(2\,a+b)\sqrt{\frac{2\,a-b+b\cosh(2\,c\,z)}{a}}\,F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\,b\,(2\,a-b+b\cosh(2\,c\,z))\sinh(2\,c\,z)\right)\Big/\left(12\,b^2\,c\sqrt{2\,a-b+b\cosh(2\,c\,z)}\right)$$

01.19.21.1806.01

$$\int \frac{\sinh^5(c z)}{\sqrt{a+b\sinh^2(c z)}}\,dz = \frac{1}{8c}\left(\frac{\cosh(c z)\sqrt{4a-2b+2b\cosh(2cz)}\,(-3a-4b+b\cosh(2cz))}{2b^2}+\frac{(3a^2+2ba+3b^2)\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)}{b^{5/2}}\right)$$

01.19.21.1807.01

$$\int \frac{\sinh^6(c z)}{\sqrt{a+b\sinh^2(c z)}}\,dz = \left(-16\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a\left(8a^2+7ba+8b^2\right)i\,E\left(i\,c z\,\middle|\,\frac{b}{a}\right)+16\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a\left(8a^2+3ba+4b^2\right)i\,F\left(i\,c z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\,b\left(-32a^2-28ba+25b^2-4b(a+7b)\cosh(2cz)+3b^2\cosh(4cz)\right)\sinh(2cz)\right)\Big/\left(240b^3c\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1808.01

$$\int \frac{\sinh^7(c z)}{\sqrt{a+b\sinh^2(c z)}}\,dz = \frac{1}{96b^{7/2}c}\left(\sqrt{b}\cosh(cz)\sqrt{4a-2b+2b\cosh(2cz)}\left(15a^2+19ba+23b^2-b(5a+9b)\cosh(2cz)+b^2\cosh(4cz)\right)-6(a+b)\left(5a^2-2ba+5b^2\right)\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)\right)$$

01.19.21.1809.01

$$\int \frac{\sinh^2(c z)}{\left(a+b\sinh^2(c z)\right)^{3/2}}\,dz = \left(2\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,a\,i\,E\left(i\,c z\,\middle|\,\frac{b}{a}\right)-2\,i\,(a-b)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\,F\left(i\,c z\,\middle|\,\frac{b}{a}\right)+\sqrt{2}\,b\sinh(2cz)\right)\Big/\left(2(a-b)\,b\,c\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1810.01

$$\int \frac{\sinh^3(c z)}{\left(b\sinh^2(c z)+a\right)^{3/2}}\,dz = \frac{\log\left(\sqrt{2}\sqrt{b}\cosh(cz)+\sqrt{2a-b+b\cosh(2cz)}\right)-\frac{\sqrt{2}\,a\sqrt{b}\cosh(cz)}{(a-b)\sqrt{2a-b+b\cosh(2cz)}}}{b^{3/2}\,c}$$

01.19.21.1811.01

$$\int \frac{\sinh^4(c z)}{\left(a+b\sinh^2(c z)\right)^{3/2}}\, dz = -\left(i\, a\left(2\sqrt{\frac{2a-b+b\cosh(2 c z)}{a}}\,(2a-b)\, E\left(i\, c z \,\middle|\, \frac{b}{a}\right) - 4(a-b)\sqrt{\frac{2a-b+b\cosh(2 c z)}{a}}\, F\left(i\, c z \,\middle|\, \frac{b}{a}\right) - i\sqrt{2}\, b\sinh(2 c z)\right)\right) \Big/ \left(2(a-b)\, b^2 c\sqrt{2a-b+b\cosh(2 c z)}\right)$$

01.19.21.1812.01

$$\int \frac{\sinh^5(c z)}{\left(a+b\sinh^2(c z)\right)^{3/2}}\, dz = \frac{\frac{\cosh(c z)\left(6a^2-3 b a+b^2+(a-b)\, b\cosh(2 c z)\right)}{(a-b)\, b^2\sqrt{4a-2b+2b\cosh(2 c z)}} - \frac{(3a+b)\log\left(\sqrt{2}\sqrt{b}\cosh(c z)+\sqrt{2a-b+b\cosh(2 c z)}\right)}{b^{5/2}}}{2c}$$

01.19.21.1813.01

$$\int \frac{\sinh^2(c z)}{\left(a+b\sinh^2(c z)\right)^{5/2}}\, dz = \left(2a^2(a+b)\, i\, E\left(i\, c z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2 c z)}{a}\right)^{3/2} - 2\, i\, a^2(a-b)\, F\left(i\, c z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2 c z)}{a}\right)^{3/2} + \sqrt{2}\, b\left(4a^2-b a-b^2+b(a+b)\cosh(2 c z)\right)\sinh(2 c z)\right) \Big/ \left(6a(a-b)^2 b\, c\,(2a-b+b\cosh(2 c z))^{3/2}\right)$$

01.19.21.1814.01

$$\int \frac{\sinh^3(c z)}{\left(a+b\sinh^2(c z)\right)^{5/2}}\, dz = \frac{\sqrt{2}\cosh(c z)\,(-5a+3b+(a-3b)\cosh(2 c z))}{3(a-b)^2 c\,(2a-b+b\cosh(2 c z))^{3/2}}$$

01.19.21.1815.01

$$\int \frac{\sinh^4(c z)}{\left(a+b\sinh^2(c z)\right)^{5/2}}\, dz = \left(2a^2(a-2b)\, i\, E\left(i\, c z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2 c z)}{a}\right)^{3/2} - i\, a\left(2a^2-5 b a+3b^2\right) F\left(i\, c z \,\middle|\, \frac{b}{a}\right)\left(\frac{2a-b+b\cosh(2 c z)}{a}\right)^{3/2} - \sqrt{2}\, b\left(-a^2+4 b a-2b^2-(a-2b)\, b\cosh(2 c z)\right)\sinh(2 c z)\right) \Big/ \left(3(a-b)^2 b^2 c\,(2a-b+b\cosh(2 c z))^{3/2}\right)$$

Involving $\left(a+b\sinh^2(c z)\right)^{\beta}$ and rational function of $\sinh(c z)$

01.19.21.1816.01

$$\int \frac{1}{(d+e\sinh(c z))\sqrt{b\sinh^2(c z)+a}}\,dz = \frac{1}{c\,e\sqrt{2a-b+b\cosh(2cz)}}\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\left(-\frac{1}{\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{b d^2}{a e^2}+1}}\tanh^{-1}\left(\frac{\sqrt{\frac{2 b d^2}{a e^2}+2}\,\cosh(cz)}{\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}\right)-\frac{i\,e\,\Pi\left(-\frac{e^2}{d^2};\,i\,c\,z\,\middle|\,\frac{b}{a}\right)}{d}\right)$$

01.19.21.1817.01

$$\int \frac{\sinh(cz)}{(d+e\sinh(c z))\sqrt{a+b\sinh^2(c z)}}\,dz = \sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\left(\frac{d}{\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{b d^2}{a e^2}+1}}\tanh^{-1}\left(\frac{\sqrt{\frac{2 b d^2}{a e^2}+2}\,\cosh(cz)}{\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}\right)-i\,e\,F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)+e\,i\,\Pi\left(-\frac{e^2}{d^2};\,i\,c\,z\,\middle|\,\frac{b}{a}\right)\right)\Big/\left(c\,e^2\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1818.01

$$\int \frac{1}{(d+e\sinh(c z))^2\sqrt{a+b\sinh^2(c z)}}\,dz = \frac{\cosh(cz)\sqrt{2a-b+b\cosh(2cz)}\;e^3}{\sqrt{2}\;c\left(d^2+e^2\right)\left(-b d^2-a e^2\right)(d+e\sinh(cz))}+\frac{i\sqrt{2a-b+b\cosh(2cz)}\;E\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)e^2}{c\left(d^2+e^2\right)\left(-b d^2-a e^2\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}+\frac{\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\;i\,F\left(i\,c\,z\,\middle|\,\frac{b}{a}\right)}{c\left(d^2+e^2\right)\sqrt{2a-b+b\cosh(2cz)}}+$$

$$\frac{d\left(-2 b d^2-a e^2-b e^2\right)}{c\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{b d^2}{a e^2}+1}\;e\left(-d^2-e^2\right)\left(-b d^2-a e^2\right)\sqrt{2a-b+b\cosh(2cz)}}\tanh^{-1}\left(\frac{\sqrt{\frac{2 b d^2}{a e^2}+2}\,\cosh(cz)}{\sqrt{\frac{d^2}{e^2}+1}\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}\right)$$

$$\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}-\frac{i\left(-2 b d^2-a e^2-b e^2\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\;\Pi\left(-\frac{e^2}{d^2};\,i\,c\,z\,\middle|\,\frac{b}{a}\right)}{c\left(d^2+e^2\right)\left(-b d^2-a e^2\right)\sqrt{2a-b+b\cosh(2cz)}}$$

01.19.21.1819.01

$$\int \frac{1}{(d+e\sinh(c z))^3 \sqrt{a+b\sinh^2(c z)}}\,dz = \frac{3\,i\,d\,e^2\left(-2 b d^2-a e^2-b e^2\right)\sqrt{2a-b+b\cosh(2 c z)}\;E\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)}{2c\left(d^2+e^2\right)^2\left(-b d^2-a e^2\right)^2\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}+$$

$$\frac{i\,d\left(-4 b d^2-3 a e^2-b e^2\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\;F\!\left(i\,c\,z \,\middle|\, \frac{b}{a}\right)}{2c\left(d^2+e^2\right)^2\left(-b d^2-a e^2\right)\sqrt{2a-b+b\cosh(2cz)}}+$$

$$\Big(4\sqrt{2}\,e^3\cosh(c z)\,(e\sinh(c z)-d)^5\,(d+e\sinh(c z))^3\,\big(-14 b^2 d^4+28 a b d^4+6 b^2 e \sinh(3 c z)\,d^3+16 a^2 e^2 d^2- 8 b^2 e^2 d^2+8 a b e^2 d^2-3(4a-3b)\,e\left(-2 b d^2-a e^2-b e^2\right)\sinh(c z)\,d+3 b^2 e^3\sinh(3 c z)\,d+ 3 a b e^3\sinh(3 c z)\,d+4 a^2 e^4-2 a b e^4-2 b\left(-7 b d^4-4 a e^2 d^2-4 b e^2 d^2-a e^4\right)\cosh(2 c z)\big)\Big)\Big/$$

$$\left(c\left(d^2+e^2\right)^2\left(-b d^2-a e^2\right)^2\sqrt{2a-b+b\cosh(2cz)}\,\left(2d^2+e^2-e^2\cosh(2cz)\right)^5\right)-$$

$$\left(i\left(a^2\left(2d^2-e^2\right)e^4+a b\left(5 d^4-2 e^2 d^2-e^4\right)e^2+b^2\left(6 d^6+5 e^2 d^4+2 e^4 d^2\right)\right)\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\;\Pi\!\left(-\frac{e^2}{d^2};\, i\,c\,z \,\middle|\, \frac{b}{a}\right)\right)\Big/$$

$$\left(2 c d\left(d^2+e^2\right)^2\left(-b d^2-a e^2\right)^2\sqrt{2a-b+b\cosh(2cz)}\right)-$$

$$\left(\left(a^2\left(2d^2-e^2\right)e^4+a b\left(5 d^4-2 e^2 d^2-e^4\right)e^2+b^2\left(6 d^6+5 e^2 d^4+2 e^4 d^2\right)\right)\tanh^{-1}\!\left(\frac{\sqrt{\frac{2 b d^2}{a e^2}+2}\;\cosh(c z)}{\sqrt{\frac{d^2}{e^2}+1}\,\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}}\right)\right.$$

$$\left.\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\right)\Big/\left(2c\sqrt{\frac{d^2}{e^2}+1}\,\sqrt{\frac{b d^2}{a e^2}+1}\;e\left(d^2+e^2\right)^2\left(-b d^2-a e^2\right)^2\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1820.01

$$\int \frac{\sinh(c z)}{(d + e \sinh(c z))^2 \sqrt{b \sinh^2(c z) + a}} \, dz = -\frac{d \cosh(c z) \sqrt{2 a - b + b \cosh(2 c z)} \; e^2}{\sqrt{2} \; c \left(d^2 + e^2\right) \left(-b d^2 - a e^2\right) (d + e \sinh(c z))} - \frac{i \, d \sqrt{2 a - b + b \cosh(2 c z)} \; E\left(i \, c z \,\middle|\, \frac{b}{a}\right) e}{c \left(d^2 + e^2\right) \left(-b d^2 - a e^2\right) \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}}} - \frac{i \, d \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}} \; F\left(i \, c z \,\middle|\, \frac{b}{a}\right)}{c \, e \left(d^2 + e^2\right) \sqrt{2 a - b + b \cosh(2 c z)}} - \frac{i \left(a e^4 - b d^4\right) \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}} \; \Pi\left(-\frac{e^2}{d^2}; i \, c z \,\middle|\, \frac{b}{a}\right)}{c \, d \, e \left(-d^2 - e^2\right) \left(-b d^2 - a e^2\right) \sqrt{2 a - b + b \cosh(2 c z)}} - \frac{a e^4 - b d^4}{c \sqrt{\frac{d^2}{e^2} + 1} \sqrt{\frac{b d^2}{a e^2} + 1} \; e^2 \left(-d^2 - e^2\right) \left(-b d^2 - a e^2\right) \sqrt{2 a - b + b \cosh(2 c z)}} \tanh^{-1}\left(\frac{\sqrt{\frac{2 b d^2}{a e^2} + 2} \; \cosh(c z)}{\sqrt{\frac{d^2}{e^2} + 1} \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}}}\right) \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}}$$

01.19.21.1821.01

$$\int \frac{\sqrt{b \sinh^2(c z) + a}}{e \sinh^2(c z) + d} \, dz = -\frac{i \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}} \left(b \, d \, F\left(i \, c z \,\middle|\, \frac{b}{a}\right) + (a e - b d) \, \Pi\left(\frac{e}{d}; i \, c z \,\middle|\, \frac{b}{a}\right)\right)}{c \, d \, e \sqrt{2 a - b + b \cosh(2 c z)}}$$

01.19.21.1822.01

$$\int \frac{1}{\left(e \sinh^2(c z) + d\right) \sqrt{b \sinh^2(c z) + a}} \, dz = -\frac{i}{c \, d \sqrt{2 a - b + b \cosh(2 c z)}} \sqrt{\frac{2 a - b + b \cosh(2 c z)}{a}} \; \Pi\left(\frac{e}{d}; i \, c z \,\middle|\, \frac{b}{a}\right)$$

01.19.21.1823.01

$$\int \frac{\sinh(c z)}{\left(e \sinh^2(c z) + d\right) \sqrt{b \sinh^2(c z) + a}} \, dz = \frac{1}{c \sqrt{d - e} \; \sqrt{a e - b d}} \tan^{-1}\left(\frac{2 \sqrt{a e - b d} \; \cosh(c z)}{\sqrt{2 d - 2 e} \; \sqrt{2 a - b + b \cosh(2 c z)}}\right)$$

01.19.21.1824.01

$$\int \frac{1}{\left(d+e\sinh^2(c z)\right)^2\sqrt{a+b\sinh^2(c z)}}\,dz = -\left(i\sqrt{\frac{2a-b+b\cosh(2cz)}{a}}\left(2\,\Pi\left(\frac{e}{d};\,i c z\,\middle|\,\frac{b}{a}\right)+\frac{1}{(d-e)(a e-b d)}\left(a d e\left(E\left(i c z\,\middle|\,\frac{b}{a}\right)+\frac{d\left(\frac{e^2}{d^2}-\frac{b}{a}\right)\Pi\left(\frac{e}{d};\,i c z\,\middle|\,\frac{b}{a}\right)}{e}-\frac{(a e-b d)F\left(i c z\,\middle|\,\frac{b}{a}\right)}{a e}-\frac{i e\sqrt{\frac{b\sinh^2(c z)}{a}+1}\,\sinh(2cz)}{2\left(e\sinh^2(c z)+d\right)}\right)\right)\right)\right)\Big/\left(2 c d^2\sqrt{2a-b+b\cosh(2cz)}\right)$$

01.19.21.1825.01

$$\int \frac{\sinh(c z)}{\left(d+e\sinh^2(c z)\right)^2\sqrt{a+b\sinh^2(c z)}}\,dz = -\frac{1}{2c(d-e)}\left(\frac{(2bd-ae-be)\tan^{-1}\left(\frac{2\sqrt{ae-bd}\,\cosh(cz)}{\sqrt{2d-2e}\,\sqrt{2a-b+b\cosh(2cz)}}\right)}{\sqrt{d-e}\,(ae-bd)^{3/2}}+\frac{e\cosh(cz)\sqrt{4a-2b+2b\cosh(2cz)}}{(bd-ae)(2d-e+e\cosh(2cz))}\right)$$

Involving $\sinh(e z)\sinh(d z)\left(a+b\sinh^2(c z)\right)^\beta$

01.19.21.1826.01

$$\int \sinh(e\,z)\sinh(d\,z)\left(a+b\sinh^2(c\,z)\right)^\beta\,dz = \frac{1}{4}\left(\frac{e^{2cz}\,b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(\frac{1}{4}b\,e^{-2cz}\left(-1+e^{2cz}\right)^2+a\right)^\beta \left(\frac{1}{(d+e)^2-4c^2\beta^2}\left(e^{-(d+e)z}\left(e^{2(d+e)z}(d+e+2c\beta)F_1\left(\frac{d+e-2c\beta}{2c};-\beta,-\beta;\frac{d+e}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)-(d+e-2c\beta)\,F_1\left(-\frac{d+e+2c\beta}{2c};-\beta,-\beta;-\frac{d+e}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)-\frac{1}{(d-e)^2-4c^2\beta^2}\left(e^{(e-d)z}\left(e^{2(d-e)z}(d-e+2c\beta)F_1\left(\frac{d-e-2c\beta}{2c};-\beta,-\beta;\frac{d-e}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)-(d-e-2c\beta)\,F_1\left(-\frac{d-e+2c\beta}{2c};-\beta,-\beta;\frac{e-d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)\right)$$

Involving $\left(a+b\sinh^2(c\,z)\right)^\beta$ and algebraic function of $\sinh(c\,z)$

01.19.21.1827.01

$$\int \left(b\sinh^2(c\,z)+a\right)^\nu\left(e\sinh^2(c\,z)+d\right)^\beta\sinh(c\,z)\,dz = \frac{1}{c}F_1\left(\frac{1}{2};-\nu,-\beta;\frac{3}{2};-\frac{b\cosh^2(c\,z)}{a-b},-\frac{e\cosh^2(c\,z)}{d-e}\right)\cosh(c\,z)\left(b\sinh^2(c\,z)+a\right)^\nu\left(\frac{b\sinh^2(c\,z)+a}{a-b}\right)^{-\nu}\left(e\sinh^2(c\,z)+d\right)^\beta\left(\frac{e\sinh^2(c\,z)+d}{d-e}\right)^{-\beta}$$

01.19.21.1828.01

$$\int \frac{\left(d+e\sinh^2(c\,z)\right)^\beta\sinh(c\,z)}{\sqrt{a+b\sinh^2(c\,z)}}\,dz = \frac{1}{c\sqrt{b\sinh^2(c\,z)+a}}F_1\left(\frac{1}{2};\frac{1}{2},-\beta;\frac{3}{2};-\frac{b\cosh^2(c\,z)}{a-b},-\frac{e\cosh^2(c\,z)}{d-e}\right)\cosh(c\,z)\sqrt{\frac{b\sinh^2(c\,z)+a}{a-b}}\left(e\sinh^2(c\,z)+d\right)^\beta\left(\frac{e\sinh^2(c\,z)+d}{d-e}\right)^{-\beta}$$

Other integrals

01.19.21.1829.01

$$\int \sqrt{\frac{a+b\sinh(e z)}{c+d\sinh(e z)}}\, dz = 2\sqrt{\frac{(d+i c)\cot^2\left(\frac{1}{4}(\pi-2 i e z)\right)}{d-i c}} \left(b(c-i d)\,\Pi\left(\frac{b c-a d}{i b d-a d}; \sin^{-1}\left(\sqrt{\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}}\right) \middle| \frac{2 i (a d-b c)}{(a-i b)(c+i d)}\right) - (a-i b) d\, F\left(\sin^{-1}\left(\sqrt{\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}}\right) \middle| \frac{2 i (a d-b c)}{(a-i b)(c+i d)}\right)\right) \operatorname{sech}(e z)\left(\cosh\left(\frac{e z}{2}\right)-i\sinh\left(\frac{e z}{2}\right)\right)^4 \sqrt{\frac{a+b\sinh(e z)}{c+d\sinh(e z)}} \sqrt{\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}} \Bigg/ \left((a-i b) d e (i+\sinh(e z)) \sqrt{\frac{(c-i d)(a+b\sinh(e z))}{(b c-a d)(i+\sinh(e z))}}\right)$$

01.19.21.1830.01

$$\int \frac{\sqrt{a+b\sinh(e z)}}{\sqrt{c+d\sinh(e z)}}\, dz = 2(a d-b c)\sqrt{\frac{(d+i c)\cot^2\left(\frac{1}{4}(\pi-2 i e z)\right)}{d-i c}} \left(b(c-i d)\,\Pi\left(\frac{b c-a d}{i b d-a d}; \sin^{-1}\left(\sqrt{\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}}\right) \middle| \frac{2 i (a d-b c)}{(a-i b)(c+i d)}\right) - (a-i b) d\, F\left(\sin^{-1}\left(\sqrt{\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}}\right) \middle| \frac{2 i (a d-b c)}{(a-i b)(c+i d)}\right)\right) \operatorname{sech}(e z)\left(\cosh\left(\frac{e z}{2}\right)-i\sinh\left(\frac{e z}{2}\right)\right)^4 \sqrt{a+b\sinh(e z)} \left(\frac{(a-i b)(c+d\sinh(e z))}{(a d-b c)(i+\sinh(e z))}\right)^{3/2} \Bigg/ \left((a-i b)^2 d e \sqrt{\frac{(c-i d)(a+b\sinh(e z))}{(b c-a d)(i+\sinh(e z))}}\,(c+d\sinh(e z))^{3/2}\right)$$

01.19.21.1831.01

$$\int \sqrt{\frac{b\sinh^2(e z)+a}{\left(d\sinh^2(e z)+c\right)^3}}\, dz = -\left(\cosh(e z)\sqrt{\frac{a(2c-d+d\cosh(2ez))}{c(2a-b+b\cosh(2ez))}}\left(\sqrt{1-\frac{b}{a}}\, a\, i\,(2c-d+d\cosh(2ez))\, E\!\left(i\sinh^{-1}\!\left(\frac{\sqrt{2-\frac{2b}{a}}\,\sinh(ez)}{\sqrt{\frac{2a-b+b\cosh(2ez)}{a}}}\right)\middle|\,\frac{bc-ad}{bc-ac}\right)+ 2\sqrt{\frac{2a-b+b\cosh(2ez)}{a}}\,(ad-bc)\sqrt{\frac{a\cosh^2(ez)}{2a-b+b\cosh(2ez)}}\sqrt{\frac{a(2c-d+d\cosh(2ez))}{c(2a-b+b\cosh(2ez))}}\,\sinh(ez)\right)\sqrt{\frac{b\sinh^2(ez)+a}{\left(d\sinh^2(ez)+c\right)^3}}\right)\Big/\left(2a(c-d)\,e\sqrt{\frac{a\cosh^2(ez)}{2a-b+b\cosh(2ez)}}\sqrt{\frac{2a-b+b\cosh(2ez)}{a}}\right)$$

01.19.21.1832.01

$$\int \frac{1}{\left(a+b\sinh^2(ez)\right)\sqrt{\frac{b\sinh^2(ez)+a}{d\sinh^2(ez)+c}}}\, dz = -\frac{i\sqrt{1-\frac{b}{a}}\,\cosh(ez)\, E\!\left(i\sinh^{-1}\!\left(\frac{\sqrt{2-\frac{2b}{a}}\,\sinh(ez)}{\sqrt{\frac{2a-b+b\cosh(2ez)}{a}}}\right)\middle|\,\frac{bc-ad}{bc-ac}\right)}{(a-b)\,e\sqrt{\frac{a\cosh^2(ez)}{2a-b+b\cosh(2ez)}}\sqrt{\frac{2a-b+b\cosh(2ez)}{a}}\sqrt{\frac{a(2c-d+d\cosh(2ez))}{c(2a-b+b\cosh(2ez))}}\sqrt{\frac{b\sinh^2(ez)+a}{d\sinh^2(ez)+c}}}$$

01.19.21.1833.01

$$\int \frac{\sqrt{\frac{b \sinh^2(e z)+a}{d \sinh^2(e z)+c}}}{c+d \sinh^2(e z)} \, dz = \left(\sqrt{\frac{a \cosh^2(e z)}{2 a-b+b \cosh(2 e z)}} \operatorname{sech}(e z) \left(2 (b c-a d) \sqrt{\frac{a \cosh^2(e z)}{2 a-b+b \cosh(2 e z)}} \sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z))}{c (2 a-b+b \cosh(2 e z))}} \sinh(e z) - i a \sqrt{1-\frac{b}{a}} (2 c-d+d \cosh(2 e z)) E\left(i \sinh^{-1}\left(\frac{\sqrt{2-\frac{2 b}{a}} \sinh(e z)}{\sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}}} \right) \middle| \frac{b c-a d}{b c-a c} \right) \right) \sqrt{\frac{b \sinh^2(e z)+a}{d \sinh^2(e z)+c}} \right) \Big/ \left(a c (c-d) e \sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z))}{c (2 a-b+b \cosh(2 e z))}} \right)$$

01.19.21.1834.01

$$\int \frac{1}{\sqrt{\left(b \sinh^2(e z)+a\right) \left(d \sinh^2(e z)+c\right)}} \, dz = \left((2 a-b+b \cosh(2 e z)) \sqrt{\frac{c \coth^2(e z)}{c-d}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{a d-b c}} F\left(\sin^{-1}\left(\sqrt{\frac{a (2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{2 a d-2 b c}} \right) \middle| \frac{b c-a d}{a c-a d} \right) \tanh(e z) \right) \Big/ \left(a e \sqrt{(2 a-b+b \cosh(2 e z)) (2 c-d+d \cosh(2 e z))} \sqrt{\frac{c (2 a-b+b \cosh(2 e z)) \operatorname{csch}^2(e z)}{b c-a d}} \right)$$

01.19.21.1835.01

$$\int \frac{1}{\sqrt{\left(b \sinh^2(e z)+a\right)\left(d \sinh^2(e z)+c\right)}\left(g \sinh^2(e z)+f\right)} \, dz = \left(\sqrt{b \sinh^2(e z)+a}\,\sqrt{d \sinh^2(e z)+c}\left(b \sqrt{1-\frac{b}{a}}\,(a d-b c) f \sqrt{\frac{c \coth^2(e z)}{c-d}}\,\sqrt{\frac{c\,(2 a-b+b \cosh(2 e z)) \operatorname{csch}^2(e z)}{b c-a d}}\right.\right.$$

$$\sqrt{\frac{a\,(2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{a d-b c}}\, F\left(\sin^{-1}\left(\sqrt{\frac{a\,(2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{2 a d-2 b c}}\right) \middle| \frac{b c-a d}{a c-a d}\right)$$

$$\sinh^2(e z) \tanh(e z)-\frac{1}{\sqrt{\frac{a \cosh^2(e z)}{2 a-b+b \cosh(2 e z)}}}\left(i\, a^2 c\, g \cosh(e z) \sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}}\right.$$

$$\left.\left.\left.\sqrt{\frac{a\,(2 c-d+d \cosh(2 e z))}{c\,(2 a-b+b \cosh(2 e z))}}\, \Pi\left(\frac{b f-a g}{b f-a f} ; i \sinh^{-1}\left(\frac{\sqrt{2-\frac{2 b}{a}} \sinh(e z)}{\sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}}}\right) \middle| \frac{b c-a d}{b c-a c}\right)\right)\right)\right) \Big/$$

$$\left(a \sqrt{1-\frac{b}{a}}\, c\, e\, f\,(a g-b f) \sqrt{2 a-b+b \cosh(2 e z)}\,\sqrt{2 c-d+d \cosh(2 e z)}\,\sqrt{\left(b \sinh^2(e z)+a\right)\left(d \sinh^2(e z)+c\right)}\right)$$

01.19.21.1836.01

$$\int \frac{\sinh^2(e z)}{\sqrt{\left(b \sinh^2(e z)+a\right)\left(d \sinh^2(e z)+c\right)^3}}\,dz = \Bigg(\cosh(e z)\,(2 c-d+d \cosh(2 e z)) \Bigg((a d-b c) \sqrt{\frac{a \cosh^2(e z)}{2 a-b+b \cosh(2 e z)}} \sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z))}{c (2 a-b+b \cosh(2 e z))}} \Bigg(\frac{1}{\sqrt{\frac{c \coth^2(e z)}{c-d}}} \left(\sqrt{\frac{c (2 a-b+b \cosh(2 e z)) \operatorname{csch}^2(e z)}{b c-a d}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{a d-b c}} F\left(\sin^{-1}\left(\sqrt{\frac{a (2 c-d+d \cosh(2 e z)) \operatorname{csch}^2(e z)}{2 a d-2 b c}}\right) \middle| \frac{b c-a d}{a c-a d}\right)\right)-2\Bigg) \sinh(e z) - i a \sqrt{1-\frac{b}{a}}\,(2 c-d+d \cosh(2 e z))\, E\left(i \sinh^{-1}\left(\frac{\sqrt{2-\frac{2 b}{a}}\, \sinh(e z)}{\sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}}}\right) \middle| \frac{b c-a d}{b c-a c}\right)\Bigg)\Bigg) \Bigg/ \left(4 (c-d) (b c-a d)\, e \sqrt{\frac{a \cosh^2(e z)}{2 a-b+b \cosh(2 e z)}} \sqrt{\frac{2 a-b+b \cosh(2 e z)}{a}} \sqrt{\frac{a (2 c-d+d \cosh(2 e z))}{c (2 a-b+b \cosh(2 e z))}} \sqrt{\left(b \sinh^2(e z)+a\right)\left(d \sinh^2(e z)+c\right)^3}\right)$$

Involving functions of the direct function and a power function

Involving powers of the direct function and a power function

Involving powers of sinh and power

Involving $z^{\alpha-1} \sinh^{\nu}(a z)$

01.19.21.1837.01

$$\int z^{\alpha-1}\sinh^{\nu}(a\,z)\,dz = \left(\frac{i}{2}\right)^{\nu}\frac{(1-\nu \bmod 2)\,z^{\alpha}}{\alpha}\binom{\nu}{\frac{\nu}{2}} - 2^{-\nu} z^{\alpha}\sum_{i=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^i\binom{\nu}{i}\left(\Gamma(\alpha,\,a\,(2\,i-\nu)\,z)\,(a\,(2\,i-\nu)\,z)^{-\alpha} + (-1)^{\nu}\,(a\,(\nu-2\,i)\,z)^{-\alpha}\,\Gamma(\alpha,\,a\,(\nu-2\,i)\,z)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1838.01

$$\int \frac{\sinh^{\nu}(a\,z)}{z}\,dz = 2^{-\nu}\,i^{-\nu}\left(2\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}\right)\text{Ci}(i\,a\,(\nu-2\,k)\,z) + i\sin\left(\frac{\pi\,\nu}{2}\right)\text{Shi}(a\,(\nu-2\,k)\,z)\right) - \binom{\nu}{\frac{\nu}{2}}\log(z)\,(\nu \bmod 2 - 1)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1839.01

$$\int z^{\alpha-1}\sinh^2(a\,z)\,dz = -\frac{z^{\alpha}\left(2^{-\alpha}\,\alpha\,\Gamma(\alpha,\,-2\,a\,z)\,(-a\,z)^{-\alpha} + 2^{-\alpha}\,(a\,z)^{-\alpha}\,\alpha\,\Gamma(\alpha,\,2\,a\,z) + 2\right)}{4\,\alpha}$$

01.19.21.1840.01

$$\int z^{\alpha-1}\sinh^3(a\,z)\,dz = \frac{1}{8}\,3^{-\alpha}\,z^{\alpha}\left(-a^2\,z^2\right)^{-\alpha}\left(\left(\Gamma(\alpha,\,3\,a\,z) - 3^{\alpha+1}\,\Gamma(\alpha,\,a\,z)\right)(-a\,z)^{\alpha} + 3^{\alpha+1}\,(a\,z)^{\alpha}\,\Gamma(\alpha,\,-a\,z) - (a\,z)^{\alpha}\,\Gamma(\alpha,\,-3\,a\,z)\right)$$

01.19.21.1841.01

$$\int z^n\sinh^{\nu}(a\,z)\,dz = n!\,\sinh^{\nu}(a\,z)\left(1-e^{-2\,a\,z}\right)^{-\nu}\sum_{j=0}^{n}\frac{\left((-1)^j\,z^{n-j}\right)}{(n-j)!\,(a\,\nu)^{j+1}}\,{}_{j+2}F_{j+1}\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,e^{-2\,a\,z}\right) /;\ n\in\mathbb{N}$$

01.19.21.1842.01

$$\int z\sinh^{\nu}(a\,z)\,dz = \frac{1}{a^2\,(\nu+1)}\,2^{-\nu-2}\sinh^{\nu+1}(a\,z)\left(2^{\nu+2}\,a\,z\cosh(a\,z)\,{}_2F_1\left(1,\,\frac{\nu+2}{2};\,\frac{\nu+3}{2};\,-\sinh^2(a\,z)\right) - \sqrt{\pi}\,(\nu+1)\,\Gamma(\nu+1)\,{}_3\tilde{F}_2\left(1,\,\frac{\nu+2}{2},\,\frac{\nu+2}{2};\,\frac{\nu+3}{2},\,\frac{\nu+4}{2};\,-\sinh^2(a\,z)\right)\sinh(a\,z)\right)$$

01.19.21.1843.01

$$\int \frac{\sinh^2(a\,z)}{z}\,dz = \frac{1}{2}\,(\text{Chi}(2\,a\,z) - \log(z))$$

01.19.21.1844.01

$$\int \frac{\sinh^3(a\,z)}{z}\,dz = \frac{1}{4}\,(\text{Shi}(3\,a\,z) - 3\,\text{Shi}(a\,z))$$

01.19.21.1845.01

$$\int \frac{\sinh^4(a\,z)}{z}\,dz = \frac{1}{8}\,(-4\,\text{Chi}(2\,a\,z) + \text{Chi}(4\,a\,z) + 3\log(z))$$

01.19.21.1846.01

$$\int \frac{\sinh^5(a\,z)}{z}\,dz = \frac{1}{16}\,(10\,\text{Shi}(a\,z) - 5\,\text{Shi}(3\,a\,z) + \text{Shi}(5\,a\,z))$$

01.19.21.1847.01

$$\int z\sinh^2(a\,z)\,dz = -\frac{\cosh(2\,a\,z) + 2\,a\,z\,(a\,z - \sinh(2\,a\,z))}{8\,a^2}$$

01.19.21.1848.01

$$\int z \sinh^3(a z)\, dz = -\frac{27 a z \cosh(a z) - 3 a z \cosh(3 a z) - 27 \sinh(a z) + \sinh(3 a z)}{36 a^2}$$

01.19.21.1849.01

$$\int z \sinh^4(a z)\, dz = \frac{16 \cosh(2 a z) - \cosh(4 a z) + 4 a z (6 a z - 8 \sinh(2 a z) + \sinh(4 a z))}{128 a^2}$$

01.19.21.1850.01

$$\int z \sinh^5(a z)\, dz = \frac{1}{3600 a^2} (2250 a z \cosh(a z) - 375 a z \cosh(3 a z) + 45 a z \cosh(5 a z) - 2250 \sinh(a z) + 125 \sinh(3 a z) - 9 \sinh(5 a z))$$

01.19.21.1851.01

$$\int z^2 \sinh^2(a z)\, dz = \frac{-4 a^3 z^3 - 6 a \cosh(2 a z) z + (6 a^2 z^2 + 3) \sinh(2 a z)}{24 a^3}$$

01.19.21.1852.01

$$\int z^2 \sinh^3(a z)\, dz = \frac{-81 (a^2 z^2 + 2) \cosh(a z) + (9 a^2 z^2 + 2) \cosh(3 a z) - 6 a z (\sinh(3 a z) - 27 \sinh(a z))}{108 a^3}$$

01.19.21.1853.01

$$\int z^2 \sinh^4(a z)\, dz = \frac{1}{256 a^3} \left(32 a^3 z^3 - 64 a^2 \sinh(2 a z) z^2 + 8 a^2 \sinh(4 a z) z^2 + 64 a \cosh(2 a z) z - 4 a \cosh(4 a z) z - 32 \sinh(2 a z) + \sinh(4 a z)\right)$$

01.19.21.1854.01

$$\int z^2 \sinh^5(a z)\, dz = \frac{1}{54\,000 a^3} \big(675 a^2 \cosh(5 a z) z^2 - 67\,500 a \sinh(a z) z + 3750 a \sinh(3 a z) z - 270 a \sinh(5 a z) z + 33\,750 (a^2 z^2 + 2) \cosh(a z) - 625 (9 a^2 z^2 + 2) \cosh(3 a z) + 54 \cosh(5 a z)\big)$$

01.19.21.1855.01

$$\int z^2 \sinh^6(z)\, dz = \frac{1}{13\,824} \big(-1440 z^3 - 3240 \cosh(2 z) z + 324 \cosh(4 z) z - 24 \cosh(6 z) z + 1620 (2 z^2 + 1) \sinh(2 z) - 81 (8 z^2 + 1) \sinh(4 z) + 4 (18 z^2 + 1) \sinh(6 z)\big)$$

01.19.21.1856.01

$$\int z^3 \sinh^2(a z)\, dz = \frac{-2 a^4 z^4 + 2 a (2 a^2 z^2 + 3) \sinh(2 a z) z - 3 (2 a^2 z^2 + 1) \cosh(2 a z)}{16 a^4}$$

01.19.21.1857.01

$$\int z^3 \sinh^3(a z)\, dz = \frac{1}{108 a^4} \left(-81 a z (a^2 z^2 + 6) \cosh(a z) + 3 a z (3 a^2 z^2 + 2) \cosh(3 a z) - 2 \left(-117 a^2 z^2 + (9 a^2 z^2 + 2) \cosh(2 a z) - 242\right) \sinh(a z)\right)$$

01.19.21.1858.01

$$\int z^3 \sinh^4(a z)\, dz = \frac{1}{1024 a^4} \big(192 (2 a^2 z^2 + 1) \cosh(2 a z) - 3 (8 a^2 z^2 + 1) \cosh(4 a z) + 4 a z (24 a^3 z^3 - 32 (2 a^2 z^2 + 3) \sinh(2 a z) + (8 a^2 z^2 + 3) \sinh(4 a z))\big)$$

01.19.21.1859.01

$$\int z^{n+\frac{1}{2}} \sinh^{\nu}(a\,z)\,dz = \frac{2^{1-\nu}\,i^{-\nu}\,z^{n+\frac{3}{2}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2\,n+3} - 2^{-\nu}\,z^{n+\frac{3}{2}}\sum_{j=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^j\binom{\nu}{j}\left((-1)^{\nu}\left(\operatorname{erfc}\left(\sqrt{-a\,(2\,j-\nu)\,z}\right)\Gamma\left(n+\frac{3}{2}\right)+e^{a\,(2\,j-\nu)\,z}\sum_{k=0}^{n}\frac{(-a\,(2\,j-\nu)\,z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{a\,(2\,j-\nu)\,z}\sum_{k=n+1}^{-1}\frac{(-a\,(2\,j-\nu)\,z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)(-a\,(2\,j-\nu)\,z)^{-n-\frac{3}{2}} + (-a\,(\nu-2\,j)\,z)^{-n-\frac{3}{2}}\left(\operatorname{erfc}\left(\sqrt{-a\,(\nu-2\,j)\,z}\right)\Gamma\left(n+\frac{3}{2}\right)+ e^{a\,(\nu-2\,j)\,z}\sum_{k=0}^{n}\frac{(-a\,(\nu-2\,j)\,z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{a\,(\nu-2\,j)\,z}\sum_{k=n+1}^{-1}\frac{(-a\,(\nu-2\,j)\,z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}}\right)\right) /;\ n\in\mathbb{Z}\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh^{\nu}(a\,z+b)$

01.19.21.1860.01

$$\int z^{\alpha-1}\sinh^{\nu}(b+a\,z)\,dz = \frac{2^{-\nu}\,i^{-\nu}\,z^{\alpha}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\alpha} - 2^{-\nu}\,z^{\alpha}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(-a^2\,(2\,k-\nu)^2\,z^2\right)^{-\alpha}\binom{\nu}{k} \left((-1)^{\nu}\,e^{2\,b\,k-b\,\nu}\,\Gamma(\alpha,\,a\,(\nu-2\,k)\,z)\,(a\,(2\,k-\nu)\,z)^{\alpha} + e^{b\,(\nu-2\,k)}\,(a\,(\nu-2\,k)\,z)^{\alpha}\,\Gamma(\alpha,\,a\,(2\,k-\nu)\,z)\right) /;\ \alpha\neq 0\land n\in\mathbb{N}^+$$

01.19.21.1861.01

$$\int \frac{\sinh^{\nu}(b+a\,z)}{z}\,dz = 2^{-\nu}\,i^{-\nu}\left(2\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}-i\,b\,(\nu-2\,k)\right)\operatorname{Ci}(i\,a\,(2\,k-\nu)\,z) - i\sin\left(\frac{\pi\,\nu}{2}-i\,b\,(\nu-2\,k)\right)\operatorname{Shi}(a\,(2\,k-\nu)\,z)\right) - \binom{\nu}{\frac{\nu}{2}}\log(z)\,(\nu \bmod 2-1)\right) /;\ n\in\mathbb{N}^+$$

01.19.21.1862.01

$$\int z^{\alpha-1}\sinh^2(b+a\,z)\,dz = -\frac{1}{\alpha}\left(2^{-\alpha-2}\,z^{\alpha}\left(-a^2\,z^2\right)^{-\alpha}\left(\alpha\,\Gamma(\alpha,\,2\,a\,z)\,(\cosh(b)-\sinh(b))^2\,(-a\,z)^{\alpha} + 2^{\alpha+1}\left(-a^2\,z^2\right)^{\alpha} + (a\,z)^{\alpha}\,\alpha\,\Gamma(\alpha,\,-2\,a\,z)\,(\cosh(b)+\sinh(b))^2\right)\right)$$

01.19.21.1863.01

$$\int z^{\alpha-1}\sinh^3(b+a\,z)\,dz = -\frac{1}{8}\,3^{-\alpha}\,e^{-3\,b}\,z^{\alpha}\left(-a^2\,z^2\right)^{-\alpha}\left(\left(3^{\alpha+1}\,e^{2\,b}\,\Gamma(\alpha,\,a\,z)-\Gamma(\alpha,\,3\,a\,z)\right)(-a\,z)^{\alpha} - 3^{\alpha+1}\,e^{4\,b}\,(a\,z)^{\alpha}\,\Gamma(\alpha,\,-a\,z) + e^{6\,b}\,(a\,z)^{\alpha}\,\Gamma(\alpha,\,-3\,a\,z)\right)$$

01.19.21.1864.01

$$\int z^n \sinh^\nu(b+a z)\,dz = n!\sinh^\nu(b+a z)\left(1-e^{-2(b+a z)}\right)^{-\nu}\sum_{j=0}^{n}\frac{\left((-1)^j z^{n-j}\right)}{(n-j)!\,(a\nu)^{j+1}}\,{}_{j+2}F_{j+1}\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,e^{-2(b+a z)}\right)/;\,n\in\mathbb{N}$$

01.19.21.1865.01

$$\int z\sinh^\nu(b+a z)\,dz = \frac{1}{4a^2}\left(\sinh^{\nu+1}(b+a z)\left(4b\cosh(b+a z)\,{}_2F_1\left(\frac{1}{2},\,\frac{1-\nu}{2};\,\frac{3}{2};\,\cosh^2(b+a z)\right)\left(-\sinh^2(b+a z)\right)^{\frac{1}{2}(-\nu-1)}+\frac{4(b+a z)\cosh(b+a z)\,{}_2F_1\left(1,\,\frac{\nu+2}{2};\,\frac{\nu+3}{2};\,-\sinh^2(b+a z)\right)}{\nu+1}-2^{-\nu}\sqrt{\pi}\,\Gamma(\nu+1)\,{}_3\tilde{F}_2\left(1,\,\frac{\nu+2}{2},\,\frac{\nu+2}{2};\,\frac{\nu+3}{2},\,\frac{\nu+4}{2};\,-\sinh^2(b+a z)\right)\sinh(b+a z)\right)\right)$$

01.19.21.1866.01

$$\int \frac{\sinh^2(b+a z)}{z^2}\,dz = -\frac{\sinh^2(b+a z)}{z}+a\,\mathrm{Chi}(2az)\sinh(2b)+a\cosh(2b)\,\mathrm{Shi}(2az)$$

01.19.21.1867.01

$$\int \frac{\sinh^2(b+a z)}{z}\,dz = \frac{1}{2}\left(\cosh(2b)\,\mathrm{Chi}(2az)-\log(z)+\sinh(2b)\,\mathrm{Shi}(2az)\right)$$

01.19.21.1868.01

$$\int \frac{\sinh^3(b+a z)}{z}\,dz = \frac{1}{4}\left(-3\,\mathrm{Chi}(az)\sinh(b)+\mathrm{Chi}(3az)\sinh(3b)-3\cosh(b)\,\mathrm{Shi}(az)+\cosh(3b)\,\mathrm{Shi}(3az)\right)$$

01.19.21.1869.01

$$\int \frac{\sinh^4(b+a z)}{z}\,dz = \frac{1}{8}\left(-4\cosh(2b)\,\mathrm{Chi}(2az)+\cosh(4b)\,\mathrm{Chi}(4az)+3\log(z)-4\sinh(2b)\,\mathrm{Shi}(2az)+\sinh(4b)\,\mathrm{Shi}(4az)\right)$$

01.19.21.1870.01

$$\int \frac{\sinh^5(b+a z)}{z}\,dz = \frac{1}{16}\left(10\,\mathrm{Chi}(az)\sinh(b)-5\,\mathrm{Chi}(3az)\sinh(3b)+\mathrm{Chi}(5az)\sinh(5b)+10\cosh(b)\,\mathrm{Shi}(az)-5\cosh(3b)\,\mathrm{Shi}(3az)+\cosh(5b)\,\mathrm{Shi}(5az)\right)$$

01.19.21.1871.01

$$\int z\sinh^2(b+a z)\,dz = -\frac{\cosh(2(b+az))+2az(az-\sinh(2(b+az)))}{8a^2}$$

01.19.21.1872.01

$$\int z\sinh^3(b+a z)\,dz = -\frac{27az\cosh(b+az)-3az\cosh(3(b+az))-27\sinh(b+az)+\sinh(3(b+az))}{36a^2}$$

01.19.21.1873.01

$$\int z\sinh^4(b+a z)\,dz = \frac{16\cosh(2(b+az))-\cosh(4(b+az))+4az(6az-8\sinh(2(b+az))+\sinh(4(b+az)))}{128a^2}$$

01.19.21.1874.01

$$\int z \sinh^5(b+az)\,dz = \frac{1}{3600\,a^2}\,(2250\,a\,z\cosh(b+a\,z) - 375\,a\,z\cosh(3\,(b+a\,z)) + 45\,a\,z\cosh(5\,(b+a\,z)) - 2250\sinh(b+a\,z) + 125\sinh(3\,(b+a\,z)) - 9\sinh(5\,(b+a\,z)))$$

01.19.21.1875.01

$$\int z^2 \sinh^2(b+az)\,dz = \frac{-4\,a^3\,z^3 - 6\,a\cosh(2\,(b+a\,z))\,z + \left(6\,a^2\,z^2+3\right)\sinh(2\,(b+a\,z))}{24\,a^3}$$

01.19.21.1876.01

$$\int z^2 \sinh^3(b+az)\,dz = \frac{1}{108\,a^3}\left(-81\left(a^2\,z^2+2\right)\cosh(b+a\,z) + \left(9\,a^2\,z^2+2\right)\cosh(3\,(b+a\,z)) - 6\,a\,z\,(\sinh(3\,(b+a\,z)) - 27\sinh(b+a\,z))\right)$$

01.19.21.1877.01

$$\int z^2 \sinh^4(b+az)\,dz = \frac{1}{256\,a^3}\left(32\,a^3\,z^3 - 64\,a^2\sinh(2\,(b+a\,z))\,z^2 + 8\,a^2\sinh(4\,(b+a\,z))\,z^2 + 64\,a\cosh(2\,(b+a\,z))\,z - 4\,a\cosh(4\,(b+a\,z))\,z - 32\sinh(2\,(b+a\,z)) + \sinh(4\,(b+a\,z))\right)$$

01.19.21.1878.01

$$\int z^2 \sinh^5(b+az)\,dz = \frac{1}{54\,000\,a^3}\left(675\,a^2\cosh(5\,(b+a\,z))\,z^2 - 67\,500\,a\sinh(b+a\,z)\,z + 3750\,a\sinh(3\,(b+a\,z))\,z - 270\,a\sinh(5\,(b+a\,z))\,z + 33\,750\left(a^2\,z^2+2\right)\cosh(b+a\,z) - 625\left(9\,a^2\,z^2+2\right)\cosh(3\,(b+a\,z)) + 54\cosh(5\,(b+a\,z))\right)$$

01.19.21.1879.01

$$\int z^2 \sinh^6(b+az)\,dz = \frac{1}{13\,824\,a^3}\left(-1440\,a^3\,z^3 + 3240\,a^2\sinh(2\,(b+a\,z))\,z^2 - 648\,a^2\sinh(4\,(b+a\,z))\,z^2 + 72\,a^2\sinh(6\,(b+a\,z))\,z^2 - 3240\,a\cosh(2\,(b+a\,z))\,z + 324\,a\cosh(4\,(b+a\,z))\,z - 24\,a\cosh(6\,(b+a\,z))\,z + 1620\sinh(2\,(b+a\,z)) - 81\sinh(4\,(b+a\,z)) + 4\sinh(6\,(b+a\,z))\right)$$

01.19.21.1880.01

$$\int z^3 \sinh^2(b+az)\,dz = \frac{-2\,a^4\,z^4 - 3\left(2\,a^2\,z^2+1\right)\cosh(2\,(b+a\,z)) + \left(4\,a^3\,z^3+6\,a\,z\right)\sinh(2\,(b+a\,z))}{16\,a^4}$$

01.19.21.1881.01

$$\int z^3 \sinh^3(b+az)\,dz = \frac{1}{108\,a^4}\left(-81\,a\,z\left(a^2\,z^2+6\right)\cosh(b+a\,z) + \left(9\,a^3\,z^3+6\,a\,z\right)\cosh(3\,(b+a\,z)) - 2\left(-117\,a^2\,z^2 + \left(9\,a^2\,z^2+2\right)\cosh(2\,(b+a\,z)) - 242\right)\sinh(b+a\,z)\right)$$

01.19.21.1882.01

$$\int z^3 \sinh^4(b+az)\,dz = \frac{1}{1024\,a^4}\left(192\left(2\,a^2\,z^2+1\right)\cosh(2\,(b+a\,z)) - 3\left(8\,a^2\,z^2+1\right)\cosh(4\,(b+a\,z)) + 4\,a\,z\left(24\,a^3\,z^3 - 32\left(2\,a^2\,z^2+3\right)\sinh(2\,(b+a\,z)) + \left(8\,a^2\,z^2+3\right)\sinh(4\,(b+a\,z))\right)\right)$$

01.19.21.1883.01

$$\int z^{n+\frac{1}{2}} \sinh^{\nu}(b+a z)\, dz = \frac{2^{1-\nu} i^{-\nu} z^{n+\frac{3}{2}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{2n+3} - 2^{-\nu} a^{-n-1} \sqrt{z} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{-a^2 (2s-\nu)^2 z^2}} \left((-1)^s (2s-\nu)^{-n-1} \binom{\nu}{s} \left((-1)^{\nu} e^{2bs-b\nu} \left(e^{-4bs+2b\nu+i\pi\nu} \sqrt{a(\nu-2s)z}\, \operatorname{erfc}\left(\sqrt{a(2s-\nu)z}\right) - (-1)^n \sqrt{a(2s-\nu)z}\, \operatorname{erfc}\left(\sqrt{a(\nu-2s)z}\right) \right) \Gamma\left(n+\frac{3}{2}\right) + e^{b(\nu-2s)+az(\nu-2s)} \sqrt{a(\nu-2s)z} \left(\sum_{k=0}^{n} \frac{(a(2s-\nu)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=n+1}^{-1} \frac{(a(2s-\nu)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) + (-1)^{n+\nu} e^{(2s-\nu)(b+az)} \sqrt{a(2s-\nu)z} \left(\sum_{k=n+1}^{-1} \frac{(a(\nu-2s)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - \sum_{k=0}^{n} \frac{(a(\nu-2s)z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) \right) /;\ n \in \mathbb{Z} \land \alpha \neq 0 \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sinh^{\nu}(a z^r)$

01.19.21.1884.01

$$\int z^{\alpha-1} \sinh^{\nu}(a z^r)\, dz = \frac{2^{-\nu} i^{-\nu} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{\alpha} - \frac{1}{r} 2^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{\alpha}{r}, -a(\nu-2k)z^r\right) (-a(\nu-2k)z^r)^{-\frac{\alpha}{r}} + (-1)^{\nu} (a(\nu-2k)z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, a(\nu-2k)z^r\right) \right) /;\ \alpha \neq 0 \land \nu \in \mathbb{N}^+$$

01.19.21.1885.01

$$\int \frac{\sinh^{\nu}(a z^r)}{z}\, dz = \frac{1}{r} 2^{-\nu} \left(-r \binom{\nu}{\frac{\nu}{2}} \log(z) (1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu} \operatorname{Ei}(a(2k-\nu)z^r) + \operatorname{Ei}(a(\nu-2k)z^r) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.1886.01

$$\int z^n \sinh^{\nu}(a z^2)\, dz = -\frac{1}{n+1} 2^{-\nu-1} z^{n+1} \left(-2 i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + (n+1) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, a(2k-\nu)z^2\right) \left(a(2k-\nu)z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{\nu} \left(a(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, a(\nu-2k)z^2\right) \right) \right) /;\ n \in \mathbb{Z} \land n \neq -1 \land \nu \in \mathbb{N}^+$$

01.19.21.1887.01

$$\int z^{2n}\sinh^{\nu}(a z^2)\,dz = \frac{2^{-\nu} i^{-\nu} z^{2n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2n+1} - 2^{-\nu-1} z^{2n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k} \left(\left(\operatorname{erfc}\left(\sqrt{-a(\nu-2k)z^2}\right)\Gamma\left(n+\frac{1}{2}\right)+e^{a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(-a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - e^{a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(-a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\left(-a(\nu-2k)z^2\right)^{\frac{1}{2}(-2n-1)} + (-1)^{\nu}\left(a(\nu-2k)z^2\right)^{\frac{1}{2}(-2n-1)}\left(\operatorname{erfc}\left(\sqrt{a(\nu-2k)z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{-a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - e^{-a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\right) /;\ n\in\mathbb{Z}\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.1888.01

$$\int z^{2n-1}\sinh^{\nu}(a z^2)\,dz = \frac{2^{-\nu-1} i^{-\nu} z^{2n}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(a(\nu-2k))^{-n}\left(-\frac{\operatorname{Ei}\left(a(\nu-2k)z^2\right)}{(-n)!} + (-1)^n e^{a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(-a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}} - (-1)^n e^{a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(-a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}} + (-1)^{\nu}\left(\frac{(-1)^{n-1}\operatorname{Ei}\left(-a(\nu-2k)z^2\right)}{(-n)!} + e^{-a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}} - e^{-a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}}\right)\right) /;\ n\in\mathbb{Z}\land n\neq 0\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.1889.01

$$\int z^{n}\sinh^{\nu}\left(\sqrt{z}\,a\right)dz = \frac{2^{-\nu} i^{-\nu} z^{n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n+1} - 2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(a(\nu-2k))^{-2(n+1)}\left(-\frac{\operatorname{Ei}\left(a(\nu-2k)\sqrt{z}\right)}{(-2(n+1))!} + e^{a(\nu-2k)\sqrt{z}}\sum_{j=0}^{2(n+1)-1}\frac{\left(-a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}} - e^{a(\nu-2k)\sqrt{z}}\sum_{j=2(n+1)}^{-1}\frac{\left(-a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}} + (-1)^{\nu}\left(-\frac{\operatorname{Ei}\left(-a(\nu-2k)\sqrt{z}\right)}{(-2(n+1))!} + e^{-a(\nu-2k)\sqrt{z}}\sum_{j=0}^{2(n+1)-1}\frac{\left(a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}} - e^{-a(\nu-2k)\sqrt{z}}\sum_{j=2(n+1)}^{-1}\frac{\left(a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}}\right)\right) /;\ n\in\mathbb{Z}\land n\neq -1\bigwedge \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh^{\nu}(a z^r + b)$

01.19.21.1890.01

$$\int z^{\alpha-1}\sinh^{\nu}(a z^r+b)\,dz = \frac{2^{-\nu} i^{-\nu} z^{\alpha}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{\alpha} - \frac{2^{-\nu} z^{\alpha}}{r}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{b(\nu-2k)}\,\Gamma\left(\frac{\alpha}{r}, -a(\nu-2k)z^r\right)(-a(\nu-2k)z^r)^{-\frac{\alpha}{r}} + (-1)^{\nu} e^{-b(\nu-2k)}(a(\nu-2k)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, a(\nu-2k)z^r\right)\right) /;\ \alpha\neq 0\land \nu\in\mathbb{N}^+$$

01.19.21.1891.01

$$\int \frac{\sinh^{\nu}(a z^r+b)}{z}\,dz = \frac{1}{r}2^{-\nu}\left(-r\binom{\nu}{\frac{\nu}{2}}\log(z)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{2bk-b\nu}\binom{\nu}{k}\left((-1)^{\nu}\,\mathrm{Ei}(a(2k-\nu)z^r) + e^{2b\nu-4bk}\,\mathrm{Ei}(a(\nu-2k)z^r)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.1892.01

$$\int z^n\sinh^{\nu}(a z^2+b)\,dz = -\frac{1}{n+1}2^{-\nu-1}z^{n+1}\left(-2 i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + (n+1)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{b\nu-2bk}\,\Gamma\left(\frac{n+1}{2}, a(2k-\nu)z^2\right)\left(a(2k-\nu)z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{\nu} e^{2bk-b\nu}\left(a(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, a(\nu-2k)z^2\right)\right)\right) /;\ n\in\mathbb{Z}\land n\neq -1\land \nu\in\mathbb{N}^+$$

01.19.21.1893.01

$$\int z^{2n}\sinh^{\nu}(a z^2+b)\,dz = \frac{2^{-\nu} i^{-\nu} z^{2n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{2n+1} - 2^{-\nu-1}z^{2n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{b(\nu-2k)}\left(\mathrm{erfc}\left(\sqrt{-a(\nu-2k)z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(-a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - e^{a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(-a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\left(-a(\nu-2k)z^2\right)^{\frac{1}{2}(-2n-1)} + (-1)^{\nu} e^{-b(\nu-2k)}\left(a(\nu-2k)z^2\right)^{\frac{1}{2}(-2n-1)}\left(\mathrm{erfc}\left(\sqrt{a(\nu-2k)z^2}\right)\Gamma\left(n+\frac{1}{2}\right) + e^{-a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}} - e^{-a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(a(\nu-2k)z^2\right)^{j+\frac{1}{2}}}{\left(n+\frac{1}{2}\right)_{j-n+1}}\right)\right) /;\ n\in\mathbb{Z}\land \nu\in\mathbb{N}^+$$

01.19.21.1894.01

$$\int z^{2n-1}\sinh^{\nu}\left(a z^2+b\right)dz = \frac{2^{-\nu-1} i^{-\nu} z^{2n}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(a(\nu-2k))^{-n}\left((-1)^n e^{b(\nu-2k)}\left(\frac{(-1)^{n-1}\operatorname{Ei}\left(a(\nu-2k)z^2\right)}{(-n)!}+e^{a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(-a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}}-e^{a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(-a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}}\right)+(-1)^{\nu}e^{-b(\nu-2k)}\left(\frac{(-1)^{n-1}\operatorname{Ei}\left(-a(\nu-2k)z^2\right)}{(-n)!}+e^{-a(\nu-2k)z^2}\sum_{j=0}^{n-1}\frac{\left(a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}}-e^{-a(\nu-2k)z^2}\sum_{j=n}^{-1}\frac{\left(a(\nu-2k)z^2\right)^j}{(n)_{j-n+1}}\right)\right)\,/;\, n\in\mathbb{Z}\land n\neq 0\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.1895.01

$$\int z^n\sinh^{\nu}\left(\sqrt{z}\,a+b\right)dz = \frac{2^{-\nu} i^{-\nu} z^{n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n+1} - 2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(a(\nu-2k))^{-2(n+1)}\left(e^{b(\nu-2k)}\left(-\frac{\operatorname{Ei}\left(a(\nu-2k)\sqrt{z}\right)}{(-2(n+1))!}+e^{a(\nu-2k)\sqrt{z}}\sum_{j=0}^{2(n+1)-1}\frac{\left(-a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}}-e^{a(\nu-2k)\sqrt{z}}\sum_{j=2(n+1)}^{-1}\frac{\left(-a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}}\right)+(-1)^{\nu}e^{-b(\nu-2k)}\left(-\frac{\operatorname{Ei}\left(-a(\nu-2k)\sqrt{z}\right)}{(-2(n+1))!}+e^{-a(\nu-2k)\sqrt{z}}\sum_{j=0}^{2(n+1)-1}\frac{\left(a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}}-e^{-a(\nu-2k)\sqrt{z}}\sum_{j=2(n+1)}^{-1}\frac{\left(a(\nu-2k)\sqrt{z}\right)^j}{(2(n+1))_{j-2(n+1)+1}}\right)\right)\,/;\, n\in\mathbb{Z}\land n\neq -1\bigwedge \nu\in\mathbb{N}^+$$

Involving $z^n \sinh^{\nu}\left(c z^r + f z\right)$

01.19.21.1896.01

$$\int z^n\sinh^{\nu}\left(c z^2+f z\right)dz = \frac{2^{-\nu} i^{-\nu} z^{n+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{n+1} - 2^{-n-\nu-1}c^{-n-1}(-f)^n(f+2cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{\frac{f^2(\nu-2k)}{4c}}\binom{\nu}{k}\left(e^{\frac{f^2(2k-\nu)}{2c}}\sum_{j=0}^{n}\left(\frac{(2k-\nu)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\left(-\frac{4cz}{f}-2\right)^j\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(2k-\nu)(f+2cz)^2}{4c}\right)+(-1)^{\nu}\sum_{j=0}^{n}\left(-\frac{(2k-\nu)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\left(-\frac{4cz}{f}-2\right)^j\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2k-\nu)(f+2cz)^2}{4c}\right)\right)\,/;\, n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.1897.01

$$\int z^n \sinh^\nu\left(\sqrt{z}\, c + f\, z\right) dz = 2^{-2n-\nu-1} f^{-2n-2} i^{-\nu} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(2k-\nu)^2} \left((-1)^k e^{\frac{1}{4}\left(\frac{c^2(\nu-2k)}{f} - 2\pi i \nu\right)} \binom{\nu}{k} \left(e^{\frac{(2k-\nu)c^2}{2f} + i\pi\nu} \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j (2k-\nu) \left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c} - 1 \right)^{h+j} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu)\left(c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f} \right) - 2f \sqrt{\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f} \right) \right) + \sum_{j=0}^{n} \sum_{h=0}^{j} 4^j (2k-\nu) \left(-\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f} \right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c} - 1 \right)^{h+j} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu)\left(c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f} \right) + 2\sqrt{-\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f} \right) \right) \right) \right) \right) c^{2n} + \frac{2^{-\nu} i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \sinh^\nu\left(c\, z^r + f\, z + g\right)$

01.19.21.1898.01

$$\int z^n \sinh^\nu\left(c z^2 + f z + g\right) dz = \frac{2^{-\nu} i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{n+1} - 2^{-n-\nu-1} i^{-\nu} c^{-n-1} (-f)^n (f + 2 c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{\frac{1}{4}\left(\frac{(\nu-2k) f^2}{c} + 8 g k - 4 g \nu - 2 \pi i \nu\right)} \binom{\nu}{k}$$

$$\left(e^{\frac{(2k-\nu) f^2}{2c} - 4 g k + 2 g \nu + i \pi \nu} \sum_{j=0}^{n} \left(\frac{(2k-\nu)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \left(-\frac{4cz}{f} - 2\right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(2k-\nu)(f+2cz)^2}{4c}\right) + \right.$$

$$\left. \sum_{j=0}^{n} \left(-\frac{(2k-\nu)(f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \left(-\frac{4cz}{f} - 2\right)^j \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2k-\nu)(f+2cz)^2}{4c}\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.1899.01

$$\int z^n \sinh^\nu\left(\sqrt{z}\, c + g + f\, z\right) dz = 2^{-2n-\nu-1} f^{-2n-2}\, i^{-\nu} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(2k-\nu)^2} \left((-1)^k e^{\frac{1}{4}\left(\frac{(\nu-2k)c^2}{f}+8gk-4g\nu-2\pi i \nu\right)} \binom{\nu}{k} \left(e^{\frac{(2k-\nu)c^2}{2f}-4gk+2g\nu+i\pi\nu} \sum_{j=0}^{n}\sum_{h=0}^{j} 4^j (2k-\nu) \left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c}-1\right)^{h+j} \binom{j}{h}\binom{n}{j} \left(c(2k-\nu)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right) + \sum_{j=0}^{n}\sum_{h=0}^{j} 4^j (2k-\nu)\left(-\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \left(-\frac{2\sqrt{z}\, f}{c}-1\right)^{h+j} \binom{j}{h}\binom{n}{j} \left(c(2k-\nu)\left(c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right) + 2\sqrt{-\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right)\right) c^{2n} + \frac{2^{-\nu}\, i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{n+1} \;/;\; n\in\mathbb{N} \land \nu\in\mathbb{N}^+$$

Involving powers of the direct function and algebraic functions

Involving powers of sinh and algebraic functions

Involving $(a\,z+b)^\beta \sinh^\nu(c\,z)$

01.19.21.1900.01

$$\int (b+a\,z)^{\beta}\sinh^{\nu}(c\,z)\,dz = \frac{2^{-\nu}\,i^{-\nu}\,(b+a\,z)^{\beta+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{a\,(\beta+1)} - \frac{1}{a}\,2^{-\nu}\,(b+a\,z)^{\beta+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k}\binom{\nu}{k}\left((-1)^{\nu}\,e^{\frac{b\,c\,(\nu-2\,k)}{a}}\,\Gamma\!\left(\beta+1,\,\frac{c\,(\nu-2\,k)\,(b+a\,z)}{a}\right)\left(\frac{c\,(\nu-2\,k)\,(b+a\,z)}{a}\right)^{-\beta-1} + \left(-\frac{c\,(\nu-2\,k)\,(b+a\,z)}{a}\right)^{-\beta-1}e^{-\frac{b\,c\,(\nu-2\,k)}{a}}\,\Gamma\!\left(\beta+1,\,-\frac{c\,(\nu-2\,k)\,(b+a\,z)}{a}\right)\right) /;\ \nu\in\mathbb{N}$$

01.19.21.1901.01

$$\int (b+a\,z)^{\beta}\sinh^{2}(c\,z)\,dz = -\frac{1}{a\,c\,(\beta+1)}\left(2^{-\beta-3}\,(b+a\,z)^{\beta}\left(-\frac{c^{2}\,(b+a\,z)^{2}}{a^{2}}\right)^{-\beta}\left(-a\,(\beta+1)\,\Gamma\!\left(\beta+1,\,-\frac{2\,c\,(b+a\,z)}{a}\right)\left(\cosh\!\left(\frac{2\,b\,c}{a}\right)-\sinh\!\left(\frac{2\,b\,c}{a}\right)\right)\left(\frac{c\,(b+a\,z)}{a}\right)^{\beta} + 2^{\beta+2}\left(-\frac{c^{2}\,(b+a\,z)^{2}}{a^{2}}\right)^{\beta}c\,(b+a\,z) + \left(-\frac{c\,(b+a\,z)}{a}\right)^{\beta}a\,(\beta+1)\,\Gamma\!\left(\beta+1,\,\frac{2\,c\,(b+a\,z)}{a}\right)\left(\cosh\!\left(\frac{2\,b\,c}{a}\right)+\sinh\!\left(\frac{2\,b\,c}{a}\right)\right)\right)\right)$$

01.19.21.1902.01

$$\int \frac{\sinh^{\nu}(c\,z)}{\sqrt{b+a\,z}}\,dz = \frac{2^{1-\nu}\,i^{-\nu}\,\sqrt{b+a\,z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{a} + \frac{1}{a}\,2^{-\nu}\,\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k}\binom{\nu}{k}\left(\frac{e^{-\frac{b\,c\,(\nu-2\,k)}{a}}\,\operatorname{erfi}\!\left(\sqrt{\frac{c\,(\nu-2\,k)}{a}}\,\sqrt{b+a\,z}\right)}{\sqrt{\frac{c\,(\nu-2\,k)}{a}}} + \frac{(-1)^{\nu}\,e^{\frac{b\,c\,(\nu-2\,k)}{a}}\,\operatorname{erfi}\!\left(\sqrt{-\frac{c\,(\nu-2\,k)}{a}}\,\sqrt{b+a\,z}\right)}{\sqrt{-\frac{c\,(\nu-2\,k)}{a}}}\right) /;\ \nu\in\mathbb{N}$$

01.19.21.1903.01

$$\int \frac{\sinh^{2}(c\,z)}{\sqrt{b+a\,z}}\,dz = \frac{1}{8\,a\,\sqrt{c}}\left(\sqrt{a}\,\sqrt{2\,\pi}\,\operatorname{erfi}\!\left(\frac{\sqrt{2}\,\sqrt{c}\,\sqrt{b+a\,z}}{\sqrt{a}}\right)\left(\cosh\!\left(\frac{2\,b\,c}{a}\right)-\sinh\!\left(\frac{2\,b\,c}{a}\right)\right) + \sqrt{a}\,\sqrt{2\,\pi}\,\operatorname{erf}\!\left(\frac{\sqrt{2}\,\sqrt{c}\,\sqrt{b+a\,z}}{\sqrt{a}}\right)\left(\cosh\!\left(\frac{2\,b\,c}{a}\right)+\sinh\!\left(\frac{2\,b\,c}{a}\right)\right) - 8\,\sqrt{c}\,\sqrt{b+a\,z}\right)$$

Involving products of the direct function and a power function

Involving products of two direct functions and a power function

Involving $z^{\alpha-1}\sinh(c\,z)\sinh(a\,z)$

01.19.21.1904.01

$$\int z^{\alpha-1}\sinh(c\,z)\sinh(a\,z)\,dz = \frac{1}{4} z^{\alpha}\left(\Gamma(\alpha,(a-c)\,z)\,((a-c)\,z)^{-\alpha} + ((c-a)\,z)^{-\alpha}\,\Gamma(\alpha,(c-a)\,z) - (-(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a+c)\,z) - ((a+c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+c)\,z)\right)$$

01.19.21.1905.01

$$\int z^{n}\sinh(c\,z)\sinh(a\,z)\,dz = \frac{1}{4} n!\left(-e^{(a+c)\,z}\,(-a-c)^{-n-1}\sum_{k=0}^{n}\frac{(-(a+c)\,z)^{k}}{k!} + (a-c)^{-n-1}\,e^{(c-a)\,z}\sum_{k=0}^{n}\frac{((a-c)\,z)^{k}}{k!} + (c-a)^{-n-1}\,e^{(a-c)\,z}\sum_{k=0}^{n}\frac{((c-a)\,z)^{k}}{k!} - (a+c)^{-n-1}\,e^{-(a+c)\,z}\sum_{k=0}^{n}\frac{((a+c)\,z)^{k}}{k!}\right) /;\, n\in\mathbb{N}$$

01.19.21.1906.01

$$\int z^{-n}\sinh(c\,z)\sinh(a\,z)\,dz = \frac{1}{4\left(a^{2}-c^{2}\right)(n-1)!}\Bigg(e^{(c-a)\,z}\Bigg(-(a-c)\,e^{2\,a\,z}\,(n-1)!\,(-a-c)^{n}\sum_{k=1}^{n-1}\frac{(-a-c)^{k-n}\,z^{k-n}}{(1-n)_{k}} + (-1)^{n}\,e^{(a-c)\,z}\,((a-c)\,\mathrm{Ei}((a+c)\,z)\,(-a-c)^{n} + (a-c)^{n}\,(a+c)\,\mathrm{Ei}((c-a)\,z)) - (a-c)^{n}\,(a+c)\,(n-1)!\sum_{k=1}^{n-1}\frac{(a-c)^{k-n}\,z^{k-n}}{(1-n)_{k}}\Bigg) - e^{-(2\,a+c)\,z}\Bigg(-(a+c)\,e^{3\,a\,z}\,(n-1)!\,(c-a)^{n}\sum_{k=1}^{n-1}\frac{(c-a)^{k-n}\,z^{k-n}}{(1-n)_{k}} + (-1)^{n}\,e^{(2\,a+c)\,z}\,((a+c)\,\mathrm{Ei}((a-c)\,z)\,(c-a)^{n} + (a-c)\,(a+c)^{n}\,\mathrm{Ei}(-(a+c)\,z)) - (a-c)\,(a+c)^{n}\,e^{a\,z}\,(n-1)!\sum_{k=1}^{n-1}\frac{(a+c)^{k-n}\,z^{k-n}}{(1-n)_{k}}\Bigg)\Bigg) /;\, n\in\mathbb{N}^{+}$$

01.19.21.1907.01

$$\int \frac{\sinh(c\,z)\sinh(a\,z)}{z}\,dz = \frac{1}{2}\,\mathrm{Chi}((a+c)\,z) - \frac{1}{2}\,\mathrm{Chi}((a-c)\,z)$$

Involving $z^{\alpha-1}\sinh(c\,z)\sinh(a\,z+b)$

01.19.21.1908.01

$$\int z^{\alpha-1}\sinh(c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4} e^{-b}\,z^{\alpha}\left(\Gamma(\alpha,(a-c)\,z)\,((a-c)\,z)^{-\alpha} + e^{2\,b}\,((c-a)\,z)^{-\alpha}\,\Gamma(\alpha,(c-a)\,z) - e^{2\,b}\,(-(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a+c)\,z) - ((a+c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+c)\,z)\right)$$

Involving $z^{\alpha-1}\sinh(c\,z+d)\sinh(a\,z+b)$

01.19.21.1909.01

$$\int z^{\alpha-1}\sinh(d+c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4} e^{-b-d}\,z^{\alpha}\left(e^{2\,d}\,\Gamma(\alpha,(a-c)\,z)\,((a-c)\,z)^{-\alpha} + e^{2\,b}\,((c-a)\,z)^{-\alpha}\,\Gamma(\alpha,(c-a)\,z) - e^{2\,(b+d)}\,(-(a+c)\,z)^{-\alpha}\,\Gamma(\alpha,-(a+c)\,z) - ((a+c)\,z)^{-\alpha}\,\Gamma(\alpha,(a+c)\,z)\right)$$

Involving $z^{n}\sinh(d\,z)\sinh\left(c\,z^{r}\right)$

01.19.21.1910.01

$$\int z^n \sinh(d\,z)\sinh\left(c\,z^2\right) dz = \frac{1}{8}\left(e^{\frac{d^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(-d)^{n-j}(d-2\,c\,z)^{j+1}\left(\frac{(d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - \right.$$
$$(-c)^{-n-1} e^{\frac{d^2}{4c}} \sum_{j=0}^{n} 2^{j-n} d^{n-j}(-d-2\,c\,z)^{j+1}\left(\frac{(-d-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-2\,c\,z)^2}{4\,c}\right) +$$
$$c^{-n-1} e^{-\frac{d^2}{4c}} \sum_{j=0}^{n} 2^{j-n} d^{n-j}(2\,c\,z-d)^{j+1}\left(-\frac{(2\,c\,z-d)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2\,c\,z-d)^2}{4\,c}\right) -$$
$$\left. c^{-n-1} e^{-\frac{d^2}{4c}} \sum_{j=0}^{n} 2^{j-n}(-d)^{n-j}(d+2\,c\,z)^{j+1}\left(-\frac{(d+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+2\,c\,z)^2}{4\,c}\right)\right) /;\ n \in \mathbb{N}$$

01.19.21.1911.01

$$\int z^n \sinh(d\,z)\sinh\left(c\sqrt{z}\right)dz = -2^{-2n-3}\,d^{-2(n+1)}$$
$$\left(-e^{\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\left(-c-2d\sqrt{z}\right)\right.\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(-c-2d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right)\right)+$$
$$e^{\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left(c\left(c-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(c-2d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right)\right)+$$
$$e^{-\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2d\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)-c\left(2d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right)-$$
$$e^{-\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2d\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2d\sqrt{z}\right)\right.$$
$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\,d\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sinh(d\,z+e)\sinh\left(c\,z^r\right)$

01.19.21.1912.01

$$\int z^n \sinh(e + d\, z) \sinh\left(c\, z^2\right) dz = \frac{1}{8}\left(e^{\frac{d^2}{4c}+e}\left(\sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d - 2\, c\, z)^{j+1} \left(\frac{(d - 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d - 2\, c\, z)^2}{4\, c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1} e^{\frac{d^2}{4c}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2\, c\, z)^{j+1} \left(\frac{(-d - 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2\, c\, z)^2}{4\, c}\right) + c^{-n-1} e^{-\frac{d^2}{4c}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2\, c\, z - d)^{j+1} \left(-\frac{(2\, c\, z - d)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2\, c\, z - d)^2}{4\, c}\right) - c^{-n-1} e^{e-\frac{d^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2\, c\, z)^{j+1} \left(-\frac{(d + 2\, c\, z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2\, c\, z)^2}{4\, c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1913.01

$$\int z^n \sinh(e+d\,z)\sinh\left(c\sqrt{z}\right)dz = -2^{-2n-3}\,d^{-2(n+1)}\left(-e^{\frac{c^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\left(-c-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(-c-2d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right)\right)+e^{\frac{c^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(c-2d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right)\right)+e^{e-\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2d\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)-c\left(2d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right)-e^{e-\frac{c^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2d\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\,d\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sinh\left(b\,z^r\right)\sinh\left(c\,z^r\right)$

01.19.21.1914.01

$$\int z^{\alpha-1}\sinh(b z^r)\sinh(c z^r)\,dz = \frac{1}{4r}\left(z^\alpha\left(-((-b-c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(-b-c)z^r\right)+((b-c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(b-c)z^r\right)+((c-b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(c-b)z^r\right)-((b+c)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r},(b+c)z^r\right)\right)\right)$$

01.19.21.1915.01

$$\int z^n\sinh(b z^2)\sinh(c z^2)\,dz = \frac{1}{8}z^{n+1}\left(-\left((-b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(-b-c)z^2\right)+\left((b-c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b-c)z^2\right)+\left((c-b)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-b)z^2\right)-\left((b+c)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b+c)z^2\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1916.01

$$\int z^n\sinh(b\sqrt{z})\sinh(c\sqrt{z})\,dz = \frac{1}{2}\left(-(-b-c)^{-2(n+1)}\Gamma\left(2(n+1),(-b-c)\sqrt{z}\right)+(b-c)^{-2(n+1)}\Gamma\left(2(n+1),(b-c)\sqrt{z}\right)+(c-b)^{-2(n+1)}\Gamma\left(2(n+1),(c-b)\sqrt{z}\right)-(b+c)^{-2(n+1)}\Gamma\left(2(n+1),(b+c)\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^n\sinh(d z)\sinh(c z^r+g)$

01.19.21.1917.01

$$\int z^n\sinh(d z)\sinh(c z^2+g)\,dz = \frac{1}{8}\left(e^{\frac{d^2}{4c}-g}\left(\sum_{j=0}^n 2^{j-n}(-d)^{n-j}(d-2cz)^{j+1}\left(\frac{(d-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-2cz)^2}{4c}\right)\right)(-c)^{-n-1}-\right.$$
$$(-c)^{-n-1}e^{\frac{d^2}{4c}-g}\sum_{j=0}^n 2^{j-n}d^{n-j}(-d-2cz)^{j+1}\left(\frac{(-d-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-2cz)^2}{4c}\right)+$$
$$c^{-n-1}e^{g-\frac{d^2}{4c}}\sum_{j=0}^n 2^{j-n}d^{n-j}(2cz-d)^{j+1}\left(-\frac{(2cz-d)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2cz-d)^2}{4c}\right)-$$
$$\left.c^{-n-1}e^{g-\frac{d^2}{4c}}\sum_{j=0}^n 2^{j-n}(-d)^{n-j}(d+2cz)^{j+1}\left(-\frac{(d+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+2cz)^2}{4c}\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1918.01

$$\int z^n \sinh(d\,z) \sinh\left(\sqrt{z}\; c + g\right) dz = -2^{-2n-3}\, d^{-2(n+1)}$$

$$\left(-e^{\frac{c^2}{4d}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(-c - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-c\left(-c-2d\sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-c-2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c-2d\sqrt{z}\right)^2}{4d}\right)\right) +$$

$$e^{\frac{c^2}{4d}+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(c-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(c-2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(c-2d\sqrt{z}\right)^2}{4d}\right)\right) +$$

$$e^{-\frac{c^2}{4d}-g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c)^{-h-j+2n} \left(2d\sqrt{z} - c\right)^{h+j} \left(-\frac{\left(2d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c\right)^2}{d}}\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right) - c\left(2d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2d\sqrt{z}-c\right)^2}{4d}\right)\right) -$$

$$e^{g-\frac{c^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, c^{-h-j+2n} \left(c + 2d\sqrt{z}\right)^{h+j} \left(-\frac{\left(c+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c\left(c+2d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(c+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) /;\; n \in \mathbb{N}$$

Involving $z^n \sinh(d\,z+e) \sinh\left(c\,z^r + g\right)$

01.19.21.1919.01

$$\int z^n \sinh(e + d z) \sinh\left(c z^2 + g\right) dz ==$$

$$\frac{1}{8}\left(e^{\frac{d^2}{4c}+e-g}\left(\sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d - 2 c z)^{j+1} \left(\frac{(d - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d - 2 c z)^2}{4 c}\right)\right) (-c)^{-n-1} -\right.$$

$$(-c)^{-n-1} e^{\frac{d^2}{4c}-e-g} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 c z)^{j+1} \left(\frac{(-d - 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 c z)^2}{4 c}\right) +$$

$$c^{-n-1} e^{-\frac{d^2}{4c}-e+g} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2 c z - d)^{j+1} \left(-\frac{(2 c z - d)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c z - d)^2}{4 c}\right) -$$

$$\left. c^{-n-1} e^{-\frac{d^2}{4c}+e+g} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 c z)^{j+1} \left(-\frac{(d + 2 c z)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 c z)^2}{4 c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1920.01

$$\int z^n \sinh(e+d\,z)\sinh\left(\sqrt{z}\;c+g\right)dz = -2^{-2n-3}\,d^{-2(n+1)}$$

$$\left(-e^{\frac{c^2}{4d}-e-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(-c-2\,d\sqrt{z}\right)^{h+j}\left(\frac{\left(-c-2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\left(-c-2\,d\sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-c-2\,d\sqrt{z}\right)^2}{4\,d}\right)-2\,d\sqrt{\frac{\left(-c-2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c-2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{c^2}{4d}-e+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c-2\,d\sqrt{z}\right)^{h+j}\left(\frac{\left(c-2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\left(c-2\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(c-2\,d\sqrt{z}\right)^2}{4\,d}\right)-2\,d\sqrt{\frac{\left(c-2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(c-2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{c^2}{4d}+e-g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2\,d\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2\,d\sqrt{z}-c\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,d\sqrt{-\frac{\left(2\,d\sqrt{z}-c\right)^2}{d}}\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)-c\left(2\,d\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,d\sqrt{z}-c\right)^2}{4\,d}\right)\right)-$$

$$e^{-\frac{c^2}{4d}+e+g}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,c^{-h-j+2n}\left(c+2\,d\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\left(c+2\,d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)+2\sqrt{-\frac{\left(c+2\,d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sinh\left(b\,z^r\right)\sinh\left(c\,z^r+g\right)$

01.19.21.1921.01

$$\int z^{\alpha-1}\sinh(b\,z^r)\sinh(c\,z^r+g)\,dz = \frac{1}{4r}\left(z^\alpha\left(-e^g\,\Gamma\left(\frac{\alpha}{r},(-b-c)\,z^r\right)((-b-c)\,z^r)^{-\frac{\alpha}{r}}+e^g\,((b-c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(b-c)\,z^r\right)+e^{-g}\,((c-b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-b)\,z^r\right)-e^{-g}\,((b+c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(b+c)\,z^r\right)\right)\right)$$

01.19.21.1922.01

$$\int z^n\sinh\left(b\,z^2\right)\sinh\left(c\,z^2+g\right)dz = \frac{1}{8}z^{n+1}\left(-e^g\,\Gamma\left(\frac{n+1}{2},(-b-c)\,z^2\right)\left((-b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^g\left((b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b-c)\,z^2\right)+e^{-g}\left((c-b)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-b)\,z^2\right)-e^{-g}\left((b+c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b+c)\,z^2\right)\right)/;\,n\in\mathbb{N}$$

01.19.21.1923.01

$$\int z^n\sinh\left(b\sqrt{z}\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{1}{2}\left(-(-b-c)^{-2(n+1)}\,e^g\,\Gamma\left(2(n+1),(-b-c)\sqrt{z}\right)+(b-c)^{-2(n+1)}\,e^g\,\Gamma\left(2(n+1),(b-c)\sqrt{z}\right)+(c-b)^{-2(n+1)}\,e^{-g}\,\Gamma\left(2(n+1),(c-b)\sqrt{z}\right)-(b+c)^{-2(n+1)}\,e^{-g}\,\Gamma\left(2(n+1),(b+c)\sqrt{z}\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sinh(b\,z^r+e)\sinh(c\,z^r+g)$

01.19.21.1924.01

$$\int z^{\alpha-1}\sinh(b\,z^r+e)\sinh(c\,z^r+g)\,dz = \frac{1}{4r}\left(z^\alpha\left(-e^{e+g}\,\Gamma\left(\frac{\alpha}{r},(-b-c)\,z^r\right)((-b-c)\,z^r)^{-\frac{\alpha}{r}}+e^{g-e}\,((b-c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(b-c)\,z^r\right)+e^{e-g}\,((c-b)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(c-b)\,z^r\right)-e^{-e-g}\,((b+c)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(b+c)\,z^r\right)\right)\right)$$

01.19.21.1925.01

$$\int z^n\sinh\left(b\,z^2+e\right)\sinh\left(c\,z^2+g\right)dz = \frac{1}{8}z^{n+1}\left(-e^{e+g}\,\Gamma\left(\frac{n+1}{2},(-b-c)\,z^2\right)\left((-b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{g-e}\left((b-c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b-c)\,z^2\right)+e^{e-g}\left((c-b)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(c-b)\,z^2\right)-e^{-e-g}\left((b+c)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},(b+c)\,z^2\right)\right)/;\,n\in\mathbb{N}$$

01.19.21.1926.01

$$\int z^n\sinh\left(\sqrt{z}\,b+e\right)\sinh\left(\sqrt{z}\,c+g\right)dz = \frac{1}{2}\left(-(-b-c)^{-2(n+1)}\,e^{e+g}\,\Gamma\left(2(n+1),(-b-c)\sqrt{z}\right)+(b-c)^{-2(n+1)}\,e^{g-e}\,\Gamma\left(2(n+1),(b-c)\sqrt{z}\right)+(c-b)^{-2(n+1)}\,e^{e-g}\,\Gamma\left(2(n+1),(c-b)\sqrt{z}\right)-(b+c)^{-2(n+1)}\,e^{-e-g}\,\Gamma\left(2(n+1),(b+c)\sqrt{z}\right)\right)/;\,n\in\mathbb{N}$$

Involving $z^n\sinh(d\,z)\sinh(c\,z^r+f\,z)$

01.19.21.1927.01

$$\int z^n \sinh(d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{8}\left(e^{\frac{(d-f)^2}{4c}}\left(\sum_{j=0}^{n} 2^{j-n}(f-d)^{n-j}(d-f-2\,c\,z)^{j+1}\left(\frac{(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1}\,e^{\frac{(-d-f)^2}{4c}}\sum_{j=0}^{n}2^{j-n}(d+f)^{n-j}(-d-f-2\,c\,z)^{j+1}\left(\frac{(-d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f-2\,c\,z)^2}{4\,c}\right) + c^{-n-1}\,e^{-\frac{(f-d)^2}{4c}}\sum_{j=0}^{n}2^{j-n}(d-f)^{n-j}(-d+f+2\,c\,z)^{j+1}\left(-\frac{(-d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f+2\,c\,z)^2}{4\,c}\right) - c^{-n-1}\,e^{-\frac{(d+f)^2}{4c}}\sum_{j=0}^{n}2^{j-n}(-d-f)^{n-j}(d+f+2\,c\,z)^{j+1}\left(-\frac{(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f+2\,c\,z)^2}{4\,c}\right)\right)\,/;\,n\in\mathbb{N}$$

01.19.21.1928.01

$$\int z^n \sinh(d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = -2^{-2n-3}\left(-e^{-\frac{c^2}{4(-d-f)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(-d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(-d-f)\sqrt{-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right) - c\left(2(-d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right)\right)\right)(-d-f)^{-2(n+1)} + e^{-\frac{c^2}{4(d-f)}}(d-f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - \right.$$

$$c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-d)}}(f-d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)-$$

$$e^{-\frac{c^2}{4(d+f)}}(d+f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sinh(d\,z+e)\sinh\left(c\,z^r+f\,z\right)$

01.19.21.1929.01

$$\int z^n \sinh(e+d\,z)\sinh\left(c\,z^2+f\,z\right)dz = \frac{1}{8}\left(e^{\frac{(d-f)^2}{4c}+e}\left(\sum_{j=0}^{n} 2^{j-n}(f-d)^{n-j}(d-f-2\,c\,z)^{j+1}\left(\frac{(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1} - (-c)^{-n-1}\,e^{\frac{(-d-f)^2}{4c}-e}\sum_{j=0}^{n} 2^{j-n}(d+f)^{n-j}(-d-f-2\,c\,z)^{j+1}\left(\frac{(-d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f-2\,c\,z)^2}{4\,c}\right) + c^{-n-1}\,e^{-\frac{(f-d)^2}{4c}-e}\sum_{j=0}^{n} 2^{j-n}(d-f)^{n-j}(-d+f+2\,c\,z)^{j+1}\left(-\frac{(-d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f+2\,c\,z)^2}{4\,c}\right) - c^{-n-1}\,e^{e-\frac{(d+f)^2}{4c}}\sum_{j=0}^{n} 2^{j-n}(-d-f)^{n-j}(d+f+2\,c\,z)^{j+1}\left(-\frac{(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f+2\,c\,z)^2}{4\,c}\right)\right) /;\ n\in\mathbb{N}$$

01.19.21.1930.01

$$\int z^n \sinh(e+d\,z)\sinh\left(\sqrt{z}\;c+f\,z\right)dz = -2^{-2n-3}\left(-e^{-\frac{c^2}{4(-d-f)}-e}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(-d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(-d-f)\sqrt{-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right) - c\left(2(-d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right)\right)\right)(-d-f)^{-2(n+1)} + e^{e-\frac{c^2}{4(d-f)}}(d-f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - \right.$$

$$c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-d)}-e}(f-d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+$$

$$2\sqrt{-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\Bigg)-$$

$$e^{e-\frac{c^2}{4(d+f)}}(d+f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+$$

$$2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sinh(b z^r) \sinh(c z^r + f z)$

01.19.21.1931.01

$$\int z^n \sinh\left(b z^2\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8}\left(-(-b-c)^{-n-1} e^{\frac{f^2}{4(b+c)}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-b-c)z - f)^{j+1} \left(-\frac{(2(-b-c)z-f)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c)z-f)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{f^2}{4(b-c)}} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(b-c)z-f)^{j+1} \left(-\frac{(2(b-c)z-f)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c)z-f)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{\frac{f^2}{4(b-c)}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f+2(c-b)z)^{j+1} \left(-\frac{(f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c-b)z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{-\frac{f^2}{4(b+c)}} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f+2(b+c)z)^{j+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1932.01

$$\int z^n \sinh\left(b\sqrt{z}\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = -2^{-2n-3} f^{-2(n+1)} \left(-e^{\frac{(-b-c)^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left((-b-c)\left(-b-c-2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(-b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-c-2f\sqrt{z}\right)^2}{4f}\right)\right) + e^{\frac{(b-c)^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left((b-c)\left(b-c-2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right) - 2f\sqrt{\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(b-c-2f\sqrt{z}\right)^2}{4f}\right)\right) + \right.$$

$$e^{-\frac{(c-b)^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c-b)^{-h-j+2n} \left(-b+c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left((c-b)\left(-b+c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2f\sqrt{z}\right)^2}{4f}\right) + \right.$$

$$\left. 2\sqrt{-\frac{\left(-b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2f\sqrt{z}\right)^2}{4f}\right)\right) -$$

$$e^{-\frac{(b+c)^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b+c)^{-h-j+2n} \left(b+c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left((b+c)\left(b+c+2f\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right) + \right.$$

$$\left.\left. 2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\, f\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \sinh\left(b z^r + e\right) \sinh\left(c z^r + f z\right)$

01.19.21.1933.01

$$\int z^n \sinh\left(b z^2 + e\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8}\left(-(-b-c)^{-n-1} e^{\frac{1}{4} i \left(4 i e - \frac{f^2}{-i b - i c}\right)} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-b-c) z - f)^{j+1} \left(-\frac{(2(-b-c) z - f)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c) z - f)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{1}{4} i \left(\frac{f^2}{i b - i c} + 4 i e\right)} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(b-c) z - f)^{j+1} \left(-\frac{(2(b-c) z - f)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c) z - f)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{\frac{1}{4} i \left(\frac{f^2}{i b - i c} + 4 i e\right)} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c-b) z)^{j+1} \left(-\frac{(f + 2(c-b) z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c-b) z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{-\frac{1}{4} i \left(4 i e - \frac{f^2}{-i b - i c}\right)} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(b+c) z)^{j+1} \left(-\frac{(f + 2(b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(b+c) z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1934.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = -2^{-2n-3} f^{-2(n+1)} \left(-e^{\frac{(-b-c)^2}{4 f} - e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-b-c)\left(-b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-b-c-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{(b-c)^2}{4 f} + e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((b-c)\left(b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(b-c-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right) + \right.$$

$$e^{-\frac{(c-b)^2}{4f}-e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c-b)^{-h-j+2n} \left(-b+c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-b)\left(-b+c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2f\sqrt{z}\right)^2}{4f}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-b+c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2f\sqrt{z}\right)^2}{4f}\right)\right)-$$

$$e^{e-\frac{(b+c)^2}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b+c)^{-h-j+2n} \left(b+c+2f\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left((b+c)\left(b+c+2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+c+2f\sqrt{z}\right)^2}{f}}\; f\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2f\sqrt{z}\right)^2}{4f}\right)\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^n \sinh\left(b z^r + d z\right) \sinh\left(c z^r + f z\right)$

01.19.21.1935.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh\left(c z^2 + f z\right) dz = \frac{1}{8}\left(-(-b-c)^{-n-1} e^{-\frac{(-d-f)^2}{4(-b-c)}} \sum_{j=0}^{n} 2^{j-n} (d+f)^{n-j} (-d-f+2(-b-c)z)^{j+1} \left(-\frac{(-d-f+2(-b-c)z)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d-f+2(-b-c)z)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}} \sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f+2(b-c)z)^{j+1} \left(-\frac{(d-f+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+2(b-c)z)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{-\frac{(f-d)^2}{4(c-b)}} \sum_{j=0}^{n} 2^{j-n} (d-f)^{n-j} (-d+f+2(c-b)z)^{j+1} \left(-\frac{(-d+f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f+2(c-b)z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)}} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2(b+c)z)^{j+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1936.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-3} \left(e^{-\frac{(-b-c)^2}{4(-d-f)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c+2(-d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left((-b-c)\left(-b-c+2(-d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right) + 2\sqrt{-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}} (-d-f) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right)\right)\right) (-d-f)^{-2n-2} - e^{-\frac{(b-c)^2}{4(d-f)}} (d-f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right)-$$

$$e^{-\frac{(c-b)^2}{4(f-d)}}(f-d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-b)^{-h-j+2n}\left(-b+c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-b)\left(-b+c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left. 2\sqrt{-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)+$$

$$e^{-\frac{(b+c)^2}{4(d+f)}}(d+f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c)^{-h-j+2n}\left(b+c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right) /;\ n\in\mathbb{N}$$

Involving $z^n \sinh(d\,z)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1937.01

$$\int z^n \sinh(d z) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8}\left(e^{\frac{(-d-f)^2}{4c}-g-i\pi}\left(\sum_{j=0}^{n} 2^{j-n} (d+f)^{n-j} (-d-f-2cz)^{j+1} \left(\frac{(-d-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-f-2cz)^2}{4c}\right)\right)(-c)^{-n-1} + e^{\frac{(d-f)^2}{4c}-g}\left(\sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f-2cz)^{j+1} \left(\frac{(d-f-2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d-f-2cz)^2}{4c}\right)\right)(-c)^{-n-1} + c^{-n-1} e^{g-\frac{(f-d)^2}{4c}} \sum_{j=0}^{n} 2^{j-n} (d-f)^{n-j} (-d+f+2cz)^{j+1} \left(-\frac{(-d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f+2cz)^2}{4c}\right) + c^{-n-1} e^{-\frac{(d+f)^2}{4c}+g+i\pi} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2cz)^{j+1} \left(-\frac{(d+f+2cz)^2}{c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2cz)^2}{4c}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1938.01

$$\int z^n \sinh(d z) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = -2^{-2n-3}\left(e^{-\frac{c^2}{4(-d-f)}-g-i\pi}\left(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(-d-f)\sqrt{z}-c\right)^{h+j} \left(-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2(-d-f)\sqrt{-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right) - c\left(2(-d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right)\right)\right)(-d-f)^{-2(n+1)} + e^{-\frac{c^2}{4(d-f)}-g} (d-f)^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c)^{-h-j+2n} \left(2(d-f)\sqrt{z}-c\right)^{h+j} \left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right) - \right.$$

$$c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\Bigg)+$$

$$e^{g-\frac{c^2}{4(f-d)}}(f-d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)+$$

$$e^{-\frac{c^2}{4(d+f)}+g+i\pi}(d+f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}$$

Involving $z^n \sinh(d\,z+e)\sinh\left(c\,z^r+f\,z+g\right)$

01.19.21.1939.01

$$\int z^n \sinh(e+d\,z)\sinh\left(c\,z^2+f\,z+g\right)dz = \frac{1}{8}\left(e^{\frac{(-d-f)^2}{4c}-e-g-i\pi}\left(\sum_{j=0}^{n}2^{j-n}(d+f)^{n-j}(-d-f-2\,c\,z)^{j+1}\left(\frac{(-d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+e^{\frac{(d-f)^2}{4c}+e-g}\left(\sum_{j=0}^{n}2^{j-n}(f-d)^{n-j}(d-f-2\,c\,z)^{j+1}\left(\frac{(d-f-2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f-2\,c\,z)^2}{4\,c}\right)\right)(-c)^{-n-1}+c^{-n-1}\,e^{-\frac{(f-d)^2}{4c}-e+g}\sum_{j=0}^{n}2^{j-n}(d-f)^{n-j}(-d+f+2\,c\,z)^{j+1}\left(-\frac{(-d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f+2\,c\,z)^2}{4\,c}\right)+c^{-n-1}\,e^{-\frac{(d+f)^2}{4c}+e+g+i\pi}\sum_{j=0}^{n}2^{j-n}(-d-f)^{n-j}(d+f+2\,c\,z)^{j+1}\left(-\frac{(d+f+2\,c\,z)^2}{c}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f+2\,c\,z)^2}{4\,c}\right)\right)\;/;\;n\in\mathbb{N}$$

01.19.21.1940.01

$$\int z^n \sinh(e+d\,z)\sinh\left(\sqrt{z}\,c+g+f\,z\right)dz = -2^{-2n-3}\left(e^{-\frac{c^2}{4(-d-f)}-e-g-i\pi}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(-d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(-d-f)\sqrt{-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{-d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right)-c\left(2(-d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f)\sqrt{z}-c\right)^2}{4(-d-f)}\right)\right)\right)(-d-f)^{-2(n+1)}+e^{-\frac{c^2}{4(d-f)}+e-g}(d-f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c)^{-h-j+2n}\left(2(d-f)\sqrt{z}-c\right)^{h+j}\left(-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(d-f)\sqrt{-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{d-f}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)-\right.$$

$$c\left(2(d-f)\sqrt{z}-c\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(d-f)\sqrt{z}-c\right)^2}{4(d-f)}\right)\Bigg)+$$

$$e^{-\frac{c^2}{4(f-d)}-e+g}(f-d)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{f-d}}\;(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)+$$

$$e^{-\frac{c^2}{4(d+f)}+e+g+i\pi}(d+f)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j c^{-h-j+2n}\left(c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\left(c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{d+f}}\;(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^n \sinh(b z^r) \sinh(c z^r + f z + g)$

01.19.21.1941.01

$$\int z^n \sinh\left(b z^2\right) \sinh\left(c z^2 + f z + g\right) dz =$$

$$\frac{1}{8}\left(e^{\frac{1}{4} i \left(-\frac{f^2}{-i b - i c} + 4 i g - 4\pi\right)} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-b-c)z - f)^{j+1} \left(-\frac{(2(-b-c)z-f)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c)z-f)^2}{4(-b-c)}\right)\right)\right.$$
$$(-b-c)^{-n-1} + (b-c)^{-n-1} e^{-\frac{1}{4} i \left(\frac{f^2}{i b - i c} - 4 i g\right)}$$
$$\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(b-c)z - f)^{j+1} \left(-\frac{(2(b-c)z-f)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c)z-f)^2}{4(b-c)}\right) +$$
$$(c-b)^{-n-1} e^{\frac{1}{4} i \left(\frac{f^2}{i b - i c} - 4 i g\right)} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c-b)z)^{j+1} \left(-\frac{(f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(c-b)z)^2}{4(c-b)}\right) + (b+c)^{-n-1} e^{-\frac{1}{4} i \left(-\frac{f^2}{-i b - i c} + 4 i g - 4\pi\right)}$$
$$\left.\sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(b+c)z)^{j+1} \left(-\frac{(f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f+2(b+c)z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1942.01

$$\int z^n \sinh\left(b\sqrt{z}\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz =$$

$$-2^{-2n-3} f^{-2(n+1)} \left(e^{\frac{(-b-c)^2}{4f} - g - i\pi} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}\right.$$
$$\binom{j}{h}\binom{n}{j}\left((-b-c)\left(-b-c-2f\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-c-2f\sqrt{z}\right)^2}{4f}\right) - \right.$$
$$\left.\left. 2f\sqrt{\frac{\left(-b-c-2f\sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-c-2f\sqrt{z}\right)^2}{4f}\right)\right)\right) + e^{\frac{(b-c)^2}{4f} - g}$$
$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c-2f\sqrt{z}\right)^{h+j} \left(\frac{\left(b-c-2f\sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((b-c)\left(b-c-2f\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(b-c-2 f \sqrt{z}\right)^2}{f}} \; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) +$$

$$e^{g-\frac{(c-b)^2}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c-b)^{-h-j+2 n} \left(-b+c+2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c-b)\left(-b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{f}} \; f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) +$$

$$e^{-\frac{(b+c)^2}{4 f}+g+i \pi} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b+c)^{-h-j+2 n} \left(b+c+2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c)\left(b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(b+c+2 f \sqrt{z}\right)^2}{f}} \; f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) /; n \in \mathbb{N}$$

Involving $z^n \sinh\left(b z^r + e\right) \sinh\left(c z^r + f z + g\right)$

01.19.21.1943.01

$$\int z^n \sinh\left(b z^2 + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8}\left(e^{\frac{1}{4} i \left(-\frac{f^2}{-i b - i c} + 4 i e + 4 i g - 4 \pi\right)} \left(\sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(-b-c) z - f)^{j+1} \left(-\frac{(2(-b-c) z - f)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c) z - f)^2}{4(-b-c)}\right)\right)(-b-c)^{-n-1} + (b-c)^{-n-1} e^{-\frac{1}{4} i \left(\frac{f^2}{i b - i c} - 4 i g + 4 i e\right)} \sum_{j=0}^{n} 2^{j-n} f^{n-j} (2(b-c) z - f)^{j+1} \left(-\frac{(2(b-c) z - f)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c) z - f)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{\frac{1}{4} i \left(\frac{f^2}{i b - i c} - 4 i g + 4 i e\right)} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(c-b) z)^{j+1} \left(-\frac{(f + 2(c-b) z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(c-b) z)^2}{4(c-b)}\right) + (b+c)^{-n-1} e^{-\frac{1}{4} i \left(-\frac{f^2}{-i b - i c} + 4 i e + 4 i g - 4 \pi\right)} \sum_{j=0}^{n} 2^{j-n} (-f)^{n-j} (f + 2(b+c) z)^{j+1} \left(-\frac{(f + 2(b+c) z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f + 2(b+c) z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1944.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = -2^{-2n-3} f^{-2(n+1)} \left(e^{\frac{(-b-c)^2}{4 f} - e - g - i \pi} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(-b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-b-c)\left(-b-c-2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(-b-c-2 f \sqrt{z}\right)^2}{f}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\right) + e^{\frac{(b-c)^2}{4 f} + e - g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c-2 f \sqrt{z}\right)^{h+j} \left(\frac{\left(b-c-2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((b-c)\left(b-c-2 f \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right) - 2 f \sqrt{\frac{\left(b-c-2 f \sqrt{z}\right)^2}{f}} \; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(b-c-2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) +$$

$$e^{-\frac{(c-b)^2}{4 f}-e+g} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c-b)^{-h-j+2 n} \left(-b+c+2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c-b)\left(-b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{f}} \; f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg) +$$

$$e^{-\frac{(b+c)^2}{4 f}+e+g+i \pi} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b+c)^{-h-j+2 n} \left(b+c+2 f \sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c+2 f \sqrt{z}\right)^2}{f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c)\left(b+c+2 f \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right) +$$

$$2 \sqrt{-\frac{\left(b+c+2 f \sqrt{z}\right)^2}{f}} \; f \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2 f \sqrt{z}\right)^2}{4 f}\right)\Bigg)\Bigg) /; n \in \mathbb{N}$$

Involving $z^n \sinh\left(b z^r + d z\right) \sinh\left(c z^r + f z + g\right)$

01.19.21.1945.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8}\left(-(-b-c)^{-n-1} e^{-\frac{(-d-f)^2}{4(-b-c)}-g} \sum_{j=0}^{n} 2^{j-n} (d+f)^{n-j} (-d-f+2(-b-c)z)^{j+1} \left(-\frac{(-d-f+2(-b-c)z)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d-f+2(-b-c)z)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)}-g} \sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f+2(b-c)z)^{j+1} \left(-\frac{(d-f+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+2(b-c)z)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{g-\frac{(f-d)^2}{4(c-b)}} \sum_{j=0}^{n} 2^{j-n} (d-f)^{n-j} (-d+f+2(c-b)z)^{j+1} \left(-\frac{(-d+f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f+2(c-b)z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{g-\frac{(d+f)^2}{4(b+c)}} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2(b+c)z)^{j+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right)\right) /; n \in \mathbb{N}$$

01.19.21.1946.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} \left(e^{-\frac{(-b-c)^2}{4(-d-f)}-g} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c+2(-d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-b-c)\left(-b-c+2(-d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right) + 2\sqrt{-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}}\, (-d-f)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right)\right)\right) (-d-f)^{-2n-2} - e^{-\frac{(b-c)^2}{4(d-f)}-g} (d-f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)-$$

$$e^{g-\frac{(c-b)^2}{4(f-d)}}(f-d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-b)^{-h-j+2n}\left(-b+c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-b)\left(-b+c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)+$$

$$e^{g-\frac{(b+c)^2}{4(d+f)}}(d+f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c)^{-h-j+2n}\left(b+c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right)\,/;\, n\in\mathbb{N}$$

Involving $z^n \sinh\left(b z^r + d z + e\right) \sinh\left(c z^r + f z + g\right)$

01.19.21.1947.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} \left(-(-b-c)^{-n-1} e^{-\frac{(-d-f)^2}{4(-b-c)} - e - g} \sum_{j=0}^{n} 2^{j-n} (d+f)^{n-j} (-d-f+2(-b-c)z)^{j+1} \left(-\frac{(-d-f+2(-b-c)z)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d-f+2(-b-c)z)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{(d-f)^2}{4(b-c)} + e - g} \sum_{j=0}^{n} 2^{j-n} (f-d)^{n-j} (d-f+2(b-c)z)^{j+1} \left(-\frac{(d-f+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+2(b-c)z)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{-\frac{(f-d)^2}{4(c-b)} - e + g} \sum_{j=0}^{n} 2^{j-n} (d-f)^{n-j} (-d+f+2(c-b)z)^{j+1} \left(-\frac{(-d+f+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f+2(c-b)z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{-\frac{(d+f)^2}{4(b+c)} + e + g} \sum_{j=0}^{n} 2^{j-n} (-d-f)^{n-j} (d+f+2(b+c)z)^{j+1} \left(-\frac{(d+f+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+2(b+c)z)^2}{4(b+c)}\right) \right) /; n \in \mathbb{N}$$

01.19.21.1948.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-3} \left(e^{-\frac{(-b-c)^2}{4(-d-f)} - e - g} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b-c)^{-h-j+2n} \left(-b-c+2(-d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-b-c)\left(-b-c+2(-d-f)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right) + 2\sqrt{-\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{-d-f}}\,(-d-f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b-c+2(-d-f)\sqrt{z}\right)^2}{4(-d-f)}\right)\right)\right) (-d-f)^{-2n-2} - e^{-\frac{(b-c)^2}{4(d-f)} + e - g} (d-f)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-c)^{-h-j+2n} \left(b-c+2(d-f)\sqrt{z}\right)^{h+j} \left(-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((b-c)\left(b-c+2(d-f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{d-f}}\,(d-f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b-c+2(d-f)\sqrt{z}\right)^2}{4(d-f)}\right)\right)\right) - e^{-\frac{(c-b)^2}{4(f-d)}-e+g}$$

$$(f-d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c-b)^{-h-j+2n}\left(-b+c+2(f-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c-b)\left(-b+c+2(f-d)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{f-d}}\,(f-d)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c+2(f-d)\sqrt{z}\right)^2}{4(f-d)}\right)\right)+$$

$$e^{-\frac{(b+c)^2}{4(d+f)}+e+g}\,(d+f)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c)^{-h-j+2n}\left(b+c+2(d+f)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((b+c)\left(b+c+2(d+f)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{d+f}}\,(d+f)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c+2(d+f)\sqrt{z}\right)^2}{4(d+f)}\right)\right)\right) /;\ n\in\mathbb{N}$$

Involving products of several direct functions and a power function

Involving $z^{\alpha-1}\sinh(a\,z)\sinh(b\,z)\sinh(c\,z)$

01.19.21.1949.01

$$\int z^{\alpha-1}\sinh(a z)\sinh(b z)\sinh(c z)\,dz = -\frac{1}{8} z^{\alpha}\left(-((a-b-c)z)^{-\alpha}\Gamma(\alpha,(a-b-c)z)-(-(a+b-c)z)^{-\alpha}\Gamma(\alpha,-(a+b-c)z)+((a+b-c)z)^{-\alpha}\Gamma(\alpha,(a+b-c)z)-(-(a-b+c)z)^{-\alpha}\Gamma(\alpha,-(a-b+c)z)+((a-b+c)z)^{-\alpha}\Gamma(\alpha,(a-b+c)z)+((-a+b+c)z)^{-\alpha}\Gamma(\alpha,(-a+b+c)z)+(-(a+b+c)z)^{-\alpha}\Gamma(\alpha,-(a+b+c)z)-((a+b+c)z)^{-\alpha}\Gamma(\alpha,(a+b+c)z)\right)$$

01.19.21.1950.01

$$\int \frac{\sinh(a z)\sinh(b z)\sinh(c z)}{z}\,dz = \frac{1}{4}(\mathrm{Shi}((a-b-c)z)-\mathrm{Shi}((a+b-c)z)-\mathrm{Shi}((a-b+c)z)+\mathrm{Shi}((a+b+c)z))$$

Involving $z^{\alpha-1}\prod_{k=1}^{n}\sinh(a_k z)$

01.19.21.1951.01

$$\int z^{\alpha-1}\prod_{k=1}^{n}\sinh(a_k z)\,dz = 2^{-n-1} z^{\alpha}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\left((-1)^{\sum_{j=1}^{n}\frac{1}{4}(2k_j+2)}\left(-\left(z\sum_{j=1}^{n}k_j a_j\right)^{-\alpha}\Gamma\left(\alpha, z\sum_{j=1}^{n}k_j a_j\right)+\Gamma\left(\alpha,-z\sum_{j=1}^{n}k_j a_j\right)\left(-\left(-z\sum_{j=1}^{n}k_j a_j\right)^{-\alpha}\right)\right)\right)$$

01.19.21.1952.01

$$\int \frac{1}{z}\prod_{k=1}^{n}\sinh(a_k z)\,dz = 2^{-n}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\left((-1)^{\sum_{j=1}^{n}\frac{1}{4}(2k_j+2)}\,\mathrm{Chi}\left(z\sum_{j=1}^{n}k_j a_j\right)\right)$$

Involving products of powers of the direct function and a power function

Involving product of power of the direct function, the direct function and a power function

Involving $z^{\alpha-1}\sinh(c z)\sinh^{\nu}(a z)$

01.19.21.1953.01

$$\int z^{\alpha-1}\sinh(c z)\sinh^{\nu}(a z)\,dz = 2^{-\nu-1} e^{\frac{i\pi\nu}{2}} z^{\alpha}\binom{\nu}{\frac{\nu}{2}}((c z)^{-\alpha}\Gamma(\alpha,c z)-(-c z)^{-\alpha}\Gamma(\alpha,-c z))(1-\nu \bmod 2)-2^{-\nu-1}z^{\alpha}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\left(-e^{i\pi+i\pi\nu}\Gamma(\alpha,(-c-2as+a\nu)z)((-c-2as+a\nu)z)^{-\alpha}-e^{i\pi\nu}((c-2as+a\nu)z)^{-\alpha}\Gamma(\alpha,(c-2as+a\nu)z)+((-c+2as-a\nu)z)^{-\alpha}\Gamma(\alpha,(-c+2as-a\nu)z)-((c+2as-a\nu)z)^{-\alpha}\Gamma(\alpha,(c+2as-a\nu)z)\right)\,/;\,\nu\in\mathbb{N}^{+}$$

01.19.21.1954.01

$$\int z^n \sinh(c z) \sinh^\nu(a z)\, dz = \frac{1}{2} n! \sinh^\nu(a z) \left(1 - e^{2 a z}\right)^{-\nu} \left(e^{c z} \sum_{p=0}^{n} \frac{((-1)^p z^{n-p})}{(n-p)!\,(c - a \nu)^{p+1}} {}_{p+2}F_{p+1}\left(\frac{c - a \nu}{2 a}, \ldots, \frac{c - a \nu}{2 a}, -\nu; \frac{c - a \nu}{2 a} + 1, \ldots, \frac{c - a \nu}{2 a} + 1; e^{2 a z}\right) - e^{-c z} \sum_{p=0}^{n} \frac{((-1)^p z^{n-p})}{(n-p)!\,(-c - a \nu)^{p+1}} {}_{p+2}F_{p+1}\left(\frac{-c - a \nu}{2 a}, \ldots, \frac{-c - a \nu}{2 a}, -\nu; \frac{-c - a \nu}{2 a} + 1, \ldots, \frac{-c - a \nu}{2 a} + 1; e^{2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sinh(c z + d) \sinh^\nu(a z)$

01.19.21.1955.01

$$\int z^{\alpha-1} \sinh(d + c z) \sinh^\nu(a z)\, dz = 2^{-\nu-1} e^{d + \frac{i \pi \nu}{2}} z^\alpha \binom{\nu}{\frac{\nu}{2}} \left(e^{-2 d} (c z)^{-\alpha} \Gamma(\alpha, c z) - (-c z)^{-\alpha} \Gamma(\alpha, -c z)\right) (1 - \nu \bmod 2) - 2^{-\nu-1} z^\alpha e^d \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{i \pi \nu} \Gamma(\alpha, (-c - 2 a s + a \nu) z) ((-c - 2 a s + a \nu) z)^{-\alpha} - e^{i \pi \nu - 2 d} ((c - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (c - 2 a s + a \nu) z) + \left(((-c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (-c + 2 a s - a \nu) z) - e^{-2 d} ((c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (c + 2 a s - a \nu) z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1956.01

$$\int z^n \sinh(d + c z) \sinh^\nu(a z)\, dz = \frac{1}{2} \left(1 - e^{-2 a z}\right)^{-\nu} n! \sinh^\nu(a z) \left(e^{d + c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{c + a \nu}{2 a}, \ldots, -\frac{c + a \nu}{2 a}, -\nu; 1 - \frac{c + a \nu}{2 a}, \ldots, 1 - \frac{c + a \nu}{2 a}; e^{-2 a z}\right) - e^{-d - c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a \nu - c)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{c - a \nu}{2 a}, \ldots, \frac{c - a \nu}{2 a}, -\nu; \frac{c - a \nu}{2 a} + 1, \ldots, \frac{c - a \nu}{2 a} + 1; e^{-2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sinh(c z) \sinh^\nu(a z + b)$

01.19.21.1957.01

$$\int z^{\alpha-1} \sinh(c z) \sinh^\nu(b + a z)\, dz = 2^{-\nu-1} e^{\frac{i \pi \nu}{2}} z^\alpha \binom{\nu}{\frac{\nu}{2}} \left((c z)^{-\alpha} \Gamma(\alpha, c z) - (-c z)^{-\alpha} \Gamma(\alpha, -c z)\right) (1 - \nu \bmod 2) - 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \binom{\nu}{s} \left(e^{4 b s + i \pi \nu} \Gamma(\alpha, (-c - 2 a s + a \nu) z) ((-c - 2 a s + a \nu) z)^{-\alpha} - e^{4 b s + i \pi \nu} ((c - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (c - 2 a s + a \nu) z) + e^{2 b \nu} \left(((-c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (-c + 2 a s - a \nu) z) - ((c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (c + 2 a s - a \nu) z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1958.01

$$\int z^n \sinh(c\,z) \sinh^\nu(b+a\,z)\,dz = \frac{1}{2}\left(1-e^{-2(b+a\,z)}\right)^{-\nu} n!\, \sinh^\nu(b+a\,z) \left(e^{c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c+a\,\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{c+a\,\nu}{2\,a}, \ldots, -\frac{c+a\,\nu}{2\,a}, -\nu; 1-\frac{c+a\,\nu}{2\,a}, \ldots, 1-\frac{c+a\,\nu}{2\,a}; e^{-2(b+a\,z)}\right) - e^{-c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\,\nu-c)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{c-a\,\nu}{2\,a}, \ldots, \frac{c-a\,\nu}{2\,a}, -\nu; \frac{c-a\,\nu}{2\,a}+1, \ldots, \frac{c-a\,\nu}{2\,a}+1; e^{-2(b+a\,z)}\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sinh(c\,z+d) \sinh^\nu(a\,z+b)$

01.19.21.1959.01

$$\int z^{\alpha-1} \sinh(c\,z+d) \sinh^\nu(a\,z+b)\,dz = 2^{-\nu-1} e^{d+\frac{i\pi\nu}{2}} z^\alpha \binom{\nu}{\frac{\nu}{2}} \left(e^{-2d} (c\,z)^{-\alpha}\, \Gamma(\alpha, c\,z) - (-c\,z)^{-\alpha}\, \Gamma(\alpha, -c\,z)\right)(1-\nu \bmod 2) - 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s e^{d-2\,b\,s-b\,\nu} \binom{\nu}{s} \left(-e^{i\pi+4\,b\,s+i\pi\nu}\, \Gamma(\alpha, (-c-2\,a\,s+a\,\nu)\,z)\,((-c-2\,a\,s+a\,\nu)\,z)^{-\alpha} - e^{-2\,d+4\,b\,s+i\pi\nu} ((c-2\,a\,s+a\,\nu)\,z)^{-\alpha}\, \Gamma(\alpha, (c-2\,a\,s+a\,\nu)\,z) + e^{2\,b\,\nu} \left(((-c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\, \Gamma(\alpha, (-c+2\,a\,s-a\,\nu)\,z) - e^{-2\,d} ((c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\, \Gamma(\alpha, (c+2\,a\,s-a\,\nu)\,z)\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.19.21.1960.01

$$\int z^n \sinh(d+c\,z) \sinh^\nu(b+a\,z)\,dz = \frac{1}{2}\left(1-e^{-2(b+a\,z)}\right)^{-\nu} n!\, \sinh^\nu(b+a\,z) \left(e^{d+c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c+a\,\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{c+a\,\nu}{2\,a}, \ldots, -\frac{c+a\,\nu}{2\,a}, -\nu; 1-\frac{c+a\,\nu}{2\,a}, \ldots, 1-\frac{c+a\,\nu}{2\,a}; e^{-2(b+a\,z)}\right) - e^{-d-c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\,\nu-c)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{c-a\,\nu}{2\,a}, \ldots, \frac{c-a\,\nu}{2\,a}, -\nu; \frac{c-a\,\nu}{2\,a}+1, \ldots, \frac{c-a\,\nu}{2\,a}+1; e^{-2(b+a\,z)}\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \sinh(b\,z^r) \sinh^\nu(c\,z)$

01.19.21.1961.01

$$\int z^n \sinh\left(b z^2\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right)(1 - \nu \bmod 2) - 2^{-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2s))^{n-j} (-c(\nu-2s) - 2bz)^{j+1} \left(\frac{(-c(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-c(\nu-2s)-2bz)^2}{4b}\right)\right)(-b)^{-n-1} + e^{\frac{1}{4} i \left(2\pi(\nu-1) - \frac{i c^2 (\nu-2s)^2}{b}\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2s))^{n-j} (c(\nu-2s) - 2bz)^{j+1} \left(\frac{(c(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(c(\nu-2s)-2bz)^2}{4b}\right)\right)(-b)^{-n-1} + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} - 2\pi(1-\nu)\right)} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2s))^{n-j} (2bz - c(\nu-2s))^{j+1} \left(-\frac{(2bz - c(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2bz-c(\nu-2s))^2}{4b}\right) + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} - 2\pi(\nu+1)\right)} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2s))^{n-j} (c(\nu-2s) + 2bz)^{j+1} \left(-\frac{(c(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c(\nu-2s)+2bz)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1962.01

$$\int z^n \sinh\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), b\sqrt{z}\right) - \Gamma\left(2(n+1), -b\sqrt{z}\right)\right)(1 - \nu \bmod 2) + 2^{-2n-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{b^2}{4c(\nu-2s)} - \frac{1}{2} i \pi(\nu+1)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b)^{-h-j+2n} \left(-b - 2c(\nu-2s)\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2c(\nu-2s)\sqrt{z}\right)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\left(-b - 2c(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2c(\nu-2s)\sqrt{z}\right)^2}{4c(\nu-2s)}\right) - 2c(\nu-2s)\right.\right.\right.$$

$$\sqrt{\frac{\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\Bigg)\,(-c\,(v-2\,s))^{-2\,(n+1)}\,+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(1-v)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}\left(\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(b\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)-2\,c\,(v-2\,s)\right.$$

$$\sqrt{\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\,(-c\,(v-2\,s))^{-2\,(n+1)}\,+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v-1)-\frac{b^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,c\,(v-2\,s)\sqrt{-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{4\,c\,(v-2\,s)}\right)-b\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\,+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v+1)-\frac{b^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)+2\,c\,(v-2\,s)\right.$$

$$\sqrt{-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b z^r + e) \sinh^\nu(c z)$

01.19.21.1963.01

$$\int z^n \sinh(b z^2 + e) \sinh^\nu(c z)\, dz = \\ i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{-e} \left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - e^{e} \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right) (1 - \nu \bmod 2) - \\ 2^{-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} + 4 i e - 2\pi(\nu+1)\right)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2s))^{n-j} (-c(\nu-2s) - 2 b z)^{j+1} \\ \left(\frac{(-c(\nu-2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-c(\nu-2s) - 2 b z)^2}{4 b}\right)\Bigg) (-b)^{-n-1} + \\ e^{\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} + 4 i e + 2\pi(\nu-1)\right)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2s))^{n-j} (c(\nu-2s) - 2 b z)^{j+1} \left(\frac{(c(\nu-2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \\ \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(c(\nu-2s) - 2 b z)^2}{4 b}\right)\Bigg) (-b)^{-n-1} + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} + 4 i e - 2\pi(1-\nu)\right)} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2s))^{n-j} \\ (2 b z - c(\nu-2s))^{j+1} \left(-\frac{(2 b z - c(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 b z - c(\nu-2s))^2}{4 b}\right) + \\ b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i c^2 (\nu-2s)^2}{b} + 4 i e - 2\pi(\nu+1)\right)} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2s))^{n-j} (c(\nu-2s) + 2 b z)^{j+1} \\ \left(-\frac{(c(\nu-2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c(\nu-2s) + 2 b z)^2}{4 b}\right)\Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1964.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e\right) \sinh^\nu(c z)\, dz = \\ i^{-\nu} 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{-e} \Gamma\left(2(n+1), b\sqrt{z}\right) - e^{e} \Gamma\left(2(n+1), -b\sqrt{z}\right)\right) (1 - \nu \bmod 2) + 2^{-2n-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \\ \Bigg(e^{\frac{b^2}{4 c(\nu-2s)} - e - \frac{1}{2} i \pi(\nu+1)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b)^{-h-j+2n} \left(-b - 2 c(\nu-2s)\sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2 c(\nu-2s)\sqrt{z}\right)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-b\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-2\,c\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)(-c\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(1-v)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(b\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-2\,c\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)(-c\,(v-2\,s))^{-2\,(n+1)}+$$

$$e^{-\frac{b^2}{4\,c\,(v-2\,s)}-e+\frac{1}{2}\,i\,\pi\,(v-1)}\,(c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,c\,(v-2\,s)\,\sqrt{-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.\left.-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)^2}{4\,c\,(v-2\,s)}\right)-b\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,(v-2\,s)\,\sqrt{z}-b\right)^2}{4\,c\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{b^2}{4\,c\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(v+1)}\,(c\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+2\,c\,(v-2\,s)\right.$$

$$\left.\left.\sqrt{-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sinh\left(b\,z^r+d\,z\right)\sinh^v(c z)$

01.19.21.1965.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((-b)^{-n-1} e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4 b}\right) - b^{-n-1} e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4 b}\right)\right) + 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(c(\nu-2s)-d)^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (d - c(\nu - 2s))^{n-j} (-d + c(\nu - 2s) - 2 b z)^{j+1} \left(\frac{(-d + c(\nu - 2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d + c(\nu - 2s) - 2 b z)^2}{4 b}\right)\right) (-b)^{-n-1} + (-1)^\nu e^{\frac{(-d-c(\nu-2s))^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (d + c(\nu - 2s))^{n-j} (-d - c(\nu - 2s) - 2 b z)^{j+1} \left(\frac{(-d - c(\nu - 2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - c(\nu - 2s) - 2 b z)^2}{4 b}\right)\right) (-b)^{-n-1} - b^{-n-1} e^{-\frac{(d+c(\nu-2s))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d - c(\nu - 2s))^{n-j} (d + c(\nu - 2s) + 2 b z)^{j+1} \left(-\frac{(d + c(\nu - 2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + c(\nu - 2s) + 2 b z)^2}{4 b}\right) - (-1)^\nu b^{-n-1} e^{-\frac{(d-c(\nu-2s))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (c(\nu - 2s) - d)^{n-j} (d - c(\nu - 2s) + 2 b z)^{j+1} \left(-\frac{(d - c(\nu - 2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d - c(\nu - 2s) + 2 b z)^2}{4 b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1966.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-2n-\nu-2} d^{-2n-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$e^{\frac{b^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b-2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(-b\left(-b-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) -$$

$$2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{-\frac{b^2}{4(-d-c(2k-\nu))}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^{h+j}$$

$$\left(-\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{-d-c(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(2(-d-c(2k-\nu))$$

$$\sqrt{-\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{-d-c(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{4(-d-c(2k-\nu))}\right) - b$$

$$\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{4(-d-c(2k-\nu))}\right)\Bigg)\Bigg)$$

$$(-d-c(2k-\nu))^{-2n-2} - e^{-\frac{b^2}{4(d-c(2k-\nu))}} (d-c(2k-\nu))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, b^{-h-j+2n}$$

$$\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^2}{d-c(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\left(b+2(d-c(2k-\nu))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^2}{4(d-c(2k-\nu))}\right) +$$

$$2\sqrt{-\frac{\left(b+2\,(d-c\,(2\,k-v))\,\sqrt{z}\right)^2}{d-c\,(2\,k-v)}}\;(d-c\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d-c\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d-c\,(2\,k-v))}\right)\Bigg)+$$

$$(-1)^v\,e^{-\frac{b^2}{4\,(-d-c\,(v-2\,k))}}\,(-d-c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)^2}{-d-c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(-d-c\,(v-2\,k))$$

$$\sqrt{-\frac{\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)^2}{-d-c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)^2}{4\,(-d-c\,(v-2\,k))}\right)-$$

$$b\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-d-c\,(v-2\,k))\,\sqrt{z}-b\right)^2}{4\,(-d-c\,(v-2\,k))}\right)\Bigg)-$$

$$(-1)^v\,e^{-\frac{b^2}{4\,(d-c\,(v-2\,k))}}\,(d-c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{d-c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d-c\,(v-2\,k))}\Bigg)+2\sqrt{-\frac{\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{d-c\,(v-2\,k)}}$$

$$(d-c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d-c\,(v-2\,k))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sinh\left(b\,z^r+d\,z+e\right)\sinh^v(c\,v\,z)$

01.19.21.1967.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((-b)^{-n-1} e^{\frac{d^2}{4b} - e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4 b}\right) - b^{-n-1} e^{e - \frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4 b}\right) \right) + 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(c(\nu - 2s) - d)^2}{4b} - e} \left(\sum_{j=0}^{n} 2^{j-n} (d - c(\nu - 2s))^{n-j} (-d + c(\nu - 2s) - 2 b z)^{j+1} \left(\frac{(-d + c(\nu - 2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d + c(\nu - 2s) - 2 b z)^2}{4 b}\right) \right) (-b)^{-n-1} + (-1)^\nu e^{\frac{(-d - c(\nu - 2s))^2}{4b} - e} \left(\sum_{j=0}^{n} 2^{j-n} (d + c(\nu - 2s))^{n-j} (-d - c(\nu - 2s) - 2 b z)^{j+1} \left(\frac{(-d - c(\nu - 2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - c(\nu - 2s) - 2 b z)^2}{4 b}\right) \right) (-b)^{-n-1} - b^{-n-1} e^{e - \frac{(d + c(\nu - 2s))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d - c(\nu - 2s))^{n-j} (d + c(\nu - 2s) + 2 b z)^{j+1} \left(-\frac{(d + c(\nu - 2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + c(\nu - 2s) + 2 b z)^2}{4 b}\right) - (-1)^\nu b^{-n-1} e^{e - \frac{(d - c(\nu - 2s))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (c(\nu - 2s) - d)^{n-j} (d - c(\nu - 2s) + 2 b z)^{j+1} \left(-\frac{(d - c(\nu - 2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d - c(\nu - 2s) + 2 b z)^2}{4 b}\right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1968.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(c z)\, dz = i^{-\nu} 2^{-2n-\nu-2} d^{-2n-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{e - \frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) -$$

$$e^{\frac{b^2}{4d}-e} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b-2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-b\left(-b-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)\Bigg) -$$

$$2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{-\frac{b^2}{4(-d-c(2k-\nu))}-e} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(2(-d-c(2k-\nu))\sqrt{z} - b\right)^{h+j}$$

$$\left(-\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{-d-c(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2(-d-c(2k-\nu))$$

$$\sqrt{-\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{-d-c(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{4(-d-c(2k-\nu))}\right) - b$$

$$\left(2(-d-c(2k-\nu))\sqrt{z} - b\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-d-c(2k-\nu))\sqrt{z}-b\right)^2}{4(-d-c(2k-\nu))}\right)\Bigg)\Bigg)\Bigg)$$

$$(-d-c(2k-\nu))^{-2n-2} - e^{e-\frac{b^2}{4(d-c(2k-\nu))}} (d-c(2k-\nu))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, b^{-h-j+2n}$$

$$\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^2}{d-c(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\left(b+2(d-c(2k-\nu))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2(d-c(2k-\nu))\sqrt{z}\right)^2}{4(d-c(2k-\nu))}\right) +$$

$$2\sqrt{-\frac{\left(b+2\,(d-c\,(2\,k-v))\sqrt{z}\right)^2}{d-c\,(2\,k-v)}}\;(d-c\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d-c\,(2\,k-v))\sqrt{z}\right)^2}{4\,(d-c\,(2\,k-v))}\right)\Bigg)\Bigg)+$$

$$(-1)^v\,e^{-\frac{b^2}{4\,(-d-c\,(v-2\,k))}-e}\,(-d-c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)^2}{-d-c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(-d-c\,(v-2\,k))$$

$$\sqrt{-\frac{\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)^2}{-d-c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)^2}{4\,(-d-c\,(v-2\,k))}\right)-$$

$$b\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-d-c\,(v-2\,k))\sqrt{z}-b\right)^2}{4\,(-d-c\,(v-2\,k))}\right)\Bigg)-$$

$$(-1)^v\,e^{e-\frac{b^2}{4\,(d-c\,(v-2\,k))}}\,(d-c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)^2}{d-c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d-c\,(v-2\,k))}\Bigg)+2\sqrt{-\frac{\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)^2}{d-c\,(v-2\,k)}}$$

$$(d-c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d-c\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d-c\,(v-2\,k))}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh\left(b\,z^r\right) \sinh^v(f\,z+g)$

01.19.21.1969.01

$$\int z^n \sinh\left(b z^2\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right)(1 - \nu \bmod 2) - i^{-\nu-1} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} + 4 g i (\nu-2s) - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (-f(\nu-2s) - 2 b z)^{j+1} \left(\frac{(-f(\nu-2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f(\nu-2s) - 2 b z)^2}{4b}\right)\right)(-b)^{-n-1} + e^{\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} - 4 i g (\nu-2s) + 2\pi(\nu-1)\right)} \left(\sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) - 2 b z)^{j+1} \left(\frac{(f(\nu-2s) - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(f(\nu-2s) - 2 b z)^2}{4b}\right)\right)(-b)^{-n-1} + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} - 4 i g (\nu-2s) - 2\pi(1-\nu)\right)} \sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (2 b z - f(\nu-2s))^{j+1} \left(-\frac{(2 b z - f(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 b z - f(\nu-2s))^2}{4b}\right) + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} + 4 g i (\nu-2s) - 2\pi(\nu+1)\right)} \sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2 b z)^{j+1} \left(-\frac{(f(\nu-2s) + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2 b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1970.01

$$\int z^n \sinh\left(b \sqrt{z}\right) \sinh^\nu(g + f z)\, dz = i^{-\nu-1} 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{b^2}{4 f(\nu-2s)} - \frac{1}{2} i \pi(\nu+1) - g(\nu-2s)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-b)^{-h-j+2n} \left(-b - 2 f(\nu-2s)\sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2 f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\left(-b - 2 f(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b - 2 f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)}\right) - 2 f(\nu-2s) \sqrt{\frac{\left(-b - 2 f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\, \Gamma\left(\right.\right.\right.$$

$$\left.\left.\frac{1}{2}(h+j+2),\ \frac{\left(-b-2 f(v-2 s)\sqrt{z}\right)^2}{4 f(v-2 s)}\right)\right)+e^{\frac{b^2}{4 f(v-2 s)}+\frac{1}{2} i \pi (1-v)-g(v-2 s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, b^{-h-j+2 n}\left(b-2 f(v-2 s)\sqrt{z}\right)^{h+j}\left(\frac{\left(b-2 f(v-2 s)\sqrt{z}\right)^2}{f(v-2 s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(b\left(b-2 f(v-2 s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(b-2 f(v-2 s)\sqrt{z}\right)^2}{4 f(v-2 s)}\right)-2 f(v-2 s)\right.$$

$$\left.\left.\sqrt{\frac{\left(b-2 f(v-2 s)\sqrt{z}\right)^2}{f(v-2 s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(b-2 f(v-2 s)\sqrt{z}\right)^2}{4 f(v-2 s)}\right)\right)\right)+e^{-\frac{b^2}{4 f(v-2 s)}+\frac{1}{2} i \pi (v-1)+g(v-2 s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2 n}\left(2 f(v-2 s)\sqrt{z}-b\right)^{h+j}\left(-\frac{\left(2 f(v-2 s)\sqrt{z}-b\right)^2}{f(v-2 s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(2 f(v-2 s)\sqrt{-\frac{\left(2 f(v-2 s)\sqrt{z}-b\right)^2}{f(v-2 s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2 f(v-2 s)\sqrt{z}-b\right)^2}{4 f(v-2 s)}\right)-\right.$$

$$\left.\left.b\left(2 f(v-2 s)\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2 f(v-2 s)\sqrt{z}-b\right)^2}{4 f(v-2 s)}\right)\right)\right)+$$

$$e^{-\frac{b^2}{4 f(v-2 s)}+\frac{1}{2} i \pi (v+1)+g(v-2 s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, b^{-h-j+2 n}\left(b+2 f(v-2 s)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2 f(v-2 s)\sqrt{z}\right)^2}{f(v-2 s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\left(b+2 f(v-2 s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(b+2 f(v-2 s)\sqrt{z}\right)^2}{4 f(v-2 s)}\right)+\right.$$

$$\left.\left.\left.2 f(v-2 s)\sqrt{-\frac{\left(b+2 f(v-2 s)\sqrt{z}\right)^2}{f(v-2 s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(b+2 f(v-2 s)\sqrt{z}\right)^2}{4 f(v-2 s)}\right)\right)\right)\right)-$$

$$(2\,i)^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -b\sqrt{z}\right) - \Gamma\left(2(n+1), b\sqrt{z}\right)\right)(1 - \nu \bmod 2) \,/;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n \sinh\left(b\,z^r + e\right) \sinh^\nu(f\,z + g)$

01.19.21.1971.01

$$\int z^n \sinh\left(b\,z^2 + e\right) \sinh^\nu(g + f\,z)\,dz = i^{-\nu}\, 2^{-\nu-2}\, z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{-e} \left(b\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b\,z^2\right) - e^{e} \left(-b\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b\,z^2\right)\right)(1 - \nu \bmod 2) - i^{-\nu-1}\, 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} + 4 g\, i (\nu-2s) + 4 i\, e - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (-f(\nu-2s) - 2bz)^{j+1} \left(\frac{(-f(\nu-2s) - 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f(\nu-2s) - 2bz)^2}{4b}\right)\right)(-b)^{-n-1} + e^{\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} - 4 i\, g (\nu-2s) + 4 i\, e + 2\pi(\nu-1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) - 2bz)^{j+1} \left(\frac{(f(\nu-2s) - 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(f(\nu-2s) - 2bz)^2}{4b}\right)\right)(-b)^{-n-1} + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} - 4 i\, g (\nu-2s) + 4 i\, e - 2\pi(1-\nu)\right)} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2bz - f(\nu-2s))^{j+1} \left(-\frac{(2bz - f(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2bz - f(\nu-2s))^2}{4b}\right) + b^{-n-1} e^{-\frac{1}{4} i \left(-\frac{i f^2 (\nu-2s)^2}{b} + 4 g\, i (\nu-2s) + 4 i\, e - 2\pi(\nu+1)\right)} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2bz)^{j+1} \left(-\frac{(f(\nu-2s) + 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2bz)^2}{4b}\right)\right) /;\, n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.1972.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e\right) \sinh^\nu(g + f\,z)\,dz = i^{-\nu-1}\, 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{b^2}{4 f (\nu-2s)} - e - \frac{1}{2} i \pi(\nu+1) - g(\nu-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n}\right.$$

$$\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-b\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\sqrt{\frac{\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+e^{\frac{b^2}{4\,f\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\sqrt{\frac{\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+e^{-\frac{b^2}{4\,f\,(v-2\,s)}-e+\frac{1}{2}\,i\,\pi\,(v-1)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)^{h+j}\left(-\frac{\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,f\,(v-2\,s)\sqrt{-\frac{\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{4\,f\,(v-2\,s)}\right)-b\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,f\,(v-2\,s)\,\sqrt{z}\,-b\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+e^{-\frac{b^2}{4\,f\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(v+1)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(b\left(b+2 f (v-2 s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2 f (v-2 s)\sqrt{z}\right)^2}{4 f (v-2 s)}\right)+\right.$$

$$\left.\left. 2 f (v-2 s)\sqrt{-\frac{\left(b+2 f (v-2 s)\sqrt{z}\right)^2}{f (v-2 s)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2 f (v-2 s)\sqrt{z}\right)^2}{4 f (v-2 s)}\right)\right)\right)-$$

$$(2 i)^{-v} b^{-2(n+1)}\binom{v}{\frac{v}{2}}\left(e^{e}\,\Gamma\left(2(n+1), -b\sqrt{z}\right)-e^{-e}\,\Gamma\left(2(n+1), b\sqrt{z}\right)\right)$$

$$(1 - v \bmod 2) \;/;\; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh\left(b z^r + d z\right) \sinh^v(f z + g)$

01.19.21.1973.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{\frac{(f(2s-\nu)-d)^2}{4b} + g(2s-\nu)} \left(\sum_{j=0}^{n} 2^{j-n} (d - f(2s-\nu))^{n-j} (-d + f(2s-\nu) - 2bz)^{j+1} \left(\frac{(-d + f(2s-\nu) - 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d+f(2s-\nu)-2bz)^2}{4b}\right)\right) (-b)^{-n-1} - e^{\frac{(f(\nu-2s)-d)^2}{4b} + g(\nu-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (d - f(\nu-2s))^{n-j} (-d + f(\nu-2s) - 2bz)^{j+1} \left(\frac{(-d+f(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d+f(\nu-2s)-2bz)^2}{4b}\right)\right) (-b)^{-n-1} + (-1)^\nu b^{-n-1} e^{g(2s-\nu) - \frac{(d+f(2s-\nu))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d - f(2s-\nu))^{n-j} (d + f(2s-\nu) + 2bz)^{j+1} \left(-\frac{(d+f(2s-\nu)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(2s-\nu)+2bz)^2}{4b}\right) + b^{-n-1} e^{g(\nu-2s) - \frac{(d+f(\nu-2s))^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d - f(\nu-2s))^{n-j} (d + f(\nu-2s) + 2bz)^{j+1} \left(-\frac{(d+f(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(\nu-2s)+2bz)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1974.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z)\, dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right) + 2\sqrt{-\frac{\left(b+2\,d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg) -$$

$$e^{\frac{b^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b-2\,d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-b\left(-b-2\,d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2\,d\sqrt{z}\right)^2}{4\,d}\right) - 2\,d\sqrt{\frac{\left(-b-2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)$$

$$d^{-2n-2} + 2^{-2n-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \Bigg((-1)^{v+1}\, e^{g(2k-v)-\frac{b^2}{4(f(2k-v)-d)}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n}$$

$$\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)^{h+j} \left(-\frac{\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)^2}{f\,(2\,k-v)-d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2\,(f\,(2\,k-v)-d)$$

$$\sqrt{-\frac{\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)^2}{f\,(2\,k-v)-d}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)^2}{4\,(f\,(2\,k-v)-d)}\right) - b$$

$$\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(f\,(2\,k-v)-d)\sqrt{z} - b\right)^2}{4\,(f\,(2\,k-v)-d)}\right)\Bigg)\Bigg)$$

$$(f\,(2\,k-v)-d)^{-2n-2} + (-1)^v\, e^{g(2k-v)-\frac{b^2}{4(d+f(2k-v))}}\, (d+f\,(2\,k-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, b^{-h-j+2n} \left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)^2}{d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(b\left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\right) +$$

$$2\sqrt{-\frac{\left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)^2}{d+f\,(2\,k-v)}}\;(d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b+2\,(d+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\right)\Bigg)-$$

$$e^{g\,(v-2\,k)-\frac{b^2}{4\,(f\,(v-2\,k)-d)}}\,(f\,(v-2\,k)-d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)^2}{f\,(v-2\,k)-d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(f\,(v-2\,k)-d)\sqrt{-\frac{\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)^2}{f\,(v-2\,k)-d}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)^2}{4\,(f\,(v-2\,k)-d)}\right)-$$

$$b\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(f\,(v-2\,k)-d)\sqrt{z}-b\right)^2}{4\,(f\,(v-2\,k)-d)}\right)\Bigg)+$$

$$e^{g\,(v-2\,k)-\frac{b^2}{4\,(d+f\,(v-2\,k))}}\,(d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),-\frac{\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\Bigg)+2\sqrt{-\frac{\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)^2}{d+f\,(v-2\,k)}}$$

$$(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b+2\,(d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sinh\left(b\,z^r+d\,z+e\right)\sinh^v(f\,z+g)$

01.19.21.1975.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^\nu(g + f z)\, dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^n 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}-e} \sum_{j=0}^n 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{\frac{(f(2s-\nu)-d)^2}{4b} - e + g(2s-\nu)} \left(\sum_{j=0}^n 2^{j-n} (d - f(2s-\nu))^{n-j} (-d + f(2s-\nu) - 2bz)^{j+1} \left(\frac{(-d + f(2s-\nu) - 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d+f(2s-\nu)-2bz)^2}{4b}\right)\right) (-b)^{-n-1} - e^{\frac{(f(\nu-2s)-d)^2}{4b} - e + g(\nu-2s)} \left(\sum_{j=0}^n 2^{j-n} (d - f(\nu-2s))^{n-j} (-d + f(\nu-2s) - 2bz)^{j+1} \left(\frac{(-d + f(\nu-2s) - 2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d+f(\nu-2s)-2bz)^2}{4b}\right)\right) (-b)^{-n-1} + (-1)^\nu b^{-n-1} e^{-\frac{(d+f(2s-\nu))^2}{4b} + e + g(2s-\nu)} \sum_{j=0}^n 2^{j-n} (-d - f(2s-\nu))^{n-j} (d + f(2s-\nu) + 2bz)^{j+1} \left(-\frac{(d+f(2s-\nu)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(2s-\nu)+2bz)^2}{4b}\right) + b^{-n-1} e^{-\frac{(d+f(\nu-2s))^2}{4b} + e + g(\nu-2s)} \sum_{j=0}^n 2^{j-n} (-d - f(\nu-2s))^{n-j} (d + f(\nu-2s) + 2bz)^{j+1} \left(-\frac{(d+f(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(\nu-2s)+2bz)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1976.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(g + f z)\, dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{e-\frac{b^2}{4d}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$e^{\frac{b^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2n}\left(-b-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-b\left(-b-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)$$

$$d^{-2n-2} + 2^{-2n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^{\nu+1}\,e^{-\frac{b^2}{4(f(2k-\nu)-d)}-e+g(2k-\nu)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2n}$$

$$\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)^{h+j}\left(-\frac{\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)^2}{f(2k-\nu)-d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2(f(2k-\nu)-d)$$

$$\sqrt{-\frac{\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)^2}{f(2k-\nu)-d}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)^2}{4(f(2k-\nu)-d)}\right) - b$$

$$\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(f(2k-\nu)-d)\sqrt{z}-b\right)^2}{4(f(2k-\nu)-d)}\right)\Bigg)\Bigg)$$

$$(f(2k-\nu)-d)^{-2n-2} + (-1)^{\nu}\,e^{-\frac{b^2}{4(d+f(2k-\nu))}+e+g(2k-\nu)}\,(d+f(2k-\nu))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2n}\left(b+2(d+f(2k-\nu))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2(d+f(2k-\nu))\sqrt{z}\right)^2}{d+f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\left(b+2(d+f(2k-\nu))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2(d+f(2k-\nu))\sqrt{z}\right)^2}{4(d+f(2k-\nu))}\right) +$$

$$2\sqrt{-\frac{\left(b+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{d+f\,(2\,k-v)}}\,(d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(2\,k-v))}\right)\right)-$$

$$e^{-\frac{b^2}{4\,(f\,(v-2\,k)-d)}-e+g\,(v-2\,k)}\,(f\,(v-2\,k)-d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2\,n}\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)^{h+j}$$

$$\left(-\frac{\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)^2}{f\,(v-2\,k)-d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(f\,(v-2\,k)-d)\sqrt{-\frac{\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)^2}{f\,(v-2\,k)-d}}\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)^2}{4\,(f\,(v-2\,k)-d)}\right)-\right.$$

$$\left.b\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(f\,(v-2\,k)-d)\,\sqrt{z}\,-b\right)^2}{4\,(f\,(v-2\,k)-d)}\right)\right)+$$

$$e^{-\frac{b^2}{4\,(d+f\,(v-2\,k))}+e+g\,(v-2\,k)}\,(d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2\,n}\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,k))}\right)+2\sqrt{-\frac{\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,k)}}$$

$$\left.\left.(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,k))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b\,z)\sinh^v\left(c\,z^r\right)$

01.19.21.1977.01

$$\int z^n \sinh(b\,z)\sinh^\nu(c\,z^2)\,dz = i^{-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(b^{-n-1}\,\Gamma(n+1,\,b\,z)-(-b)^{-n-1}\,\Gamma(n+1,\,-b\,z)\right)(1-\nu \bmod 2)+$$
$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{b^2}{4c(2s-\nu)}}\left(\sum_{j=0}^{n}2^{j-n}\,b^{n-j}\,(-b-2\,c\,(2\,s-\nu)\,z)^{j+1}\right.\right.$$
$$\left.\left(\frac{(-b-2\,c\,(2\,s-\nu)\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-b-2\,c\,(2\,s-\nu)\,z)^2}{4\,c\,(2\,s-\nu)}\right)\right)(-c\,(2\,s-\nu))^{-n-1}-$$
$$e^{\frac{b^2}{4c(2s-\nu)}}\left(\sum_{j=0}^{n}2^{j-n}\,(-b)^{n-j}\,(b-2\,c\,(2\,s-\nu)\,z)^{j+1}\left(\frac{(b-2\,c\,(2\,s-\nu)\,z)^2}{c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(b-2\,c\,(2\,s-\nu)\,z)^2}{4\,c\,(2\,s-\nu)}\right)\right)$$
$$(-c\,(2\,s-\nu))^{-n-1}+(-1)^\nu\,e^{\frac{b^2}{4c(\nu-2s)}}\,(-c\,(\nu-2\,s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}\,b^{n-j}\,(-b-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-b-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-b-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)-$$
$$(-1)^\nu\,e^{\frac{b^2}{4c(\nu-2s)}}\,(-c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-b)^{n-j}\,(b-2\,c\,(\nu-2\,s)\,z)^{j+1}$$
$$\left.\left(\frac{(b-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(b-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)/;\ n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.1978.01

$$\int z^n \sinh(b\,z)\sinh^\nu\!\left(c\sqrt{z}\right)dz =$$
$$\frac{i^{-\nu}\,2^{-\nu-1}\,z^n\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,-b\,z)\,(-b\,z)^{-n}+(b\,z)^{-n}\,\Gamma(n+1,\,b\,z)\right)(1-\nu \bmod 2)}{b}-2^{-2n-\nu-2}\,b^{-2n-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}$$
$$\left((-1)^\nu\,e^{\frac{c^2(\nu-2s)^2}{4b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,s))^{-h-j+2n}\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\right.$$
$$\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2\,s)\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)^2}{4\,b}\right)-\right.$$
$$\left.\left.2\,b\sqrt{\frac{\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(-2\sqrt{z}\,b-c\,(\nu-2\,s)\right)^2}{4\,b}\right)\right)+\right.$$

$$e^{\frac{c^2 (v-2 s)^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c (v-2 s))^{-h-j+2 n} \left(c (v-2 s)-2 b \sqrt{z}\right)^{h+j} \left(\frac{\left(c (v-2 s)-2 b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c (v-2 s) \left(c (v-2 s)-2 b \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \frac{\left(c (v-2 s)-2 b \sqrt{z}\right)^2}{4 b}\right)-\right.$$

$$\left.2 b \sqrt{\frac{\left(c (v-2 s)-2 b \sqrt{z}\right)^2}{b}} \Gamma\left(\frac{1}{2} (h+j+2), \frac{\left(c (v-2 s)-2 b \sqrt{z}\right)^2}{4 b}\right)\right)-(-1)^v e^{-\frac{c^2 (v-2 s)^2}{4 b}}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c (v-2 s))^{-h-j+2 n} \left(2 b \sqrt{z}-c (v-2 s)\right)^{h+j} \left(-\frac{\left(2 b \sqrt{z}-c (v-2 s)\right)^2}{b}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 b \sqrt{-\frac{\left(2 b \sqrt{z}-c (v-2 s)\right)^2}{b}} \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 b \sqrt{z}-c (v-2 s)\right)^2}{4 b}\right)-\right.$$

$$\left.c (v-2 s) \left(2 b \sqrt{z}-c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 b \sqrt{z}-c (v-2 s)\right)^2}{4 b}\right)\right)-$$

$$e^{-\frac{c^2 (v-2 s)^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c (v-2 s))^{-h-j+2 n} \left(2 \sqrt{z} b+c (v-2 s)\right)^{h+j} \left(-\frac{\left(2 \sqrt{z} b+c (v-2 s)\right)^2}{b}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c (v-2 s) \left(2 \sqrt{z} b+c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 \sqrt{z} b+c (v-2 s)\right)^2}{4 b}\right)+\right.$$

$$\left.\left.2 \sqrt{-\frac{\left(2 \sqrt{z} b+c (v-2 s)\right)^2}{b}} b \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 \sqrt{z} b+c (v-2 s)\right)^2}{4 b}\right)\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sinh(d z+e) \sinh^v\left(c z^r\right)$

01.19.21.1979.01

$$\int z^n \sinh(e + d z) \sinh^\nu(c z^2) \, dz = (-1)^n i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(d^{-n-1} e^e \Gamma(n+1, -d z) - (-d)^{-n-1} e^{-e} \Gamma(n+1, d z)\right) (1 - \nu \bmod 2) - i^{-\nu-1} 2^{-\nu-2} \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{d^2}{4 c (\nu - 2 s)} - e - \frac{1}{2} i \pi (\nu+1)} \left(\sum_{j=0}^n 2^{j-n} d^{n-j} (-d - 2 c (\nu - 2 s) z)^{j+1} \left(\frac{(-d - 2 c (\nu - 2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 c (\nu - 2 s) z)^2}{4 c (\nu - 2 s)} \right) \right) (-c (\nu - 2 s))^{-n-1} + e^{\frac{d^2}{4 c (\nu - 2 s)} + e + \frac{1}{2} i \pi (1-\nu)} \left(\sum_{j=0}^n 2^{j-n} (-d)^{n-j} (d - 2 c (\nu - 2 s) z)^{j+1} \left(\frac{(d - 2 c (\nu - 2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d - 2 c (\nu - 2 s) z)^2}{4 c (\nu - 2 s)} \right) \right) (-c (\nu - 2 s))^{-n-1} + e^{-\frac{d^2}{4 c (\nu - 2 s)} - e + \frac{1}{2} i \pi (\nu-1)} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} d^{n-j} (2 c (\nu - 2 s) z - d)^{j+1} \left(-\frac{(2 c (\nu - 2 s) z - d)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c (\nu - 2 s) z - d)^2}{4 c (\nu - 2 s)} \right) + e^{-\frac{d^2}{4 c (\nu - 2 s)} + e + \frac{1}{2} i \pi (\nu+1)} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-d)^{n-j} (d + 2 c (\nu - 2 s) z)^{j+1} \left(-\frac{(d + 2 c (\nu - 2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 c (\nu - 2 s) z)^2}{4 c (\nu - 2 s)} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1980.01

$$\int z^n \sinh(e + d z) \sinh^\nu(c \sqrt{z}) \, dz = 2^{-2n-\nu-2} i^{-\nu-1} \left(\sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{c^2 (\nu-2s)^2}{4d} - e - \frac{1}{2} i \pi (\nu+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-c (\nu - 2 s))^{-h-j+2n} \left(-2 \sqrt{z} \, d - c (\nu - 2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z} \, d - c (\nu - 2 s)\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c (\nu - 2 s) \left(-2 \sqrt{z} \, d - c (\nu - 2 s)\right) \Gamma\left(\frac{1}{2} (h + j + 1), \frac{\left(-2 \sqrt{z} \, d - c (\nu - 2 s)\right)^2}{4 d} \right) - 2 d \right.\right.\right.$$

$$\sqrt{\frac{\left(-2\sqrt{z}\,d-c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\,d-c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{\frac{c^2\,(v-2\,s)^2}{4\,d}-e+\frac{1}{2}\,i\,\pi\,(v-1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^{h+j}\left(\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{4\,d}\right)-2\,d$$

$$\sqrt{\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{-\frac{c^2\,(v-2\,s)^2}{4\,d}+e+\frac{1}{2}\,i\,\pi\,(1-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,d\sqrt{-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d}\right)-c\,(v-2\,s)$$

$$\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{-\frac{c^2\,(v-2\,s)^2}{4\,d}+e+\frac{1}{2}\,i\,\pi\,(v+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)+2$$

$$\sqrt{-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}}\;d\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{-2(n+1)} + (-1)^n\, 2^{-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(d^{-n-1}\, e^{e}\, \Gamma(n+1, -d\,z) - (-d)^{-n-1}\, e^{-e}\, \Gamma(n+1, d\,z)\right)$$
$$(1 - \nu \bmod 2) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sinh(b\, z^r) \sinh^\nu(c\, z^r)$

01.19.21.1981.01

$$\int z^{\alpha-1} \sinh(b\, z^r) \sinh^\nu(c\, z^r)\, dz = \frac{i^{-\nu}\, 2^{-\nu-1}\, z^\alpha \binom{\nu}{\frac{\nu}{2}} \left((b\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, b\, z^r\right) - (-b\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, -b\, z^r\right)\right) (1 - \nu \bmod 2)}{r} + \frac{2^{-\nu-1}\, z^\alpha}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s}$$
$$\left(-(-1)^\nu\, \Gamma\left(\frac{\alpha}{r}, (-b - 2\,c\,s + c\,\nu)\, z^r\right) ((-b - 2\,c\,s + c\,\nu)\, z^r)^{-\frac{\alpha}{r}} + (-1)^\nu\, ((b - 2\,c\,s + c\,\nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (b - 2\,c\,s + c\,\nu)\, z^r\right) - \right.$$
$$\left. ((-b + 2\,c\,s - c\,\nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (-b + 2\,c\,s - c\,\nu)\, z^r\right) + ((b + 2\,c\,s - c\,\nu)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\left(\frac{\alpha}{r}, (b + 2\,c\,s - c\,\nu)\, z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.1982.01

$$\int z^n \sinh(b\, z^2) \sinh^\nu(c\, z^2)\, dz =$$
$$2^{-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left((b\, z^2)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, b\, z^2\right) - (-b\, z^2)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, -b\, z^2\right)\right) (1 - \nu \bmod 2)\, z^{n+1} + 2^{-\nu-2}\, z^{n+1}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-(-1)^\nu\, \Gamma\left(\frac{n+1}{2}, (-b - 2\,c\,s + c\,\nu)\, z^2\right) ((-b - 2\,c\,s + c\,\nu)\, z^2)^{\frac{1}{2}(-n-1)} + (-1)^\nu\, ((b - 2\,c\,s + c\,\nu)\, z^2)^{\frac{1}{2}(-n-1)}\right.$$
$$\Gamma\left(\frac{n+1}{2}, (b - 2\,c\,s + c\,\nu)\, z^2\right) - ((-b + 2\,c\,s - c\,\nu)\, z^2)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, (-b + 2\,c\,s - c\,\nu)\, z^2\right) +$$
$$\left. ((b + 2\,c\,s - c\,\nu)\, z^2)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, (b + 2\,c\,s - c\,\nu)\, z^2\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1983.01

$$\int z^n \sinh\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = i^{-\nu}\, 2^{-\nu}\, b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), b\sqrt{z}\right) - \Gamma\left(2(n+1), -b\sqrt{z}\right)\right) (1 - \nu \bmod 2) -$$
$$2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu\, \Gamma\left(2(n+1), (c(\nu - 2s) - b)\sqrt{z}\right) (c(\nu - 2s) - b)^{-2(n+1)} - \right.$$
$$(-1)^\nu\, (b + c(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1), (b + c(\nu - 2s))\sqrt{z}\right) + (-b - c(\nu - 2s))^{-2(n+1)}$$
$$\left. \Gamma\left(2(n+1), (-b - c(\nu - 2s))\sqrt{z}\right) - (b - c(\nu - 2s))^{-2(n+1)}\, \Gamma\left(2(n+1), (b - c(\nu - 2s))\sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sinh(b\, z^r + e) \sinh^\nu(c\, z^r)$

01.19.21.1984.01

$$\int z^{\alpha-1}\sinh(b\,z^r+e)\sinh^\nu(c\,z^r)\,dz = \frac{i^{-\nu}\,2^{-\nu-1}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\,(b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,b\,z^r\right)-e^e\,(-b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-b\,z^r\right)\right)(1-\nu \bmod 2)}{r} + \frac{2^{-\nu-1}\,z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-(-1)^\nu\,e^e\,\Gamma\left(\frac{\alpha}{r},\,(-b-2\,c\,s+c\,\nu)\,z^r\right)((-b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}} + (-1)^\nu\,e^{-e}\,((b-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b-2\,c\,s+c\,\nu)\,z^r\right)-e^e\,((-b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-b+2\,c\,s-c\,\nu)\,z^r\right)+ e^{-e}\,((b+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b+2\,c\,s-c\,\nu)\,z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1985.01

$$\int z^n\sinh\left(b\,z^2+e\right)\sinh^\nu\left(c\,z^2\right)dz = 2^{-\nu-2}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\left(b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,b\,z^2\right)-e^e\left(-b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,-b\,z^2\right)\right)(1-\nu \bmod 2)\,z^{n+1} + 2^{-\nu-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-(-1)^\nu\,e^e\,\Gamma\left(\frac{n+1}{2},\,(-b-2\,c\,s+c\,\nu)\,z^2\right)\left((-b-2\,c\,s+c\,\nu)\,z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu\,e^{-e}\left((b-2\,c\,s+c\,\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,(b-2\,c\,s+c\,\nu)\,z^2\right)-e^e\left((-b+2\,c\,s-c\,\nu)\,z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\,(-b+2\,c\,s-c\,\nu)\,z^2\right)+e^{-e}\left((b+2\,c\,s-c\,\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,(b+2\,c\,s-c\,\nu)\,z^2\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.1986.01

$$\int z^n\sinh\left(\sqrt{z}\;b+e\right)\sinh^\nu\left(c\,\sqrt{z}\right)dz = i^{-\nu}\,2^{-\nu}\,b^{-2(n+1)}\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\,\Gamma\left(2\,(n+1),\,b\,\sqrt{z}\right)-e^e\,\Gamma\left(2\,(n+1),\,-b\,\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu\,e^e\,\Gamma\left(2\,(n+1),\,(c\,(\nu-2\,s)-b)\,\sqrt{z}\right)(c\,(\nu-2\,s)-b)^{-2(n+1)}-(-1)^\nu\,e^{-e}\,(b+c\,(\nu-2\,s))^{-2(n+1)} \Gamma\left(2\,(n+1),\,(b+c\,(\nu-2\,s))\,\sqrt{z}\right)+e^e\,(-b-c\,(\nu-2\,s))^{-2(n+1)}\,\Gamma\left(2\,(n+1),\,(-b-c\,(\nu-2\,s))\,\sqrt{z}\right)- e^{-e}\,(b-c\,(\nu-2\,s))^{-2(n+1)}\,\Gamma\left(2\,(n+1),\,(b-c\,(\nu-2\,s))\,\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^n\sinh\left(b\,z^r+d\,z\right)\sinh^\nu\left(c\,z^r\right)$

01.19.21.1987.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^\nu\left(c z^2\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4 b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4 b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{d^2}{4(c(2s-\nu)-b)}} \left(\sum_{j=0}^{n} 2^{j-n} d^{n-j} (2 (c (2 s - \nu) - b) z - d)^{j+1} \left(-\frac{(2 (c (2 s - \nu) - b) z - d)^2}{c (2 s - \nu) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (c (2 s - \nu) - b) z - d)^2}{4 (c (2 s - \nu) - b)}\right)\right) (c (2 s - \nu) - b)^{-n-1} + (-1)^\nu e^{-\frac{d^2}{4(b+c(2s-\nu))}} (b + c (2 s - \nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 (b + c (2 s - \nu)) z)^{j+1} \left(-\frac{(d + 2 (b + c (2 s - \nu)) z)^2}{b + c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 (b + c (2 s - \nu)) z)^2}{4 (b + c (2 s - \nu))}\right) - e^{-\frac{d^2}{4(c(\nu-2s)-b)}} (c (\nu - 2 s) - b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2 (c (\nu - 2 s) - b) z - d)^{j+1} \left(-\frac{(2 (c (\nu - 2 s) - b) z - d)^2}{c (\nu - 2 s) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 (c (\nu - 2 s) - b) z - d)^2}{4 (c (\nu - 2 s) - b)}\right) + e^{-\frac{d^2}{4(b+c(\nu-2s))}} (b + c (\nu - 2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 (b + c (\nu - 2 s)) z)^{j+1} \left(-\frac{(d + 2 (b + c (\nu - 2 s)) z)^2}{b + c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 (b + c (\nu - 2 s)) z)^2}{4 (b + c (\nu - 2 s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1988.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(c \sqrt{z}\right) dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right) - \right.$$

$$e^{\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b)^{-h-j+2n} \left(-b - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-b\left(-b-2d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\right)\right)$$

$$d^{-2n-2} + 2^{-2n-\nu-2} \left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu+1} e^{\frac{(c(2k-\nu)-b)^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-\nu)-b)^{-h-j+2n}\right.\right.$$

$$\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((c(2k-\nu)-b)\left(-b+c(2k-\nu)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right) - 2\right.$$

$$\left.\left. d\sqrt{\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right)\right)\right) -$$

$$e^{\frac{(c(\nu-2k)-b)^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2k)-b)^{-h-j+2n} \left(-b+c(\nu-2k)-2d\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left((c(\nu-2k)-b)\left(-b+c(\nu-2k)-2d\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{4d}\right)\right)\right) + (-1)^{\nu} e^{-\frac{(b+c(2k-\nu))^2}{4d}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(2\,k-v))^{-h-j+2\,n}\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{(b+c\,(v-2\,k))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\left.d\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)d^{-2\,n-2}\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sinh\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r\right)$

01.19.21.1989.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^\nu\left(c z^2\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2bz)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2bz)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{d^2}{4(c(2s-\nu)-b)}-e} \left(\sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(2s-\nu)-b)z-d)^{j+1} \left(-\frac{(2(c(2s-\nu)-b)z-d)^2}{c(2s-\nu)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(2s-\nu)-b)z-d)^2}{4(c(2s-\nu)-b)}\right)\right) (c(2s-\nu)-b)^{-n-1} + (-1)^\nu e^{e-\frac{d^2}{4(b+c(2s-\nu))}} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(2s-\nu))z)^{j+1} \left(-\frac{(d+2(b+c(2s-\nu))z)^2}{b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(2s-\nu))z)^2}{4(b+c(2s-\nu))}\right) - e^{-\frac{d^2}{4(c(\nu-2s)-b)}-e} (c(\nu-2s)-b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(\nu-2s)-b)z-d)^{j+1} \left(-\frac{(2(c(\nu-2s)-b)z-d)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(\nu-2s)-b)z-d)^2}{4(c(\nu-2s)-b)}\right) + e^{e-\frac{d^2}{4(b+c(\nu-2s))}} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(\nu-2s))z)^{j+1} \left(-\frac{(d+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1990.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu\left(c \sqrt{z}\right) dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{e-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2d\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right) - \right.$$

$$e^{\frac{b^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2n}\left(-b-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-b\left(-b-2d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\right)\right)$$

$$d^{-2n-2}+2^{-2n-\nu-2}\,d^{-2n-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^{\nu+1}\,e^{\frac{(c(2k-\nu)-b)^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(2k-\nu)-b)^{-h-j+2n}\right.$$

$$\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c(2k-\nu)-b)\left(-b+c(2k-\nu)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2d\sqrt{\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right)\right)-e^{\frac{(c(\nu-2k)-b)^2}{4d}-e}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(\nu-2k)-b)^{-h-j+2n}\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((c(\nu-2k)-b)\left(-b+c(\nu-2k)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{4d}\right)-\right.$$

$$\left.2d\sqrt{\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$(-1)^\nu\,e^{e-\frac{(b+c(2k-\nu))^2}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c(2k-\nu))^{-h-j+2n}\left(b+c(2k-\nu)+2d\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{e-\frac{(b+c\,(v-2\,k))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sinh(d\,z)\sinh^v\left(c\,z^r+g\right)$

01.19.21.1991.01

$$\int z^n \sinh(d z) \sinh^\nu\left(c z^2 + g\right) dz = (-1)^n i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(d^{-n-1} \Gamma(n+1, -d z) - (-d)^{-n-1} \Gamma(n+1, d z)\right) (1 - \nu \bmod 2) - i^{-\nu-1} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{\frac{d^2}{4 c (\nu-2 s)} - \frac{1}{2} i \pi (\nu+1) - g (\nu-2 s)} \left(\sum_{j=0}^n 2^{j-n} d^{n-j} (-d - 2 c (\nu - 2 s) z)^{j+1} \left(\frac{(-d - 2 c (\nu-2 s) z)^2}{c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 c (\nu-2 s) z)^2}{4 c (\nu-2 s)} \right) \right) (-c (\nu - 2 s))^{-n-1} + e^{\frac{d^2}{4 c (\nu-2 s)} + \frac{1}{2} i \pi (1-\nu) - g (\nu-2 s)} \left(\sum_{j=0}^n 2^{j-n} (-d)^{n-j} (d - 2 c (\nu - 2 s) z)^{j+1} \left(\frac{(d - 2 c (\nu-2 s) z)^2}{c (\nu-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d - 2 c (\nu-2 s) z)^2}{4 c (\nu-2 s)} \right) \right) (-c (\nu - 2 s))^{-n-1} + e^{-\frac{d^2}{4 c (\nu-2 s)} + \frac{1}{2} i \pi (\nu-1) + g (\nu-2 s)} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} d^{n-j} (2 c (\nu-2 s) z - d)^{j+1} \left(-\frac{(2 c (\nu-2 s) z - d)^2}{c (\nu-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 c (\nu-2 s) z - d)^2}{4 c (\nu-2 s)} \right) + e^{-\frac{d^2}{4 c (\nu-2 s)} + \frac{1}{2} i \pi (\nu+1) + g (\nu-2 s)} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-d)^{n-j} (d + 2 c (\nu-2 s) z)^{j+1} \left(-\frac{(d + 2 c (\nu-2 s) z)^2}{c (\nu-2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 c (\nu-2 s) z)^2}{4 c (\nu-2 s)} \right) \Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.1992.01

$$\int z^n \sinh(d z) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2 n-\nu-2} i^{-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{c^2 (\nu-2 s)^2}{4 d} - g (\nu-2 s) - \frac{1}{2} i \pi (\nu+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-c (\nu-2 s))^{-h-j+2 n} \left(-2 \sqrt{z}\, d - c (\nu-2 s)\right)^{h+j} \left(\frac{\left(-2 \sqrt{z}\, d - c (\nu-2 s)\right)^2}{d} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c (\nu-2 s) \left(-2 \sqrt{z}\, d - c (\nu-2 s)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2 \sqrt{z}\, d - c (\nu-2 s)\right)^2}{4 d} \right) - 2 d \sqrt{\frac{\left(-2 \sqrt{z}\, d - c (\nu-2 s)\right)^2}{d}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2 \sqrt{z}\, d - c (\nu-2 s)\right)^2}{4 d} \right) \right) + e^{\frac{c^2 (\nu-2 s)^2}{4 d} + g (\nu-2 s) + \frac{1}{2} i \pi (\nu-1)} \right.\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c\,(v-2\,s))^{-h-j+2\,n}\,\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)^{h+j}\left(\frac{\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)^{2}}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)^{2}}{4\,d}\right)-2\,d\right.$$

$$\left.\sqrt{\frac{\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)^{2}}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(c\,(v-2\,s)-2\,d\,\sqrt{z}\right)^{2}}{4\,d}\right)\right)+e^{-\frac{c^{2}\,(v-2\,s)^{2}}{4\,d}-g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(1-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-c\,(v-2\,s))^{-h-j+2\,n}\,\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)^{2}}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,d\,\sqrt{-\frac{\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)^{2}}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)^{2}}{4\,d}\right)-c\,(v-2\,s)\right.$$

$$\left.\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,d\,\sqrt{z}\,-c\,(v-2\,s)\right)^{2}}{4\,d}\right)\right)+e^{-\frac{c^{2}\,(v-2\,s)^{2}}{4\,d}+g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(v+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c\,(v-2\,s))^{-h-j+2\,n}\,\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^{2}}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^{2}}{4\,d}\right)+2\right.$$

$$\left.\left.\left.\left.\sqrt{-\frac{\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^{2}}{d}}\;d\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,\sqrt{z}\,d+c\,(v-2\,s)\right)^{2}}{4\,d}\right)\right)\right)\right)\right)$$

$$d^{-2\,(n+1)}+(-1)^{n}\,2^{-v-1}\,i^{-v}\binom{v}{\frac{v}{2}}\left(d^{-n-1}\,\Gamma(n+1,\,-d\,z)-(-d)^{-n-1}\,\Gamma(n+1,\,d\,z)\right)$$

$$(1-v \bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^{+}$$

Involving $z^n \sinh(d\,z+e)\sinh^\nu(c\,z^r+g)$

01.19.21.1993.01

$$\int z^n \sinh(e+d\,z)\sinh^\nu(c\,z^2+g)\,dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,e^e\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,e^{-e}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2)-i^{-\nu-1}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{d^2}{4c(\nu-2s)}-e-\frac{1}{2}i\pi(\nu+1)-g(\nu-2s)}\left(\sum_{j=0}^{n}2^{j-n}\,d^{n-j}\,(-d-2c(\nu-2s)z)^{j+1}\left(\frac{(-d-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{\frac{d^2}{4c(\nu-2s)}+e+\frac{1}{2}i\pi(1-\nu)-g(\nu-2s)}\left(\sum_{j=0}^{n}2^{j-n}(-d)^{n-j}(d-2c(\nu-2s)z)^{j+1}\left(\frac{(d-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{-\frac{d^2}{4c(\nu-2s)}-e+\frac{1}{2}i\pi(\nu-1)+g(\nu-2s)}(c(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,d^{n-j}\,(2c(\nu-2s)z-d)^{j+1}\left(-\frac{(2c(\nu-2s)z-d)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2c(\nu-2s)z-d)^2}{4c(\nu-2s)}\right)+e^{-\frac{d^2}{4c(\nu-2s)}+e+\frac{1}{2}i\pi(\nu+1)+g(\nu-2s)}(c(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d)^{n-j}(d+2c(\nu-2s)z)^{j+1}\left(-\frac{(d+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.1994.01

$$\int z^n \sinh(e+d\,z)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = 2^{-2n-\nu-2}\,i^{-\nu-1}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2(\nu-2s)^2}{4d}-g(\nu-2s)-e-\frac{1}{2}i\pi(\nu+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(\nu-2s))^{-h-j+2n}\left(-2\sqrt{z}\,d-c(\nu-2s)\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\,d-c(\nu-2s)\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c(\nu-2s)\left(-2\sqrt{z}\,d-c(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-2\sqrt{z}\,d-c(\nu-2s)\right)^2}{4d}\right)-2\right.\right.\right.$$

$$d\sqrt{\frac{\left(-2\sqrt{z}\,d-c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-2\sqrt{z}\,d-c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{c^2\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)-e+\frac{1}{2}\,i\,\pi\,(v-1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{4\,d}\right)-2\,d\sqrt{\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(c\,(v-2\,s)-2\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+e^{-\frac{c^2\,(v-2\,s)^2}{4\,d}-g\,(v-2\,s)+e+\frac{1}{2}\,i\,\pi\,(1-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,d\sqrt{-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d}\right)-c\,(v-2\,s)$$

$$\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,d\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)+e^{-\frac{c^2\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)+e+\frac{1}{2}\,i\,\pi\,(v+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,d+c\,(v-2\,s)\right)^2}{4\,d}\right)+2$$

$$\sqrt{-\frac{\left(2\sqrt{z}\ d+c\,(v-2\,s)\right)^2}{d}}\ d\,\Gamma\left(\frac{1}{2}\,(h+j+2),\ -\frac{\left(2\sqrt{z}\ d+c\,(v-2\,s)\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{-2\,(n+1)}+(-1)^n\,2^{-v-1}\,i^{-v}\binom{v}{\frac{v}{2}}\left(d^{-n-1}\,e^e\,\Gamma(n+1,\,-d\,z)-(-d)^{-n-1}\,e^{-e}\,\Gamma(n+1,\,d\,z)\right)$$

$$(1-v \bmod 2)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh\left(b\,z^r\right)\sinh^v\left(c\,z^r+g\right)$

01.19.21.1995.01

$$\int z^{\alpha-1}\sinh(b\,z^r)\sinh^v(c\,z^r+g)\,dz = \frac{i^{-v}\,2^{-v-1}\,z^\alpha\binom{v}{\frac{v}{2}}\left((b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,b\,z^r\right)-(-b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-b\,z^r\right)\right)(1-v \bmod 2)}{r}+$$
$$\frac{2^{-v-1}\,z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(-(-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\left(\frac{\alpha}{r},\,(-b-2\,c\,s+c\,v)\,z^r\right)((-b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}+$$
$$(-1)^v\,e^{2\,g\,s-g\,v}\,((b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b-2\,c\,s+c\,v)\,z^r\right)-e^{g\,v-2\,g\,s}\,((-b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}$$
$$\Gamma\left(\frac{\alpha}{r},\,(-b+2\,c\,s-c\,v)\,z^r\right)+e^{g\,v-2\,g\,s}\,((b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b+2\,c\,s-c\,v)\,z^r\right)\Bigg)\ /;\ v\in\mathbb{N}^+$$

01.19.21.1996.01

$$\int z^n\sinh\left(b\,z^2\right)\sinh^v\left(c\,z^2+g\right)dz =$$
$$2^{-v-2}\,i^{-v}\binom{v}{\frac{v}{2}}\left(\left(b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,b\,z^2\right)-\left(-b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,-b\,z^2\right)\right)(1-v \bmod 2)\,z^{n+1}+$$
$$2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(-(-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\left(\frac{n+1}{2},\,(-b-2\,c\,s+c\,v)\,z^2\right)\left((-b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}+(-1)^v\,e^{2\,g\,s-g\,v}$$
$$\left((b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(b-2\,c\,s+c\,v)\,z^2\right)-e^{g\,v-2\,g\,s}\left((-b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\Bigg(\frac{n+1}{2},$$
$$(-b+2\,c\,s-c\,v)\,z^2\Bigg)+e^{g\,v-2\,g\,s}\left((b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(b+2\,c\,s-c\,v)\,z^2\right)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.1997.01

$$\int z^n\sinh\left(b\sqrt{z}\right)\sinh^v\left(\sqrt{z}\ c+g\right)dz =$$
$$i^{-v}\,2^{-v}\,b^{-2\,(n+1)}\binom{v}{\frac{v}{2}}\left(\Gamma\left(2\,(n+1),\,b\sqrt{z}\right)-\Gamma\left(2\,(n+1),\,-b\sqrt{z}\right)\right)(1-v \bmod 2)-2^{-v}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}$$
$$\Bigg((-1)^v\,e^{-g\,(v-2\,s)}\,\Gamma\left(2\,(n+1),\,(c\,(v-2\,s)-b)\sqrt{z}\right)(c\,(v-2\,s)-b)^{-2\,(n+1)}-(-1)^v\,e^{-g\,(v-2\,s)}\,(b+c\,(v-2\,s))^{-2\,(n+1)}$$
$$\Gamma\left(2\,(n+1),\,(b+c\,(v-2\,s))\sqrt{z}\right)+e^{g\,(v-2\,s)}\,(-b-c\,(v-2\,s))^{-2\,(n+1)}\,\Gamma\left(2\,(n+1),\,(-b-c\,(v-2\,s))\sqrt{z}\right)-$$
$$e^{g\,(v-2\,s)}\,(b-c\,(v-2\,s))^{-2\,(n+1)}\,\Gamma\left(2\,(n+1),\,(b-c\,(v-2\,s))\sqrt{z}\right)\Bigg)\ /;\ n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh(b z^r+e)\sinh^\nu(c z^r+g)$

01.19.21.1998.01

$$\int z^{\alpha-1}\sinh(b z^r+e)\sinh^\nu(c z^r+g)\,dz = \frac{i^{-\nu}\,2^{-\nu-1}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\,(b z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,b z^r\right)-e^e\,(-b z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,-b z^r\right)\right)(1-\nu \bmod 2)}{r}+$$
$$\frac{2^{-\nu-1}\,z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-(-1)^\nu\,e^{e+2 g s-g\nu}\,\Gamma\left(\frac{\alpha}{r},\,(-b-2 c s+c\nu)\,z^r\right)((-b-2 c s+c\nu)\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$(-1)^\nu\,e^{-e+2 g s-g\nu}\,((b-2 c s+c\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b-2 c s+c\nu)\,z^r\right)-e^{e-2 g s+g\nu}\,((-b+2 c s-c\nu)\,z^r)^{-\frac{\alpha}{r}}$$
$$\left.\Gamma\left(\frac{\alpha}{r},\,(-b+2 c s-c\nu)\,z^r\right)+e^{-e-2 g s+g\nu}\,((b+2 c s-c\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(b+2 c s-c\nu)\,z^r\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.1999.01

$$\int z^n\sinh(b z^2+e)\sinh^\nu(c z^2+g)\,dz =$$
$$2^{-\nu-2}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\left(b z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,b z^2\right)-e^e\left(-b z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,-b z^2\right)\right)(1-\nu \bmod 2)\,z^{n+1}+$$
$$2^{-\nu-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-(-1)^\nu\,e^{e+2 g s-g\nu}\,\Gamma\left(\frac{n+1}{2},\,(-b-2 c s+c\nu)\,z^2\right)\left((-b-2 c s+c\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}+(-1)^\nu\,e^{-e+2 g s-g\nu}\right.$$
$$\left((b-2 c s+c\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(b-2 c s+c\nu)\,z^2\right)-e^{e-2 g s+g\nu}\left((-b+2 c s-c\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\right.$$
$$\left.\left.(-b+2 c s-c\nu)\,z^2\right)+e^{-e-2 g s+g\nu}\left((b+2 c s-c\nu)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,(b+2 c s-c\nu)\,z^2\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2000.01

$$\int z^n\sinh\left(\sqrt{z}\,b+e\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz =$$
$$i^{-\nu}\,2^{-\nu}\,b^{-2(n+1)}\binom{\nu}{\frac{\nu}{2}}\left(e^{-e}\,\Gamma\left(2(n+1),\,b\sqrt{z}\right)-e^e\,\Gamma\left(2(n+1),\,-b\sqrt{z}\right)\right)(1-\nu \bmod 2)-$$
$$2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu\,e^{e-g(\nu-2s)}\,\Gamma\left(2(n+1),\,(c(\nu-2s)-b)\sqrt{z}\right)(c(\nu-2s)-b)^{-2(n+1)}-(-1)^\nu\,e^{-e-g(\nu-2s)}\right.$$
$$(b+c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\,(b+c(\nu-2s))\sqrt{z}\right)+e^{e+g(\nu-2s)}\,(-b-c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\right.$$
$$\left.\left.(-b-c(\nu-2s))\sqrt{z}\right)-e^{g(\nu-2s)-e}\,(b-c(\nu-2s))^{-2(n+1)}\,\Gamma\left(2(n+1),\,(b-c(\nu-2s))\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^n\sinh(b z^r+d z)\sinh^\nu(c z^r+g)$

01.19.21.2001.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + g\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{g(2s-\nu) - \frac{d^2}{4(c(2s-\nu)-b)}} \left(\sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(2s-\nu)-b)z - d)^{j+1} \left(-\frac{(2(c(2s-\nu)-b)z-d)^2}{c(2s-\nu)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(2s-\nu)-b)z-d)^2}{4(c(2s-\nu)-b)}\right)\right) (c(2s-\nu)-b)^{-n-1} + (-1)^\nu e^{g(2s-\nu) - \frac{d^2}{4(b+c(2s-\nu))}} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(2s-\nu))z)^{j+1} \left(-\frac{(d+2(b+c(2s-\nu))z)^2}{b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(2s-\nu))z)^2}{4(b+c(2s-\nu))}\right) - e^{g(\nu-2s) - \frac{d^2}{4(c(\nu-2s)-b)}} (c(\nu-2s)-b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(\nu-2s)-b)z - d)^{j+1} \left(-\frac{(2(c(\nu-2s)-b)z-d)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(\nu-2s)-b)z-d)^2}{4(c(\nu-2s)-b)}\right) + e^{g(\nu-2s) - \frac{d^2}{4(b+c(\nu-2s))}} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(\nu-2s))z)^{j+1} \left(-\frac{(d+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2002.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\left(b + 2 d \sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$e^{\frac{b^2}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b-2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-b\left(-b-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)$$

$$d^{-2n-2} + 2^{-2n-\nu-2}\, d^{-2n-2} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k \binom{\nu}{k} \Bigg((-1)^{\nu+1}\, e^{\frac{(c(2k-\nu)-b)^2}{4d}+g(2k-\nu)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c(2k-\nu)-b)^{-h-j+2n}$$

$$\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((c(2k-\nu)-b)\left(-b+c(2k-\nu)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right) -$$

$$2d\sqrt{\frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+c(2k-\nu)-2d\sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$e^{\frac{(c(\nu-2k)-b)^2}{4d}+g(\nu-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c(\nu-2k)-b)^{-h-j+2n} \left(-b+c(\nu-2k)-2d\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((c(\nu-2k)-b)\left(-b+c(\nu-2k)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(\nu-2k)-2d\sqrt{z}\right)^2}{4d}\right) -$$

$$2\,d\sqrt{\frac{\left(-b+c\,(v-2\,k)-2\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b+c\,(v-2\,k)-2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$(-1)^v\,e^{g\,(2\,k-v)-\frac{(b+c\,(2\,k-v))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(2\,k-v))^{-h-j+2\,n}\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{g\,(v-2\,k)-\frac{(b+c\,(v-2\,k))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\Bigg)+2\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{d}}\;d\,\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,d\,\sqrt{z}\right)^2}{4\,d}\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sinh\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2003.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^\nu\left(c z^2 + g\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{d^2}{4(c(2s-\nu)-b)}-e+g(2s-\nu)} \left(\sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(2s-\nu)-b)z-d)^{j+1} \left(-\frac{(2(c(2s-\nu)-b)z-d)^2}{c(2s-\nu)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(2s-\nu)-b)z-d)^2}{4(c(2s-\nu)-b)}\right)\right) (c(2s-\nu)-b)^{-n-1} + (-1)^\nu e^{-\frac{d^2}{4(b+c(2s-\nu))}+e+g(2s-\nu)} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(2s-\nu))z)^{j+1} \left(-\frac{(d+2(b+c(2s-\nu))z)^2}{b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(2s-\nu))z)^2}{4(b+c(2s-\nu))}\right) - e^{-\frac{d^2}{4(c(\nu-2s)-b)}-e+g(\nu-2s)} (c(\nu-2s)-b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (2(c(\nu-2s)-b)z-d)^{j+1} \left(-\frac{(2(c(\nu-2s)-b)z-d)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(c(\nu-2s)-b)z-d)^2}{4(c(\nu-2s)-b)}\right) + e^{-\frac{d^2}{4(b+c(\nu-2s))}+e+g(\nu-2s)} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2(b + c(\nu-2s))z)^{j+1} \left(-\frac{(d+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2004.01

$$\int z^n \sinh\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{e-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 d \sqrt{z}\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\; d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) -$$

$$e^{\frac{b^2}{4d}-e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b)^{-h-j+2n}\left(-b-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-b\left(-b-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)\Bigg)$$

$$d^{-2n-2}+2^{-2n-v-2}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^{v+1}\,e^{\frac{(c(2k-v)-b)^2}{4d}-e+g(2k-v)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(2k-v)-b)^{-h-j+2n}$$

$$\left(-b+c(2k-v)-2d\sqrt{z}\right)^{h+j}\left(\frac{\left(-b+c(2k-v)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c(2k-v)-b)\left(-b+c(2k-v)-2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(2k-v)-2d\sqrt{z}\right)^2}{4d}\right)-2d$$

$$\sqrt{\frac{\left(-b+c(2k-v)-2d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+c(2k-v)-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)(-d)^{-2n-2} -$$

$$e^{\frac{(c(v-2k)-b)^2}{4d}-e+g(v-2k)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2k)-b)^{-h-j+2n}\left(-b+c(v-2k)-2d\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b+c(v-2k)-2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c(v-2k)-b)\left(-b+c(v-2k)-2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+c(v-2k)-2d\sqrt{z}\right)^2}{4d}\right)-2d\sqrt{\frac{\left(-b+c(v-2k)-2d\sqrt{z}\right)^2}{d}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+c(v-2k)-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)(-d)^{-2n-2}+(-1)^v d^{-2n-2} e^{-\frac{(b+c(2k-v))^2}{4d}+e+g(2k-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(2k-v))^{-h-j+2n}\left(b+c(2k-v)+2d\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c(2k-v)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(2k-v))\left(b+c(2k-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+c(2k-v)+2d\sqrt{z}\right)^2}{4d}\right)+$$

$$2\sqrt{-\frac{\left(b+c(2k-v)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c(2k-v)+2d\sqrt{z}\right)^2}{4d}\right)\Bigg)+$$

$$d^{-2n-2} e^{-\frac{(b+c(v-2k))^2}{4d}+e+g(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(v-2k))^{-h-j+2n}\left(b+c(v-2k)+2d\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c(v-2k)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b+c(v-2k))\left(b+c(v-2k)+2d\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(b+c(v-2k)+2d\sqrt{z}\right)^2}{4d}\Bigg)+2\sqrt{-\frac{\left(b+c(v-2k)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2), -\frac{\left(b+c(v-2k)+2d\sqrt{z}\right)^2}{4d}\Bigg)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(d\,z)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2005.01

$$\int z^n \sinh(d\,z)\sinh^\nu\left(c\,z^2+f\,z\right)dz = i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2)-$$
$$2^{-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(e^{\frac{(-d-f(\nu-2s))^2}{4c(\nu-2s)}-\frac{1}{2}i\pi(\nu+1)}$$
$$\left(\sum_{j=0}^{n}2^{j-n}(d+f(\nu-2s))^{n-j}(-d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{\frac{(d-f(\nu-2s))^2}{4c(\nu-2s)}+\frac{1}{2}i\pi(1-\nu)}$$
$$\left(\sum_{j=0}^{n}2^{j-n}(f(\nu-2s)-d)^{n-j}(d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{\frac{1}{2}i\pi(\nu-1)-\frac{(f(\nu-2s)-d)^2}{4c(\nu-2s)}}(c(\nu-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}(d-f(\nu-2s))^{n-j}(-d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)+e^{\frac{1}{2}i\pi(\nu+1)-\frac{(d+f(\nu-2s))^2}{4c(\nu-2s)}}(c(\nu-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}(-d-f(\nu-2s))^{n-j}(d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2006.01

$$\int z^n\sinh(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz =$$
$$i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2)+2^{-2n-\nu-2}\,i^{-\nu-1}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{1}{2}i\pi(\nu-1)-\frac{c^2(\nu-2s)^2}{4(f(\nu-2s)-d)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(\nu-2s))^{-h-j+2n}\left(c(\nu-2s)+2(f(\nu-2s)-d)\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}}$$

$$\left.\left.(f\,(v-2\,s)-d)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)\right)\right)$$

$$(f\,(v-2\,s)-d)^{-2\,(n+1)}+e^{\frac{1}{2}\,i\,\pi\,(v+1)-\frac{c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}}\,(d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}\,(d+f\,(v-2\,s))\,\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d-f\,(v-2\,s))}-\frac{1}{2}\,i\,\pi\,(v+1)}\,(-d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-d-f(v-2s))\sqrt{-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)-c(v-2s)\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)\right)+$$

$$e^{\frac{1}{2}i\pi(1-v)-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}}(d-f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}\left(-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)-c(v-2s)\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(d\,z+e)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2007.01

$$\int z^n \sinh(e+d\,z)\sinh^\nu\left(c\,z^2+f\,z\right)dz = i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}e^e\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}e^{-e}\,\Gamma(n+1,d\,z)\right)(1-\nu\bmod 2)-$$

$$2^{-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-d-f(\nu-2s))^2}{4c(\nu-2s)}-e-\frac{1}{2}i\pi(\nu+1)}\right.$$

$$\left(\sum_{j=0}^n 2^{j-n}(d+f(\nu-2s))^{n-j}(-d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{\frac{(d-f(\nu-2s))^2}{4c(\nu-2s)}+e+\frac{1}{2}i\pi(1-\nu)}$$

$$\left(\sum_{j=0}^n 2^{j-n}(f(\nu-2s)-d)^{n-j}(d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\right.$$

$$\left.\Gamma\left(\frac{j+1}{2},\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{-\frac{(f(\nu-2s)-d)^2}{4c(\nu-2s)}-e+\frac{1}{2}i\pi(\nu-1)}(c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^n 2^{j-n}(d-f(\nu-2s))^{n-j}(-d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)+e^{-\frac{(d+f(\nu-2s))^2}{4c(\nu-2s)}+e+\frac{1}{2}i\pi(\nu+1)}(c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^n 2^{j-n}(-d-f(\nu-2s))^{n-j}(d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)/;\ n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2008.01

$$\int z^n \sinh(e+d\,z)\sinh^\nu\left(\sqrt{z}\,c+f\,z\right)dz =$$

$$i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}e^e\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}e^{-e}\,\Gamma(n+1,d\,z)\right)(1-\nu\bmod 2)+$$

$$2^{-2n-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2(\nu-2s)^2}{4(f(\nu-2s)-d)}-e+\frac{1}{2}i\pi(\nu-1)}\left(\sum_{j=0}^n\sum_{h=0}^j(-1)^{j-h}4^j(c(\nu-2s))^{-h-j+2n}\right.\right.$$

$$\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}}$$

$$\left.\left.(f\,(v-2\,s)-d)\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)\right)\right)$$

$$(f\,(v-2\,s)-d)^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}+e+\frac{1}{2}\,i\,\pi\,(v+1)}\,(d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+\right.$$

$$2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}\,(d+f\,(v-2\,s))\,\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d-f\,(v-2\,s))}-e-\frac{1}{2}\,i\,\pi\,(v+1)}\,(-d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-d-f(v-2s))\sqrt{-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)-c(v-2s)\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}+e+\frac{1}{2}i\pi(1-v)}(d-f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}\left(-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)-c(v-2s)\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b z^r) \sinh^v(c z^r + f z)$

01.19.21.2009.01

$$\int z^n \sinh\left(b z^2\right) \sinh^\nu\left(c z^2 + f z\right) dz = \\ i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right) (1 - \nu \bmod 2) - \\ 2^{-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{i b + 2 i c s - i c \nu} + 2\pi(\nu-1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(c(\nu-2s)-b) z)^{j+1} \right.\right. \\ \left. \left(-\frac{(f(\nu-2s) + 2(c(\nu-2s)-b)z)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{4(c(\nu-2s)-b)}\right)\right) \\ (c(\nu-2s)-b)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b + 2 i c s - i c \nu} - 2\pi(\nu+1)\right)} (b + c(\nu-2s))^{-n-1} \\ \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(b + c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \\ \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b + 2 i c s - i c \nu} - 2\pi(\nu+1)\right)} (-b - c(\nu-2s))^{-n-1} \\ \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-b-c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(-b-c(\nu-2s))z - f(\nu-2s))^2}{-b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \\ \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c(\nu-2s))z - f(\nu-2s))^2}{4(-b-c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{i b + 2 i c s - i c \nu} - 2\pi(1-\nu)\right)} (b - c(\nu-2s))^{-n-1} \\ \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(b-c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(b-c(\nu-2s))z - f(\nu-2s))^2}{b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \\ \left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c(\nu-2s))z - f(\nu-2s))^2}{4(b-c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2010.01

$$\int z^n \sinh\left(b\sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = -i^{-\nu} 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -b\sqrt{z}\right) - \Gamma\left(2(n+1), b\sqrt{z}\right)\right)(1 - \nu \bmod 2) + \\ 2^{-2n-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} (f(\nu-2s))^{-2(n+1)} \\ \left(e^{\frac{(-b-c(\nu-2s))^2}{4 f(\nu-2s)} - \frac{1}{2} i \pi (\nu+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b - c(\nu-2s))^{-h-j+2n} \left(-b - c(\nu-2s) - 2 f(\nu-2s)\sqrt{z}\right)^{h+j} \right.$$

$$\left(\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-b-c\,(v-2\,s))\left(-b-c\,(v-2\,s)-\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\left.\left.\sqrt{\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+$$

$$e^{\frac{(b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(1-v)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c\,(v-2\,s))^{-h-j+2\,n}\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((b-c\,(v-2\,s))\left(b-c\,(v-2\,s)-\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\left.\left.\sqrt{\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v-1)-\frac{(c\,(v-2\,s)-b)^2}{4\,f\,(v-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-b)^{-h-j+2\,n}\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,s)-b)\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg) +$$

$$e^{\frac{1}{2}i\pi(v+1)-\frac{(b+c(v-2s))^2}{4f(v-2s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(v-2s))^{-h-j+2n}\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c(v-2s))\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)+2f(v-2s)\sqrt{-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2), -\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)\Bigg)\Bigg) /; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b z^r + e) \sinh^v(c z^r + f z)$

01.19.21.2011.01

$$\int z^n \sinh\left(b z^2+e\right) \sinh^v\left(c z^2+f z\right) dz = i^{-v} 2^{-v-2} z^{n+1} \binom{v}{\frac{v}{2}} \left(e^{-e} \left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - e^e \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right) (1 - v \bmod 2) - 2^{-v-2} i^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{i b+2 i c s-i c v}+4 i e+2\pi(v-1)\right)} \left(\sum_{j=0}^n 2^{j-n} (-f(v-2s))^{n-j} (f(v-2s)+2(c(v-2s)-b)z)^{j+1} \left(-\frac{(f(v-2s)+2(c(v-2s)-b)z)^2}{c(v-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2s)+2(c(v-2s)-b)z)^2}{4(c(v-2s)-b)}\right)\right) (c(v-2s)-b)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{-i b+2 i c s-i c v}+4 i e-2\pi(v+1)\right)} (b+c(v-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f(v-2s))^{n-j} (f(v-2s)+2(b+c(v-2s))z)^{j+1} \left(-\frac{(f(v-2s)+2(b+c(v-2s))z)^2}{b+c(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2s)+2(b+c(v-2s))z)^2}{4(b+c(v-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{-i b+2 i c s-i c v}+4 i e-2\pi(v+1)\right)} (-b-c(v-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(v-2s))^{n-j} (2(-b-c(v-2s))z-f(v-2s))^{j+1} \left(-\frac{(2(-b-c(v-2s))z-f(v-2s))^2}{-b-c(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c(v-2s))z-f(v-2s))^2}{4(-b-c(v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{i b+2 i c s-i c v}+4 i e-2\pi(1-v)\right)} (b-c(v-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(v-2s))^{n-j} (2(b-c(v-2s))z-f(v-2s))^{j+1} \left(-\frac{(2(b-c(v-2s))z-f(v-2s))^2}{b-c(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c(v-2s))z-f(v-2s))^2}{4(b-c(v-2s))}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2012.01

$$\int z^n \sinh\left(\sqrt{z}\, b+e\right) \sinh^v\left(\sqrt{z}\, c+f z\right) dz = -i^{-v} 2^{-v} b^{-2(n+1)} \binom{v}{\frac{v}{2}} \left(e^e \Gamma\left(2(n+1), -b\sqrt{z}\right) - e^{-e} \Gamma\left(2(n+1), b\sqrt{z}\right)\right) (1 - v \bmod 2) + 2^{-2n-v-2} i^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} (f(v-2s))^{-2(n+1)} \left(e^{\frac{(-b-c(v-2s))^2}{4 f (v-2s)}-e-\frac{1}{2} i \pi (v+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-b-c(v-2s))^{-h-j+2n} \left(-b-c(v-2s)-2 f(v-2s)\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((-b-c\,(v-2\,s))\left(-b-c\,(v-2\,s)-\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\sqrt{\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)+$$

$$e^{\frac{(b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(1-v)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c\,(v-2\,s))^{-h-j+2\,n}\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((b-c\,(v-2\,s))\left(b-c\,(v-2\,s)-\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\sqrt{\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)+$$

$$e^{-\frac{(c\,(v-2\,s)-b)^2}{4\,f\,(v-2\,s)}-e+\frac{1}{2}\,i\,\pi\,(v-1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-b)^{-h-j+2\,n}\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,s)-b)\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.$$

$$\left.-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg) +$$

$$e^{-\frac{(b+c(v-2s))^2}{4f(v-2s)}+e+\frac{1}{2}i\pi(v+1)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c(v-2s))^{-h-j+2n}\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c(v-2s))\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)+2f(v-2s)\sqrt{-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2), -\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)\Bigg)\Bigg) /; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b z^r + d z) \sinh^v(c z^r + f z)$

01.19.21.2013.01

$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + f z\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-(-1)^\nu e^{-\frac{(f(2s-\nu)-d)^2}{4(c(2s-\nu)-b)}} \left(\sum_{j=0}^{n} 2^{j-n} (d - f(2s-\nu))^{n-j} (-d + f(2s-\nu) + 2(c(2s-\nu) - b) z)^{j+1} \left(-\frac{(-d + f(2s-\nu) + 2(c(2s-\nu)-b) z)^2}{c(2s-\nu) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f(2s-\nu) + 2(c(2s-\nu)-b) z)^2}{4(c(2s-\nu)-b)}\right)\right) (c(2s-\nu) - b)^{-n-1} + (-1)^\nu e^{-\frac{(d+f(2s-\nu))^2}{4(b+c(2s-\nu))}} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(2s-\nu))^{n-j} (d + f(2s-\nu) + 2(b + c(2s-\nu)) z)^{j+1} \left(-\frac{(d + f(2s-\nu) + 2(b + c(2s-\nu)) z)^2}{b + c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f(2s-\nu) + 2(b + c(2s-\nu)) z)^2}{4(b + c(2s-\nu))}\right) - e^{-\frac{(f(\nu-2s)-d)^2}{4(c(\nu-2s)-b)}} (c(\nu-2s) - b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d - f(\nu-2s))^{n-j} (-d + f(\nu-2s) + 2(c(\nu-2s) - b) z)^{j+1} \left(-\frac{(-d + f(\nu-2s) + 2(c(\nu-2s)-b) z)^2}{c(\nu-2s) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f(\nu-2s) + 2(c(\nu-2s)-b) z)^2}{4(c(\nu-2s)-b)}\right) + e^{-\frac{(d+f(\nu-2s))^2}{4(b+c(\nu-2s))}} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(\nu-2s))^{n-j} (d + f(\nu-2s) + 2(b + c(\nu-2s)) z)^{j+1} \left(-\frac{(d + f(\nu-2s) + 2(b + c(\nu-2s)) z)^2}{b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f(\nu-2s) + 2(b + c(\nu-2s)) z)^2}{4(b + c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2014.01

$$\int z^n \sinh\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + f\, z\right) dz = i^\nu\, 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\Bigg(d^{-2n-2}\, e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, b^{-h-j+2n} \left(b + 2d\sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\left(b + 2d\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\Bigg) -$$

$$(-d)^{-2n-2}\, e^{\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(-b\left(-b - 2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right) -$$

$$2d\sqrt{\frac{\left(-b-2d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b-2d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) + 2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\Bigg((-1)^{\nu+1}\, e^{-\frac{(c(2k-\nu)-b)^2}{4(f(2k-\nu)-d)}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(2k-\nu)-b)^{-h-j+2n} \left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^2}{f(2k-\nu)-d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg((c(2k-\nu)-b)\left(-b + c(2k-\nu) + \right.$$

$$\left. 2(f(2k-\nu)-d)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^2}{4(f(2k-\nu)-d)}\right) + 2$$

$$\sqrt{-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^2}{f(2k-\nu)-d}}\, (f(2k-\nu)-d)$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(2k-v)+2(f(2k-v)-d)\sqrt{z}\right)^2}{4(f(2k-v)-d)}\right)\Bigg)\Bigg)(f(2k-v)-d)^{-2n-2} +$$

$$(-1)^v e^{-\frac{(b+c(2k-v))^2}{4(d+f(2k-v))}} (d+f(2k-v))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (b+c(2k-v))^{-h-j+2n}$$

$$\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(2k-v))\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\Bigg) + 2\sqrt{-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}}$$

$$(d+f(2k-v))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\right)\Bigg) - e^{-\frac{(c(v-2k)-b)^2}{4(f(v-2k)-d)}}$$

$$(f(v-2k)-d)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (c(v-2k)-b)^{-h-j+2n} \left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((c(v-2k)-b)\big(-b+c(v-2k)+$$

$$2(f(v-2k)-d)\sqrt{z}\big)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\right) +$$

$$2\sqrt{-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}}\;(f(v-2k)-d)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\Bigg)\Bigg) + e^{-\frac{(b+c(v-2k))^2}{4(d+f(v-2k))}} (d+f(v-2k))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(b+c\,(v-2\,k))^{-h-j+2\,n}\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$
$$\left(-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$
$$\left.-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(d+f\,(v-2\,k))}\right)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{d+f\,(v-2\,k)}}$$
$$\left.\left.(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(d+f\,(v-2\,k))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^{+}$$

Involving $z^n \sinh(b\,z^r+d\,z+e)\sinh^v(c\,z^r+f\,z)$

01.19.21.2015.01

$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^v\left(c z^2 + f z\right) dz = -i^v 2^{-v-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4 b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4 b}\right)\right) - 2^{-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{v+1} e^{-\frac{(f(2s-v)-d)^2}{4(c(2s-v)-b)}-e} \left(\sum_{j=0}^{n} 2^{j-n} (d - f(2s-v))^{n-j} (-d + f(2s-v) + 2(c(2s-v) - b) z)^{j+1} \left(-\frac{(-d + f(2s-v) + 2(c(2s-v) - b) z)^2}{c(2s-v) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f(2s-v) + 2(c(2s-v) - b) z)^2}{4(c(2s-v) - b)}\right)\right) (c(2s-v) - b)^{-n-1} + (-1)^v e^{e-\frac{(d+f(2s-v))^2}{4(b+c(2s-v))}} (b + c(2s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(2s-v))^{n-j} (d + f(2s-v) + 2(b + c(2s-v)) z)^{j+1} \left(-\frac{(d + f(2s-v) + 2(b + c(2s-v)) z)^2}{b + c(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f(2s-v) + 2(b + c(2s-v)) z)^2}{4(b + c(2s-v))}\right) - e^{-\frac{(f(v-2s)-d)^2}{4(c(v-2s)-b)}-e} (c(v-2s) - b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d - f(v-2s))^{n-j} (-d + f(v-2s) + 2(c(v-2s) - b) z)^{j+1} \left(-\frac{(-d + f(v-2s) + 2(c(v-2s) - b) z)^2}{c(v-2s) - b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f(v-2s) + 2(c(v-2s) - b) z)^2}{4(c(v-2s) - b)}\right) + e^{e-\frac{(d+f(v-2s))^2}{4(b+c(v-2s))}} (b + c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(v-2s))^{n-j} (d + f(v-2s) + 2(b + c(v-2s)) z)^{j+1} \left(-\frac{(d + f(v-2s) + 2(b + c(v-2s)) z)^2}{b + c(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f(v-2s) + 2(b + c(v-2s)) z)^2}{4(b + c(v-2s))}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \sinh\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz =$$

$$i^{\nu}\, 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(d^{-2n-2}\, e^{e-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, b^{-h-j+2n} \left(b + 2 d \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) +$$

$$2 \sqrt{-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\Bigg) - (-d)^{-2n-2}\, e^{\frac{b^2}{4d}-e}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b - 2 d \sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-b \left(-b - 2 d \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + j + 1), \frac{\left(-b - 2 d \sqrt{z}\right)^2}{4 d}\right) - 2 d \sqrt{\frac{\left(-b - 2 d \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h + j + 2), \frac{\left(-b - 2 d \sqrt{z}\right)^2}{4 d}\right)\Bigg)\Bigg) +$$

$$2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg((-1)^{\nu+1}\, e^{-\frac{(c(2k-\nu)-b)^2}{4(f(2k-\nu)-d)}-e} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(2k-\nu)-b)^{-h-j+2n}$$

$$\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^2}{f(2k-\nu)-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg((c(2k-\nu)-b) \left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h + j + 1), -\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu)-d)\sqrt{z}\right)^2}{4(f(2k-\nu)-d)}\right) + 2$$

$$\sqrt{-\frac{\left(-b+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d)\,\sqrt{z}\right)^2}{f\,(2\,k-v)-d}}\;(f\,(2\,k-v)-d)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-b+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d)\,\sqrt{z}\right)^2}{4\,(f\,(2\,k-v)-d)}\right)\Bigg)\Bigg)\Bigg)(f\,(2\,k-v)-d)^{-2\,n-2}+$$

$$(-1)^v\,e^{e^{-\frac{(b+c\,(2\,k-v))^2}{4\,(d+f\,(2\,k-v))}}}\,(d+f\,(2\,k-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{d+f\,(2\,k-v)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{d+f\,(2\,k-v)}}$$

$$(d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\right)\Bigg)-e^{-\frac{(c\,(v-2\,k)-b)^2}{4\,(f\,(v-2\,k)-d)}-e}$$

$$(f\,(v-2\,k)-d)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-b)^{-h-j+2\,n}\left(-b+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((c\,(v-2\,k)-b)\Big(-b+c\,(v-2\,k)+$$

$$2\,(f\,(v-2\,k)-d)\,\sqrt{z}\Big)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-b+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d)}\right)+$$

$$2\,\sqrt{-\frac{\left(-b+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d}}\;(f\,(v-2\,k)-d)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(-b+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d)}\Bigg)\Bigg)+e^{e-\frac{(b+c\,(v-2\,k))^2}{4\,(d+f\,(v-2\,k))}}\,(d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}}$$

$$(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,\sinh(d\,z)\,\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.2017.01

$$\int z^n \sinh(d\,z)\sinh^\nu\left(c\,z^2+f\,z+g\right)dz = i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2) - 2^{-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(e^{\frac{(-d-f(\nu-2s))^2}{4c(\nu-2s)}-\frac{1}{2}i\pi(\nu+1)-g(\nu-2s)}\Bigg(\sum_{j=0}^{n}2^{j-n}(d+f(\nu-2s))^{n-j}(-d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\Bigg)(-c(\nu-2s))^{-n-1}+e^{\frac{(d-f(\nu-2s))^2}{4c(\nu-2s)}+\frac{1}{2}i\pi(1-\nu)-g(\nu-2s)}\Bigg(\sum_{j=0}^{n}2^{j-n}(f(\nu-2s)-d)^{n-j}(d-f(\nu-2s)-2c(\nu-2s)z)^{j+1}\left(\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f(\nu-2s)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\Bigg)(-c(\nu-2s))^{-n-1}+e^{-\frac{(f(\nu-2s)-d)^2}{4c(\nu-2s)}+\frac{1}{2}i\pi(\nu-1)+g(\nu-2s)}(c(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d-f(\nu-2s))^{n-j}(-d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)+e^{-\frac{(d+f(\nu-2s))^2}{4c(\nu-2s)}+\frac{1}{2}i\pi(\nu+1)+g(\nu-2s)}(c(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d-f(\nu-2s))^{n-j}(d+f(\nu-2s)+2c(\nu-2s)z)^{j+1}\left(-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f(\nu-2s)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\Bigg)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2018.01

$$\int z^n \sinh(d\,z)\sinh^\nu\left(\sqrt{z}\,c+g+f\,z\right)dz = i^{-\nu}(-1)^n 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2)+2^{-2n-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(e^{-\frac{c^2(\nu-2s)^2}{4(f(\nu-2s)-d)}+g(\nu-2s)+\frac{1}{2}i\pi(\nu-1)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(\nu-2s))^{-h-j+2n}\left(c(\nu-2s)+2(f(\nu-2s)-d)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)$$

$$\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)+2$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}}\;(f\,(v-2\,s)-d)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)\Bigg)\Bigg)(f\,(v-2\,s)-d)^{-2\,(n+1)}+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(v+1)}\,(d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+$$

$$2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}\;(d+f\,(v-2\,s))\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\Bigg)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d-f\,(v-2\,s))}-g\,(v-2\,s)-\frac{1}{2}\,i\,\pi\,(v+1)}\,(-d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-d-f(v-2s))\sqrt{-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)-c(v-2s)\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(-d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d-f(v-2s))}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}-g(v-2s)+\frac{1}{2}i\pi(1-v)}(d-f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}\left(-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)-c(v-2s)\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sinh(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.2019.01

$$\int z^n \sinh(e+d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = i^{-\nu}(-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,e^{e}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,e^{-e}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2) - 2^{-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-e-\frac{1}{2}\,i\,\pi\,(\nu+1)-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(d+f\,(\nu-2\,s))^{n-j}\,(-d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(1-\nu)-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(\nu-2\,s)-d)^{n-j}\,(d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{(f\,(\nu-2\,s)-d)^2}{4\,c\,(\nu-2\,s)}-e+\frac{1}{2}\,i\,\pi\,(\nu-1)+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(d-f\,(\nu-2\,s))^{n-j}\,(-d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{(d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(\nu+1)+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-f\,(\nu-2\,s))^{n-j}\,(d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

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$$\int z^n \sinh(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g+f\,z\right)dz = i^{-\nu}(-1)^n\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(d^{-n-1}\,e^{e}\,\Gamma(n+1,-d\,z)-(-d)^{-n-1}\,e^{-e}\,\Gamma(n+1,d\,z)\right)(1-\nu \bmod 2) + 2^{-2\,n-\nu-2}\,i^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2\,(\nu-2\,s)^2}{4\,(f\,(\nu-2\,s)-d)}+g\,(\nu-2\,s)-e+\frac{1}{2}\,i\,\pi\,(\nu-1)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d}}$$

$$\left.\left.(f\,(v-2\,s)-d)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d)\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d)}\right)\right)\right)$$

$$(f\,(v-2\,s)-d)^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d+f\,(v-2\,s))}+g\,(v-2\,s)+e+\frac{1}{2}\,i\,\pi\,(v+1)}\,(d+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}\,(d+f\,(v-2\,s))\,\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d-f\,(v-2\,s))}-g\,(v-2\,s)-e-\frac{1}{2}\,i\,\pi\,(v+1)}\,(-d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-d-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}-g\,(v-2\,s)+e+\frac{1}{2}i\,\pi\,(1-v)}\,(d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d-f\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b\,z^r)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n \sinh(b z^2) \sinh^\nu(c z^2 + f z + g) \, dz = i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left((b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - (-b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right) \right) (1 - \nu \bmod 2) - 2^{-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{i b + 2 i c s - i c \nu} - 4 i g (\nu-2s) + 2\pi(\nu-1) \right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(c(\nu-2s)-b) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(c(\nu-2s)-b)z)^2}{c(\nu-2s)-b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{4(c(\nu-2s)-b)} \right) \right) (c(\nu-2s)-b)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b + 2 i c s - i c \nu} + 4 g i (\nu-2s) - 2\pi(\nu+1) \right)} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(b + c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{b + c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))} \right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b + 2 i c s - i c \nu} + 4 g i (\nu-2s) - 2\pi(\nu+1) \right)} (-b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-b - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(-b-c(\nu-2s))z - f(\nu-2s))^2}{-b - c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c(\nu-2s))z - f(\nu-2s))^2}{4(-b-c(\nu-2s))} \right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{i b + 2 i c s - i c \nu} - 4 i g (\nu-2s) - 2\pi(1-\nu) \right)} (b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(b - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(b-c(\nu-2s))z - f(\nu-2s))^2}{b - c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c(\nu-2s))z - f(\nu-2s))^2}{4(b-c(\nu-2s))} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sinh(b \sqrt{z}) \sinh^\nu(\sqrt{z}\, c + g + f z) \, dz = -i^{-\nu} 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(2(n+1), -b\sqrt{z}) - \Gamma(2(n+1), b\sqrt{z}) \right) (1 - \nu \bmod 2) + 2^{-2n-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} (f(\nu-2s))^{-2(n+1)} \left(e^{\frac{(-b-c(\nu-2s))^2}{4 f(\nu-2s)} - \frac{1}{2} i \pi (\nu+1) - g(\nu-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b - c(\nu-2s))^{-h-j+2n} \left(-b - c(\nu-2s) - 2 f(\nu-2s)\sqrt{z} \right)^{h+j} \right.$$

$$\left(\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((-b-c\,(v-2\,s))\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\sqrt{\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{(b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c\,(v-2\,s))^{-h-j+2\,n}\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b-c\,(v-2\,s))\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\sqrt{\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{(c\,(v-2\,s)-b)^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(v-1)+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-b)^{-h-j+2\,n}\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,s)-b)\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg)+$$

$$e^{-\frac{(b+c(v-2s))^2}{4f(v-2s)}+\frac{1}{2}i\pi(v+1)+g(v-2s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c(v-2s))^{-h-j+2n}\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c(v-2s))\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)+2f(v-2s)\sqrt{-\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2), -\frac{\left(b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh\left(b\, z^r + e\right) \sinh^v\left(c\, z^r + f\, z + g\right)$

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$$\int z^n \sinh\left(b z^2+e\right) \sinh^\nu\left(c z^2+f z+g\right) dz = i^{-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{-e} \left(b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b z^2\right) - e^e \left(-b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -b z^2\right)\right) (1-\nu \bmod 2) - 2^{-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{i b+2 i c s-i c \nu}-4 i g(\nu-2s)+4 i e+2\pi(\nu-1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(c(\nu-2s)-b)z)^{j+1} \left(-\frac{(f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{4(c(\nu-2s)-b)}\right)\right) (c(\nu-2s)-b)^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b+2 i c s-i c \nu}+4 g i(\nu-2s)+4 i e-2\pi(\nu+1)\right)} (b+c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(b+c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-i b+2 i c s-i c \nu}+4 g i(\nu-2s)+4 i e-2\pi(\nu+1)\right)} (-b-c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-b-c(\nu-2s))z-f(\nu-2s))^{j+1} \left(-\frac{(2(-b-c(\nu-2s))z-f(\nu-2s))^2}{-b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-b-c(\nu-2s))z-f(\nu-2s))^2}{4(-b-c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{i b+2 i c s-i c \nu}-4 i g(\nu-2s)+4 i e-2\pi(1-\nu)\right)} (b-c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(b-c(\nu-2s))z-f(\nu-2s))^{j+1} \left(-\frac{(2(b-c(\nu-2s))z-f(\nu-2s))^2}{b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(b-c(\nu-2s))z-f(\nu-2s))^2}{4(b-c(\nu-2s))}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sinh\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+g+f z\right) dz = -i^{-\nu} 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^e \Gamma\left(2(n+1), -b\sqrt{z}\right) - e^{-e} \Gamma\left(2(n+1), b\sqrt{z}\right)\right) (1-\nu \bmod 2) + 2^{-2n-\nu-2} i^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} (f(\nu-2s))^{-2(n+1)}$$

$$\left(e^{\frac{(-b-c(v-2s))^2}{4f(v-2s)}-e-\frac{1}{2}i\pi(v+1)-g(v-2s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-b-c(v-2s))^{-h-j+2n}\left(-b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(-b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-b-c(v-2s))\left(-b-c(v-2s)-\right.\right.$$

$$\left.2f(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-2f(v-2s)$$

$$\left.\sqrt{\frac{\left(-b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)+$$

$$e^{\frac{(b-c(v-2s))^2}{4f(v-2s)}+e+\frac{1}{2}i\pi(1-v)-g(v-2s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b-c(v-2s))^{-h-j+2n}\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b-c(v-2s))\left(b-c(v-2s)-\right.\right.$$

$$\left.2f(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-2f(v-2s)$$

$$\left.\sqrt{\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)+$$

$$e^{-\frac{(c(v-2s)-b)^2}{4f(v-2s)}-e+\frac{1}{2}i\pi(v-1)+g(v-2s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2s)-b)^{-h-j+2n}\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c(v-2s)-b)\left(-b+c(v-2s)+2f(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+2\,f\,(v-2\,s)\,\sqrt{-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg)+$$

$$e^{-\frac{(b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e+\frac{1}{2}\,i\,\pi\,(v+1)+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,s))^{-h-j+2\,n}\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)+2\,f\,(v-2\,s)\,\sqrt{-\frac{\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,\sinh\left(b\,z^r+d\,z\right)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sinh\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = -i^{\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1}\, e^{-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + 2 b z)^2}{4 b} \right) - (-b)^{-n-1}\, e^{\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d - 2 b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d - 2 b z)^2}{4 b} \right) \right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-(-1)^{\nu}\, e^{g (2 s - \nu) - \frac{(f (2 s - \nu) - d)^2}{4 (c (2 s - \nu) - b)}} \left(\sum_{j=0}^{n} 2^{j-n} (d - f (2 s - \nu))^{n-j} (-d + f (2 s - \nu) + 2 (c (2 s - \nu) - b) z)^{j+1} \left(-\frac{(-d + f (2 s - \nu) + 2 (c (2 s - \nu) - b) z)^2}{c (2 s - \nu) - b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f (2 s - \nu) + 2 (c (2 s - \nu) - b) z)^2}{4 (c (2 s - \nu) - b)} \right) \right) (c (2 s - \nu) - b)^{-n-1} + (-1)^{\nu}\, e^{g (2 s - \nu) - \frac{(d + f (2 s - \nu))^2}{4 (b + c (2 s - \nu))}} (b + c (2 s - \nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f (2 s - \nu))^{n-j} (d + f (2 s - \nu) + 2 (b + c (2 s - \nu)) z)^{j+1} \left(-\frac{(d + f (2 s - \nu) + 2 (b + c (2 s - \nu)) z)^2}{b + c (2 s - \nu)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f (2 s - \nu) + 2 (b + c (2 s - \nu)) z)^2}{4 (b + c (2 s - \nu))} \right) - e^{g (\nu - 2 s) - \frac{(f (\nu - 2 s) - d)^2}{4 (c (\nu - 2 s) - b)}} (c (\nu - 2 s) - b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d - f (\nu - 2 s))^{n-j} (-d + f (\nu - 2 s) + 2 (c (\nu - 2 s) - b) z)^{j+1} \left(-\frac{(-d + f (\nu - 2 s) + 2 (c (\nu - 2 s) - b) z)^2}{c (\nu - 2 s) - b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d + f (\nu - 2 s) + 2 (c (\nu - 2 s) - b) z)^2}{4 (c (\nu - 2 s) - b)} \right) + e^{g (\nu - 2 s) - \frac{(d + f (\nu - 2 s))^2}{4 (b + c (\nu - 2 s))}} (b + c (\nu - 2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f (\nu - 2 s))^{n-j} (d + f (\nu - 2 s) + 2 (b + c (\nu - 2 s)) z)^{j+1} \left(-\frac{(d + f (\nu - 2 s) + 2 (b + c (\nu - 2 s)) z)^2}{b + c (\nu - 2 s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d + f (\nu - 2 s) + 2 (b + c (\nu - 2 s)) z)^2}{4 (b + c (\nu - 2 s))} \right) \right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sinh\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g + f\, z\right) dz = 2^{-2n-\nu-2}\, i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{-\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, b^{-h-j+2n} \left(b + 2d\sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\left(b + 2d\sqrt{z}\right)\right.\right.$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b + 2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b + 2d\sqrt{z}\right)^2}{4d}\right)\right) -$$

$$e^{\frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\left(-b - 2d\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b - 2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b - 2d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b - 2d\sqrt{z}\right)^2}{4d}\right)\right)\right)$$

$$d^{-2n-2} + 2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu+1} e^{g(2k-\nu) - \frac{(c(2k-\nu)-b)^2}{4(f(2k-\nu)-d)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(2k-\nu) - b)^{-h-j+2n}\right.\right.$$

$$\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{f(2k-\nu) - d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((c(2k-\nu) - b)\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{4(f(2k-\nu) - d)}\right) + 2$$

$$\sqrt{-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{f(2k-\nu) - d}}\, (f(2k-\nu) - d)$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(2k-v)+2(f(2k-v)-d)\sqrt{z}\right)^2}{4(f(2k-v)-d)}\right)\Bigg)\Bigg)(f(2k-v)-d)^{-2n-2}+$$

$$(-1)^v e^{g(2k-v)-\frac{(b+c(2k-v))^2}{4(d+f(2k-v))}}(d+f(2k-v))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(2k-v))^{-h-j+2n}$$

$$\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(2k-v))\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\Bigg)+2\sqrt{-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}}$$

$$(d+f(2k-v))\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\right)\Bigg)-$$

$$e^{g(v-2k)-\frac{(c(v-2k)-b)^2}{4(f(v-2k)-d)}}(f(v-2k)-d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2k)-b)^{-h-j+2n}$$

$$\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c(v-2k)-b)\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\Bigg)+$$

$$2\sqrt{-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}}(f(v-2k)-d)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\ -\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\Bigg)\Bigg)+$$

$$e^{g(v-2k)-\frac{(b+c(v-2k))^2}{4(d+f(v-2k))}}(d+f(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c(v-2k))^{-h-j+2n}$$

$$\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{d+f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(v-2k))\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{4(d+f(v-2k))}\Bigg)+2\sqrt{-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{d+f(v-2k)}}$$

$$(d+f(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{4(d+f(v-2k))}\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sinh(b z^r + d z + e) \sinh^v(c z^r + f z + g)$

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$$\int z^n \sinh\left(b z^2 + d z + e\right) \sinh^\nu\left(c z^2 + f z + g\right) dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d + 2 b z)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - (-b)^{-n-1} e^{\frac{d^2}{4b}-e} \sum_{j=0}^{n} 2^{j-n} d^{n-j} (-d - 2 b z)^{j+1} \left(\frac{(-d-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d-2bz)^2}{4b}\right)\right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{(f(2s-\nu)-d)^2}{4(c(2s-\nu)-b)}-e+g(2s-\nu)} (c(2s-\nu)-b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d - f(2s-\nu))^{n-j} (-d + f(2s-\nu) + 2(c(2s-\nu)-b) z)^{j+1} \left(-\frac{(-d+f(2s-\nu)+2(c(2s-\nu)-b)z)^2}{c(2s-\nu)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f(2s-\nu)+2(c(2s-\nu)-b)z)^2}{4(c(2s-\nu)-b)}\right) + (-1)^\nu e^{-\frac{(d+f(2s-\nu))^2}{4(b+c(2s-\nu))}+e+g(2s-\nu)} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(2s-\nu))^{n-j} (d + f(2s-\nu) + 2(b + c(2s-\nu)) z)^{j+1} \left(-\frac{(d+f(2s-\nu)+2(b+c(2s-\nu))z)^2}{b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(2s-\nu)+2(b+c(2s-\nu))z)^2}{4(b+c(2s-\nu))}\right) - e^{-\frac{(f(\nu-2s)-d)^2}{4(c(\nu-2s)-b)}-e+g(\nu-2s)} (c(\nu-2s)-b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d - f(\nu-2s))^{n-j} (-d + f(\nu-2s) + 2(c(\nu-2s)-b) z)^{j+1} \left(-\frac{(-d+f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{c(\nu-2s)-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-d+f(\nu-2s)+2(c(\nu-2s)-b)z)^2}{4(c(\nu-2s)-b)}\right) + e^{-\frac{(d+f(\nu-2s))^2}{4(b+c(\nu-2s))}+e+g(\nu-2s)} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d - f(\nu-2s))^{n-j} (d + f(\nu-2s) + 2(b + c(\nu-2s)) z)^{j+1} \left(-\frac{(d+f(\nu-2s)+2(b+c(\nu-2s))z)^2}{b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(\nu-2s)+2(b+c(\nu-2s))z)^2}{4(b+c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sinh\left(\sqrt{z}\, b + e + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g + f\, z\right) dz = 2^{-2n-\nu-2}\, i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{e - \frac{b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, b^{-h-j+2n} \left(b + 2d\sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\left(b + 2d\sqrt{z}\right) \right.\right.$$

$$\left. \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b + 2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}}\; d\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b + 2d\sqrt{z}\right)^2}{4d}\right)\right) -$$

$$e^{\frac{b^2}{4d} - e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(-b - 2d\sqrt{z}\right)^{h+j} \left(\frac{\left(-b - 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\left(-b - 2d\sqrt{z}\right) \right.$$

$$\left.\left. \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b - 2d\sqrt{z}\right)^2}{4d}\right) - 2d\sqrt{\frac{\left(-b - 2d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b - 2d\sqrt{z}\right)^2}{4d}\right)\right)\right)$$

$$d^{-2n-2} + 2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu+1}\, e^{-\frac{(c(2k-\nu)-b)^2}{4(f(2k-\nu)-d)} - e + g(2k-\nu)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(2k-\nu) - b)^{-h-j+2n} \right.\right.$$

$$\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{f(2k-\nu) - d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((c(2k-\nu) - b)\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{4(f(2k-\nu) - d)}\right) + 2$$

$$\sqrt{-\frac{\left(-b + c(2k-\nu) + 2(f(2k-\nu) - d)\sqrt{z}\right)^2}{f(2k-\nu) - d}}\; (f(2k-\nu) - d)$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b+c(2k-v)+2(f(2k-v)-d)\sqrt{z}\right)^2}{4(f(2k-v)-d)}\right)\Bigg)\Bigg)(f(2k-v)-d)^{-2n-2}+$$

$$(-1)^v e^{-\frac{(b+c(2k-v))^2}{4(d+f(2k-v))}+e+g(2k-v)}(d+f(2k-v))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(2k-v))^{-h-j+2n}$$

$$\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(2k-v))\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\Bigg)+2\sqrt{-\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{d+f(2k-v)}}$$

$$(d+f(2k-v))\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^2}{4(d+f(2k-v))}\right)\Bigg)-$$

$$e^{-\frac{(c(v-2k)-b)^2}{4(f(v-2k)-d)}-e+g(v-2k)}(f(v-2k)-d)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2k)-b)^{-h-j+2n}$$

$$\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((c(v-2k)-b)\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\Bigg)+$$

$$2\sqrt{-\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{f(v-2k)-d}}\;(f(v-2k)-d)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2), -\frac{\left(-b+c(v-2k)+2(f(v-2k)-d)\sqrt{z}\right)^2}{4(f(v-2k)-d)}\Bigg)\Bigg)+$$

$$e^{-\frac{(b+c(v-2k))^2}{4(d+f(v-2k))}+e+g(v-2k)}(d+f(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(v-2k))^{-h-j+2n}$$

$$\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{d+f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c(v-2k))\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{4(d+f(v-2k))}\Bigg)+2\sqrt{-\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{d+f(v-2k)}}$$

$$(d+f(v-2k))\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+c(v-2k)+2(d+f(v-2k))\sqrt{z}\right)^2}{4(d+f(v-2k))}\right)\Bigg)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving product of powers of two direct functions and a power function

Involving $z^{\alpha-1}\sinh^{\mu}(c\,z)\sinh^{v}(a\,z)$

01.19.21.2029.01

$$\int z^{\alpha-1}\sinh^m(c\,z)\sinh^v(a\,z)\,dz = \frac{i^{v-m}\,2^{-m-v}\,z^{\alpha}\,(1-m \bmod 2)(1-v \bmod 2)}{\alpha}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} - 2^{-m-v}z^{\alpha}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}e^{\frac{i\pi v}{2}}\binom{m}{k}\left(\Gamma(\alpha, c(m-2k)z)(c(m-2k)z)^{-\alpha}+e^{i m\pi}((2ck-cm)z)^{-\alpha}\Gamma(\alpha,(2ck-cm)z)\right)-i^{-m}2^{-m-v}z^{\alpha}$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\Gamma(\alpha,-a(v-2s)z)(-a(v-2s)z)^{-\alpha}+e^{i\pi v}((av-2as)z)^{-\alpha}\Gamma(\alpha,(av-2as)z)\right)+$$

$$2^{-m-v}z^{\alpha}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Big(-e^{i\pi v}\Gamma(\alpha,(-2ck+cm-2as+av)z)((-2ck+cm-2as+av)z)^{-\alpha}-$$

$$e^{i\pi m+i\pi v}((2ck-cm-2as+av)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-2as+av)z)-$$
$$((-2ck+cm+2as-av)z)^{-\alpha}\Gamma(\alpha,(-2ck+cm+2as-av)z)-$$
$$e^{i m\pi}((2ck-cm+2as-av)z)^{-\alpha}\Gamma(\alpha,(2ck-cm+2as-av)z)\Big)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2030.01

$$\int z^n \sinh^\mu(c\,z)\sinh^\nu(a\,z)\,dz = \left(1-e^{2\,c\,z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sinh^\mu(c\,z)\left(\frac{i}{2}\right)^\nu \sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2\,c\,z}\right)+\left(1-e^{2\,c\,z}\right)^{-\mu} n!\sinh^\mu(c\,z)\left(\frac{i}{2}\right)^\nu \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(i^\nu e^{-a(\nu-2k)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-a(\nu-2k)-c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{a(-2k+\nu)+c\,\mu}{2c},\ldots,-\frac{a(-2k+\nu)+c\,\mu}{2c},-\mu;1-\frac{a(-2k+\nu)+c\,\mu}{2c},\ldots,1-\frac{a(-2k+\nu)+c\,\mu}{2c};e^{2\,c\,z}\right)+i^{-\nu}e^{a(\nu-2k)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(a(\nu-2k)-c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{a(-2k+\nu)-c\,\mu}{2c},\ldots,\frac{a(-2k+\nu)-c\,\mu}{2c},-\mu;1+\frac{a(-2k+\nu)-c\,\mu}{2c},\ldots,1+\frac{a(-2k+\nu)-c\,\mu}{2c};e^{2\,c\,z}\right)\right)\;/;\;\nu\in\mathbb{N}\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sinh^\mu(c\,z)\sinh^\nu(a\,z+b)$

01.19.21.2031.01

$$\int z^{\alpha-1}\sinh^m(c\,z)\sinh^\nu(b+a\,z)\,dz = \frac{i^{\nu-m}2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu}z^\alpha i^\nu\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}\binom{m}{k}\left(\Gamma(\alpha,c(m-2k)z)(c(m-2k)z)^{-\alpha}+e^{i\,m\,\pi}((2ck-cm)z)^{-\alpha}\Gamma(\alpha,(2ck-cm)z)\right) - i^{-m}2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(e^{2b\nu}\Gamma(\alpha,-a(\nu-2s)z)(-a(\nu-2s)z)^{-\alpha}+e^{4bs+i\pi\nu}((a\nu-2as)z)^{-\alpha}\Gamma(\alpha,(a\nu-2as)z)\right)+2^{-m-\nu}z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(-e^{4bs+i\pi\nu}\Gamma(\alpha,(-2ck+cm-2as+a\nu)z)((-2ck+cm-2as+a\nu)z)^{-\alpha}-e^{i\pi m+4bs+i\pi\nu}((2ck-cm-2as+a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-2as+a\nu)z)+e^{2b\nu}\left(-\Gamma(\alpha,(-2ck+cm+2as-a\nu)z)((-2ck+cm+2as-a\nu)z)^{-\alpha}-e^{i\,m\,\pi}((2ck-cm+2as-a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm+2as-a\nu)z)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.2032.01

$$\int z^n \sinh^\mu(c z) \sinh^\nu(b+a z)\,dz = 2^{-\nu} i^{-\nu} \left(1-e^{-2 c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2) \sinh^\mu(c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c\mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{\mu}{2}, \ldots, -\frac{\mu}{2}, -\mu; 1-\frac{\mu}{2}, \ldots, 1-\frac{\mu}{2}; e^{-2 c z}\right) + 2^{-\nu} i^{-\nu} \left(1-e^{-2 c z}\right)^{-\mu} n! \sinh^\mu(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2 b k+2 a z k-b \nu-a \nu z-\frac{i\pi\nu}{2}} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c\mu - a(\nu-2k))^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{2 a k-a\nu+c\mu}{2c}, \ldots, -\frac{2 a k-a\nu+c\mu}{2c}, -\mu; 1-\frac{2 a k-a\nu+c\mu}{2c}, \ldots, 1-\frac{2 a k-a\nu+c\mu}{2c}; e^{-2 c z}\right) + e^{\frac{i\pi\nu}{2}+b(\nu-2k)+a(\nu-2k)z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a(\nu-2k)+c\mu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{a(\nu-2k)+c\mu}{2c}, \ldots, -\frac{a(\nu-2k)+c\mu}{2c}, -\mu; 1-\frac{a(\nu-2k)+c\mu}{2c}, \ldots, 1-\frac{a(\nu-2k)+c\mu}{2c}; e^{-2 c z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2033.01

$$\int z^n \sinh^m(c z) \sinh^\nu(b+a z)\,dz = 2^{-m} i^{-m} \left(1-e^{-2(b+a z)}\right)^{-\nu} \binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2) \sinh^\nu(b+a z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1-\frac{\nu}{2}, \ldots, 1-\frac{\nu}{2}; e^{-2(b+a z)}\right) + 2^{-m} \left(1-e^{-2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b+a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2 c k z - c m z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\nu - c(m-2k))^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{a\nu-c(m-2k)}{2a}, \ldots, -\frac{a\nu-c(m-2k)}{2a}, -\nu; 1-\frac{a\nu-c(m-2k)}{2a}, \ldots, 1-\frac{a\nu-c(m-2k)}{2a}; e^{-2(b+a z)}\right) + e^{c m z-2 c k z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c(m-2k)+a\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{c(m-2k)+a\nu}{2a}, \ldots, -\frac{c(m-2k)+a\nu}{2a}, -\nu; 1-\frac{c(m-2k)+a\nu}{2a}, \ldots, 1-\frac{c(m-2k)+a\nu}{2a}; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sinh^\mu(c z+d) \sinh^\nu(a z+b)$

01.19.21.2034.01

$$\int z^{\alpha-1}\sinh^m(c\,z+d)\sinh^\nu(a\,z+b)\,dz = \frac{i^{\nu-m}\,2^{-m-\nu}\,z^\alpha\,(1-m\bmod 2)\,(1-\nu\bmod 2)}{\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} - 2^{-m-\nu}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}\,e^{2\,d\,k+d\,m+\frac{i\,\pi\,\nu}{2}}\binom{m}{k}\left(e^{-2\,d\,m}\,\Gamma(\alpha,\,c\,(m-2\,k)\,z)\,(c\,(m-2\,k)\,z)^{-\alpha}+e^{i\,m\,\pi-4\,d\,k}\,((2\,c\,k-c\,m)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,c\,k-c\,m)\,z)\right) - i^{-m}\,2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\,e^{-2\,b\,s-b\,\nu}\binom{\nu}{s}\left(e^{2\,b\,\nu}\,\Gamma(\alpha,\,-a\,(\nu-2\,s)\,z)\,(-a\,(\nu-2\,s)\,z)^{-\alpha}+e^{4\,b\,s+i\,\pi\,\nu}\,((a\,\nu-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a\,\nu-2\,a\,s)\,z)\right)+2^{-m-\nu}\,z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k-m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\,e^{2\,d\,k+d\,m-2\,b\,s-b\,\nu}\binom{\nu}{s}\Big(-e^{-2\,d\,m+4\,b\,s+i\,\pi\,\nu}\,\Gamma(\alpha,\,(-2\,c\,k+c\,m-2\,a\,s+a\,\nu)\,z)\,((-2\,c\,k+c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha} - e^{-4\,d\,k+4\,b\,s+i\,\pi\,\nu+i\,m\,\pi}\,((2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,c\,k-c\,m-2\,a\,s+a\,\nu)\,z) + e^{2\,b\,\nu}\left(-e^{-2\,d\,m}\,\Gamma(\alpha,\,(-2\,c\,k+c\,m+2\,a\,s-a\,\nu)\,z)\,((-2\,c\,k+c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha} - e^{i\,m\,\pi-4\,d\,k}\,((2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,c\,k-c\,m+2\,a\,s-a\,\nu)\,z)\right)\Big)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2035.01

$$\int z^n\sinh^\mu(d+c\,z)\sinh^\nu(b+a\,z)\,dz = 2^{-\nu}\,i^{-\nu}\left(1-e^{-2\,(d+c\,z)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}\,n!\,(1-\nu\bmod 2)\sinh^\mu(d+c\,z)\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\,\ldots,\,-\frac{\mu}{2},\,-\mu;\,1-\frac{\mu}{2},\,\ldots,\,1-\frac{\mu}{2};\,e^{-2\,(d+c\,z)}\right)+2^{-\nu}\,i^{-\nu}\left(1-e^{-2\,(d+c\,z)}\right)^{-\mu}n!\,\sinh^\mu(d+c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{2\,b\,k+2\,a\,z\,k-b\,\nu-a\,\nu\,z-\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(c\,\mu-a\,(\nu-2\,k))^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{2\,a\,k-a\,\nu+c\,\mu}{2\,c},\,\ldots,\,-\frac{2\,a\,k-a\,\nu+c\,\mu}{2\,c},\,-\mu;\,1-\frac{2\,a\,k-a\,\nu+c\,\mu}{2\,c},\,\ldots,\,1-\frac{2\,a\,k-a\,\nu+c\,\mu}{2\,c};\,e^{-2\,(d+c\,z)}\right)+e^{\frac{i\,\pi\,\nu}{2}+b\,(\nu-2\,k)+a\,(\nu-2\,k)\,z}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(a\,(\nu-2\,k)+c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{a\,(\nu-2\,k)+c\,\mu}{2\,c},\,\ldots,\,-\frac{a\,(\nu-2\,k)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{a\,(\nu-2\,k)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{a\,(\nu-2\,k)+c\,\mu}{2\,c};\,e^{-2\,(d+c\,z)}\right)\Bigg)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

Involving $z^n\sinh^m(b\,z)\sinh^\nu(c\,z^r)$

01.19.21.2036.01

$$\int z^n \sinh^m(b z) \sinh^\nu(c z^2) \, dz = -i^{-m-\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i \pi \nu}{2}} \Gamma\left(\frac{n+1}{2}, -c(\nu-2k) z^2\right) \left(-c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i \pi \nu} \left(c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2k) z^2\right) \right) \right)$$

$$z^{n+1} + \frac{(2i)^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n (2i)^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i m \pi} \Gamma(n+1, b(m-2k) z) (-b(m-2k))^{-n-1} + e^{\frac{i m \pi}{2}} (b(m-2k))^{-n-1} \Gamma(n+1, -b(m-2k) z) \right) -$$

$$i^{-m-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{b^2 (m-2k)^2}{4 c (\nu-2s)} - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} \right.$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (b(m-2k))^{n-j} (-b(m-2k) - 2c(\nu-2s) z)^{j+1} \left(\frac{(-b(m-2k) - 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-b(m-2k) - 2c(\nu-2s) z)^2}{4 c(\nu-2s)} \right) \right) (-c(\nu-2s))^{-n-1} + e^{\frac{b^2 (m-2k)^2}{4 c (\nu-2s)} - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}}$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (-b(m-2k))^{n-j} (b(m-2k) - 2c(\nu-2s) z)^{j+1} \left(\frac{(b(m-2k) - 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(b(m-2k) - 2c(\nu-2s) z)^2}{4 c(\nu-2s)} \right) \right) (-c(\nu-2s))^{-n-1} + e^{-\frac{b^2 (m-2k)^2}{4 c (\nu-2s)} + \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (b(m-2k))^{n-j} (2c(\nu-2s) z - b(m-2k))^{j+1} \left(-\frac{(2c(\nu-2s) z - b(m-2k))^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2c(\nu-2s) z - b(m-2k))^2}{4 c(\nu-2s)} \right) + e^{-\frac{b^2 (m-2k)^2}{4 c (\nu-2s)} + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-b(m-2k))^{n-j} (b(m-2k) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(b(m-2k) + 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b(m-2k) + 2c(\nu-2s) z)^2}{4 c(\nu-2s)} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2037.01

$$\int z^n \sinh^m(b z) \sinh^\nu(c\sqrt{z})\, dz == \frac{i^{m-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + \frac{1}{b} \Bigg(i^{-\nu} 2^{-m-\nu} z^n \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \frac{1}{2k-m} \left((-1)^k \binom{m}{k} \left(e^{i m \pi} (b(m-2k)z)^{-n} \Gamma(n+1, b(m-2k)z) - (b(2k-m)z)^{-n} \Gamma(n+1, b(2k-m)z) \right) \right) \Bigg) -$$

$$i^m (-1)^\nu 2^{-m-\nu+1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(2(n+1), (c\nu - 2ck)\sqrt{z}\right) \left((c\nu - 2ck)\sqrt{z}\right)^{-2(n+1)} + \right.$$

$$\left. (-1)^\nu \left((2ck - c\nu)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (2ck - c\nu)\sqrt{z}\right) \right) + (-1)^{m+\nu} 2^{-m-2n-\nu-1}$$

$$\sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{-\frac{c^2 (\nu-2s)^2}{4b(2k-m)}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(\nu-2s))^{-h-j+2n} \left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right)^2}{b(2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2b(2k-m)$$

$$\sqrt{-\frac{\left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right)^2}{b(2k-m)}} \; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right)^2}{4b(2k-m)} \right) -$$

$$c(\nu-2s)\left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2b(2k-m)\sqrt{z} - c(\nu-2s)\right)^2}{4b(2k-m)} \right) \Bigg) \Bigg)$$

$$(b(2k-m))^{-2n-2} + (-1)^\nu e^{-\frac{c^2 (\nu-2s)^2}{4b(2k-m)}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2s))^{-h-j+2n} \left(2b\sqrt{z}(2k-m) + c(\nu-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2b\sqrt{z}(2k-m) + c(\nu-2s)\right)^2}{b(2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c(\nu-2s)\left(2b\sqrt{z}(2k-m) + c(\nu-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2b\sqrt{z}(2k-m) + c(\nu-2s)\right)^2}{4b(2k-m)} \right) + 2b(2k-m)$$

$$\sqrt{-\frac{\left(2\,b\,\sqrt{z}\,\,(2\,k-m)+c\,(v-2\,s)\right)^2}{b\,(2\,k-m)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,b\,\sqrt{z}\,\,(2\,k-m)+c\,(v-2\,s)\right)^2}{4\,b\,(2\,k-m)}\right)\Bigg)\Bigg)$$

$$(b\,(2\,k-m))^{-2\,n-2}+(-1)^m\,e^{-\frac{c^2\,(v-2\,s)^2}{4\,b\,(m-2\,k)}}\,(b\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,b\,(m-2\,k)\,\sqrt{-\frac{\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)\right)+$$

$$(-1)^{m+v}\,e^{-\frac{c^2\,(v-2\,s)^2}{4\,b\,(m-2\,k)}}\,(b\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)+\right.$$

$$2\,b\,(m-2\,k)\,\sqrt{-\frac{\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,b\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(d z + e) \sinh^v(c z^r)$

01.19.21.2038.01

$$\int z^n \sinh^m(e+d\,z)\sinh^\nu(c\,z^2)\,dz = -2^{-m-\nu-1}\,i^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\!\left(\frac{n+1}{2},-c\,(\nu-2k)\,z^2\right)\left(-c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-\frac{1}{2}i\pi\nu}\left(c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},c\,(\nu-2k)\,z^2\right)\right)+$$
$$\frac{i^{-m-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1}+(-1)^n\,2^{-m-\nu}\,i^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}i\pi m-e\,(m-2k)}\,\Gamma(n+1,d\,(m-2k)\,z)\,(-d\,(m-2k))^{-n-1}+e^{\frac{i\pi m}{2}+e\,(m-2k)}\,(d\,(m-2k))^{-n-1}\,\Gamma(n+1,-d\,(m-2k)\,z)\right)-2^{-m-\nu-1}\,i^{-m-\nu}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}-e\,(m-2k)-\frac{i\pi\nu}{2}-\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2k))^{n-j}\,(-d\,(m-2k)-2c\,(\nu-2s)\,z)^{j+1}\right.\right.$$
$$\left.\left(\frac{(-d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(-d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)$$
$$(-c\,(\nu-2s))^{-n-1}+e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}+e\,(m-2k)-\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-d\,(m-2k))^{n-j}\,(d\,(m-2k)-2c\,(\nu-2s)\,z)^{j+1}\right.$$
$$\left.\left(\frac{(d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)$$
$$(-c\,(\nu-2s))^{-n-1}+e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}-e\,(m-2k)+\frac{i\pi\nu}{2}-\frac{i m\pi}{2}}\,(c\,(\nu-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2k))^{n-j}\,(2c\,(\nu-2s)\,z-d\,(m-2k))^{j+1}\left(-\frac{(2c\,(\nu-2s)\,z-d\,(m-2k))^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2c\,(\nu-2s)\,z-d\,(m-2k))^2}{4c\,(\nu-2s)}\right)+e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}+e\,(m-2k)+\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\,(c\,(\nu-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}\,(-d\,(m-2k))^{n-j}\,(d\,(m-2k)+2c\,(\nu-2s)\,z)^{j+1}\left(-\frac{(d\,(m-2k)+2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,(m-2k)+2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)\Big/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2039.01

$$\int z^n \sinh^m(e+d\,z)\sinh^\nu\!\left(c\sqrt{z}\right)dz = \frac{i^{-m-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\,2^{-m-\nu}\,i^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{-\frac{1}{2}i\pi m-e(m-2k)}\,\Gamma(n+1,\,d(m-2k)z)\,(-d(m-2k))^{-n-1} + e^{\frac{i\pi m}{2}+e(m-2k)}\,(d(m-2k))^{-n-1}\,\Gamma(n+1,\,-d(m-2k)z)\right) +$$

$$2^{-m-\nu+1}\,i^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}$$

$$\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\!\left(2(n+1),\,-c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2}i\pi\nu}\,\Gamma\!\left(2(n+1),\,c(\nu-2k)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-\nu-1}\,i^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2(\nu-2s)^2}{4d(m-2k)}-e(m-2k)-\frac{i\pi\nu}{2}-\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(\nu-2s))^{-h-j+2n}\right.\right.$$

$$\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)^{h+j}\left(\frac{\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(-c(\nu-2s)\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)^2}{4d(m-2k)}\right) -\right.$$

$$2d(m-2k)\sqrt{\frac{\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)^2}{d(m-2k)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(-2d\sqrt{z}\,(m-2k)-c(\nu-2s)\right)^2}{4d(m-2k)}\right)\right)\right)(-d(m-2k))^{-2(n+1)} +$$

$$e^{\frac{c^2(\nu-2s)^2}{4d(m-2k)}-e(m-2k)+\frac{i\pi\nu}{2}-\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(\nu-2s))^{-h-j+2n}\left(c(\nu-2s)-2d(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(c(\nu-2s)-2d(m-2k)\sqrt{z}\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c(\nu-2s)\left(c(\nu-2s)-2d(m-2k)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(c(v-2s)-2d(m-2k)\sqrt{z}\right)^2}{4d(m-2k)}\right) - 2d(m-2k)$$

$$\sqrt{\frac{\left(c(v-2s)-2d(m-2k)\sqrt{z}\right)^2}{d(m-2k)}}\ \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(c(v-2s)-2d(m-2k)\sqrt{z}\right)^2}{4d(m-2k)}\right)\Bigg)\Bigg)\Bigg)$$

$$(-d(m-2k))^{-2(n+1)} + e^{-\frac{c^2(v-2s)^2}{4d(m-2k)}+e(m-2k)-\frac{i\pi v}{2}+\frac{i m\pi}{2}}\,(d(m-2k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(v-2s))^{-h-j+2n}\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2d(m-2k)$$

$$\sqrt{-\frac{\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)^2}{d(m-2k)}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)^2}{4d(m-2k)}\right) -$$

$$c(v-2s)\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2d(m-2k)\sqrt{z}-c(v-2s)\right)^2}{4d(m-2k)}\right)\Bigg) +$$

$$e^{-\frac{c^2(v-2s)^2}{4d(m-2k)}+e(m-2k)+\frac{i\pi v}{2}+\frac{i m\pi}{2}}\,(d(m-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2s))^{-h-j+2n}$$

$$\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)^{h+j}\left(-\frac{\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c(v-2s)\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)^2}{4d(m-2k)}\right) +$$

$$2d(m-2k)\sqrt{-\frac{\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)^2}{d(m-2k)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2d\sqrt{z}\,(m-2k)+c(v-2s)\right)^2}{4d(m-2k)}\right)\Bigg)\Bigg)\Bigg) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh^m(b z^r)\sinh^v(c z^r)$

01.19.21.2040.01

$$\int z^{\alpha-1}\sinh^m(b z^r)\sinh^v(c z^r)\,dz = \frac{i^{m-v}\,2^{-m-v}\,z^\alpha \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{\alpha} - \frac{i^{-v}\,2^{-m-v}\,z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k} \left((-1)^m\,\Gamma\!\left(\frac{\alpha}{r},(b m-2 b k) z^r\right)((b m-2 b k) z^r)^{-\frac{\alpha}{r}} + ((2 b k-b m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2 b k-b m) z^r\right)\right) - \frac{i^m\,2^{-m-v}\,z^\alpha}{r}\binom{m}{\frac{m}{2}} (1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,\Gamma\!\left(\frac{\alpha}{r},(c v-2 c k) z^r\right)((c v-2 c k) z^r)^{-\frac{\alpha}{r}} + ((2 c k-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2 c k-c v) z^r\right)\right) - \frac{2^{-m-v}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^{m+v}\,\Gamma\!\left(\frac{\alpha}{r},(-2 b k+b m-2 c s+c v) z^r\right)((-2 b k+b m-2 c s+c v) z^r)^{-\frac{\alpha}{r}} + (-1)^v((2 b k-b m-2 c s+c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2 b k-b m-2 c s+c v) z^r\right) + (-1)^m((-2 b k+b m+2 c s-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(-2 b k+b m+2 c s-c v) z^r\right) + ((2 b k-b m+2 c s-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2 b k-b m+2 c s-c v) z^r\right)\right) /;\ m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

01.19.21.2041.01

$$\int z^n \sinh^m(b z^2) \sinh^\nu(c z^2)\, dz = \frac{i^{-m-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} - 2^{-m-\nu-1}\, i^{-m-\nu}\, z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$
$$\left(e^{\frac{i m \pi}{2}}\, \Gamma\!\left(\frac{n+1}{2}, -b(m-2k) z^2\right) \left(-b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{i m \pi}{2}} \left(b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, b(m-2k) z^2\right)\right) -$$
$$2^{-m-\nu-1}\, i^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i \pi \nu}{2}}\, \Gamma\!\left(\frac{n+1}{2}, -c(\nu-2s) z^2\right) \left(-c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$\left. e^{-\frac{1}{2} i \pi \nu} \left(c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, c(\nu-2s) z^2\right)\right) - 2^{-m-\nu-1}\, i^{-m-\nu}\, z^{n+1}$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{2} i \pi (m-\nu)}\, \Gamma\!\left(\frac{n+1}{2}, (c(\nu-2s) - b(m-2k)) z^2\right) \left((c(\nu-2s) - b(m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$e^{-\frac{1}{2} i \pi (m+\nu)} \left((b(m-2k) + c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (b(m-2k) + c(\nu-2s)) z^2\right) +$$
$$e^{\frac{1}{2} i \pi (m+\nu)} \left((-b(m-2k) - c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (-b(m-2k) - c(\nu-2s)) z^2\right) + e^{-\frac{1}{2} i \pi (m-\nu)}$$
$$\left.\left((b(m-2k) - c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\!\left(\frac{n+1}{2}, (b(m-2k) - c(\nu-2s)) z^2\right)\right) /;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2042.01

$$\int z^n \sinh^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = -2^{-m-\nu+1}\, i^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\, b^{-2(n+1)} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k (m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{\frac{i m\pi}{2}}\Gamma\left(2(n+1), -b(m-2k)\sqrt{z}\right)+e^{-\frac{i m\pi}{2}}\Gamma\left(2(n+1), b(m-2k)\sqrt{z}\right)\right)+ \frac{i^{-m-\nu}\, 2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1} - 2^{-m-\nu+1}\, i^{-m-\nu}\, c^{-2(n+1)}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s(\nu-2s)^{-2(n+1)}\binom{\nu}{s}\left(e^{\frac{i\pi\nu}{2}}\Gamma\left(2(n+1), -c(\nu-2s)\sqrt{z}\right)+e^{-\frac{1}{2}i\pi\nu}\Gamma\left(2(n+1), c(\nu-2s)\sqrt{z}\right)\right)- 2^{-m-\nu+1}\, i^{-m-\nu} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{1}{2}i\pi(m-\nu)}\Gamma\left(2(n+1), (c(\nu-2s)-b(m-2k))\sqrt{z}\right)\left((c(\nu-2s)-b(m-2k))\sqrt{z}\right)^{-2(n+1)}+e^{-\frac{1}{2}i\pi(m+\nu)}\left((b(m-2k)+c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b(m-2k)+c(\nu-2s))\sqrt{z}\right)+e^{\frac{1}{2}i\pi(m+\nu)}\left((-b(m-2k)-c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b(m-2k)-c(\nu-2s))\sqrt{z}\right)+e^{-\frac{1}{2}i\pi(m-\nu)}\left((b(m-2k)-c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b(m-2k)-c(\nu-2s))\sqrt{z}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $z^n \sinh^m(d\, z) \sinh^\nu(c\, z^r + g)$

01.19.21.2043.01

$$\int z^n \sinh^m(d\,z)\sinh^\nu\left(c\,z^2+g\right)dz = -2^{-m-\nu-1}\, i^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}+g(\nu-2k)}\Gamma\left(\frac{n+1}{2}, -c(\nu-2k)z^2\right)\left(-c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}+ e^{-\frac{1}{2}i\pi\nu-g(\nu-2k)}\left(c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c(\nu-2k)z^2\right)\right)\right)z^{n+1}+ \frac{i^{-m-\nu}\, 2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1}+(-1)^n\, 2^{-m-\nu}\, i^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{i m\pi}{2}}\Gamma(n+1, d(m-2k)z)(-d(m-2k))^{-n-1}+e^{\frac{i m\pi}{2}}(d(m-2k))^{-n-1}\Gamma(n+1, -d(m-2k)z)\right)-$$

$$2^{-m-v-1} i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{\frac{d^2 (m-2k)^2}{4c(v-2s)} - g(v-2s) - \frac{i\pi v}{2} - \frac{i m \pi}{2}}$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (d(m-2k))^{n-j} (-d(m-2k) - 2c(v-2s)z)^{j+1} \left(\frac{(-d(m-2k) - 2c(v-2s)z)^2}{c(v-2s)} \right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d(m-2k) - 2c(v-2s)z)^2}{4c(v-2s)} \right) \right) (-c(v-2s))^{-n-1} + e^{\frac{d^2 (m-2k)^2}{4c(v-2s)} - g(v-2s) - \frac{i\pi v}{2} + \frac{i m \pi}{2}}$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (-d(m-2k))^{n-j} (d(m-2k) - 2c(v-2s)z)^{j+1} \left(\frac{(d(m-2k) - 2c(v-2s)z)^2}{c(v-2s)} \right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d(m-2k) - 2c(v-2s)z)^2}{4c(v-2s)} \right) \right) (-c(v-2s))^{-n-1} +$$

$$e^{-\frac{d^2 (m-2k)^2}{4c(v-2s)} + \frac{i\pi v}{2} + g(v-2s) - \frac{i m \pi}{2}} (c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d(m-2k))^{n-j} (2c(v-2s)z - d(m-2k))^{j+1}$$

$$\left(-\frac{(2c(v-2s)z - d(m-2k))^2}{c(v-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2c(v-2s)z - d(m-2k))^2}{4c(v-2s)} \right) +$$

$$e^{-\frac{d^2 (m-2k)^2}{4c(v-2s)} + \frac{i\pi v}{2} + g(v-2s) + \frac{i m \pi}{2}} (c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d(m-2k))^{n-j} (d(m-2k) + 2c(v-2s)z)^{j+1}$$

$$\left(-\frac{(d(m-2k) + 2c(v-2s)z)^2}{c(v-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left. \Gamma\left(\frac{j+1}{2}, -\frac{(d(m-2k) + 2c(v-2s)z)^2}{4c(v-2s)} \right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2044.01

$$\int z^n \sinh^m(d z) \sinh^v\left(\sqrt{z}\, c + g\right) dz =$$

$$\frac{i^{-m-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} i^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m \pi}{2}} \Gamma(n+1, d(m-2k)z)(-d(m-2k))^{-n-1} + e^{\frac{i m \pi}{2}} (d(m-2k))^{-n-1} \Gamma(n+1, -d(m-2k)z) \right) +$$

$$2^{-m-v+1}\, i^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+n} (i\, c\,(v-2k))^{-2(n+1)} \binom{v}{k}$$

$$\left(e^{\frac{i\pi v}{2}+g(v-2k)}\, \Gamma\!\left(2(n+1),\, -c\,(v-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi v - g(v-2k)}\, \Gamma\!\left(2(n+1),\, c\,(v-2k)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-v-1}\, i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{c^2 (v-2s)^2}{4d(m-2k)} - g(v-2s) - \frac{i\pi v}{2} - \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\,(v-2s))^{-h-j+2n} \right.\right.$$

$$\left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right)^{h+j} \left(\frac{\left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(-c\,(v-2s) \left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{\left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right)^2}{4d\,(m-2k)} \right) - \right.$$

$$2d\,(m-2k) \sqrt{\frac{\left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right)^2}{d\,(m-2k)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{\left(-2d\sqrt{z}\,(m-2k) - c\,(v-2s)\right)^2}{4d\,(m-2k)} \right)\right)\right) (-d\,(m-2k))^{-2(n+1)} +$$

$$e^{\frac{c^2 (v-2s)^2}{4d(m-2k)} + g(v-2s) + \frac{i\pi v}{2} - \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(v-2s))^{-h-j+2n} \left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right)^{h+j} \right.$$

$$\left(\frac{\left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\,(v-2s) \left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right) \right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{\left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right)^2}{4d\,(m-2k)} \right) - 2d\,(m-2k)$$

$$\left.\left.\sqrt{\frac{\left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{\left(c\,(v-2s) - 2d\,(m-2k)\sqrt{z}\right)^2}{4d\,(m-2k)} \right)\right)\right)$$

$$(-d\,(m-2k))^{-2(n+1)} + e^{-\frac{c^2 (v-2s)^2}{4d(m-2k)} - g(v-2s) - \frac{i\pi v}{2} + \frac{i m \pi}{2}}\, (d\,(m-2k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,d\,(m-2\,k)$$

$$\sqrt{-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$c\,(v-2\,s)\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2\,s)\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)+$$

$$2\,d\,(m-2\,k)\,\sqrt{-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(d\,z+e)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2045.01

$$\int z^n\,\sinh^m(e+d\,z)\,\sinh^v\left(c\,z^2+g\right)dz=$$

$$-2^{-m-v-1}\,i^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,\Gamma\!\left(\frac{n+1}{2},\,-c\,(v-2\,k)\,z^2\right)\left(-c\,(v-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$e^{-\frac{1}{2} i \pi v - g (v-2k)} \left(c (v-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c (v-2k) z^2\right)\Bigg)\Bigg) z^{n+1} +$$

$$\frac{i^{-m-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} i^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{-\frac{1}{2} i \pi m - e (m-2k)} \Gamma(n+1, d (m-2k) z) (-d (m-2k))^{-n-1} + e^{\frac{i \pi m}{2} + e (m-2k)} (d (m-2k))^{-n-1} \Gamma(n+1, -d (m-2k) z)\right) -$$

$$2^{-m-v-1} i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{\frac{d^2 (m-2k)^2}{4 c (v-2s)} - e (m-2k) - g (v-2s) - \frac{i \pi v}{2} - \frac{i m \pi}{2}}$$

$$\Bigg(\sum_{j=0}^{n} 2^{j-n} (d (m-2k))^{n-j} (-d (m-2k) - 2 c (v-2s) z)^{j+1} \left(\frac{(-d (m-2k) - 2 c (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d (m-2k) - 2 c (v-2s) z)^2}{4 c (v-2s)}\right)\Bigg) (-c (v-2s))^{-n-1} +$$

$$e^{\frac{d^2 (m-2k)^2}{4 c (v-2s)} + e (m-2k) - g (v-2s) - \frac{i \pi v}{2} + \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-d (m-2k))^{n-j} (d (m-2k) - 2 c (v-2s) z)^{j+1}$$

$$\left(\frac{(d (m-2k) - 2 c (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d (m-2k) - 2 c (v-2s) z)^2}{4 c (v-2s)}\right)\Bigg)$$

$$(-c (v-2s))^{-n-1} + e^{-\frac{d^2 (m-2k)^2}{4 c (v-2s)} - e (m-2k) + \frac{i \pi v}{2} + g (v-2s) - \frac{i m \pi}{2}} (c (v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (d (m-2k))^{n-j} (2 c (v-2s) z - d (m-2k))^{j+1} \left(-\frac{(2 c (v-2s) z - d (m-2k))^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2 c (v-2s) z - d (m-2k))^2}{4 c (v-2s)}\right) + e^{-\frac{d^2 (m-2k)^2}{4 c (v-2s)} + e (m-2k) + \frac{i \pi v}{2} + g (v-2s) + \frac{i m \pi}{2}} (c (v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-d (m-2k))^{n-j} (d (m-2k) + 2 c (v-2s) z)^{j+1} \left(-\frac{(d (m-2k) + 2 c (v-2s) z)^2}{c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d (m-2k) + 2 c (v-2s) z)^2}{4 c (v-2s)}\right)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2046.01

$$\int z^n \sinh^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\ c+g\right)dz = \frac{i^{-m-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{n+1} + (-1)^n\,2^{-m-\nu}\,i^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{-\frac{1}{2}i\pi m-e(m-2k)}\,\Gamma(n+1,\,d\,(m-2k)\,z)\,(-d\,(m-2k))^{-n-1} + e^{\frac{i\pi m}{2}+e(m-2k)}\,(d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-d\,(m-2k)\,z)\right)+$$

$$2^{-m-\nu+1}\,i^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}$$

$$\left(e^{\frac{i\pi\nu}{2}+g(\nu-2k)}\,\Gamma\left(2\,(n+1),\,-c\,(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2}i\pi\nu-g(\nu-2k)}\,\Gamma\left(2\,(n+1),\,c\,(\nu-2k)\sqrt{z}\right)\right)+$$

$$2^{-m-2n-\nu-1}\,i^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2(\nu-2s)^2}{4d(m-2k)}-g(\nu-2s)-e(m-2k)-\frac{i\pi\nu}{2}-\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\right.\right.$$

$$\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^{h+j}\left(\frac{\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(-c\,(\nu-2s)\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)-\right.$$

$$2\,d\,(m-2k)\sqrt{\frac{\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{d\,(m-2k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-2\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)\right)\right)(-d\,(m-2k))^{-2(n+1)}+$$

$$e^{\frac{c^2(\nu-2s)^2}{4d(m-2k)}+g(\nu-2s)-e(m-2k)+\frac{i\pi\nu}{2}-\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)-2\,d\,(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(c\,(\nu-2s)-2\,d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(\nu-2s)\left(c\,(\nu-2s)-2\,d\,(m-2k)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(c\,(v-2\,s)-2\,d\,(m-2\,k)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,k)}\right)-2\,d\,(m-2\,k)$$

$$\left.\left.\sqrt{\frac{\left(c\,(v-2\,s)-2\,d\,(m-2\,k)\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(c\,(v-2\,s)-2\,d\,(m-2\,k)\,\sqrt{z}\,\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)$$

$$(-d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-g\,(v-2\,s)+e\,(m-2\,k)-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(d\,(m-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,d\,(m-2\,k)\right.$$

$$\sqrt{-\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$\left.c\,(v-2\,s)\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,(v-2\,s)+e\,(m-2\,k)+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)+\right.$$

$$2\,d\,(m-2\,k)\sqrt{-\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2\,d\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh^m(b z^r)\sinh^v(c z^r+g)$

01.19.21.2047.01

$$\int z^{\alpha-1}\sinh^m(b z^r)\sinh^v(c z^r+g)\,dz = \frac{i^{m-v}\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{\alpha} - \frac{i^{-v}\,2^{-m-v}\,z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,\Gamma\left(\frac{\alpha}{r},(b m-2 b k) z^r\right)((b m-2 b k) z^r)^{-\frac{\alpha}{r}}+((2 b k-b m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2 b k-b m) z^r\right)\right)-$$
$$\frac{i^m\,2^{-m-v}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$
$$\left((-1)^v\,e^{2 g k-g v}\,\Gamma\left(\frac{\alpha}{r},(c v-2 c k) z^r\right)((c v-2 c k) z^r)^{-\frac{\alpha}{r}}+e^{g v-2 g k}\,((2 c k-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2 c k-c v) z^r\right)\right)-\frac{2^{-m-v}\,z^\alpha}{r}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^{m+v}\,e^{2 g s-g v}\,\Gamma\left(\frac{\alpha}{r},(-2 b k+b m-2 c s+c v) z^r\right)((-2 b k+b m-2 c s+c v) z^r)^{-\frac{\alpha}{r}}+\right.$$
$$(-1)^v\,e^{2 g s-g v}\,((2 b k-b m-2 c s+c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2 b k-b m-2 c s+c v) z^r\right)+$$
$$(-1)^m\,e^{g v-2 g s}\,((-2 b k+b m+2 c s-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-2 b k+b m+2 c s-c v) z^r\right)+$$
$$\left.e^{g v-2 g s}\,((2 b k-b m+2 c s-c v) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2 b k-b m+2 c s-c v) z^r\right)\right)\,/;\, m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2048.01

$$\int z^n \sinh^m(b z^2) \sinh^\nu(c z^2 + g) \, dz = \frac{i^{-m-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} - 2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{\frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, -b(m-2k) z^2\right) \left(-b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{i m \pi}{2}} \left(b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b(m-2k) z^2\right)\right) -$$

$$2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i \pi \nu}{2} + g(\nu - 2s)} \Gamma\left(\frac{n+1}{2}, -c(\nu-2s) z^2\right) \left(-c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$

$$\left. e^{-\frac{1}{2} i \pi \nu - g(\nu-2s)} \left(c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2s) z^2\right)\right) -$$

$$2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{1}{2} i \pi (m-\nu) - g(\nu-2s)} \Gamma\left(\frac{n+1}{2}, (c(\nu-2s) - b(m-2k)) z^2\right)\right.$$

$$\left((c(\nu-2s) - b(m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i \pi (m+\nu) - g(\nu-2s)} \left((b(m-2k) + c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\Gamma\left(\frac{n+1}{2}, (b(m-2k) + c(\nu-2s)) z^2\right) + e^{\frac{1}{2} i \pi (m+\nu) + g(\nu-2s)} \left((-b(m-2k) - c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\Gamma\left(\frac{n+1}{2}, (-b(m-2k) - c(\nu-2s)) z^2\right) + e^{g(\nu-2s) - \frac{1}{2} i \pi (m-\nu)} \left((b(m-2k) - c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\left.\Gamma\left(\frac{n+1}{2}, (b(m-2k) - c(\nu-2s)) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2049.01

$$\int z^n \sinh^m\left(b\sqrt{z}\right)\sinh^v\left(\sqrt{z}\,c+g\right)dz = -2^{-m-v+1}\,i^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\,b^{-2(n+1)}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k(m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{\frac{i m\pi}{2}}\Gamma\left(2(n+1),\,-b(m-2k)\sqrt{z}\right)+e^{-\frac{i m\pi}{2}}\Gamma\left(2(n+1),\,b(m-2k)\sqrt{z}\right)\right)+$$
$$\frac{i^{-m-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1}-2^{-m-v+1}\,i^{-m-v}\,c^{-2(n+1)}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s(v-2s)^{-2(n+1)}\binom{v}{s}\left(e^{\frac{i\pi v}{2}+g(v-2s)}\Gamma\left(2(n+1),\,-c(v-2s)\sqrt{z}\right)+e^{-\frac{1}{2}i\pi v-g(v-2s)}\Gamma\left(2(n+1),\,c(v-2s)\sqrt{z}\right)\right)-$$
$$2^{-m-v+1}\,i^{-m-v}\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{1}{2}i\pi(m-v)-g(v-2s)}\Gamma\left(2(n+1),\,(c(v-2s)-b(m-2k))\sqrt{z}\right)\right.$$
$$\left((c(v-2s)-b(m-2k))\sqrt{z}\right)^{-2(n+1)}+e^{-\frac{1}{2}i\pi(m+v)-g(v-2s)}\left((b(m-2k)+c(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1),\,(b(m-2k)+c(v-2s))\sqrt{z}\right)+e^{\frac{1}{2}i\pi(m+v)+g(v-2s)}\left((-b(m-2k)-c(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1),\,(-b(m-2k)-c(v-2s))\sqrt{z}\right)+e^{g(v-2s)-\frac{1}{2}i\pi(m-v)}\left((b(m-2k)-c(v-2s))\sqrt{z}\right)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1),\,(b(m-2k)-c(v-2s))\sqrt{z}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sinh^m\left(b z^r+e\right)\sinh^v\left(c z^r+g\right)$

01.19.21.2050.01

$$\int z^{\alpha-1}\sinh^m(b z^r+e)\sinh^\nu(c z^r+g)\,dz = \frac{i^{m-\nu}2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{\alpha} - \frac{i^{-\nu}2^{-m-\nu}z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m e^{2ek-em}\,\Gamma\left(\frac{\alpha}{r},(bm-2bk)z^r\right)((bm-2bk)z^r)^{-\frac{\alpha}{r}} + e^{em-2ek}((2bk-bm)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2bk-bm)z^r\right)\right) - \frac{i^m 2^{-m-\nu}z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu e^{2gk-g\nu}\,\Gamma\left(\frac{\alpha}{r},(c\nu-2ck)z^r\right)((c\nu-2ck)z^r)^{-\frac{\alpha}{r}} + e^{g\nu-2gk}((2ck-c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2ck-c\nu)z^r\right)\right) - \frac{2^{-m-\nu}z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}e^{2ek-em+2gs-g\nu}\,\Gamma\left(\frac{\alpha}{r},(-2bk+bm-2cs+c\nu)z^r\right)((-2bk+bm-2cs+c\nu)z^r)^{-\frac{\alpha}{r}} + (-1)^\nu e^{-2ek+em+2gs-g\nu}((2bk-bm-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2bk-bm-2cs+c\nu)z^r\right) + (-1)^m e^{2ek-em-2gs+g\nu}((-2bk+bm+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-2bk+bm+2cs-c\nu)z^r\right) + e^{-2ek+em-2gs+g\nu}((2bk-bm+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2bk-bm+2cs-c\nu)z^r\right)\right)\ /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2051.01

$$\int z^n \sinh^m\left(b z^2+e\right) \sinh^\nu\left(c z^2+g\right) dz = \frac{i^{-m-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} -$$
$$2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i\pi m}{2}+e(m-2k)} \Gamma\left(\frac{n+1}{2}, -b(m-2k) z^2\right) \left(-b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{-\frac{1}{2} i \pi m - e(m-2k)} \left(b(m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, b(m-2k) z^2\right) \right) -$$
$$2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i\pi\nu}{2}+g(\nu-2s)} \Gamma\left(\frac{n+1}{2}, -c(\nu-2s) z^2\right) \left(-c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{-\frac{1}{2} i \pi \nu - g(\nu-2s)} \left(c(\nu-2s) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2s) z^2\right) \right) -$$
$$2^{-m-\nu-1} i^{-m-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e(m-2k)+\frac{1}{2} i\pi(m-\nu)-g(\nu-2s)} \Gamma\left(\frac{n+1}{2}, (c(\nu-2s)-b(m-2k)) z^2\right) \right.$$
$$\left((c(\nu-2s)-b(m-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-e(m-2k)-\frac{1}{2} i\pi(m+\nu)-g(\nu-2s)} \left((b(m-2k)+c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (b(m-2k)+c(\nu-2s)) z^2\right) + e^{e(m-2k)+\frac{1}{2} i\pi(m+\nu)+g(\nu-2s)} \left((-b(m-2k)-c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (-b(m-2k)-c(\nu-2s)) z^2\right) + e^{-e(m-2k)-\frac{1}{2} i\pi(m-\nu)+g(\nu-2s)}$$
$$\left. \left((b(m-2k)-c(\nu-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (b(m-2k)-c(\nu-2s)) z^2\right) \right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2052.01

$$\int z^n \sinh^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = -2^{-m-\nu+1}\, i^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, b^{-2(n+1)} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k (m-2k)^{-2(n+1)} \binom{m}{k} \left(e^{\frac{i\pi m}{2}+e(m-2k)}\, \Gamma\left(2(n+1), -b(m-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi m - e(m-2k)}\, \Gamma\left(2(n+1), b(m-2k)\sqrt{z}\right)\right) + \frac{i^{-m-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} - 2^{-m-\nu+1}\, i^{-m-\nu}\, c^{-2(n+1)} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s (\nu-2s)^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{i\pi\nu}{2}+g(\nu-2s)}\, \Gamma\left(2(n+1), -c(\nu-2s)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu - g(\nu-2s)}\, \Gamma\left(2(n+1), c(\nu-2s)\sqrt{z}\right)\right) - 2^{-m-\nu+1}\, i^{-m-\nu}\, z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e(m-2k)+\frac{1}{2} i\pi(m-\nu)-g(\nu-2s)}\, \Gamma\left(2(n+1), (c(\nu-2s)-b(m-2k))\sqrt{z}\right) \left((c(\nu-2s)-b(m-2k))\sqrt{z}\right)^{-2(n+1)} + e^{-e(m-2k)-\frac{1}{2} i\pi(m+\nu)-g(\nu-2s)} \left((b(m-2k)+c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b(m-2k)+c(\nu-2s))\sqrt{z}\right) + e^{e(m-2k)+\frac{1}{2} i\pi(m+\nu)+g(\nu-2s)} \left((-b(m-2k)-c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b(m-2k)-c(\nu-2s))\sqrt{z}\right) + e^{-e(m-2k)-\frac{1}{2} i\pi(m-\nu)+g(\nu-2s)} \left((b(m-2k)-c(\nu-2s))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b(m-2k)-c(\nu-2s))\sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^n \sinh^m(d\,z) \sinh^\nu\left(c\,z^r+f\,z\right)$

01.19.21.2053.01

$$\int z^n \sinh^m(d\,z) \sinh^\nu\left(c\,z^2+f\,z\right) dz = \frac{i^{-m-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, i^{-m-\nu}\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m\pi}{2}}\, \Gamma(n+1, d(m-2k)z)\, (-d(m-2k))^{-n-1} + e^{\frac{i m\pi}{2}} (d(m-2k))^{-n-1}\, \Gamma(n+1, -d(m-2k)z)\right) - 2^{-m-\nu-1}\, i^{-m-\nu} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{f^2(\nu-2k)}{4c}-\frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (-f(\nu-2k)-2cz(\nu-2k))^{j+1} \left(\frac{(-f(\nu-2k)-2cz(\nu-2k))^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f(\nu-2k)-2cz(\nu-2k))^2}{4c(\nu-2k)}\right)\right)\right.$$

$$(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\pi v}{2}-\frac{f^2\,(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$2^{-m-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(-d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}-\frac{1}{2}i\pi\,(m+v)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2\,k)+f\,(v-2\,s))^{n-j}\right.\right.$$

$$(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{(d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+\frac{1}{2}i\pi\,(m-v)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,s)-d\,(m-2\,k))^{n-j}\,(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\right.$$

$$\left(\frac{(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},\frac{(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{1}{2}i\pi\,(v-m)-\frac{(f\,(v-2\,s)-d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{1}{2}i\pi\,(m+v)-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\right)/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sinh^m(d z) \sinh^\nu\left(\sqrt{z}\, c + g + f z\right) dz = \frac{i^{-m-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n 2^{-m-\nu} i^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m \pi}{2}} \Gamma(n+1, d(m-2k)z)(-d(m-2k))^{-n-1} + e^{\frac{i m \pi}{2}} (d(m-2k))^{-n-1} \Gamma(n+1, -d(m-2k)z)\right) + 2^{-m-2n-\nu-1} i^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+n-1} (i f(\nu-2k))^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{(\nu-2k)c^2}{4f} - \frac{i \pi \nu}{2} - g(\nu-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(\nu-2k))^{-h-j+2n} \left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right)^{h+j} \left(\frac{\left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c(\nu-2k)\left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right)^2}{4f(\nu-2k)}\right) - 2f(\nu-2k) \sqrt{\frac{\left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right)^2}{f(\nu-2k)}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c(\nu-2k) - 2f\sqrt{z}(\nu-2k)\right)^2}{4f(\nu-2k)}\right)\right) + e^{-\frac{(\nu-2k)c^2}{4f} + \frac{i \pi \nu}{2} + g(\nu-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2k))^{-h-j+2n} \left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right)^{h+j} \left(-\frac{\left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(\nu-2k)\left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right)^2}{4f(\nu-2k)}\right) + 2f(\nu-2k) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right)^2}{4f(\nu-2k)}\right) \sqrt{-\frac{\left(c(\nu-2k) + 2f\sqrt{z}(\nu-2k)\right)^2}{f(\nu-2k)}}\right)\right) +$$

$$2^{-m-2n-v-1}\, i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{-\frac{c^2 (v-2s)^2}{4 (f (v-2s)-d (m-2k))}+g (v-2s)+\frac{1}{2} i \pi (v-m)}$$

$$\Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c (v-2s))^{-h-j+2n} \left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)^2}{f (v-2s)-d (m-2k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(c (v-2s) \left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)^2}{4 (f (v-2s)-d (m-2k))}\right) +$$

$$2 (f (v-2s)-d (m-2k))\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)^2}{4 (f (v-2s)-d (m-2k))}\right)$$

$$\sqrt{-\frac{\left(c (v-2s)+2 (f (v-2s)-d (m-2k)) \sqrt{z}\right)^2}{f (v-2s)-d (m-2k)}} \Bigg)\Bigg)$$

$$(f (v-2s)-d (m-2k))^{-2 (n+1)} + e^{-\frac{c^2 (v-2s)^2}{4 (d (m-2k)+f (v-2s))}+g (v-2s)+\frac{1}{2} i \pi (m+v)} (d (m-2k)+f (v-2s))^{-2 (n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c (v-2s))^{-h-j+2n} \left(c (v-2s)+2 (d (m-2k)+f (v-2s)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c (v-2s)+2 (d (m-2k)+f (v-2s)) \sqrt{z}\right)^2}{d (m-2k)+f (v-2s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(c (v-2s) \left(c (v-2s)+2 (d (m-2k)+f (v-2s)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(v-2s)+2(d(m-2k)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2k)+f(v-2s))}\right)+$$

$$2(d(m-2k)+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(v-2s)+2(d(m-2k)+f(v-2s))\sqrt{z}\right)^2}{4(d(m-2k)+f(v-2s))}\right)$$

$$\left.\sqrt{-\frac{\left(c(v-2s)+2(d(m-2k)+f(v-2s))\sqrt{z}\right)^2}{d(m-2k)+f(v-2s)}}\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(-d(m-2k)-f(v-2s))}-g(v-2s)-\frac{1}{2}i\pi(m+v)}(-d(m-2k)-f(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}\left(2(-d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(-d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-d(m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2(-d(m-2k)-f(v-2s))\sqrt{-\frac{\left(2(-d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-d(m-2k)-f(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(-d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d(m-2k)-f(v-2s))}\right)-c(v-2s)\left(2(-d(m-2k)-f(v-2s))\right.$$

$$\left.\left.\sqrt{z}-c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-d(m-2k)-f(v-2s))}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(d(m-2k)-f(v-2s))}-g(v-2s)+\frac{1}{2}i\pi(m-v)}(d(m-2k)-f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j$$

$$(-c(v-2s))^{-h-j+2n}\left(2(d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d(m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(d\,z+e)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n\sinh^m(e+d\,z)\sinh^v\left(c\,z^2+f\,z\right)dz ==$$

$$\frac{i^{-m-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1}+(-1)^n\,i^{-m-v}\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{-\frac{1}{2}i\pi m-e\,(m-2\,k)}\,\Gamma(n+1,\,d\,(m-2\,k)\,z)\,(-d\,(m-2\,k))^{-n-1}+e^{\frac{i\pi m}{2}+e\,(m-2\,k)}\,(d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-d\,(m-2\,k)\,z)\right)-$$

$$2^{-m-v-1}\,i^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{f^2\,(v-2\,k)}{4\,c}-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k))^{n-j}\,(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)$$

$$(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\pi v}{2}-\frac{f^2\,(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left.\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$2^{-m-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(-d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}-e\,(m-2\,k)-\frac{1}{2}i\pi\,(m+v)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2\,k)+f\,(v-2\,s))^{n-j}\right.\right.$$

$$(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{(d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m-v)}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,s)-d\,(m-2\,k))^{n-j}$$

$$(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{-\frac{(f\,(v-2\,s)-d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}-e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{-\frac{(d\,(m-2\,k)+f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sinh^m(e+d\,z)\sinh^v\left(\sqrt{z}\;c+f\,z\right)dz=$$

$$\frac{i^{-m-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\Bigg(e^{-\frac{1}{2}\,i\,\pi\,m-e\,(m-2\,k)}\,\Gamma(n+1,\,d\,(m-2\,k)\,z)\,(-d\,(m-2\,k))^{-n-1}+e^{\frac{i\,\pi\,m}{2}+e\,(m-2\,k)}\,(d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-d\,(m-2\,k)\,z)\Bigg)+$$

$$2^{-m-2n-v-1}\, i^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+n-1} (i\, f\, (v-2k))^{-2(n+1)} \binom{v}{k}$$

$$\Bigg(e^{\frac{c^2 (v-2k)}{4f} - \frac{i \pi v}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\, (v-2k))^{-h-j+2n} \left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right)^{h+j}$$

$$\left(\frac{\left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right)^2}{f\, (v-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\, (v-2k) \left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ \frac{\left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\, (v-2k)} \Bigg) - 2 f\, (v-2k)$$

$$\sqrt{\frac{\left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right)^2}{f\, (v-2k)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(-c\, (v-2k) - 2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\, (v-2k)} \right) \Bigg) +$$

$$e^{\frac{i \pi v}{2} - \frac{c^2 (v-2k)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\, (v-2k))^{-h-j+2n} \left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right)^2}{f\, (v-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c\, (v-2k) \left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ -\frac{\left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\, (v-2k)} \Bigg) + 2 f\, (v-2k)\, \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\, (v-2k)} \Bigg) \sqrt{-\frac{\left(c\, (v-2k) + 2 f \sqrt{z}\, (v-2k)\right)^2}{f\, (v-2k)}} \Bigg)\Bigg) +$$

$$2^{-m-2n-v-1}\, i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{-\frac{c^2 (v-2s)^2}{4(f\,(v-2s) - d\,(m-2k))} - e\,(m-2k) + \frac{1}{2} i \pi (v-m)}$$

$$\Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\, (v-2s))^{-h-j+2n} \left(c\, (v-2s) + 2\,(f\, (v-2s) - d\, (m-2k)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}}\,\right)\right)$$

$$(f\,(v-2\,s)-d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}\,(d\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}}\,\right)+$$

$$e^{-\frac{c^2 (v-2 s)^2}{4 (-d (m-2 k)-f (v-2 s))}-e (m-2 k)-\frac{1}{2} i \pi (m+v)} (-d (m-2 k)-f (v-2 s))^{-2 (n+1)}$$
$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c (v-2 s))^{-h-j+2 n} \left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^{h+j}$$
$$\left(-\frac{\left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{-d (m-2 k)-f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$
$$\left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{-\frac{\left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{-d (m-2 k)-f (v-2 s)}} \Gamma\left(\frac{1}{2} (h+j+2),\right.\right.$$
$$\left.-\frac{\left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{4 (-d (m-2 k)-f (v-2 s))}\right)-c (v-2 s) \left(2 (-d (m-2 k)-f (v-2 s))\right.$$
$$\left.\left.\sqrt{z}-c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (-d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{4 (-d (m-2 k)-f (v-2 s))}\right)\right)+$$
$$e^{-\frac{c^2 (v-2 s)^2}{4 (d (m-2 k)-f (v-2 s))}+e (m-2 k)+\frac{1}{2} i \pi (m-v)} (d (m-2 k)-f (v-2 s))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j$$
$$(-c (v-2 s))^{-h-j+2 n} \left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^{h+j}$$
$$\left(-\frac{\left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{d (m-2 k)-f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$
$$\left(2 (d (m-2 k)-f (v-2 s)) \sqrt{-\frac{\left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{d (m-2 k)-f (v-2 s)}}\right.$$
$$\Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{4 (d (m-2 k)-f (v-2 s))}\right)-$$
$$c (v-2 s) \left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),\right.$$
$$\left.\left.\left.-\frac{\left(2 (d (m-2 k)-f (v-2 s)) \sqrt{z}-c (v-2 s)\right)^2}{4 (d (m-2 k)-f (v-2 s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \sinh^m(b z^r) \sinh^v(c z^r + f z)$

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$$\int z^n \sinh^m(b z^2) \sinh^v(c z^2 + f z)\, dz ==$$

$$\frac{i^{v-m}\, 2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} - i^{-m-v}\, 2^{-m-v-1}\, z^{n+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{\frac{i m \pi}{2}}\, \Gamma\!\left(\frac{n+1}{2}, -b (m - 2k) z^2\right) \left(-b (m - 2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{i m \pi}{2}} \left(b (m - 2k) z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2}, b (m - 2k) z^2\right)\right) -$$

$$i^{-m}\, 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{-\frac{f^2 (2k - v)}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (-f (2k - v))^{n-j} (f (2k - v) + 2 c z (2k - v))^{j+1}\right.\right.$$

$$\left.\left(-\frac{(f (2k - v) + 2 c z (2k - v))^2}{c (2k - v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f (2k - v) + 2 c z (2k - v))^2}{4 c (2k - v)}\right)\right) (c (2k - v))^{-n-1} +$$

$$e^{-\frac{f^2 (v - 2k)}{4c}} (c (v - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v - 2k))^{n-j} (f (v - 2k) + 2 c z (v - 2k))^{j+1}$$

$$\left.\left(-\frac{(f (v - 2k) + 2 c z (v - 2k))^2}{c (v - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f (v - 2k) + 2 c z (v - 2k))^2}{4 c (v - 2k)}\right)\right) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{-\frac{f^2 (2s - v)^2}{4 (c (2s - v) - b (2k - m))}} \left(\sum_{j=0}^{n} 2^{j-n} (-f (2s - v))^{n-j}\right.\right.$$

$$(f (2s - v) + 2 (c (2s - v) - b (2k - m)) z)^{j+1} \left(-\frac{(f (2s - v) + 2 (c (2s - v) - b (2k - m)) z)^2}{c (2s - v) - b (2k - m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f (2s - v) + 2 (c (2s - v) - b (2k - m)) z)^2}{4 (c (2s - v) - b (2k - m))}\right)\right) (c (2s - v) - b (2k - m))^{-n-1} +$$

$$(-1)^{m+v} e^{-\frac{f^2 (2s - v)^2}{4 (c (2s - v) - b (m - 2k))}} (c (2s - v) - b (m - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (2s - v))^{n-j}$$

$$(f (2s - v) + 2 (c (2s - v) - b (m - 2k)) z)^{j+1} \left(-\frac{(f (2s - v) + 2 (c (2s - v) - b (m - 2k)) z)^2}{c (2s - v) - b (m - 2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f (2s - v) + 2 (c (2s - v) - b (m - 2k)) z)^2}{4 (c (2s - v) - b (m - 2k))}\right) +$$

$$e^{-\frac{f^2 (v-2 s)^2}{4 (c (v-2 s)-b (2 k-m))}} (c (v-2 s)-b (2 k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v-2 s))^{n-j}$$

$$(f (v-2 s)+2 (c (v-2 s)-b (2 k-m)) z)^{j+1} \left(-\frac{(f (v-2 s)+2 (c (v-2 s)-b (2 k-m)) z)^2}{c (v-2 s)-b (2 k-m)}\right)^{\frac{1}{2} (-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2 s)+2 (c (v-2 s)-b (2 k-m)) z)^2}{4 (c (v-2 s)-b (2 k-m))}\right) +$$

$$(-1)^m e^{-\frac{f^2 (v-2 s)^2}{4 (c (v-2 s)-b (m-2 k))}} (c (v-2 s)-b (m-2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v-2 s))^{n-j}$$

$$(f (v-2 s)+2 (c (v-2 s)-b (m-2 k)) z)^{j+1} \left(-\frac{(f (v-2 s)+2 (c (v-2 s)-b (m-2 k)) z)^2}{c (v-2 s)-b (m-2 k)}\right)^{\frac{1}{2} (-j-1)}$$

$$\left.\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2 s)+2 (c (v-2 s)-b (m-2 k)) z)^2}{4 (c (v-2 s)-b (m-2 k))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sinh^m\left(b \sqrt{z}\right) \sinh^v\left(\sqrt{z}\, c + f z\right) dz = -i^{-m-v} 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k (m-2 k)^{-2 (n+1)} \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma\left(2 (n+1), -b (m-2 k) \sqrt{z}\right) + e^{-\frac{i m \pi}{2}} \Gamma\left(2 (n+1), b (m-2 k) \sqrt{z}\right)\right)\right) b^{-2 (n+1)} +$$

$$\frac{i^{-m-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2) (1 - v \bmod 2)}{n+1} + 2^{-m-2 n-v-1} i^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} (f (v-2 k))^{-2 (n+1)} \left(e^{\frac{c^2 (v-2 k)}{4 f} - \frac{i \pi v}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c (v-2 k))^{-h-j+2 n} \left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right)^{h+j} \right.$$

$$\left(\frac{\left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right)^2}{f (v-2 k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c (v-2 k) \left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2} (h+j+1), \frac{\left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right)^2}{4 f (v-2 k)}\right) - 2 f (v-2 k)$$

$$\left.\left.\sqrt{\frac{\left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right)^2}{f (v-2 k)}}\; \Gamma\left(\frac{1}{2} (h+j+2), \frac{\left(-c (v-2 k) - 2 f \sqrt{z}\, (v-2 k)\right)^2}{4 f (v-2 k)}\right)\right)\right) +$$

$$e^{\frac{i\pi v}{2}-\frac{c^2(v-2k)}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2k)\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)+2f\,(v-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)\sqrt{-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\right)\right)+$$

$$2^{-m-2n-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f\,(v-2s))^{-2(n+1)}\left(e^{\frac{(-b(m-2k)-c(v-2s))^2}{4f(v-2s)}-\frac{1}{2}i\pi(m+v)}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2k)-c\,(v-2s))^{-h-j+2n}\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-b\,(m-2k)-c\,(v-2s))\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)-$$

$$2f\,(v-2s)\sqrt{\frac{\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b\,(m-2k)-c\,(v-2s)-2f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)\right)\right)+e^{\frac{(b(m-2k)-c(v-2s))^2}{4f(v-2s)}+\frac{1}{2}i\pi(m-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,(m-2\,k)-c\,(v-2\,s))\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{1}{2}\,i\,\pi\,(v-m)-\frac{(c\,(v-2\,s)-b\,(m-2\,k))^{2}}{4\,f\,(v-2\,s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c\,(v-2\,s)-b\,(m-2\,k))^{-h-j+2\,n}\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,s)-b\,(m-2\,k))\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)+e^{\frac{1}{2}\,i\,\pi\,(m+v)-\frac{(b\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,(m-2\,k)+c\,(v-2\,s))\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sinh^m\left(b\,z^r+e\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\sinh^m\left(b\,z^2+e\right)\sinh^v\left(c\,z^2+f\,z\right)dz = \frac{i^{v-m}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-$$

$$i^{-m-v}\,2^{-m-v-1}\,z^{n+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\pi m}{2}+e\,(m-2\,k)}\,\Gamma\left(\frac{n+1}{2},\,-b\,(m-2\,k)\,z^2\right)\left(-b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{-\frac{1}{2}\,i\,\pi\,m-e\,(m-2\,k)}\left(b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,b\,(m-2\,k)\,z^2\right)\right)-$$

$$i^{-m}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v\,e^{-\frac{f^2\,(2\,k-v)}{4\,c}}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2\,k-v))^{n-j}\,(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^{j+1}\right.$$

$$\left(-\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{4\,c\,(2\,k-v)}\right)\Bigg)\,(c\,(2\,k-v))^{-n-1} +$$

$$e^{-\frac{f^2\,(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v\, e^{-\frac{f^2\,(2\,s-v)^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}-e\,(2\,k-m)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\,(-f\,(2\,s-v))^{n-j}$$

$$(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^{j+1} \left(-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{c\,(2\,s-v)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}\right)\Bigg)\,(c\,(2\,s-v)-b\,(2\,k-m))^{-n-1} +$$

$$(-1)^{m+v}\, e^{-\frac{f^2\,(2\,s-v)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}-e\,(m-2\,k)}\,(c\,(2\,s-v)-b\,(m-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-f\,(2\,s-v))^{n-j}$$

$$(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^{j+1} \left(-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{c\,(2\,s-v)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}\right) +$$

$$e^{-\frac{f^2\,(v-2\,s)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}-e\,(2\,k-m)}\,(c\,(v-2\,s)-b\,(2\,k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-f\,(v-2\,s))^{n-j}$$

$$(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^{j+1} \left(-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{c\,(v-2\,s)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}\right) +$$

$$(-1)^m\, e^{-\frac{f^2\,(v-2\,s)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}-e\,(m-2\,k)}\,(c\,(v-2\,s)-b\,(m-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-f\,(v-2\,s))^{n-j}$$

$$(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^{j+1} \left(-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{c\,(v-2\,s)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}\right)\Bigg)\Bigg) /;\, n\in\mathbb{N} \bigwedge m\in\mathbb{N}^+ \bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sinh^m\left(\sqrt{z}\, b+e\right) \sinh^v\left(\sqrt{z}\, c+f z\right) dz = -i^{-m-v}\, 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k (m-2k)^{-2(n+1)} \binom{m}{k} \left(e^{\frac{i\pi m}{2}+e(m-2k)}\, \Gamma\left(2(n+1), -b(m-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi m - e(m-2k)}\, \Gamma\left(2(n+1), b(m-2k)\sqrt{z}\right)\right)\right) b^{-2(n+1)} +$$

$$\frac{i^{-m-v}\, 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} + 2^{-m-2n-v-1}\, i^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} (f(v-2k))^{-2(n+1)} \left(e^{\frac{c^2(v-2k)}{4f}-\frac{i\pi v}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c(v-2k))^{-h-j+2n} \left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j} \right.$$

$$\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-c(v-2k)\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), \frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right) - 2f(v-2k)$$

$$\left.\left.\sqrt{\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\right) +$$

$$e^{\frac{i\pi v}{2}-\frac{c^2(v-2k)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(v-2k))^{-h-j+2n} \left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c(v-2k)\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), -\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right) + 2f(v-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left. -\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right) \sqrt{-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\right)\right) +$$

$$2^{-m-2n-v-1} i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} (f(v-2s))^{-2(n+1)} \Bigg(e^{\frac{(-b(m-2k)-c(v-2s))^2}{4f(v-2s)} - e(m-2k) - \frac{1}{2} i \pi (m+v)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-b(m-2k)-c(v-2s))^{-h-j+2n} \left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((-b(m-2k)-c(v-2s)) \left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)} \right) -$$

$$2f(v-2s) \sqrt{\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}} \; \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)} \Bigg) \Bigg) + e^{\frac{(b(m-2k)-c(v-2s))^2}{4f(v-2s)} + e(m-2k) + \frac{1}{2} i \pi (m-v)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b(m-2k)-c(v-2s))^{-h-j+2n} \left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((b(m-2k)-c(v-2s)) \left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)} \right) -$$

$$2\, f\, (v-2\, s)\, \sqrt{\frac{\left(b\, (m-2\, k)-c\, (v-2\, s)-2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{f\, (v-2\, s)}}\; \Gamma\!\left(\frac{1}{2}\, (h+j+2),\right.$$

$$\left.\left.\left.\frac{\left(b\, (m-2\, k)-c\, (v-2\, s)-2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{4\, f\, (v-2\, s)}\right)\right)\right)+e^{-\frac{(c\, (v-2\, s)-b\, (m-2\, k))^2}{4\, f\, (v-2\, s)}-e\, (m-2\, k)+\frac{1}{2}\, i\, \pi\, (v-m)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\, (v-2\, s)-b\, (m-2\, k))^{-h-j+2\, n} \left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{f\, (v-2\, s)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(\vphantom{\frac{1}{2}}\right.(c\, (v-2\, s)-b\, (m-2\, k)) \left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{4\, f\, (v-2\, s)}\right)+$$

$$2\, f\, (v-2\, s)\, \Gamma\!\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{4\, f\, (v-2\, s)}\right)$$

$$\left.\sqrt{-\frac{\left(-b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{f\, (v-2\, s)}}\;\right)+e^{-\frac{(b\, (m-2\, k)+c\, (v-2\, s))^2}{4\, f\, (v-2\, s)}+e\, (m-2\, k)+\frac{1}{2}\, i\, \pi\, (m+v)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b\, (m-2\, k)+c\, (v-2\, s))^{-h-j+2\, n} \left(b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)^2}{f\, (v-2\, s)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(\vphantom{\frac{1}{2}}\right.(b\, (m-2\, k)+c\, (v-2\, s)) \left(b\, (m-2\, k)+c\, (v-2\, s)+2\, f\, (v-2\, s)\, \sqrt{z}\,\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2f(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(b z^r + d z) \sinh^v(c z^r + f z)$

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$$\int z^n \sinh^m(b z^2+d z)\sinh^v(c z^2+f z)\,dz = $$

$$\frac{i^{v-m}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{\frac{d^2(2k-m)}{4b}}\left(\sum_{j=0}^{n}2^{j-n}(d(2k-m))^{n-j}(-d(2k-m)-2bz(2k-m))^{j+1}\left(\frac{(-d(2k-m)-2bz(2k-m))^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-d(2k-m)-2bz(2k-m))^2}{4b(2k-m)}\right)\right)(-b(2k-m))^{-n-1}+\right.$$

$$(-1)^m e^{\frac{d^2(m-2k)}{4b}}(-b(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(m-2k))^{n-j}(-d(m-2k)-2bz(m-2k))^{j+1}$$

$$\left.\left(\frac{(-d(m-2k)-2bz(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-d(m-2k)-2bz(m-2k))^2}{4b(m-2k)}\right)\right)-$$

$$i^{-m}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v e^{-\frac{f^2(2k-v)}{4c}}\left(\sum_{j=0}^{n}2^{j-n}(-f(2k-v))^{n-j}(f(2k-v)+2cz(2k-v))^{j+1}\right.\right.$$

$$\left.\left.\left(-\frac{(f(2k-v)+2cz(2k-v))^2}{c(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f(2k-v)+2cz(2k-v))^2}{4c(2k-v)}\right)\right)(c(2k-v))^{-n-1}+\right.$$

$$e^{-\frac{f^2(v-2k)}{4c}}(c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2k))^{n-j}(f(v-2k)+2cz(v-2k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v e^{-\frac{(f(2s-v)-d(2k-m))^2}{4(c(2s-v)-b(2k-m))}}\Bigg(\sum_{j=0}^{n}2^{j-n}(d(2k-m)-f(2s-v))^{n-j}$$

$$(-d(2k-m)+f(2s-v)+2(c(2s-v)-b(2k-m))z)^{j+1}$$

$$\left(-\frac{(-d(2k-m)+f(2s-v)+2(c(2s-v)-b(2k-m))z)^2}{c(2s-v)-b(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(-d(2k-m)+f(2s-v)+2(c(2s-v)-b(2k-m))z)^2}{4(c(2s-v)-b(2k-m))}\right)\Bigg)$$

$$(c(2s-v)-b(2k-m))^{-n-1}+(-1)^{m+v}e^{-\frac{(f(2s-v)-d(m-2k))^2}{4(c(2s-v)-b(m-2k))}}(c(2s-v)-b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(d(m-2k)-f(2s-v))^{n-j}(-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^{j+1}$$

$$\left(-\frac{(-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{c(2s-v)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{4(c(2s-v)-b(m-2k))}\right)+$$

$$e^{-\frac{(f(v-2s)-d(2k-m))^2}{4(c(v-2s)-b(2k-m))}}(c(v-2s)-b(2k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(2k-m)-f(v-2s))^{n-j}$$

$$(-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^{j+1}$$

$$\left(-\frac{(-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{c(v-2s)-b(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{4(c(v-2s)-b(2k-m))}\right)+$$

$$(-1)^m e^{-\frac{(f(v-2s)-d(m-2k))^2}{4(c(v-2s)-b(m-2k))}}(c(v-2s)-b(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(m-2k)-f(v-2s))^{n-j}$$

$$(-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^{j+1}$$

$$\left(-\frac{(-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{c(v-2s)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{4(c(v-2s)-b(m-2k))}\right)\Bigg)\Bigg)\Big/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sinh^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + f\, z\right) dz = \frac{i^{\nu-m}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + i^\nu\, 2^{-m-2n-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{b^2 (2k-m)}{4d}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b\,(2k-m))^{-h-j+2n} \left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right)^{h+j} \right.\right.$$

$$\left(\frac{\left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\,(2k-m) \left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right)^2}{4\,d\,(2k-m)} \right) - 2\,d\,(2k-m)$$

$$\left.\left.\left. \sqrt{\frac{\left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b\,(2k-m) - 2\,d\,\sqrt{z}\,(2k-m)\right)^2}{4\,d\,(2k-m)} \right) \right)\right)\right.$$

$$(-d\,(2k-m))^{-2n-2} + (-1)^m\, e^{\frac{b^2 (m-2k)}{4d}} (-d\,(m-2k))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b\,(m-2k))^{-h-j+2n}$$

$$\left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right)^{h+j} \left(\frac{\left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(-b\,(m-2k) \left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)} \right) - \right.$$

$$2\,d\,(m-2k) \sqrt{\frac{\left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\right.$$

$$\left.\left.\left. \frac{1}{2}(h+j+2), \frac{\left(-b\,(m-2k) - 2\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)} \right)\right)\right) +$$

$$i^{-m}\, 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg((-1)^\nu e^{-\frac{c^2 (2k-\nu)}{4f}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-\nu))^{-h-j+2n}$$

$$\left(c(2k-\nu) + 2f\sqrt{z}\,(2k-\nu)\right)^{h+j} \left(-\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(c(2k-\nu)$$

$$\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right) + 2f(2k-\nu)$$

$$\sqrt{-\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)}\right)\Bigg)\Bigg)$$

$$(f(2k-\nu))^{-2n-2} + e^{-\frac{c^2(\nu-2k)}{4f}} (f(\nu-2k))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2k))^{-h-j+2n}$$

$$\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^{h+j} \left(-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(c(\nu-2k)$$

$$\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right) + 2f(\nu-2k)$$

$$\sqrt{-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right)\Bigg)\Bigg)\Bigg) +$$

$$2^{-m-2n-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg((-1)^\nu e^{-\frac{(c(2k-\nu)-b(2s-m))^2}{4(f(2k-\nu)-d(2s-m))}} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-\nu)-b(2s-m))^{-h-j+2n}$$

$$\left(-b(2s-m)+c(2k-\nu)+2(f(2k-\nu)-d(2s-m))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b(2s-m)+c(2k-\nu)+2(f(2k-\nu)-d(2s-m))\sqrt{z}\right)^2}{f(2k-\nu)-d(2s-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Big((c(2k-\nu)-b(2s-m))\left(-b(2s-m)+c(2k-\nu)+2(f(2k-\nu)-d(2s-m))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(-b(2s-m)+c(2k-v)+2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (4(f(2k-v)-d(2s-m)))\right)+2(f(2k-v)-d(2s-m))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(-b(2s-m)+c(2k-v)+2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (4(f(2k-v)-d(2s-m)))\right)\sqrt{\left(-\left(-b(2s-m)+c(2k-v)+ 2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (f(2k-v)-d(2s-m))\right)}\Bigg)$$

$$(f(2k-v)-d(2s-m))^{-2n-2}+(-1)^{m+v} e^{-\frac{(c(2k-v)-b(m-2s))^2}{4(f(2k-v)-d(m-2s))}}(f(2k-v)-d(m-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(2k-v)-b(m-2s))^{-h-j+2n}$$

$$\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{f(2k-v)-d(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c(2k-v)-b(m-2s))\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{4(f(2k-v)-d(m-2s))}\right)+2(f(2k-v)-d(m-2s))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{4(f(2k-v)-d(m-2s))}\right)$$

$$\sqrt{\left(-\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2 \Big/ (f(2k-v)-d(m-2s))\right)}\Bigg)+$$

$$e^{-\frac{(c(v-2k)-b(2s-m))^2}{4(f(v-2k)-d(2s-m))}}(f(v-2k)-d(2s-m))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2k)-b(2s-m))^{-h-j+2n}$$

$$\left(-b(2s-m)+c(v-2k)+2(f(v-2k)-d(2s-m))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-b\,(2\,s-m))\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\Bigg)+2\,(f\,(v-2\,k)-d\,(2\,s-m))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\right)$$

$$\sqrt{\left(-\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2\Big/\right.}$$

$$\left.(f\,(v-2\,k)-d\,(2\,s-m))\right)\Bigg)+(-1)^m\,e^{-\frac{(c\,(v-2\,k)-b\,(m-2\,s))^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}}$$

$$(f\,(v-2\,k)-d\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-b\,(m-2\,s))\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\Bigg)+2\,(f\,(v-2\,k)-d\,(m-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\right)$$

$$\sqrt{\left(-\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2\Big/\right.}$$

$$\left.(f\,(v-2\,k)-d\,(m-2\,s))\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(d\, z) \sinh^v\left(c\, z^r + f\, z + g\right)$

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$$\int z^n \sinh^m(d\, z) \sinh^v\left(c\, z^2 + f\, z + g\right) dz = \frac{i^{-m-v}\, 2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\, (1 - v \bmod 2)}{n+1} + (-1)^n\, i^{-m-v}\, 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i\, m\, \pi}{2}}\, \Gamma(n+1,\, d\, (m-2\, k)\, z)\, (-d\, (m-2\, k))^{-n-1} + e^{\frac{i\, m\, \pi}{2}}\, (d\, (m-2\, k))^{-n-1}\, \Gamma(n+1,\, -d\, (m-2\, k)\, z)\right) -$$
$$2^{-m-v-1}\, i^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k}$$
$$\left(e^{\frac{(v-2\, k)\, f^2}{4\, c} - \frac{i\, \pi\, v}{2} - g\, (v-2\, k)} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\, (v-2\, k))^{n-j}\, (-f\, (v-2\, k) - 2\, c\, z\, (v-2\, k))^{j+1} \left(\frac{(-f\, (v-2\, k) - 2\, c\, z\, (v-2\, k))^2}{c\, (v-2\, k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$
$$\left.\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2},\, \frac{(-f\, (v-2\, k) - 2\, c\, z\, (v-2\, k))^2}{4\, c\, (v-2\, k)}\right)\right) (-c\, (v-2\, k))^{-n-1} +\right.$$
$$e^{-\frac{(v-2\, k)\, f^2}{4\, c} + \frac{i\, \pi\, v}{2} + g\, (v-2\, k)}\, (c\, (v-2\, k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-f\, (v-2\, k))^{n-j}\, (f\, (v-2\, k) + 2\, c\, z\, (v-2\, k))^{j+1}$$
$$\left.\left(-\frac{(f\, (v-2\, k) + 2\, c\, z\, (v-2\, k))^2}{c\, (v-2\, k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2},\, -\frac{(f\, (v-2\, k) + 2\, c\, z\, (v-2\, k))^2}{4\, c\, (v-2\, k)}\right)\right) -$$
$$2^{-m-v-1}\, i^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{(-d\, (m-2\, k) - f\, (v-2\, s))^2}{4\, c\, (v-2\, s)} - \frac{1}{2} i\, \pi\, (m+v) - g\, (v-2\, s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (d\, (m-2\, k) + f\, (v-2\, s))^{n-j}\right.\right.$$
$$(-d\, (m-2\, k) - f\, (v-2\, s) - 2\, c\, (v-2\, s)\, z)^{j+1} \left(\frac{(-d\, (m-2\, k) - f\, (v-2\, s) - 2\, c\, (v-2\, s)\, z)^2}{c\, (v-2\, s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2},\, \frac{(-d\, (m-2\, k) - f\, (v-2\, s) - 2\, c\, (v-2\, s)\, z)^2}{4\, c\, (v-2\, s)}\right)\right) (-c\, (v-2\, s))^{-n-1} +$$
$$e^{\frac{(d\, (m-2\, k) - f\, (v-2\, s))^2}{4\, c\, (v-2\, s)} + \frac{1}{2} i\, \pi\, (m-v) - g\, (v-2\, s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\, (v-2\, s) - d\, (m-2\, k))^{n-j}\right.$$
$$(d\, (m-2\, k) - f\, (v-2\, s) - 2\, c\, (v-2\, s)\, z)^{j+1} \left(\frac{(d\, (m-2\, k) - f\, (v-2\, s) - 2\, c\, (v-2\, s)\, z)^2}{c\, (v-2\, s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\ \frac{(d(m-2k)-f(v-2s)-2c(v-2s)z)^2}{4c(v-2s)}\right)\right)(-c(v-2s))^{-n-1}+$$

$$e^{-\frac{(f(v-2s)-d(m-2k))^2}{4c(v-2s)}+\frac{1}{2}i\pi(v-m)+g(v-2s)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(m-2k)-f(v-2s))^{n-j}$$

$$(-d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(-d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\ -\frac{(-d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)+$$

$$e^{-\frac{(d(m-2k)+f(v-2s))^2}{4c(v-2s)}+\frac{1}{2}i\pi(m+v)+g(v-2s)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d(m-2k)-f(v-2s))^{n-j}$$

$$(d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\ -\frac{(d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sinh^m(dz)\sinh^v\left(\sqrt{z}\ c+g+fz\right)dz=$$

$$\frac{i^{-m-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{im\pi}{2}}\Gamma(n+1,\ d(m-2k)z)(-d(m-2k))^{-n-1}+e^{\frac{im\pi}{2}}(d(m-2k))^{-n-1}\Gamma(n+1,\ -d(m-2k)z)\right)+$$

$$2^{-m-2n-v-1}\,i^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}(i\,f(v-2k))^{-2(n+1)}\binom{v}{k}$$

$$\Bigg(e^{\frac{(v-2k)c^2}{4f}-\frac{i\pi v}{2}-g(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(v-2k))^{-h-j+2n}\left(-c(v-2k)-2f\sqrt{z}\ (v-2k)\right)^{h+j}$$

$$\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\ (v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c(v-2k)\left(-c(v-2k)-2f\sqrt{z}\ (v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ \frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)-2\,f\,(v-2\,k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)+$$

$$e^{-\frac{(v-2k)c^2}{4f}+\frac{i\pi v}{2}+g\,(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ -\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2(v-2s)^2}{4(f(v-2s)-d(m-2k))}+g\,(v-2s)+\frac{1}{2}i\pi(v-m)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\sqrt{z}\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\ -\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}}\,\right)\right)$$

$$(f\,(v-2\,s)-d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(m+v)}\,(d\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}}\,\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)-\frac{1}{2}\,i\,\pi\,(m+v)}\,(-d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{-d\,(m-2\,k)-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-d\,(m-2\,k)-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\right.$$

$$\left.\left.\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(m-v)}\,(d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\,(d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sinh^m(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sinh^m(d\,z+e)\sinh^\nu\left(c\,z^2+f\,z+g\right)dz = \frac{i^{-m-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{n+1} + (-1)^n\, i^{-m-\nu}\,2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$
$$\left(e^{-\frac{1}{2}i\pi m-e(m-2k)}\,\Gamma(n+1,\,d\,(m-2k)\,z)\,(-d\,(m-2k))^{-n-1} + e^{\frac{i\pi m}{2}+e(m-2k)}\,(d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-d\,(m-2k)\,z)\right) -$$
$$2^{-m-\nu-1}\,i^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(e^{\frac{(\nu-2k)f^2}{4c}-\frac{i\pi\nu}{2}-g(\nu-2k)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(\nu-2k))^{n-j}\,(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^{j+1}\left(\frac{(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^2}{4\,c\,(\nu-2k)}\right)\right)(-c\,(\nu-2k))^{-n-1} +$$
$$e^{-\frac{(\nu-2k)f^2}{4c}+\frac{i\pi\nu}{2}+g(\nu-2k)}\,(c\,(\nu-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(\nu-2k))^{n-j}\,(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^{j+1}$$
$$\left.\left(-\frac{(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^2}{4\,c\,(\nu-2k)}\right)\right) -$$
$$2^{-m-\nu-1}\,i^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-d\,(m-2k)-f\,(\nu-2s))^2}{4\,c\,(\nu-2s)}-e\,(m-2k)-\frac{1}{2}i\pi(m+\nu)-g\,(\nu-2s)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,(m-2k)+f\,(\nu-2s))^{n-j}\right.\right.$$
$$(-d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^{j+1}\left(\frac{(-d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\right)(-c\,(\nu-2s))^{-n-1} +$$
$$e^{\frac{(d\,(m-2k)-f\,(\nu-2s))^2}{4\,c\,(\nu-2s)}+e\,(m-2k)+\frac{1}{2}i\pi(m-\nu)-g\,(\nu-2s)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(\nu-2s)-d\,(m-2k))^{n-j}\right.$$
$$(d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^{j+1}\left(\frac{(d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\right)(-c\,(\nu-2s))^{-n-1} +$$

$$e^{-\frac{(f(v-2s)-d(m-2k))^2}{4c(v-2s)}-e(m-2k)+\frac{1}{2}i\pi(v-m)+g(v-2s)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(m-2k)-f(v-2s))^{n-j}$$

$$(-d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(-d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)+$$

$$e^{-\frac{(d(m-2k)+f(v-2s))^2}{4c(v-2s)}+e(m-2k)+\frac{1}{2}i\pi(m+v)+g(v-2s)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d(m-2k)-f(v-2s))^{n-j}$$

$$(d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)\right)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sinh^m(dz+e)\sinh^v\left(\sqrt{z}\,c+fz+g\right)dz=$$

$$\frac{i^{-m-v}2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n2^{-m-v}i^{-m-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{-\frac{1}{2}i\pi m-e(m-2k)}\Gamma(n+1,d(m-2k)z)(-d(m-2k))^{-n-1}+e^{\frac{i\pi m}{2}+e(m-2k)}(d(m-2k))^{-n-1}\Gamma(n+1,-d(m-2k)z)\right)+$$

$$2^{-m-2n-v-1}i^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}(if(v-2k))^{-2(n+1)}\binom{v}{k}$$

$$\Bigg(e^{\frac{(v-2k)c^2}{4f}-\frac{i\pi v}{2}-g(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2k))^{-h-j+2n}\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c(v-2k)\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\Bigg)-2f(v-2k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{(v-2\,k)\,c^2}{4\,f}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)+2\,f\,(v-2\,k)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2\,(v-2\,s)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}+g\,(v-2\,s)-e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-d\,(m-2\,k))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)-d\,(m-2\,k)}}\Bigg)\Bigg)\,(f\,(v-2\,s)-d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}\,(d\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,(m-2\,k)+f\,(v-2\,s)}}\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)-e\,(m-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)}\,(-d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-d\,(m-2\,k)-f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(2\left(-d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-d\,(m-2\,k)-f\,(v-2\,s)\right)}\Bigg)-c\,(v-2\,s)\left(2\left(-d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(-d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-d\,(m-2\,k)-f\,(v-2\,s)\right)}\right)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m-v)}\left(d\,(m-2\,k)-f\,(v-2\,s)\right)^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-c\,(v-2\,s)\right)^{-h-j+2\,n}\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)-f\,(v-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(d\,(m-2\,k)-f\,(v-2\,s)\right)}\right)-$$

$$c\,(v-2\,s)\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.-\frac{\left(2\left(d\,(m-2\,k)-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(d\,(m-2\,k)-f\,(v-2\,s)\right)}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sinh^m(b\,z^r)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n\sinh^m(b\,z^2)\sinh^v(c\,z^2+f\,z+g)\,dz=\frac{i^{v-m}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-$$

$$i^{-m-v}\,2^{-m-v-1}\,z^{n+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma\!\left(\frac{n+1}{2},\,-b\,(m-2\,k)\,z^2\right)\left(-b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{-\frac{i\,m\,\pi}{2}}\left(b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,b\,(m-2\,k)\,z^2\right)\right)-i^{-m}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Biggl((-1)^v e^{g(2k-v)-\frac{f^2(2k-v)}{4c}}\Biggl(\sum_{j=0}^{n}2^{j-n}(-f(2k-v))^{n-j}(f(2k-v)+2cz(2k-v))^{j+1}$$

$$\left(-\frac{(f(2k-v)+2cz(2k-v))^2}{c(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(2k-v)+2cz(2k-v))^2}{4c(2k-v)}\right)\Biggr)(c(2k-v))^{-n-1}+$$

$$e^{g(v-2k)-\frac{f^2(v-2k)}{4c}}(c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2k))^{n-j}(f(v-2k)+2cz(v-2k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Biggr)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Biggl((-1)^v e^{g(2s-v)-\frac{f^2(2s-v)^2}{4(c(2s-v)-b(2k-m))}}\Biggl(\sum_{j=0}^{n}2^{j-n}(-f(2s-v))^{n-j}$$

$$(f(2s-v)+2(c(2s-v)-b(2k-m))z)^{j+1}\left(-\frac{(f(2s-v)+2(c(2s-v)-b(2k-m))z)^2}{c(2s-v)-b(2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(2s-v)+2(c(2s-v)-b(2k-m))z)^2}{4(c(2s-v)-b(2k-m))}\right)\Biggr)(c(2s-v)-b(2k-m))^{-n-1}+$$

$$(-1)^{m+v}e^{g(2s-v)-\frac{f^2(2s-v)^2}{4(c(2s-v)-b(m-2k))}}(c(2s-v)-b(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(2s-v))^{n-j}$$

$$(f(2s-v)+2(c(2s-v)-b(m-2k))z)^{j+1}\left(-\frac{(f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{c(2s-v)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{4(c(2s-v)-b(m-2k))}\right)+$$

$$e^{g(v-2s)-\frac{f^2(v-2s)^2}{4(c(v-2s)-b(2k-m))}}(c(v-2s)-b(2k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(c(v-2s)-b(2k-m))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{c(v-2s)-b(2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{4(c(v-2s)-b(2k-m))}\right)+$$

$$(-1)^m e^{g(v-2s)-\frac{f^2(v-2s)^2}{4(c(v-2s)-b(m-2k))}} (c(v-2s)-b(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(c(v-2s)-b(m-2k))z)^{j+1} \left(-\frac{(f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{c(v-2s)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{4(c(v-2s)-b(m-2k))}\right)\Bigg) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+ \wedge v \in \mathbb{N}^+$$

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$$\int z^n \sinh^m\left(b\sqrt{z}\right) \sinh^v\left(\sqrt{z}\, c+g+f z\right) dz = -i^{-m-v} 2^{-m-v+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k (m-2k)^{-2(n+1)} \binom{m}{k} \left(e^{\frac{i m\pi}{2}} \Gamma\left(2(n+1), -b(m-2k)\sqrt{z}\right) + e^{-\frac{i m\pi}{2}} \Gamma\left(2(n+1), b(m-2k)\sqrt{z}\right)\right)\right) b^{-2(n+1)} +$$

$$\frac{i^{-m-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1} + 2^{-m-2n-v-1} i^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} (f(v-2k))^{-2(n+1)} \Bigg(e^{\frac{(v-2k)c^2}{4f}-\frac{i\pi v}{2}-g(v-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2k))^{-h-j+2n}$$

$$\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j} \left(\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c(v-2k)$$

$$\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right) - 2f(v-2k)$$

$$\sqrt{\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\Bigg) +$$

$$e^{-\frac{(v-2k)c^2}{4f}+\frac{i\pi v}{2}+g(v-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(v-2k))^{-h-j+2n} \left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(c(v-2k)\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ -\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f\,(v-2\,s))^{-2\,(n+1)}\Bigg(e^{\frac{(-b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-\frac{1}{2}\,i\,\pi\,(m+v)-g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-b\,(m-2\,k)-c\,(v-2\,s))\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\Bigg(\frac{1}{2}(h+j+1),\ \frac{\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{\frac{(b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b(m-2k)-c(v-2s))\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2f(v-2s)\sqrt{\frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)+e^{-\frac{(c(v-2s)-b(m-2k))^2}{4f(v-2s)}+\frac{1}{2}i\pi(v-m)+g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2s)-b(m-2k))^{-h-j+2n}\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c(v-2s)-b(m-2k))\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2f(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\sqrt{-\frac{\left(-b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\right)+e^{-\frac{(b(m-2k)+c(v-2s))^2}{4f(v-2s)}+\frac{1}{2}i\pi(m+v)+g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b(m-2k)+c(v-2s))^{-h-j+2n}\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((b\,(m-2\,k)+c\,(v-2\,s))\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(b\,z^r+e)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n\sinh^m(b\,z^2+e)\sinh^v(c\,z^2+f\,z+g)\,dz = \frac{i^{v-m}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}-$$

$$i^{-m-v}\,2^{-m-v-1}\,z^{n+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\pi m}{2}+e\,(m-2\,k)}\,\Gamma\left(\frac{n+1}{2},\,-b\,(m-2\,k)\,z^2\right)\left(-b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{-\frac{1}{2}i\pi m-e\,(m-2\,k)}\left(b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,b\,(m-2\,k)\,z^2\right)\right)-i^{-m}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{g\,(2\,k-v)-\frac{f^2\,(2\,k-v)}{4\,c}}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2\,k-v))^{n-j}\,(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^{j+1}\right.\right.$$

$$\left.\left(-\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\,\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{4\,c\,(2\,k-v)}\right)\right)(c\,(2\,k-v))^{-n-1}+$$

$$e^{g\,(v-2\,k)-\frac{f^2\,(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{-\frac{f^2\,(2\,s-v)^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}+g\,(2\,s-v)-e\,(2\,k-m)}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2\,s-v))^{n-j}$$

$$(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^{j+1}\left(-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{c\,(2\,s-v)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}\right)\Bigg)(c\,(2\,s-v)-b\,(2\,k-m))^{-n-1}+$$

$$(-1)^{m+v}\,e^{-\frac{f^2\,(2\,s-v)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}+g\,(2\,s-v)-e\,(m-2\,k)}\,(c\,(2\,s-v)-b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(2\,s-v))^{n-j}$$

$$(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^{j+1}\left(-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{c\,(2\,s-v)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}\right)+$$

$$e^{-\frac{f^2\,(v-2\,s)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}+g\,(v-2\,s)-e\,(2\,k-m)}\,(c\,(v-2\,s)-b\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,s))^{n-j}$$

$$(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^{j+1}\left(-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{c\,(v-2\,s)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}\right)+$$

$$(-1)^m\,e^{-\frac{f^2\,(v-2\,s)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}+g\,(v-2\,s)-e\,(m-2\,k)}\,(c\,(v-2\,s)-b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,s))^{n-j}$$

$$(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^{j+1}\left(-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{c\,(v-2\,s)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sinh^m\left(\sqrt{z}\, b+e\right)\sinh^v\left(\sqrt{z}\, c+g+f\,z\right)dz = -i^{-m-v}\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k (m-2\,k)^{-2\,(n+1)}\binom{m}{k}\right.$$

$$\left.\left(e^{\frac{i\pi m}{2}+e\,(m-2\,k)}\,\Gamma\left(2\,(n+1),\,-b\,(m-2\,k)\sqrt{z}\right)+e^{-\frac{1}{2}\,i\,\pi\,m-e\,(m-2\,k)}\,\Gamma\left(2\,(n+1),\,b\,(m-2\,k)\sqrt{z}\right)\right)\right)b^{-2\,(n+1)}+$$

$$\frac{i^{-m-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1}+2^{-m-2\,n-v-1}\,i^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f\,(v-2\,k))^{-2\,(n+1)}\left(e^{\frac{(v-2\,k)\,c^2}{4\,f}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,k))^{-h-j+2\,n}\right.$$

$$\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)^{h+j}\left(\frac{\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2\,k)\right.$$

$$\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\left.\left.\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right.+$$

$$e^{-\frac{(v-2\,k)\,c^2}{4\,f}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)+2\,f\,(v-2\,k)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\right)\right)+$$

$$2^{-m-2n-v-1}\, i^{-m-v} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} (f(v-2s))^{-2(n+1)} \Bigg(e^{\frac{(-b(m-2k)-c(v-2s))^2}{4f(v-2s)}-e(m-2k)-\frac{1}{2}i\pi(m+v)-g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b(m-2k)-c(v-2s))^{-h-j+2n} \left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((-b(m-2k)-c(v-2s))\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right) -$$

$$2f(v-2s)\sqrt{\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\; \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)\Bigg) + e^{\frac{(b(m-2k)-c(v-2s))^2}{4f(v-2s)}+e(m-2k)+\frac{1}{2}i\pi(m-v)-g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b(m-2k)-c(v-2s))^{-h-j+2n} \left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((b(m-2k)-c(v-2s))\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right) -$$

$$2\,f\,(v-2\,s)\,\sqrt{\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+e^{-\frac{(c\,(v-2\,s)-b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}-e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-b\,(m-2\,k))^{-h-j+2\,n}\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,s)-b\,(m-2\,k))\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\sqrt{-\frac{\left(-b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)+e^{-\frac{(b\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,(m-2\,k)+c\,(v-2\,s))\left(b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2f(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(b\,z^r+d\,z)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n \sinh^m(b\,z^2+d\,z)\sinh^v(c\,z^2+f\,z+g)\,dz = \frac{i^{v-m}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{\frac{d^2(2k-m)}{4b}}\left(\sum_{j=0}^{n}2^{j-n}(d(2k-m))^{n-j}(-d(2k-m)-2bz(2k-m))^{j+1}\left(\frac{(-d(2k-m)-2bz(2k-m))^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-d(2k-m)-2bz(2k-m))^2}{4b(2k-m)}\right)\right)(-b(2k-m))^{-n-1}+\right.$$

$$(-1)^m e^{\frac{d^2(m-2k)}{4b}}(-b(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(d(m-2k))^{n-j}(-d(m-2k)-2bz(m-2k))^{j+1}$$

$$\left.\left(\frac{(-d(m-2k)-2bz(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-d(m-2k)-2bz(m-2k))^2}{4b(m-2k)}\right)\right) - i^{-m}\,2^{-m-v-1}$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v e^{g(2k-v)-\frac{f^2(2k-v)}{4c}}\left(\sum_{j=0}^{n}2^{j-n}(-f(2k-v))^{n-j}(f(2k-v)+2cz(2k-v))^{j+1}\right.\right.$$

$$\left.\left.\left(-\frac{(f(2k-v)+2cz(2k-v))^2}{c(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f(2k-v)+2cz(2k-v))^2}{4c(2k-v)}\right)\right)(c(2k-v))^{-n-1}+\right.$$

$$e^{g(v-2k)-\frac{f^2(v-2k)}{4c}}(c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2k))^{n-j}(f(v-2k)+2cz(v-2k))^{j+1}$$

$$\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\,\Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v\, e^{g\,(2\,s-v)-\frac{(f\,(2\,s-v)-d\,(2\,k-m))^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}} \Bigg(\sum_{j=0}^{n} 2^{j-n}\,(d\,(2\,k-m)-f\,(2\,s-v))^{n-j}$$

$$(-d\,(2\,k-m)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^{j+1}$$

$$\left(-\frac{(-d\,(2\,k-m)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{c\,(2\,s-v)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(-d\,(2\,k-m)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,z)^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}\right)\Bigg)$$

$$(c\,(2\,s-v)-b\,(2\,k-m))^{-n-1} + (-1)^{m+v}\, e^{g\,(2\,s-v)-\frac{(f\,(2\,s-v)-d\,(m-2\,k))^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}}\,(c\,(2\,s-v)-b\,(m-2\,k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(d\,(m-2\,k)-f\,(2\,s-v))^{n-j}\,(-d\,(m-2\,k)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(-d\,(m-2\,k)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{c\,(2\,s-v)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(-d\,(m-2\,k)+f\,(2\,s-v)+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,z)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}\right) +$$

$$e^{g\,(v-2\,s)-\frac{(f\,(v-2\,s)-d\,(2\,k-m))^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}}\,(c\,(v-2\,s)-b\,(2\,k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(d\,(2\,k-m)-f\,(v-2\,s))^{n-j}$$

$$(-d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^{j+1}$$

$$\left(-\frac{(-d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{c\,(v-2\,s)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(-d\,(2\,k-m)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,z)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}\right) +$$

$$(-1)^m\, e^{g\,(v-2\,s)-\frac{(f\,(v-2\,s)-d\,(m-2\,k))^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}}\,(c\,(v-2\,s)-b\,(m-2\,k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(d\,(m-2\,k)-f\,(v-2\,s))^{n-j}\,(-d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{c\,(v-2\,s)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(-d\,(m-2\,k)+f\,(v-2\,s)+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,z)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}\right)\Bigg) /;\, n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \sinh^m\left(\sqrt{z}\, b + d\, z\right) \sinh^v\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{i^{v-m}\, 2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2)}{n+1} + i^v\, 2^{-m-2n-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{b^2 (2k-m)}{4d}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b\,(2k-m))^{-h-j+2n} \left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right)^{h+j} \left(\frac{\left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\,(2k-m) \left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right)^2}{4d\,(2k-m)} \right) - 2d\,(2k-m) \sqrt{\frac{\left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b\,(2k-m) - 2d\sqrt{z}\,(2k-m)\right)^2}{4d\,(2k-m)} \right) \right) \right) (-d\,(2k-m))^{-2n-2} + (-1)^m\, e^{\frac{b^2 (m-2k)}{4d}} (-d\,(m-2k))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b\,(m-2k))^{-h-j+2n} \left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right)^{h+j} \left(\frac{\left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-b\,(m-2k) \left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right)^2}{4d\,(m-2k)} \right) - 2d\,(m-2k) \sqrt{\frac{\left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b\,(m-2k) - 2d\sqrt{z}\,(m-2k)\right)^2}{4d\,(m-2k)} \right) \right) \right) +$$

$$i^{-m} 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{g(2k-\nu) - \frac{c^2 (2k-\nu)}{4f}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-\nu))^{-h-j+2n} \right.\right.$$

$$\left(c(2k-\nu) + 2f\sqrt{z}\,(2k-\nu)\right)^{h+j} \left(-\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(2k-\nu) \right.$$

$$\left(c(2k-\nu) + 2f\sqrt{z}\,(2k-\nu)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)} \right) + 2f(2k-\nu)$$

$$\left.\left.\left. \sqrt{-\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f(2k-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{4f(2k-\nu)} \right) \right)\right)\right)$$

$$(f(2k-\nu))^{-2n-2} + e^{g(\nu-2k) - \frac{c^2 (\nu-2k)}{4f}} (f(\nu-2k))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2k))^{-h-j+2n}$$

$$\left(c(\nu-2k) + 2f\sqrt{z}\,(\nu-2k)\right)^{h+j} \left(-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(\nu-2k) \right.$$

$$\left(c(\nu-2k) + 2f\sqrt{z}\,(\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)} \right) + 2f(\nu-2k)$$

$$\left.\left.\left. \sqrt{-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)} \right) \right)\right)\right) +$$

$$2^{-m-2n-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left((-1)^\nu e^{g(2k-\nu) - \frac{(c(2k-\nu)-b(2s-m))^2}{4(f(2k-\nu)-d(2s-m))}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j \right.\right.$$

$$(c(2k-\nu) - b(2s-m))^{-h-j+2n} \left(-b(2s-m) + c(2k-\nu) + 2(f(2k-\nu) - d(2s-m))\sqrt{z} \right)^{h+j}$$

$$\left(-\frac{\left(-b(2s-m) + c(2k-\nu) + 2(f(2k-\nu)-d(2s-m))\sqrt{z}\right)^2}{f(2k-\nu) - d(2s-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((c(2k-\nu) - b(2s-m)) \left(-b(2s-m) + c(2k-\nu) + 2(f(2k-\nu) - d(2s-m))\sqrt{z} \right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(-b(2s-m)+c(2k-v)+2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (4(f(2k-v)-d(2s-m)))\right)+2(f(2k-v)-d(2s-m))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(-b(2s-m)+c(2k-v)+2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (4(f(2k-v)-d(2s-m)))\right)\sqrt{\left(-\left(-b(2s-m)+c(2k-v)+2(f(2k-v)-d(2s-m))\sqrt{z}\right)^2 \Big/ (f(2k-v)-d(2s-m))\right)}\Bigg)$$

$$(f(2k-v)-d(2s-m))^{-2n-2}+(-1)^{m+v}\, e^{g(2k-v)-\frac{(c(2k-v)-b(m-2s))^2}{4(f(2k-v)-d(m-2s))}}\,(f(2k-v)-d(m-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(2k-v)-b(m-2s))^{-h-j+2n}$$

$$\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{f(2k-v)-d(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c(2k-v)-b(m-2s))\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.-\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{4(f(2k-v)-d(m-2s))}\right)+2(f(2k-v)-d(m-2s))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2}{4(f(2k-v)-d(m-2s))}\right)$$

$$\sqrt{\left(-\left(-b(m-2s)+c(2k-v)+2(f(2k-v)-d(m-2s))\sqrt{z}\right)^2 \Big/ (f(2k-v)-d(m-2s))\right)}\Bigg)+e^{g(v-2k)-\frac{(c(v-2k)-b(2s-m))^2}{4(f(v-2k)-d(2s-m))}}$$

$$(f(v-2k)-d(2s-m))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2k)-b(2s-m))^{-h-j+2n}$$

$$\left(-b(2s-m)+c(v-2k)+2(f(v-2k)-d(2s-m))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(2\,s-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-b\,(2\,s-m))\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\Bigg)+2\,(f\,(v-2\,k)-d\,(2\,s-m))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\right)$$

$$\sqrt{\left(-\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\right)^2\Big/\right.}$$

$$\left.(f\,(v-2\,k)-d\,(2\,s-m))\right)\Bigg)+(-1)^m\,e^{g\,(v-2\,k)-\frac{(c\,(v-2\,k)-b\,(m-2\,s))^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}}$$

$$(f\,(v-2\,k)-d\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-b\,(m-2\,s))\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\Bigg)+2\,(f\,(v-2\,k)-d\,(m-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\right)$$

$$\sqrt{\left(-\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\,\sqrt{z}\right)^2\Big/\right.}$$

$$\left.(f\,(v-2\,k)-d\,(m-2\,s))\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sinh^m(b z^r + d z + e) \sinh^v(c z^r + f z + g)$

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$$\int z^n \sinh^m(b z^2 + d z + e) \sinh^v(c z^2 + f z + g)\, dz = \frac{i^{v-m} 2^{-m-v} z^{n+1} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} - i^v 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{d^2 (2k-m)}{4b} - e(2k-m)} (-b(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d(2k-m))^{n-j} (-d(2k-m) - 2bz(2k-m))^{j+1} \left(\frac{(-d(2k-m) - 2bz(2k-m))^2}{b(2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d(2k-m) - 2bz(2k-m))^2}{4b(2k-m)} \right) + (-1)^m e^{\frac{d^2 (m-2k)}{4b} - e(m-2k)} (-b(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d(m-2k))^{n-j} (-d(m-2k) - 2bz(m-2k))^{j+1} \left(\frac{(-d(m-2k) - 2bz(m-2k))^2}{b(m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-d(m-2k) - 2bz(m-2k))^2}{4b(m-2k)} \right) \right) - i^{-m} 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{g(2k-v) - \frac{f^2 (2k-v)}{4c}} (c(2k-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(2k-v))^{n-j} (f(2k-v) + 2cz(2k-v))^{j+1} \left(-\frac{(f(2k-v) + 2cz(2k-v))^2}{c(2k-v)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(2k-v) + 2cz(2k-v))^2}{4c(2k-v)} \right) + e^{g(v-2k) - \frac{f^2 (v-2k)}{4c}} (c(v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(v-2k))^{n-j} (f(v-2k) + 2cz(v-2k))^{j+1} \left(-\frac{(f(v-2k) + 2cz(v-2k))^2}{c(v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2k) + 2cz(v-2k))^2}{4c(v-2k)} \right) \right) - 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{-\frac{(f(2s-v) - d(2k-m))^2}{4(c(2s-v) - b(2k-m))} - e(2k-m) + g(2s-v)} (c(2s-v) - b(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (d(2k-m) - f(2s-v))^{n-j} (-d(2k-m) + f(2s-v) + 2(c(2s-v) - b(2k-m))z)^{j+1} \left(-\frac{(-d(2k-m) + f(2s-v) + 2(c(2s-v) - b(2k-m))z)^2}{c(2s-v) - b(2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \right.$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-d(2k-m)+f(2s-v)+2(c(2s-v)-b(2k-m))z)^2}{4(c(2s-v)-b(2k-m))}\right)+$$

$$(-1)^{m+v} e^{-\frac{(f(2s-v)-d(m-2k))^2}{4(c(2s-v)-b(m-2k))}-e(m-2k)+g(2s-v)} (c(2s-v)-b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (d(m-2k)-f(2s-v))^{n-j} (-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^{j+1}$$

$$\left(-\frac{(-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{c(2s-v)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-d(m-2k)+f(2s-v)+2(c(2s-v)-b(m-2k))z)^2}{4(c(2s-v)-b(m-2k))}\right)+$$

$$e^{-\frac{(f(v-2s)-d(2k-m))^2}{4(c(v-2s)-b(2k-m))}-e(2k-m)+g(v-2s)} (c(v-2s)-b(2k-m))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (d(2k-m)-f(v-2s))^{n-j} (-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^{j+1}$$

$$\left(-\frac{(-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{c(v-2s)-b(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-d(2k-m)+f(v-2s)+2(c(v-2s)-b(2k-m))z)^2}{4(c(v-2s)-b(2k-m))}\right)+$$

$$(-1)^{m} e^{-\frac{(f(v-2s)-d(m-2k))^2}{4(c(v-2s)-b(m-2k))}-e(m-2k)+g(v-2s)} (c(v-2s)-b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (d(m-2k)-f(v-2s))^{n-j} (-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^{j+1}$$

$$\left(-\frac{(-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{c(v-2s)-b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\left.\Gamma\left(\frac{j+1}{2}, -\frac{(-d(m-2k)+f(v-2s)+2(c(v-2s)-b(m-2k))z)^2}{4(c(v-2s)-b(m-2k))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sinh^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^v\left(\sqrt{z}\, c + f\, z + g\right) dz =$$

$$\frac{i^{v-m}\, 2^{-m-v}\, z^{n+1}\, (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} + i^v\, 2^{-m-2n-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{b^2 (2k-m)}{4d} - e(2k-m)} (-d(2k-m))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b(2k-m))^{-h-j+2n} \right.$$

$$\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)^{h+j}\left(\frac{\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(-b\,(2k-m)\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)^2}{4d\,(2k-m)}\right)-\right.$$

$$2d\,(2k-m)\sqrt{\frac{\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(-b\,(2k-m)-2d\sqrt{z}\,(2k-m)\right)^2}{4d\,(2k-m)}\right)\right)+(-1)^m\,e^{\frac{b^2(m-2k)}{4d}-e\,(m-2k)}$$

$$(-d\,(m-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2k))^{-h-j+2n}\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(\frac{\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-b\,(m-2k)\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)^2}{4d\,(m-2k)}\right)-2d\,(m-2k)$$

$$\left.\left.\sqrt{\frac{\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-b\,(m-2k)-2d\sqrt{z}\,(m-2k)\right)^2}{4d\,(m-2k)}\right)\right)\right)+$$

$$i^{-m}\,2^{-m-2n-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu\,e^{g\,(2k-\nu)-\frac{c^2(2k-\nu)}{4f}}\,(f\,(2k-\nu))^{-2n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2k-\nu))^{-h-j+2n}\left(c\,(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(2k-\nu)+2f\sqrt{z}\,(2k-\nu)\right)^2}{f\,(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(2\,k-v)\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)+2\,f\,(2\,k-$$

$$v)\,\sqrt{-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{f\,(2\,k-v)}}\,\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)\Bigg)\Bigg)+$$

$$e^{g\,(v-2\,k)-\frac{c^2\,(v-2\,k)}{4\,f}}\,(f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\,\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg((-1)^v\,e^{-\frac{(c\,(2\,k-v)-b\,(2\,s-m))^2}{4\,(f\,(2\,k-v)-d\,(2\,s-m))}-e\,(2\,s-m)+g\,(2\,k-v)}\,(f\,(2\,k-v)-d\,(2\,s-m))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2\,k-v)-b\,(2\,s-m))^{-h-j+2\,n}$$

$$\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\right)^2}{f\,(2\,k-v)-d\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(2\,k-v)-b\,(2\,s-m))\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\,\right)^2}{4\,(f\,(2\,k-v)-d\,(2\,s-m))}\Bigg)+2\,(f\,(2\,k-v)-d\,(2\,s-m))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\,\right)^2}{4\,(f\,(2\,k-v)-d\,(2\,s-m))}\right)$$

$$\sqrt{-\frac{\left(-b\,(2\,s-m)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(2\,s-m))\,\sqrt{z}\,\right)^2}{f\,(2\,k-v)-d\,(2\,s-m)}}\;\Bigg)+$$

$$(-1)^{m+v}\,e^{-\frac{(c\,(2\,k-v)-b\,(m-2\,s))^2}{4\,(f\,(2\,k-v)-d\,(m-2\,s))}-e\,(m-2\,s)+g\,(2\,k-v)}\,(f\,(2\,k-v)-d\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(c\,(2\,k-v)-b\,(m-2\,s))^{-h-j+2\,n}\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)^2}{f\,(2\,k-v)-d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(2\,k-v)-b\,(m-2\,s))\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)^2}{4\,(f\,(2\,k-v)-d\,(m-2\,s))}\Bigg)+2\,(f\,(2\,k-v)-d\,(m-2\,s))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)^2}{4\,(f\,(2\,k-v)-d\,(m-2\,s))}\right)$$

$$\sqrt{-\frac{\left(-b\,(m-2\,s)+c\,(2\,k-v)+2\,(f\,(2\,k-v)-d\,(m-2\,s))\,\sqrt{z}\,\right)^2}{f\,(2\,k-v)-d\,(m-2\,s)}}\;\Bigg)+$$

$$e^{-\frac{(c\,(v-2\,k)-b\,(2\,s-m))^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}-e\,(2\,s-m)+g\,(v-2\,k)}\,(f\,(v-2\,k)-d\,(2\,s-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(c\,(v-2\,k)-b\,(2\,s-m))^{-h-j+2\,n}\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\,\sqrt{z}\,\right)^2}{f\,(v-2\,k)-d\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,k)-b\,(2\,s-m))\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\right)+2\,(f\,(v-2\,k)-d\,(2\,s-m))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(2\,s-m))}\right)$$

$$\left.\sqrt{-\frac{\left(-b\,(2\,s-m)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(2\,s-m))\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(2\,s-m)}}\right)+$$

$$(-1)^m\,e^{-\frac{(c\,(v-2\,k)-b\,(m-2\,s))^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}-e\,(m-2\,s)+g\,(v-2\,k)}\,(f\,(v-2\,k)-d\,(m-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(c\,(v-2\,k)-b\,(m-2\,s))^{-h-j+2\,n}\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,k)-b\,(m-2\,s))\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\right)+2\,(f\,(v-2\,k)-d\,(m-2\,s))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)^2}{4\,(f\,(v-2\,k)-d\,(m-2\,s))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-b\,(m-2\,s)+c\,(v-2\,k)+2\,(f\,(v-2\,k)-d\,(m-2\,s))\sqrt{z}\right)^2}{f\,(v-2\,k)-d\,(m-2\,s)}}\right)\right)\,/;\,n\in$$

$$\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving rational functions of the direct function and a power function

Involving $\frac{z}{a+b\sinh(c\,z+d)}$

01.19.21.2075.01

$$\int \frac{z}{i-\sinh(z)}\,dz = -\frac{2\,i\sinh\left(\frac{z}{2}\right)z}{\cosh\left(\frac{z}{2}\right)+i\sinh\left(\frac{z}{2}\right)} + z - 2\tan^{-1}\left(\tanh\left(\frac{z}{2}\right)\right) + i\log(\cosh(z))$$

01.19.21.2076.01

$$\int \frac{z}{i+\sinh(z)}\,dz = -\frac{2\,i\sinh\left(\frac{z}{2}\right)z}{\cosh\left(\frac{z}{2}\right)-i\sinh\left(\frac{z}{2}\right)} - z + 2\tan^{-1}\left(\tanh\left(\frac{z}{2}\right)\right) + i\log(\cosh(z))$$

01.19.21.2077.01

$$\int \frac{z}{a+b\sinh(c\,z)}\,dz = -\frac{1}{c^2}\left(\frac{i\,\pi\tanh^{-1}\left(\frac{a\tanh\left(\frac{c\,z}{2}\right)-b}{\sqrt{a^2+b^2}}\right)}{\sqrt{a^2+b^2}} + \right.$$

$$\frac{1}{\sqrt{-a^2-b^2}}\left((\pi-2\,i\,c\,z)\tanh^{-1}\left(\frac{(a-i\,b)\cot\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)+2\cos^{-1}\left(-\frac{i\,a}{b}\right)\tanh^{-1}\left(\frac{(a+i\,b)\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)+\right.$$

$$\left(\cos^{-1}\left(-\frac{i\,a}{b}\right)+2\,i\left(\tanh^{-1}\left(\frac{(a-i\,b)\cot\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)+\tanh^{-1}\left(\frac{(a+i\,b)\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)\right)\right)$$

$$\log\left(\frac{\left(\frac{1}{2}+\frac{i}{2}\right)\sqrt{-a^2-b^2}\,e^{\frac{c\,z}{2}}}{\sqrt{-i\,b}\,\sqrt{a+b\sinh(c\,z)}}\right)+$$

$$\left(\cos^{-1}\left(-\frac{i\,a}{b}\right)-2\,i\tanh^{-1}\left(\frac{(a-i\,b)\cot\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)-2\,i\tanh^{-1}\left(\frac{(a+i\,b)\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(\frac{\left(\frac{1}{2}-\frac{i}{2}\right)\sqrt{-a^2-b^2}\,e^{-\frac{c\,z}{2}}}{\sqrt{-i\,b}\,\sqrt{a+b\sinh(c\,z)}}\right)-\left(\cos^{-1}\left(-\frac{i\,a}{b}\right)-2\,i\tanh^{-1}\left(\frac{(a+i\,b)\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(\frac{(b+i\,a)\left(-b+i\,a+\sqrt{-a^2-b^2}\right)\left(i+\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}{b\left(a-i\,b+\sqrt{-a^2-b^2}\,\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}\right)-$$

$$\left(\cos^{-1}\left(-\frac{i\,a}{b}\right)+2\,i\tanh^{-1}\left(\frac{(a+i\,b)\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(\frac{(b+i\,a)\left(a+\left(b+\sqrt{-a^2-b^2}\right)i\right)\left(-i+\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}{b\left(b+i\,a+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}\right)+$$

$$i\left(\mathrm{Li}_2\left(\frac{\left(i\,a+\sqrt{-a^2-b^2}\right)\left(b+i\,a-i\sqrt{-a^2-b^2}\,\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}{b\left(b+i\,a+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}\right)-\right.$$

$$\left.\left.\left.\mathrm{Li}_2\left(\frac{\left(a+i\sqrt{-a^2-b^2}\right)\left(-a+i\,b+\sqrt{-a^2-b^2}\,\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}{b\left(b+i\,a+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(\pi-2\,i\,c\,z)\right)\right)}\right)\right)\right)\right)$$

01.19.21.2078.01

$$\int \frac{z}{a+b\sinh(c+z)}\,dz = -\frac{i\pi\tanh^{-1}\left(\frac{a\tanh\left(\frac{c+z}{2}\right)-b}{\sqrt{a^2+b^2}}\right)}{\sqrt{a^2+b^2}} - \frac{1}{\sqrt{-a^2-b^2}}\left((-2ic+\pi-2iz)\tanh^{-1}\left(\frac{(a-ib)\cot\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right) + \right.$$

$$2\left(-ic+\cos^{-1}\left(-\frac{ia}{b}\right)\right)\tanh^{-1}\left(\frac{(a+ib)\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right) +$$

$$\left(\cos^{-1}\left(-\frac{ia}{b}\right)+2i\left(\tanh^{-1}\left(\frac{(a-ib)\cot\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)+\tanh^{-1}\left(\frac{(a+ib)\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)\right)\right)$$

$$\log\left(\frac{\sqrt[4]{-1}\sqrt{-a^2-b^2}\,e^{\frac{c+z}{2}}}{\sqrt{2}\sqrt{-ib}\sqrt{a+b\sinh(c+z)}}\right) +$$

$$\left(\cos^{-1}\left(-\frac{ia}{b}\right)-2i\tanh^{-1}\left(\frac{(a-ib)\cot\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)-2i\tanh^{-1}\left(\frac{(a+ib)\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(-\frac{(-1)^{3/4}\sqrt{-a^2-b^2}\,e^{-\frac{c}{2}-\frac{z}{2}}}{\sqrt{2}\sqrt{-ib}\sqrt{a+b\sinh(c+z)}}\right) - \left(\cos^{-1}\left(-\frac{ia}{b}\right)-2i\tanh^{-1}\left(\frac{(a+ib)\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(\frac{(b+ia)\left(-b+ia+\sqrt{-a^2-b^2}\right)\left(i+\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}{b\left(a-ib+\sqrt{-a^2-b^2}\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}\right) -$$

$$\left(\cos^{-1}\left(-\frac{ia}{b}\right)+2i\tanh^{-1}\left(\frac{(a+ib)\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)}{\sqrt{-a^2-b^2}}\right)\right)$$

$$\log\left(\frac{(b+ia)\left(a+\left(b+\sqrt{-a^2-b^2}\right)i\right)\left(-i+\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}{b\left(b+ia+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}\right) +$$

$$i\left(\mathrm{Li}_2\left(\frac{\left(ia+\sqrt{-a^2-b^2}\right)\left(b+ia-i\sqrt{-a^2-b^2}\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}{b\left(b+ia+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}\right) - \right.$$

$$\left.\left.\mathrm{Li}_2\left(\frac{\left(a+i\sqrt{-a^2-b^2}\right)\left(-a+ib+\sqrt{-a^2-b^2}\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}{b\left(b+ia+\sqrt{-a^2-b^2}\,i\tan\left(\frac{1}{4}(-2ic+\pi-2iz)\right)\right)}\right)\right)\right)$$

Involving $\frac{z \sinh(c z)}{a+b \sinh(2 c z)}$

01.19.21.2079.01

$$\int \frac{z\sinh(c\,z)}{a+b\sinh(2\,c\,z)}\,dz = \frac{1}{4\sqrt{a^2+b^2}\;c^2}\left(\frac{b}{\sqrt{a^2+b^2}-a}\left(\frac{2}{9}\,e^{3\,c\,z}\,{}_3F_2\!\left(\frac{3}{2},\frac{3}{2},1;\frac{5}{2},\frac{5}{2};\frac{b\,e^{2\,c\,z}}{\sqrt{a^2+b^2}-a}\right)+\frac{1}{b^{3/2}}\sqrt{\sqrt{a^2+b^2}-a}\right.\right.$$

$$\left(c\,z\left(-2\left(\sqrt{a^2+b^2}-a\right)\tanh^{-1}\!\left(\frac{\sqrt{b}\;e^{c\,z}}{\sqrt{\sqrt{a^2+b^2}-a}}\right)+2\sqrt{b}\,\sqrt{\sqrt{a^2+b^2}-a}\;e^{c\,z}+\right.\right.$$

$$\left.b\log\!\left(\frac{e^{c\,z}\sqrt{b}}{\sqrt{\sqrt{a^2+b^2}-a}}+1\right)-b\log\!\left(1-\frac{\sqrt{b}\;e^{c\,z}}{\sqrt{\sqrt{a^2+b^2}-a}}\right)\right)-$$

$$\left.\left.\left.b\,\mathrm{Li}_2\!\left(\frac{\sqrt{b}\;e^{c\,z}}{\sqrt{\sqrt{a^2+b^2}-a}}\right)+b\,\mathrm{Li}_2\!\left(-\frac{\sqrt{b}\;e^{c\,z}}{\sqrt{\sqrt{a^2+b^2}-a}}\right)\right)\right)\right)+$$

$$\frac{b}{a+\sqrt{a^2+b^2}}\left(\frac{2}{9}\,e^{3\,c\,z}\,{}_3F_2\!\left(\frac{3}{2},\frac{3}{2},1;\frac{5}{2},\frac{5}{2};-\frac{b\,e^{2\,c\,z}}{a+\sqrt{a^2+b^2}}\right)+\frac{i}{b^{3/2}}\sqrt{a+\sqrt{a^2+b^2}}\right.$$

$$\left(c\,z\left(2\,i\sqrt{b}\,\sqrt{a+\sqrt{a^2+b^2}}\;e^{c\,z}-2\,i\left(a+\sqrt{a^2+b^2}\right)\tan^{-1}\!\left(\frac{\sqrt{b}\;e^{c\,z}}{\sqrt{a+\sqrt{a^2+b^2}}}\right)+\right.\right.$$

$$\left.b\log\!\left(1-\frac{i\sqrt{b}\;e^{c\,z}}{\sqrt{a+\sqrt{a^2+b^2}}}\right)-b\log\!\left(1+\frac{i\sqrt{b}\;e^{c\,z}}{\sqrt{a+\sqrt{a^2+b^2}}}\right)\right)+$$

$$\left.\left.\left.b\,\mathrm{Li}_2\!\left(\frac{i\sqrt{b}\;e^{c\,z}}{\sqrt{a+\sqrt{a^2+b^2}}}\right)-b\,\mathrm{Li}_2\!\left(-\frac{i\sqrt{b}\;e^{c\,z}}{\sqrt{a+\sqrt{a^2+b^2}}}\right)\right)\right)\right)$$

Involving algebraic functions of the direct function and a power function

Involving $\frac{z\sinh(cz)}{\left(a+b\sinh^2(cz)\right)^\beta}$

01.19.21.2080.01

$$\int \frac{z\sinh(cz)}{\left(a+b\sinh^2(cz)\right)^{3/2}}\,dz = \frac{1}{(a-b)\,c^2}\left(\frac{c\,z\cosh(cz)}{\sqrt{a+\frac{1}{2}\,b\cosh(2\,c\,z)-\frac{b}{2}}} - \frac{\tanh^{-1}\left(\frac{\sqrt{2}\,\sqrt{b}\,\sinh(cz)}{\sqrt{2\,a-b+b\cosh(2\,c\,z)}}\right)}{\sqrt{b}}\right)$$

Involving functions of the direct function and algebraic functions

Involving products of the direct function and algebraic functions

Involving products of two direct functions and algebraic functions

Involving $(f+e\,z)^{\alpha-1}\sinh(d+c\,z)\sinh(b+a\,z)$

01.19.21.2081.01

$$\int (f+e\,z)^{\alpha-1}\sinh(d+c\,z)\sinh(b+a\,z)\,dz = \frac{1}{4\,e}\left((f+e\,z)^\alpha\left(-\frac{(a-c)^2\,(f+e\,z)^2}{e^2}\right)^{-\alpha}\left(-\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^{-\alpha}\right.$$
$$\left(-\left(\Gamma\left(\alpha,-\frac{(a+c)\,(f+e\,z)}{e}\right)\left(\cosh\left(b+d-\frac{(a+c)\,f}{e}\right)+\sinh\left(b+d-\frac{(a+c)\,f}{e}\right)\right)\right)\left(\frac{(a+c)\,(f+e\,z)}{e}\right)^\alpha+\right.$$
$$\left(-\frac{(a+c)\,(f+e\,z)}{e}\right)^\alpha\Gamma\left(\alpha,\frac{(a+c)\,(f+e\,z)}{e}\right)\left(\cosh\left(b+d-\frac{(a+c)\,f}{e}\right)-\sinh\left(b+d-\frac{(a+c)\,f}{e}\right)\right)\Bigg)\Bigg)$$
$$\left(-\frac{(a-c)^2\,(f+e\,z)^2}{e^2}\right)^\alpha+\left(\frac{(c-a)\,(f+e\,z)}{e}\right)^\alpha\left(-\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^\alpha\Gamma\left(\alpha,\frac{(a-c)\,(f+e\,z)}{e}\right)$$
$$\left(\cosh\left(b-d+\frac{(c-a)\,f}{e}\right)-\sinh\left(b-d+\frac{(c-a)\,f}{e}\right)\right)+\left(\frac{(a-c)\,(f+e\,z)}{e}\right)^\alpha\left(-\frac{(a+c)^2\,(f+e\,z)^2}{e^2}\right)^\alpha$$
$$\left.\Gamma\left(\alpha,\frac{(c-a)\,(f+e\,z)}{e}\right)\left(\cosh\left(b-d+\frac{(c-a)\,f}{e}\right)+\sinh\left(b-d+\frac{(c-a)\,f}{e}\right)\right)\right)\Bigg)$$

01.19.21.2082.01

$$\int \frac{\sinh(d+c\,z)\sinh(b+a\,z)}{f+e\,z}\,dz =$$
$$\frac{1}{2\,e}\left(-\cosh\left(\frac{b\,e-d\,e-a\,f+c\,f}{e}\right)\operatorname{Chi}\left(\frac{(a-c)\,(f+e\,z)}{e}\right)+\cosh\left(b+d-\frac{(a+c)\,f}{e}\right)\operatorname{Chi}\left(\frac{(a+c)\,(f+e\,z)}{e}\right)-\right.$$
$$\left.\sinh\left(\frac{b\,e-d\,e-a\,f+c\,f}{e}\right)\operatorname{Shi}\left(\frac{(a-c)\,(f+e\,z)}{e}\right)+\sinh\left(b+d-\frac{(a+c)\,f}{e}\right)\operatorname{Shi}\left(\frac{(a+c)\,(f+e\,z)}{e}\right)\right)$$

01.19.21.2083.01

$$\int \frac{\sinh(a\,z)\sinh(b+a\,z)}{b+a\,z}\,dz = \frac{\cosh(b)\,\mathrm{Chi}(2\,(b+a\,z)) - \cosh(b)\log(b+a\,z) - \sinh(b)\,\mathrm{Shi}(2\,(b+a\,z))}{2\,a}$$

Involving functions of the direct function and exponential function

Involving powers of the direct function and exponential function

Involving powers of sinh and exp

Involving $e^{b\,z}\sinh^{\nu}(a\,z)$

01.19.21.2084.01

$$\int e^{b\,z}\sinh^{\nu}(a\,z)\,dz = \frac{e^{b\,z}\left(-e^{-a\,z}+e^{a\,z}\right)^{\nu}}{b-a\,\nu}\left(2-2\,e^{2\,a\,z}\right)^{-\nu}\,{}_2F_1\!\left(\frac{b-a\,\nu}{2\,a}, -\nu; \frac{1}{2}\left(\frac{b}{a}-\nu+2\right); e^{2\,a\,z}\right)$$

01.19.21.2085.01

$$\int e^{b\,z}\sinh^{\nu}(a\,z)\,dz = \left(\frac{i}{2}\right)^{\nu}\frac{e^{b\,z}\,(1-\nu \bmod 2)}{b}\binom{\nu}{\frac{\nu}{2}} + 2^{-\nu}\sum_{i=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{i}\binom{\nu}{i}\left(\frac{(-1)^{\nu}\,e^{(b+2\,a\,i-a\,\nu)\,z}}{b+2\,a\,i-a\,\nu} + \frac{e^{(b-2\,a\,i+a\,\nu)\,z}}{b-2\,a\,i+a\,\nu}\right)/;\ \nu\in\mathbb{N}$$

01.19.21.2086.01

$$\int e^{b\,z}\sinh^{2}(a\,z)\,dz = \frac{e^{b\,z}\left(-4\,a^{2}+2\,b\sinh(2\,a\,z)\,a+b^{2}-b^{2}\cosh(2\,a\,z)\right)}{8\,a^{2}\,b-2\,b^{3}}$$

01.19.21.2087.01

$$\int e^{a\,z}\sinh^{2}(a\,z)\,dz = \frac{e^{-a\,z}\left(-3-6\,e^{2\,a\,z}+e^{4\,a\,z}\right)}{12\,a}$$

01.19.21.2088.01

$$\int e^{2\,a\,z}\sinh^{2}(a\,z)\,dz = \frac{4\,a\,z-4\,e^{2\,a\,z}+e^{4\,a\,z}}{16\,a}$$

01.19.21.2089.01

$$\int e^{b\,z}\sinh^{3}(a\,z)\,dz = \frac{1}{4\left(9\,a^{4}-10\,b^{2}\,a^{2}+b^{4}\right)}\left(e^{b\,z}\left(3\,a\left(b^{2}-9\,a^{2}\right)\cosh(a\,z)+3\,a\left(a^{2}-b^{2}\right)\cosh(3\,a\,z)+2\,b\left(13\,a^{2}-b^{2}+\left(b^{2}-a^{2}\right)\cosh(2\,a\,z)\right)\sinh(a\,z)\right)\right)$$

01.19.21.2090.01

$$\int e^{b\,z}\sinh^{4}(a\,z)\,dz = \frac{1}{8}\,e^{b\,z}\left(-\frac{4\,b\cosh(2\,a\,z)}{b^{2}-4\,a^{2}}+\frac{b\cosh(4\,a\,z)}{b^{2}-16\,a^{2}}+\frac{4\,a\sinh(4\,a\,z)}{16\,a^{2}-b^{2}}+\frac{3}{b}-\frac{8\,a\sinh(2\,a\,z)}{4\,a^{2}-b^{2}}\right)$$

01.19.21.2091.01

$$\int e^{2\,a\,z}\sinh^{4}(a\,z)\,dz = -\frac{24\,a\,z+3\,e^{-2\,a\,z}-18\,e^{2\,a\,z}+6\,e^{4\,a\,z}-e^{6\,a\,z}}{96\,a}$$

01.19.21.2092.01

$$\int e^{-2\,a\,z}\sinh^{4}(a\,z)\,dz = -\frac{24\,a\,z+e^{-6\,a\,z}-6\,e^{-4\,a\,z}+18\,e^{-2\,a\,z}-3\,e^{2\,a\,z}}{96\,a}$$

01.19.21.2093.01

$$\int \frac{\sinh^3(a z)}{\sqrt{e^{b z}}} \, dz = \left(3 a \left(b^2 - 36 a^2\right) \cosh(a z) + 3 a \left(4 a^2 - b^2\right) \cosh(3 a z) - b \left(52 a^2 - b^2 + \left(b^2 - 4 a^2\right) \cosh(2 a z)\right) \sinh(a z)\right) \Big/ \left(\left(144 a^4 - 40 b^2 a^2 + b^4\right) \sqrt{e^{b z}}\right)$$

Involving $e^{p z+e} \sinh^\nu(a z)$

01.19.21.2094.01

$$\int e^{e+p z} \sinh^\nu(a z) \, dz = \frac{e^{e+p z} \sinh^\nu(a z)}{p + a \nu} \left(1 - e^{-2 a z}\right)^{-\nu} {}_2F_1\left(-\frac{p + a \nu}{2 a}, -\nu; \frac{1}{2}\left(-\frac{p}{a} - \nu + 2\right); e^{-2 a z}\right)$$

01.19.21.2095.01

$$\int e^{e+p z} \sinh^\nu(a z) \, dz = \frac{2^{-\nu} i^{-\nu} e^{e+p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{p} + 2^{-\nu} e^e \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(-2 a k + p + a \nu) z}}{p + a(\nu - 2 k)} + \frac{(-1)^\nu e^{(2 a k + p - a \nu) z}}{2 a k + p - a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}$$

Involving $e^{p z} \sinh^\nu(a z + b)$

01.19.21.2096.01

$$\int e^{p z} \sinh^\nu(b + a z) \, dz = \frac{e^{p z} \sinh^\nu(b + a z)}{p + a \nu} \left(1 - e^{-2 (b + a z)}\right)^{-\nu} {}_2F_1\left(-\frac{p + a \nu}{2 a}, -\nu; \frac{1}{2}\left(-\frac{p}{a} - \nu + 2\right); e^{-2 (b + a z)}\right)$$

01.19.21.2097.01

$$\int e^{p z} \sinh^\nu(b + a z) \, dz = \frac{2^{-\nu} i^{-\nu} e^{p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{p} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b (2 k + \nu)} \left(\frac{e^{(-2 a k + p + a \nu) z - 4 b k}}{p + a(\nu - 2 k)} + \frac{(-1)^\nu e^{(2 a k + p - a \nu) z - 2 b \nu}}{2 a k + p - a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}$$

Involving $e^{p z+e} \sinh^\nu(a z + b)$

01.19.21.2098.01

$$\int e^{e+p z} \sinh^\nu(b + a z) \, dz = \frac{e^{e+p z} \sinh^\nu(b + a z)}{p + a \nu} \left(1 - e^{-2 (b + a z)}\right)^{-\nu} {}_2F_1\left(-\frac{p + a \nu}{2 a}, -\nu; \frac{1}{2}\left(-\frac{p}{a} - \nu + 2\right); e^{-2 (b + a z)}\right)$$

01.19.21.2099.01

$$\int e^{e+p z} \sinh^\nu(b + a z) \, dz = \frac{2^{-\nu} i^{-\nu} e^{e+p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{p} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{e + b (2 k + \nu)} \left(\frac{e^{(-2 a k + p + a \nu) z - 4 b k}}{p + a(\nu - 2 k)} + \frac{(-1)^\nu e^{(2 a k + p - a \nu) z - 2 b \nu}}{2 a k + p - a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}$$

Involving $e^{b z^r} \sinh^\nu(c z)$

01.19.21.2100.01

$$\int e^{b z^2} \sinh^{\nu}(c z)\, dz = \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{b}} \left(i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k e^{-\frac{c^2(\nu-2k)^2}{4b}} \binom{\nu}{k} \left(\operatorname{erfi}\left(\frac{-2ck+c\nu+2bz}{2\sqrt{b}}\right) + (-1)^{\nu} \operatorname{erfi}\left(\frac{2ck-c\nu+2bz}{2\sqrt{b}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2101.01

$$\int e^{\sqrt{z}\, b} \sinh^{\nu}(c z)\, dz = \frac{2^{1-\nu} i^{-\nu} e^{\sqrt{z}\, b}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(2 e^{b\sqrt{z}} \left(\frac{(-1)^{\nu} e^{(2ck-c\nu)z}}{2ck-c\nu} + \frac{e^{(c\nu-2ck)z}}{c\nu-2ck}\right) - \frac{b\, e^{\frac{b^2}{8ck-4c\nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(c\nu-2ck)\sqrt{z}}{2\sqrt{c\nu-2ck}}\right)}{(c\nu-2ck)^{3/2}} - \frac{(-1)^{\nu} b\, e^{\frac{b^2}{4c\nu-8ck}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(2ck-c\nu)\sqrt{z}}{2\sqrt{2ck-c\nu}}\right)}{(2ck-c\nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \sinh^{\nu}(c z)$

01.19.21.2102.01

$$\int e^{b z^2+e} \sinh^{\nu}(c z)\, dz = \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{b}} \left(i^{-\nu} e^{e} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k e^{-\frac{c^2(\nu-2k)^2-4be}{4b}} \binom{\nu}{k} \left(\operatorname{erfi}\left(\frac{-2ck+c\nu+2bz}{2\sqrt{b}}\right) + (-1)^{\nu} \operatorname{erfi}\left(\frac{2ck-c\nu+2bz}{2\sqrt{b}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2103.01

$$\int e^{\sqrt{z}\, b+e} \sinh^{\nu}(c z)\, dz = \frac{2^{1-\nu} i^{-\nu} e^{\sqrt{z}\, b+e}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{-\nu-1} e^{e} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(2 e^{b\sqrt{z}} \left(\frac{(-1)^{\nu} e^{(2ck-c\nu)z}}{2ck-c\nu} + \frac{e^{(c\nu-2ck)z}}{c\nu-2ck}\right) - \frac{b\, e^{\frac{b^2}{8ck-4c\nu}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(c\nu-2ck)\sqrt{z}}{2\sqrt{c\nu-2ck}}\right)}{(c\nu-2ck)^{3/2}} - \frac{(-1)^{\nu} b\, e^{\frac{b^2}{4c\nu-8ck}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2(2ck-c\nu)\sqrt{z}}{2\sqrt{2ck-c\nu}}\right)}{(2ck-c\nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \sinh^\nu(c z)$

01.19.21.2104.01

$$\int e^{b z^2 + d z} \sinh^\nu(c z) \, dz = \frac{2^{-\nu-1} i^{-\nu} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)(1 - \nu \bmod 2)}{\sqrt{b}} + \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{b}} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k e^{-\frac{d^2 - 2c(2k+\nu)d + c^2(\nu-2k)^2}{4b}} \binom{\nu}{k} \left(e^{-\frac{c d \nu}{b}} \operatorname{erfi}\left(\frac{d - 2ck + c\nu + 2bz}{2\sqrt{b}}\right) + (-1)^\nu e^{-\frac{2cdk}{b}} \operatorname{erfi}\left(\frac{d + 2ck - c\nu + 2bz}{2\sqrt{b}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2105.01

$$\int e^{\sqrt{z}\, b + d z} \sinh^\nu(c z) \, dz = 2^{-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\frac{e^{\sqrt{z}\, b + d z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b + 2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right)(1 - \nu \bmod 2) + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(2 e^{b\sqrt{z}} \left(\frac{(-1)^\nu e^{(d+2ck-c\nu)z}}{d + 2ck - c\nu} + \frac{e^{(d-2ck+c\nu)z}}{d - 2ck + c\nu}\right) - \frac{b\, e^{\frac{b^2}{-4d+8ck-4c\nu}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b + 2(d - 2ck + c\nu)\sqrt{z}}{2\sqrt{d - 2ck + c\nu}}\right)}{(d - 2ck + c\nu)^{3/2}} - \frac{(-1)^\nu b\, e^{\frac{b^2}{-4d-8ck+4c\nu}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b + 2(d + 2ck - c\nu)\sqrt{z}}{2\sqrt{d + 2ck - c\nu}}\right)}{(d + 2ck - c\nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z + e} \sinh^\nu(c z)$

01.19.21.2106.01

$$\int e^{b z^2 + d z + e} \sinh^\nu(c z) \, dz = \frac{2^{-\nu-1} i^{-\nu} e^{e - \frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)(1 - \nu \bmod 2)}{\sqrt{b}} + \frac{2^{-\nu-1}\sqrt{\pi}}{\sqrt{b}} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k e^{-\frac{d^2 - 2c(2k+\nu)d + c^2(\nu-2k)^2 - 4be}{4b}} \binom{\nu}{k} \left(e^{-\frac{c d \nu}{b}} \operatorname{erfi}\left(\frac{d - 2ck + c\nu + 2bz}{2\sqrt{b}}\right) + (-1)^\nu e^{-\frac{2cdk}{b}} \operatorname{erfi}\left(\frac{d + 2ck - c\nu + 2bz}{2\sqrt{b}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2107.01

$$\int e^{\sqrt{z}\, b+e+d\,z} \sinh^{\nu}(c\,z)\, dz = 2^{-\nu}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\frac{e^{\sqrt{z}\, b+e+d\,z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}} \right)(1 - \nu \bmod 2) +$$

$$2^{-\nu-1}\, e^{e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(2\, e^{b\sqrt{z}} \left(\frac{(-1)^{\nu}\, e^{(d+2\,c\,k-c\,\nu)\,z}}{d+2\,c\,k-c\,\nu} + \frac{e^{(d-2\,c\,k+c\,\nu)\,z}}{d-2\,c\,k+c\,\nu} \right) - \right.$$

$$\left. \frac{b\, e^{\frac{b^2}{-4\,d+8\,c\,k-4\,c\,\nu}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d-2\,c\,k+c\,\nu)\sqrt{z}}{2\sqrt{d-2\,c\,k+c\,\nu}}\right)}{(d-2\,c\,k+c\,\nu)^{3/2}} - \frac{(-1)^{\nu}\, b\, e^{\frac{b^2}{-4\,d-8\,c\,k+4\,c\,\nu}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d+2\,c\,k-c\,\nu)\sqrt{z}}{2\sqrt{d+2\,c\,k-c\,\nu}}\right)}{(d+2\,c\,k-c\,\nu)^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b\,z^r} \sinh^{\nu}(f\,z+g)$

01.19.21.2108.01

$$\int e^{b\,z^2} \sinh^{\nu}(g+f\,z)\, dz = \frac{i^{\nu}\, 2^{-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \mathrm{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} +$$

$$2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{f^2\,(\nu-2\,k)^2}{4\,b}+g\,(\nu-2\,k)}\, \mathrm{erfi}\left(\frac{-2\,f\,k+f\,\nu+2\,b\,z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(2\,f\,k-f\,\nu)^2}{b}+8\,g\,k-4\,g\,\nu+4\,\pi\,i\,\nu\right)}\, \mathrm{erf}\left(\frac{2\,f\,k-f\,\nu+2\,b\,z}{2\sqrt{-b}}\right)}{\sqrt{-b}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2109.01

$$\int e^{b\sqrt{z}} \sinh^{\nu}(g+f\,z)\, dz =$$

$$\frac{i^{-\nu}\, 2^{1-\nu}\, e^{b\sqrt{z}} \left(b\sqrt{z}-1\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{b^2} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^{\nu}\, b\, e^{\frac{b^2}{4\,f\,(\nu-2\,k)}+2\,g\,k-g\,\nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(2\,f\,k-f\,\nu)\sqrt{z}}{2\sqrt{-f\,(\nu-2\,k)}}\right)}{2\,(2\,f\,k-f\,\nu)^{3/2}} + \right.$$

$$\left. \frac{e^{\sqrt{z}\, b-2\,g\,k+g\,\nu+(f\,\nu-2\,f\,k)\,z}}{f\,\nu-2\,f\,k} - \frac{b\, e^{\frac{b^2}{4\,f\,(2\,k-\nu)}-2\,g\,k+g\,\nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(f\,\nu-2\,f\,k)\sqrt{z}}{2\sqrt{f\,\nu-2\,f\,k}}\right)}{2\,(f\,\nu-2\,f\,k)^{3/2}} + \frac{(-1)^{\nu}\, e^{\sqrt{z}\, b+2\,g\,k-g\,\nu+(2\,f\,k-f\,\nu)\,z}}{2\,f\,k-f\,\nu} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b\,z^r+e} \sinh^{\nu}(f\,z+g)$

01.19.21.2110.01

$$\int e^{b z^2+e} \sinh^\nu(g+f z)\, dz = \frac{i^\nu 2^{-\nu-1} e^e \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{f^2 (\nu-2k)^2}{4b}+g(\nu-2k)+e} \operatorname{erfi}\left(\frac{-2 f k+f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(2 f k-f \nu)^2}{b}+4 e+8 g k-4 g \nu+4 \pi i \nu\right)} \operatorname{erf}\left(\frac{2 f k-f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2111.01

$$\int e^{\sqrt{z}\, b+e} \sinh^\nu(g+f z)\, dz = \frac{i^{-\nu} 2^{1-\nu} e^{\sqrt{z}\, b+e} \left(b\sqrt{z}-1\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{b^2} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^\nu b\, e^{\frac{b^2}{4 f (\nu-2k)}+e+2 g k-g \nu} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2(2 f k-f \nu)\sqrt{z}}{2\sqrt{-f(\nu-2k)}}\right)}{2(2 f k-f \nu)^{3/2}} + \frac{e^{\sqrt{z}\, b+e-2 g k+g \nu+(f \nu-2 f k) z}}{f \nu-2 f k} - \frac{b\, e^{\frac{b^2}{4 f(2k-\nu)}+e-2 g k+g \nu} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2(f \nu-2 f k)\sqrt{z}}{2\sqrt{f \nu-2 f k}}\right)}{2(f \nu-2 f k)^{3/2}} + \frac{(-1)^\nu e^{\sqrt{z}\, b+e+2 g k-g \nu+(2 f k-f \nu) z}}{2 f k-f \nu} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z} \sinh^\nu(f z+g)$

01.19.21.2112.01

$$\int e^{b z^2+d z} \sinh^\nu(g+f z)\, dz = \frac{i^\nu 2^{-\nu-1} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{(d+f(\nu-2k))^2}{4b}+g(\nu-2k)} \operatorname{erfi}\left(\frac{d-2 f k+f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 f k-f \nu)^2}{b}+8 g k-4 g \nu+4 \pi i \nu\right)} \operatorname{erf}\left(\frac{d+2 f k-f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2113.01

$$\int e^{\sqrt{z}\, b+d\, z} \sinh^\nu(g+f\, z)\, dz = \left(\frac{e^{\sqrt{z}\, b+d\, z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\, d\sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^\nu + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^\nu\, b\, e^{-\frac{b^2}{4(d+2 f k-f \nu)}+2 g k-g \nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d+2 f k-f \nu)\sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)}{2\,(d+2 f k-f \nu)^{3/2}} + \frac{e^{\sqrt{z}\, b-2 g k+g \nu+(d-2 f k+f \nu) z}}{d-2 f k+f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f(\nu-2k))}-2 g k+g \nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d-2 f k+f \nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2\,(d-2 f k+f \nu)^{3/2}} + \frac{(-1)^\nu\, e^{\sqrt{z}\, b+2 g k-g \nu+(d+2 f k-f \nu) z}}{d+2 f k-f \nu}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z + e} \sinh^\nu(f z + g)$

01.19.21.2114.01

$$\int e^{b z^2+d z+e} \sinh^\nu(g+f\, z)\, dz = \frac{i^\nu\, 2^{-\nu-1}\, e^{e-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \mathrm{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{(d+f(\nu-2k))^2}{4b}+e+g(\nu-2k)}\, \mathrm{erfi}\left(\frac{d-2 f k+f \nu+2 b z}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 f k-f \nu)^2}{b}+4 e+8 g k-4 g \nu+4 \pi i \nu\right)}\, \mathrm{erf}\left(\frac{d+2 f k-f \nu+2 b z}{2\sqrt{-b}}\right)}{\sqrt{-b}}\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2115.01

$$\int e^{\sqrt{z}\, b+e+d\, z} \sinh^\nu(g+f\, z)\, dz = \left(\frac{e^{\sqrt{z}\, b+e+d\, z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\, d\sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^\nu + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^\nu\, b\, e^{-\frac{b^2}{4(d+2 f k-f \nu)}+e+2 g k-g \nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d+2 f k-f \nu)\sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)}{2\,(d+2 f k-f \nu)^{3/2}} + \frac{e^{\sqrt{z}\, b+e-2 g k+g \nu+(d-2 f k+f \nu) z}}{d-2 f k+f \nu} - \frac{b\, e^{-\frac{b^2}{4(d+f(\nu-2k))}+e-2 g k+g \nu} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2\,(d-2 f k+f \nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2\,(d-2 f k+f \nu)^{3/2}} + \frac{(-1)^\nu\, e^{\sqrt{z}\, b+e+2 g k-g \nu+(d+2 f k-f \nu) z}}{d+2 f k-f \nu}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{bz}\sinh^{\nu}(c z^r)$

01.19.21.2116.01

$$\int e^{bz}\sinh^{\nu}(c z^2)\,dz = \frac{2^{-\nu} i^{-\nu} e^{bz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b} + \frac{1}{\sqrt{-c}}\left(2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor}\frac{(-1)^k}{\sqrt{\nu-2k}}e^{\frac{b^2}{4c\nu-8ck}}\binom{\nu}{k}\left((-1)^{\nu}\operatorname{erfi}\left(\frac{b-2c(\nu-2k)z}{2\sqrt{-c}\sqrt{\nu-2k}}\right)-e^{\frac{b^2}{4ck-2c\nu}}\operatorname{erf}\left(\frac{b+2c(\nu-2k)z}{2\sqrt{-c}\sqrt{\nu-2k}}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2117.01

$$\int e^{bz}\sinh^{\nu}(c\sqrt{z})\,dz = \frac{2^{-\nu} i^{-\nu} e^{bz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b} + \frac{2^{-\nu-1}}{b^{3/2}}\sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^k e^{-\frac{(4k^2+\nu^2)c^2}{4b}-(2k-\nu)\sqrt{z}\,c}\binom{\nu}{k}\left(c\,e^{-c\left((\nu-2k)\sqrt{z}-\frac{ck\nu}{b}\right)}\sqrt{\pi}\,(2k-\nu)\left(\operatorname{erfi}\left(\frac{2\sqrt{z}\,b-2ck+c\nu}{2\sqrt{b}}\right)+(-1)^{\nu}\operatorname{erfi}\left(\frac{-2\sqrt{z}\,b-2ck+c\nu}{2\sqrt{b}}\right)\right)+2\sqrt{b}\,e^{\frac{(4k^2+\nu^2)c^2}{4b}+bz}+2(-1)^{\nu}\sqrt{b}\,e^{\frac{(4k^2+\nu^2)c^2}{4b}-2(\nu-2k)\sqrt{z}\,c+bz}\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{dz+e}\sinh^{\nu}(c z^r)$

01.19.21.2118.01

$$\int e^{e+dz}\sinh^{\nu}(c z^2)\,dz = \frac{e^{e+dz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)(2i)^{-\nu}}{d} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu}e^{\frac{d^2}{4c(\nu-2k)}+e}\operatorname{erfi}\left(\frac{d+4ckz-2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}}-\frac{e^{\frac{1}{4}\left(4e-\frac{d^2}{c\nu-2ck}\right)}\operatorname{erf}\left(\frac{d-4ckz+2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}}\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2119.01

$$\int e^{e+dz}\sinh^{\nu}(c\sqrt{z})\,dz = \frac{e^{e+dz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu}\sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^k\binom{\nu}{k}\left(-\frac{(-1)^{\nu}c\,e^{e-\frac{(2ck-c\nu)^2}{4d}}\sqrt{\pi}\,(2k-\nu)\operatorname{erfi}\left(\frac{2\sqrt{z}\,d+c(2k-\nu)}{2\sqrt{d}}\right)}{2d^{3/2}}+\frac{e^{e+dz+(c\nu-2ck)\sqrt{z}}}{d}+\frac{(-1)^{\nu}e^{e+dz+(2ck-c\nu)\sqrt{z}}}{d}-\frac{c\,e^{e-\frac{c^2(\nu-2k)^2}{4d}}\sqrt{\pi}\,(\nu-2k)\operatorname{erfi}\left(\frac{2\sqrt{z}\,d+c(\nu-2k)}{2\sqrt{d}}\right)}{2d^{3/2}}\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{b z^r} \sinh^\nu(c z^r)$

01.19.21.2120.01

$$\int e^{b z^r} \sinh^\nu(c z^r)\, dz = -\frac{2^{-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-b-2ck+c\nu) z^r\right) ((-b-2ck+c\nu) z^r)^{-1/r} + ((-b-c(\nu-2k)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-c(\nu-2k)) z^r\right)\right) - \left(\frac{i}{2}\right)^\nu \frac{z(-b z^r)^{-1/r} (1-\nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2121.01

$$\int e^{b z^2} \sinh^\nu(c z^2)\, dz = \frac{2^{-\nu-1} i^{-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^\nu \operatorname{erfi}\left(\frac{2bz+4ckz-2c\nu z}{2\sqrt{b+2ck-c\nu}}\right)}{\sqrt{b+2ck-c\nu}} - \frac{\operatorname{erf}\left(\frac{2bz-4ckz+2c\nu z}{2\sqrt{-b+2ck-c\nu}}\right)}{\sqrt{-b+2ck-c\nu}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2122.01

$$\int e^{\sqrt{z}\, b} \sinh^\nu\left(\sqrt{z}\, c\right) dz = \frac{2^{1-\nu} i^{-\nu} e^{\sqrt{z}\, b} \left(b\sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{b^2} + 2^{2-\nu} i^{-\nu} e^{\sqrt{z}\, b} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\left(b^2 - c^2 (2k-\nu)^2\right)^2} \binom{\nu}{k} \left(\left(\sqrt{z}\, b^3 - b^2 - c^2 (2k-\nu)^2 \sqrt{z}\, b - c^2 (2k-\nu)^2\right) \cos\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right) + c\, i\, (2k-\nu) \left(\sqrt{z}\, b^2 - 2b - c^2 (2k-\nu)^2 \sqrt{z}\right) \sin\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \sinh^\nu(c z^r)$

01.19.21.2123.01

$$\int e^{b z^r + e} \sinh^\nu(c z^r)\, dz = -\frac{2^{-\nu} z\, e^e}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-b-2ck+c\nu) z^r\right) ((-b-2ck+c\nu) z^r)^{-1/r} + ((-b-c(\nu-2k)) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-c(\nu-2k)) z^r\right)\right) - \left(\frac{i}{2}\right)^\nu \frac{e^e z(-b z^r)^{-1/r} (1-\nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2124.01

$$\int e^{b z^2+e} \sinh^\nu(c z^2)\, dz = \frac{2^{-\nu-1} i^{-\nu} e^e \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi}\, e^e \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^\nu \operatorname{erfi}\left(\frac{2 b z+4 c k z-2 c \nu z}{2 \sqrt{b+2 c k-c \nu}}\right)}{\sqrt{b+2 c k-c \nu}} - \frac{\operatorname{erf}\left(\frac{2 b z-4 c k z+2 c \nu z}{2 \sqrt{-b+2 c k-c \nu}}\right)}{\sqrt{-b+2 c k-c \nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2125.01

$$\int e^{\sqrt{z}\, b+e} \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{2^{1-\nu} i^{-\nu} e^{\sqrt{z}\, b+e} \left(b \sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{2-\nu} i^{-\nu} e^{\sqrt{z}\, b+e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\left(b^2 - c^2 (2k-\nu)^2\right)^2} \left((-1)^k \binom{\nu}{k} \right) \left(\left(\sqrt{z}\, b^3 - b^2 - c^2 (2k-\nu)^2 \sqrt{z}\, b - c^2 (2k-\nu)^2\right) \cos\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right) + c\, i\, (2k-\nu) \left(\sqrt{z}\, b^2 - 2b - c^2 (2k-\nu)^2 \sqrt{z}\right) \sin\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \sinh^\nu(c z^r)$

01.19.21.2126.01

$$\int e^{b z^2+d z} \sinh^\nu(c z^2)\, dz = \frac{i^\nu 2^{-\nu-1} e^{-\frac{d^2}{4 b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2 b z}{2 \sqrt{b}}\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4 (b+c (\nu-2k))}} \operatorname{erfi}\left(\frac{d+2 b z-4 c k z+2 c \nu z}{2 \sqrt{b-2 c k+c \nu}}\right)}{\sqrt{b-2 c k+c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2 c k-c \nu}+4 \pi i \nu\right)} \operatorname{erf}\left(\frac{d+2 b z+4 c k z-2 c \nu z}{2 \sqrt{-b-2 c k+c \nu}}\right)}{\sqrt{-b-2 c k+c \nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2127.01

$$\int e^{\sqrt{z}\,b+d\,z}\sinh^\nu\left(c\sqrt{z}\right)dz = \left(\frac{e^{\sqrt{z}\,b+d\,z}}{d} - \frac{b\,e^{-\frac{b^2}{4d}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^\nu + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(\frac{e^{\sqrt{z}\,(b-2ck+c\nu)+d\,z}}{d} + \frac{(-1)^\nu e^{\sqrt{z}\,(b+2ck-c\nu)+d\,z}}{d} - \frac{(-1)^\nu e^{-\frac{(b+2ck-c\nu)^2}{4d}}\sqrt{\pi}\,(b+2ck-c\nu)\operatorname{erfi}\left(\frac{b+c(2k-\nu)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}} - \right.$$
$$\left.\frac{e^{-\frac{(b+c(\nu-2k))^2}{4d}}\sqrt{\pi}\,(b+c(\nu-2k))\operatorname{erfi}\left(\frac{b+c(\nu-2k)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e}\sinh^\nu(c z^r)$

01.19.21.2128.01

$$\int e^{b z^2+d z+e}\sinh^\nu\left(c z^2\right)dz = \frac{i^\nu\,2^{-\nu-1}\,e^{e-\frac{d^2}{4b}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} +$$
$$2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{-\frac{d^2}{4(b+c(\nu-2k))}+e}\operatorname{erfi}\left(\frac{d+2bz-4ckz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2ck-c\nu}+4e+4\pi i\nu\right)}\operatorname{erf}\left(\frac{d+2bz+4ckz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right)\ /;\ \nu\in\mathbb{N}^+$$

01.19.21.2129.01

$$\int e^{\sqrt{z}\,b+e+d\,z}\sinh^\nu\left(c\sqrt{z}\right)dz = \left(\frac{e^{\sqrt{z}\,b+e+d\,z}}{d} - \frac{b\,e^{e-\frac{b^2}{4d}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^\nu + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(\frac{e^{e+d\,z+(b-2ck+c\nu)\sqrt{z}}}{d} + \frac{(-1)^\nu e^{e+d\,z+(b+2ck-c\nu)\sqrt{z}}}{d} - \frac{(-1)^\nu e^{e-\frac{(b+2ck-c\nu)^2}{4d}}\sqrt{\pi}\,(b+2ck-c\nu)\operatorname{erfi}\left(\frac{b+c(2k-\nu)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}} - \right.$$
$$\left.\frac{e^{e-\frac{(b+c(\nu-2k))^2}{4d}}\sqrt{\pi}\,(b+c(\nu-2k))\operatorname{erfi}\left(\frac{b+c(\nu-2k)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving $e^{dz}\sinh^{\nu}(c z^r + g)$

01.19.21.2130.01

$$\int e^{dz}\sinh^{\nu}(c z^2+g)\,dz = \frac{e^{dz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)(2 i)^{-\nu}}{d} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu} e^{\frac{d^2}{4c(\nu-2k)}-g(\nu-2k)}\operatorname{erfi}\left(\frac{d+4ckz-2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{c\nu-2ck}-8gk+4g\nu\right)}\operatorname{erf}\left(\frac{d-4ckz+2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}}\right)\ /;\ \nu\in\mathbb{N}^+$$

01.19.21.2131.01

$$\int e^{dz}\sinh^{\nu}(\sqrt{z}\,c+g)\,dz = \frac{e^{dz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu} e^{2gk-g\nu+(2ck-c\nu)\sqrt{z}+dz}}{d} + \frac{e^{-2gk+g\nu+(-2ck+c\nu)\sqrt{z}+dz}}{d} - \frac{(-1)^{\nu} e^{-\frac{(2ck-c\nu)^2}{4d}+2gk-g\nu}\sqrt{\pi}\,(2ck-c\nu)\operatorname{erfi}\left(\frac{2\sqrt{z}\,d+c(2k-\nu)}{2\sqrt{d}}\right)}{2d^{3/2}} - \frac{c\,e^{-\frac{c^2(\nu-2k)^2}{4d}-2gk+g\nu}\sqrt{\pi}\,(\nu-2k)\operatorname{erfi}\left(\frac{2\sqrt{z}\,d+c(\nu-2k)}{2\sqrt{d}}\right)}{2d^{3/2}}\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving $e^{dz+e}\sinh^{\nu}(c z^r + g)$

01.19.21.2132.01

$$\int e^{e+dz}\sinh^{\nu}(c z^2+g)\,dz = \frac{e^{e+dz}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)(2 i)^{-\nu}}{d} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu} e^{\frac{d^2}{4c(\nu-2k)}+e-g(\nu-2k)}\operatorname{erfi}\left(\frac{d+4ckz-2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{c\nu-2ck}+4e-8gk+4g\nu\right)}\operatorname{erf}\left(\frac{d-4ckz+2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}}\right)\ /;\ \nu\in\mathbb{N}^+$$

01.19.21.2133.01

$$\int e^{e+d z} \sinh^{\nu}\left(\sqrt{z}\, c+g\right) dz = \frac{e^{e+d z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{e+2 g k-g \nu+(2 c k-c \nu) \sqrt{z}+d z}}{d} + \frac{e^{e-2 g k+g \nu+(-2 c k+c \nu) \sqrt{z}+d z}}{d} - \frac{(-1)^{\nu} e^{-\frac{(2 c k-c \nu)^2}{4 d}+e+2 g k-g \nu} \sqrt{\pi}\, (2 c k-c \nu) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, d+c (2 k-\nu)}{2 \sqrt{d}}\right)}{2 d^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu-2 k)^2}{4 d}+e-2 g k+g \nu} \sqrt{\pi}\, (\nu-2 k) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, d+c (\nu-2 k)}{2 \sqrt{d}}\right)}{2 d^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r} \sinh^{\nu}(c z^r + g)$

01.19.21.2134.01

$$\int e^{b z^r} \sinh^{\nu}(c z^r+g)\, dz = -\frac{2^{-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 g k-g \nu} \binom{\nu}{k} \left((-1)^{\nu} e^{4 g k}\, \Gamma\left(\frac{1}{r}, (-b-2 c k+c \nu) z^r\right) ((-b-2 c k+c \nu) z^r)^{-1/r} + e^{2 g \nu} ((-b-c (\nu-2 k)) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-b-c (\nu-2 k)) z^r\right) \right) - \left(\frac{i}{2}\right)^{\nu} \frac{z (-b z^r)^{-1/r} (1-\nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2135.01

$$\int e^{b z^2} \sinh^{\nu}(c z^2+g)\, dz = \frac{2^{-\nu-1} i^{-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{-g (\nu-2 k)} \operatorname{erfi}\left(\frac{2 b z+4 c k z-2 c \nu z}{2 \sqrt{b+2 c k-c \nu}}\right)}{\sqrt{b+2 c k-c \nu}} - \frac{e^{-2 g k+g \nu} \operatorname{erf}\left(\frac{2 b z-4 c k z+2 c \nu z}{2 \sqrt{-b+2 c k-c \nu}}\right)}{\sqrt{-b+2 c k-c \nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2136.01

$$\int e^{\sqrt{z}\,b}\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-\nu}\,i^{-\nu}\,e^{\sqrt{z}\,b}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{2-\nu}\,i^{-\nu}\,e^{\sqrt{z}\,b}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\left(b^2-c^2(2k-\nu)^2\right)^2} \binom{\nu}{k}\left(\left(\sqrt{z}\,b^3-b^2-c^2(2k-\nu)^2\sqrt{z}\,b-c^2(2k-\nu)^2\right)\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g(\nu-2k)\right)+ c\,i\,(2k-\nu)\left(\sqrt{z}\,b^2-2b-c^2(2k-\nu)^2\sqrt{z}\right)\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g(\nu-2k)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sinh^{\nu}(c z^r+g)$

01.19.21.2137.01

$$\int e^{b z^r+e}\sinh^{\nu}(c z^r+g)\,dz = -\frac{2^{-\nu} z}{r} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{e-2gk-g\nu}\binom{\nu}{k}\left((-1)^{\nu} e^{4gk}\,\Gamma\left(\frac{1}{r},(-b-2ck+c\nu)z^r\right)\left((-b-2ck+c\nu)z^r\right)^{-1/r}+e^{2g\nu}\left((-b-c(\nu-2k))z^r\right)^{-1/r} \Gamma\left(\frac{1}{r},(-b-c(\nu-2k))z^r\right)\right)-\left(\frac{i}{2}\right)^{\nu}\frac{e^e z(-b z^r)^{-1/r}(1-\nu \bmod 2)}{r}\binom{\nu}{\frac{\nu}{2}}\Gamma\left(\frac{1}{r},-b z^r\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2138.01

$$\int e^{b z^2+e}\sinh^{\nu}\left(c z^2+g\right)dz = \frac{2^{-\nu-1}\,i^{-\nu}\,e^e\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\,z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu} e^{e-g(\nu-2k)}\operatorname{erfi}\left(\frac{2bz+4ckz-2c\nu z}{2\sqrt{b+2ck-c\nu}}\right)}{\sqrt{b+2ck-c\nu}}-\frac{e^{e-2gk+g\nu}\operatorname{erf}\left(\frac{2bz-4ckz+2c\nu z}{2\sqrt{-b+2ck-c\nu}}\right)}{\sqrt{-b+2ck-c\nu}}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2139.01

$$\int e^{\sqrt{z}\,b+e}\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{2^{1-\nu}\,i^{-\nu}\,e^{\sqrt{z}\,b+e}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{2-\nu}\,i^{-\nu}\,e^{\sqrt{z}\,b+e}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\left(b^2-c^2(2k-\nu)^2\right)^2} \left((-1)^k\binom{\nu}{k}\left(\left(\sqrt{z}\,b^3-b^2-c^2(2k-\nu)^2\sqrt{z}\,b-c^2(2k-\nu)^2\right)\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g(\nu-2k)\right)+ c\,i\,(2k-\nu)\left(\sqrt{z}\,b^2-2b-c^2(2k-\nu)^2\sqrt{z}\right)\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g(\nu-2k)\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z}\sinh^{\nu}(c z^r+g)$

01.19.21.2140.01

$$\int e^{b z^2+d z} \sinh^\nu(c z^2+g)\, dz = \frac{i^\nu 2^{-\nu-1} e^{-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{g(\nu-2k)-\frac{d^2}{4(b+c(\nu-2k))}} \operatorname{erfi}\left(\frac{d+2bz-4ckz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2ck-c\nu}+8gk-4g\nu+4\pi i \nu\right)} \operatorname{erf}\left(\frac{d+2bz+4ckz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2141.01

$$\int e^{\sqrt{z}\, b+d z} \sinh^\nu(\sqrt{z}\, c+g)\, dz = \left(\frac{e^{\sqrt{z}\, b+d z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^\nu + 2^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-2gk+g\nu+dz+(b-2ck+c\nu)\sqrt{z}}}{d} + \frac{(-1)^\nu e^{2gk-g\nu+dz+(b+2ck-c\nu)\sqrt{z}}}{d} - \frac{(-1)^\nu e^{-\frac{(b+2ck-c\nu)^2}{4d}+2gk-g\nu} \sqrt{\pi}\, (b+2ck-c\nu) \operatorname{erfi}\left(\frac{b+c(2k-\nu)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}} - \frac{e^{-\frac{(b+c(\nu-2k))^2}{4d}-2gk+g\nu} \sqrt{\pi}\, (b+c(\nu-2k)) \operatorname{erfi}\left(\frac{b+c(\nu-2k)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sinh^\nu(c z^r+g)$

01.19.21.2142.01

$$\int e^{b z^2+d z+e} \sinh^\nu(c z^2+g)\, dz = \frac{i^\nu 2^{-\nu-1} e^{e-\frac{d^2}{4b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{d^2}{4(b+c(\nu-2k))}+e+g(\nu-2k)} \operatorname{erfi}\left(\frac{d+2bz-4ckz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{d^2}{b+2ck-c\nu}+4e+8gk-4g\nu+4\pi i \nu\right)} \operatorname{erf}\left(\frac{d+2bz+4ckz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2143.01

$$\int e^{\sqrt{z}\, b+e+d\,z} \sinh^{\nu}\left(\sqrt{z}\, c+g\right) dz = \left(\frac{e^{\sqrt{z}\, b+e+d\,z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^{\nu} + 2^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{e+2gk-g\nu+(b+2ck-c\nu)\sqrt{z}+d\,z}}{d} + \frac{e^{e-2gk+g\nu+(b-2ck+c\nu)\sqrt{z}+d\,z}}{d} - \frac{(-1)^{\nu} e^{-\frac{(b+2ck-c\nu)^2}{4d}+e+2gk-g\nu} \sqrt{\pi}\, (b+2ck-c\nu)\, \mathrm{erfi}\left(\frac{b+c(2k-\nu)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}} - \frac{e^{-\frac{(b+c(\nu-2k))^2}{4d}+e-2gk+g\nu} \sqrt{\pi}\, (b+c(\nu-2k))\, \mathrm{erfi}\left(\frac{b+c(\nu-2k)+2d\sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}}\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{d\,z} \sinh^{\nu}(c\,z^r + f\,z)$

01.19.21.2144.01

$$\int e^{d\,z} \sinh^{\nu}\left(c\,z^2 + f\,z\right) dz = \frac{2^{-\nu}\, i^{-\nu}\, e^{d\,z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)}}\, \mathrm{erfi}\left(\frac{d+2fk-f\nu+4ckz-2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}} - \frac{e^{-\frac{(d-2fk+f\nu)^2}{4(c\nu-2ck)}}\, \mathrm{erfi}\left(\frac{d-2fk+f\nu-4ckz+2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2145.01

$$\int e^{d\,z} \sinh^{\nu}\left(\sqrt{z}\, c + f\,z\right) dz = \frac{e^{d\,z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(c\nu-2ck)+(d-2fk+f\nu)z}}{d-2fk+f\nu} - \frac{c\, e^{-\frac{c^2(\nu-2k)^2}{4(d+f(\nu-2k))}} \sqrt{\pi}\, (\nu-2k)\, \mathrm{erfi}\left(\frac{c(\nu-2k)+2(d-2fk+f\nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2\,(d-2fk+f\nu)^{3/2}} + \frac{(-1)^{\nu} e^{\sqrt{z}\,(2ck-c\nu)+(d+2fk-f\nu)z}}{d+2fk-f\nu} - \frac{(-1)^{\nu} e^{-\frac{(2ck-c\nu)^2}{4(d+2fk-f\nu)}} \sqrt{\pi}\, (2ck-c\nu)\, \mathrm{erfi}\left(\frac{c(2k-\nu)+2(d+2fk-f\nu)\sqrt{z}}{2\sqrt{d+2fk-f\nu}}\right)}{2\,(d+2fk-f\nu)^{3/2}}\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{d z+e} \sinh^{\nu}(c z^r + f z)$

01.19.21.2146.01

$$\int e^{e+d z} \sinh^{\nu}(c z^2 + f z)\, dz = \frac{2^{-\nu} i^{-\nu} e^{e+d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)}+e} \operatorname{erfi}\left(\frac{d+2fk-f\nu+4ckz-2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d-2fk+f\nu)^2}{c\nu-2ck}+4e\right)} \operatorname{erf}\left(\frac{d-2fk+f\nu-4ckz+2c\nu z}{2\sqrt{2ck-c\nu}}\right)}{\sqrt{2ck-c\nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2147.01

$$\int e^{e+d z} \sinh^{\nu}(\sqrt{z}\, c + f z)\, dz = \frac{e^{e+d z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{e+(d-2fk+f\nu)z+(c\nu-2ck)\sqrt{z}}}{d-2fk+f\nu} - \frac{c\, e^{e-\frac{c^2(\nu-2k)^2}{4(d+f(\nu-2k))}} \sqrt{\pi}\, (\nu-2k) \operatorname{erfi}\left(\frac{c(\nu-2k)+2(d-2fk+f\nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2(d-2fk+f\nu)^{3/2}} + \frac{(-1)^{\nu} e^{e+(d+2fk-f\nu)z+(2ck-c\nu)\sqrt{z}}}{d+2fk-f\nu} - \frac{(-1)^{\nu} e^{e-\frac{(2ck-c\nu)^2}{4(d+2fk-f\nu)}} \sqrt{\pi}\, (2ck-c\nu) \operatorname{erfi}\left(\frac{c(2k-\nu)+2(d+2fk-f\nu)\sqrt{z}}{2\sqrt{d+2fk-f\nu}}\right)}{2(d+2fk-f\nu)^{3/2}} \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r} \sinh^{\nu}(c z^r + f z)$

01.19.21.2148.01

$$\int e^{b z^2} \sinh^{\nu}(c z^2 + f z)\, dz = \frac{i^{\nu} 2^{-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}(\sqrt{b}\, z) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{f^2(\nu-2k)^2}{4(b+c(\nu-2k))}} \operatorname{erfi}\left(\frac{-2fk-4czk+f\nu+2bz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(2fk-f\nu)^2}{b+2ck-c\nu}+4\pi i \nu\right)} \operatorname{erf}\left(\frac{2fk+4czk-f\nu+2bz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2149.01

$$\int e^{b\sqrt{z}} \sinh^{\nu}\left(\sqrt{z}\, c + f z\right) dz = \frac{2^{1-\nu} e^{b\sqrt{z}}\, i^{-\nu} \left(b\sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(b-2ck+c\nu)+(f\nu-2fk)z}}{f\nu - 2fk} - \frac{e^{\frac{(b-c(2k-\nu))^2}{4f(2k-\nu)}} \sqrt{\pi}\, (b - 2ck + c\nu) \operatorname{erfi}\left(\frac{b-c(2k-\nu)+2(f\nu-2fk)\sqrt{z}}{2\sqrt{f\nu-2fk}}\right)}{2(f\nu - 2fk)^{3/2}} + \frac{(-1)^{\nu} e^{\sqrt{z}\,(b+2ck-c\nu)+(2fk-f\nu)z}}{2fk - f\nu} - \frac{(-1)^{\nu} e^{\frac{(b-c(\nu-2k))^2}{4f(\nu-2k)}} \sqrt{\pi}\, (b - c(\nu - 2k)) \operatorname{erfi}\left(\frac{b-c(\nu-2k)+2(2fk-f\nu)\sqrt{z}}{2\sqrt{-f(\nu-2k)}}\right)}{2(2fk - f\nu)^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \sinh^{\nu}(c z^r + f z)$

01.19.21.2150.01

$$\int e^{b z^2 + e} \sinh^{\nu}\left(c z^2 + f z\right) dz = \frac{i^{\nu}\, 2^{-\nu-1} e^{e} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{b}\, z\right) (1 - \nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{f^2(\nu-2k)^2}{4(b+c(\nu-2k))}+e} \operatorname{erfi}\left(\frac{-2fk-4czk+f\nu+2bz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(2fk-f\nu)^2}{b+2ck-c\nu}+4e+4\pi i \nu\right)} \operatorname{erf}\left(\frac{2fk+4czk-f\nu+2bz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2151.01

$$\int e^{\sqrt{z}\, b+e} \sinh^{\nu}\left(\sqrt{z}\, c + f z\right) dz = \frac{2^{1-\nu} e^{\sqrt{z}\, b+e}\, i^{-\nu} \left(b\sqrt{z} - 1\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)}{b^2} + 2^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{e+(f\nu-2fk)z+(b-2ck+c\nu)\sqrt{z}}}{f\nu - 2fk} - \frac{e^{\frac{(b-c(2k-\nu))^2}{4f(2k-\nu)}+e} \sqrt{\pi}\, (b - 2ck + c\nu) \operatorname{erfi}\left(\frac{b-c(2k-\nu)+2(f\nu-2fk)\sqrt{z}}{2\sqrt{f\nu-2fk}}\right)}{2(f\nu - 2fk)^{3/2}} + \frac{(-1)^{\nu} e^{e+(2fk-f\nu)z+(b+2ck-c\nu)\sqrt{z}}}{2fk - f\nu} - \frac{(-1)^{\nu} e^{\frac{(b-c(\nu-2k))^2}{4f(\nu-2k)}+e} \sqrt{\pi}\, (b - c(\nu - 2k)) \operatorname{erfi}\left(\frac{b-c(\nu-2k)+2(2fk-f\nu)\sqrt{z}}{2\sqrt{-f(\nu-2k)}}\right)}{2(2fk - f\nu)^{3/2}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + d z} \sinh^{\nu}(c z^r + f z)$

01.19.21.2152.01

$$\int e^{b z^2+d z} \sinh^\nu(c z^2+f z)\,dz = \frac{i^\nu 2^{-\nu-1}\sqrt{\pi}\,(1-\nu \bmod 2)}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}} e^{-\frac{d^2}{4b}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right) + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k} \left(\frac{e^{-\frac{(d+f(\nu-2k))^2}{4(b+c(\nu-2k))}} \operatorname{erfi}\left(\frac{d-2fk+f\nu+2bz-4ckz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2fk-f\nu)^2}{b+2ck-c\nu}+4\pi i\nu\right)} \operatorname{erf}\left(\frac{d+2fk-f\nu+2bz+4ckz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2153.01

$$\int e^{\sqrt{z}\,b+d z} \sinh^\nu(\sqrt{z}\,c+f z)\,dz = \left(\frac{e^{\sqrt{z}\,b+d z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}}\sqrt{\pi}\operatorname{erfi}\left(\frac{b+2d\sqrt{z}}{2\sqrt{d}}\right)}{2 d^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^\nu + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(-\frac{(-1)^\nu\left(\sqrt{\pi}\,(b+2ck-c\nu)\right)e^{-\frac{(b+2ck-c\nu)^2}{4(d+2fk-f\nu)}}\operatorname{erfi}\left(\frac{b+c(2k-\nu)+2(d+2fk-f\nu)\sqrt{z}}{2\sqrt{d+2fk-f\nu}}\right)}{2(d+2fk-f\nu)^{3/2}} - \frac{\left(\sqrt{\pi}\,(b+c(\nu-2k))\right)e^{-\frac{(b+c(\nu-2k))^2}{4(d+f(\nu-2k))}}\operatorname{erfi}\left(\frac{b+c(\nu-2k)+2(d-2fk+f\nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2(d-2fk+f\nu)^{3/2}} + \frac{e^{\sqrt{z}\,(b-2ck+c\nu)+(d-2fk+f\nu)z}}{d-2fk+f\nu} + \frac{(-1)^\nu e^{\sqrt{z}\,(b+2ck-c\nu)+(d+2fk-f\nu)z}}{d+2fk-f\nu}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e}\sinh^\nu(c z^r+f z)$

01.19.21.2154.01

$$\int e^{b z^2+d z+e} \sinh^\nu(c z^2+f z)\,dz = \frac{i^\nu 2^{-\nu-1}\sqrt{\pi}\,(1-\nu \bmod 2)}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}} e^{e-\frac{d^2}{4b}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right) + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k} \left(\frac{e^{-\frac{(d+f(\nu-2k))^2}{4(b+c(\nu-2k))}+e} \operatorname{erfi}\left(\frac{d-2fk+f\nu+2bz-4ckz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2fk-f\nu)^2}{b+2ck-c\nu}+4e+4\pi i\nu\right)} \operatorname{erf}\left(\frac{d+2fk-f\nu+2bz+4ckz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2155.01

$$\int e^{\sqrt{z}\, b+e+d\,z} \sinh^\nu\left(\sqrt{z}\, c+f\,z\right) dz = \left(\frac{e^{\sqrt{z}\, b+e+d\,z}}{d} - \frac{b\, e^{e-\frac{b^2}{4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2\,d\sqrt{z}}{2\sqrt{d}}\right)}{2\,d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^\nu +$$

$$2^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^\nu \left(\sqrt{\pi}\, (b+2\,c\,k-c\,\nu)\right) e^{e-\frac{(b+2\,c\,k-c\,\nu)^2}{4(d+2\,f\,k-f\,\nu)}} \operatorname{erfi}\left(\frac{b+c\,(2\,k-\nu)+2\,(d+2\,f\,k-f\,\nu)\sqrt{z}}{2\sqrt{d+2\,f\,k-f\,\nu}}\right)}{2\,(d+2\,f\,k-f\,\nu)^{3/2}} - \right.$$

$$\frac{\left(\sqrt{\pi}\, (b+c\,(\nu-2\,k))\right) e^{e-\frac{(b+c\,(\nu-2\,k))^2}{4\,(d+f\,(\nu-2\,k))}} \operatorname{erfi}\left(\frac{b+c\,(\nu-2\,k)+2\,(d-2\,f\,k+f\,\nu)\sqrt{z}}{2\sqrt{d+f\,(\nu-2\,k)}}\right)}{2\,(d-2\,f\,k+f\,\nu)^{3/2}} +$$

$$\left. \frac{e^{e+(d-2\,f\,k+f\,\nu)\,z+(b-2\,c\,k+c\,\nu)\sqrt{z}}}{d-2\,f\,k+f\,\nu} + \frac{(-1)^\nu\, e^{e+(d+2\,f\,k-f\,\nu)\,z+(b+2\,c\,k-c\,\nu)\sqrt{z}}}{d+2\,f\,k-f\,\nu} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{d\,z} \sinh^\nu\left(c\,z^r+f\,z+g\right)$

01.19.21.2156.01

$$\int e^{d\,z} \sinh^\nu\left(c\,z^2+f\,z+g\right) dz = \frac{2^{-\nu}\, i^{-\nu}\, e^{d\,z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)}{d} + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\left(\frac{(-1)^\nu\, e^{\frac{(d-f\,(\nu-2\,k))^2}{4\,c\,(\nu-2\,k)}-g\,(\nu-2\,k)} \operatorname{erfi}\left(\frac{d+2\,f\,k-f\,\nu+4\,c\,k\,z-2\,c\,\nu\,z}{2\sqrt{2\,c\,k-c\,\nu}}\right)}{\sqrt{2\,c\,k-c\,\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d-2\,f\,k+f\,\nu)^2}{c\,\nu-2\,c\,k}-8\,g\,k+4\,g\,\nu\right)} \operatorname{erf}\left(\frac{d-2\,f\,k+f\,\nu-4\,c\,k\,z+2\,c\,\nu\,z}{2\sqrt{2\,c\,k-c\,\nu}}\right)}{\sqrt{2\,c\,k-c\,\nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2157.01

$$\int e^{d z}\sinh^{\nu}\left(\sqrt{z}\;c+g+f\,z\right)dz = \frac{e^{d z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}}{d} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu}e^{2 g k-g \nu+(2 c k-c \nu)\sqrt{z}+(d+2 f k-f \nu) z}}{d+2 f k-f \nu}+\frac{e^{-2 g k+g \nu+(-2 c k+c \nu)\sqrt{z}+(d-2 f k+f \nu) z}}{d-2 f k+f \nu}-\frac{c\, e^{-\frac{c^2(\nu-2k)^2}{4(d+f(\nu-2k))}-2 g k+g \nu}\sqrt{\pi}\,(\nu-2k)\,\mathrm{erfi}\left(\frac{c(\nu-2k)+2(d-2 f k+f \nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2(d-2 f k+f \nu)^{3/2}}-\frac{(-1)^{\nu}e^{-\frac{(2 c k-c \nu)^2}{4(d+2 f k-f \nu)}+2 g k-g \nu}\sqrt{\pi}\,(2 c k-c \nu)\,\mathrm{erfi}\left(\frac{c(2k-\nu)+2(d+2 f k-f \nu)\sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)}{2(d+2 f k-f \nu)^{3/2}}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{d z+e}\sinh^{\nu}\left(c\, z^r+f\,z+g\right)$

01.19.21.2158.01

$$\int e^{e+d z}\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{2^{-\nu}i^{-\nu}e^{e+d z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{d}+2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu}e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)}+e-g(\nu-2k)}\,\mathrm{erfi}\left(\frac{d+2 f k-f \nu+4 c k z-2 c \nu z}{2\sqrt{2 c k-c \nu}}\right)}{\sqrt{2 c k-c \nu}}-\frac{e^{\frac{1}{4}\left(-\frac{(d-2 f k+f \nu)^2}{c \nu-2 c k}+4 e-8 g k+4 g \nu\right)}\,\mathrm{erf}\left(\frac{d-2 f k+f \nu-4 c k z+2 c \nu z}{2\sqrt{2 c k-c \nu}}\right)}{\sqrt{2 c k-c \nu}}\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2159.01

$$\int e^{e+d z}\sinh^{\nu}\left(\sqrt{z}\,c+g+f z\right)dz = \frac{e^{e+d z}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}}{d}+2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu}e^{e+2 g k-g \nu+(2 c k-c \nu)\sqrt{z}+(d+2 f k-f \nu) z}}{d+2 f k-f \nu}+\frac{e^{e-2 g k+g \nu+(-2 c k+c \nu)\sqrt{z}+(d-2 f k+f \nu) z}}{d-2 f k+f \nu}-\frac{c\, e^{-\frac{c^2(\nu-2 k)^2}{4(d+f(\nu-2 k))}+e-2 g k+g \nu}\sqrt{\pi}\,(\nu-2 k)\operatorname{erfi}\left(\frac{c(\nu-2 k)+2(d-2 f k+f \nu)\sqrt{z}}{2\sqrt{d+f(\nu-2 k)}}\right)}{2(d-2 f k+f \nu)^{3/2}}-\frac{(-1)^{\nu}e^{-\frac{(2 c k-c \nu)^2}{4(d+2 f k-f \nu)}+e+2 g k-g \nu}\sqrt{\pi}\,(2 c k-c \nu)\operatorname{erfi}\left(\frac{c(2 k-\nu)+2(d+2 f k-f \nu)\sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)}{2(d+2 f k-f \nu)^{3/2}}\right)/;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r}\sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.2160.01

$$\int e^{b z^2}\sinh^{\nu}\left(c z^2+f z+g\right)dz = \frac{i^{\nu}2^{-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\,z\right)(1-\nu \bmod 2)}{\sqrt{b}}+2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{-\frac{f^2(\nu-2 k)^2}{4(b+c(\nu-2 k))}+g(\nu-2 k)}\operatorname{erfi}\left(\frac{-2 f k-4 c z k+f \nu+2 b z+2 c \nu z}{2\sqrt{b-2 c k+c \nu}}\right)}{\sqrt{b-2 c k+c \nu}}-\frac{e^{\frac{1}{4}\left(-\frac{(2 f k-f \nu)^2}{b+2 c k-c \nu}+8 g k-4 g \nu+4\pi i \nu\right)}\operatorname{erf}\left(\frac{2 f k+4 c z k-f \nu+2 b z-2 c \nu z}{2\sqrt{-b-2 c k+c \nu}}\right)}{\sqrt{-b-2 c k+c \nu}}\right)/;\ \nu\in\mathbb{N}^+$$

01.19.21.2161.01

$$\int e^{b\sqrt{z}} \sinh^{\nu}\left(\sqrt{z}\, c+g+f\,z\right) dz = \frac{2^{1-\nu} e^{b\sqrt{z}}\, i^{-\nu}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu} e^{2gk-g\nu+(b+2ck-c\nu)\sqrt{z}+(2fk-f\nu)z}}{2fk-f\nu}+\frac{e^{-2gk+g\nu+(b-2ck+c\nu)\sqrt{z}+(-2fk+f\nu)z}}{-2fk+f\nu}-\frac{e^{\frac{(b-c(2k-\nu))^2}{4f(2k-\nu)}-2gk+g\nu}\sqrt{\pi}\,(b-2ck+c\nu)\operatorname{erfi}\left(\frac{b-c(2k-\nu)+2(f\nu-2fk)\sqrt{z}}{2\sqrt{f\nu-2fk}}\right)}{2(f\nu-2fk)^{3/2}}-\frac{(-1)^{\nu} e^{\frac{(b-c(\nu-2k))^2}{4f(\nu-2k)}+2gk-g\nu}\sqrt{\pi}\,(b-c(\nu-2k))\operatorname{erfi}\left(\frac{b-c(\nu-2k)+2(2fk-f\nu)\sqrt{z}}{2\sqrt{-f(\nu-2k)}}\right)}{2(2fk-f\nu)^{3/2}}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.2162.01

$$\int e^{b z^2+e} \sinh^{\nu}\left(c z^2+f z+g\right) dz = \frac{i^{\nu}\, 2^{-\nu-1} e^{e}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\sqrt{b}\, z\right)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{-\frac{f^2(\nu-2k)^2}{4(b+c(\nu-2k))}+g(\nu-2k)+e}\operatorname{erfi}\left(\frac{-2fk-4czk+f\nu+2bz+2c\nu z}{2\sqrt{b-2ck+c\nu}}\right)}{\sqrt{b-2ck+c\nu}}-\frac{e^{\frac{1}{4}\left(-\frac{(2fk-f\nu)^2}{b+2ck-c\nu}+4e+8gk-4g\nu+4\pi i\nu\right)}\operatorname{erf}\left(\frac{2fk+4czk-f\nu+2bz-2c\nu z}{2\sqrt{-b-2ck+c\nu}}\right)}{\sqrt{-b-2ck+c\nu}}\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2163.01

$$\int e^{\sqrt{z}\,b+e}\sinh^{\nu}\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{2^{1-\nu}\,e^{\sqrt{z}\,b+e}\,i^{-\nu}\left(b\sqrt{z}-1\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b^2} + 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{(-1)^{\nu}\,e^{e+2\,g\,k-g\,\nu+(b+2\,c\,k-c\,\nu)\sqrt{z}+(2\,f\,k-f\,\nu)\,z}}{2\,f\,k-f\,\nu} + \frac{e^{e-2\,g\,k+g\,\nu+(b-2\,c\,k+c\,\nu)\sqrt{z}+(-2\,f\,k+f\,\nu)\,z}}{-2\,f\,k+f\,\nu} - \frac{e^{\frac{(b-c\,(2\,k-\nu))^2}{4\,f\,(2\,k-\nu)}+e-2\,g\,k+g\,\nu}\sqrt{\pi}\,(b-2\,c\,k+c\,\nu)\,\mathrm{erfi}\left(\frac{b-c\,(2\,k-\nu)+2\,(f\,\nu-2\,f\,k)\sqrt{z}}{2\sqrt{f\,\nu-2\,f\,k}}\right)}{2\,(f\,\nu-2\,f\,k)^{3/2}} - \frac{(-1)^{\nu}\,e^{\frac{(b-c\,(\nu-2\,k))^2}{4\,f\,(\nu-2\,k)}+e+2\,g\,k-g\,\nu}\sqrt{\pi}\,(b-c\,(\nu-2\,k))\,\mathrm{erfi}\left(\frac{b-c\,(\nu-2\,k)+2\,(2\,f\,k-f\,\nu)\sqrt{z}}{2\sqrt{-f\,(\nu-2\,k)}}\right)}{2\,(2\,f\,k-f\,\nu)^{3/2}}\right) /;\ \nu\in\mathbb{N}^{+}$$

Involving $e^{b\,z^r+d\,z}\sinh^{\nu}\left(c\,z^r+f\,z+g\right)$

01.19.21.2164.01

$$\int e^{b\,z^2+d\,z}\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{i^{\nu}\,2^{-\nu-1}\sqrt{\pi}\,(1-\nu \bmod 2)}{\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}\,e^{-\frac{d^2}{4\,b}}\,\mathrm{erfi}\left(\frac{d+2\,b\,z}{2\sqrt{b}}\right) + 2^{-\nu-1}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{-\frac{(d+f\,(\nu-2\,k))^2}{4\,(b+c\,(\nu-2\,k))}+g\,(\nu-2\,k)}\,\mathrm{erfi}\left(\frac{d-2\,f\,k+f\,\nu+2\,b\,z-4\,c\,k\,z+2\,c\,\nu\,z}{2\sqrt{b-2\,c\,k+c\,\nu}}\right)}{\sqrt{b-2\,c\,k+c\,\nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2\,f\,k-f\,\nu)^2}{b+2\,c\,k-c\,\nu}+8\,g\,k-4\,g\,\nu+4\,\pi\,i\,\nu\right)}\,\mathrm{erf}\left(\frac{d+2\,f\,k-f\,\nu+2\,b\,z+4\,c\,k\,z-2\,c\,\nu\,z}{2\sqrt{-b-2\,c\,k+c\,\nu}}\right)}{\sqrt{-b-2\,c\,k+c\,\nu}}\right) /;\ \nu\in\mathbb{N}^{+}$$

01.19.21.2165.01

$$\int e^{\sqrt{z}\, b+d\, z} \sinh^{\nu}\left(\sqrt{z}\, c+g+f\, z\right) dz = \left(\frac{e^{\sqrt{z}\, b+d\, z}}{d} - \frac{b\, e^{-\frac{b^2}{4d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2\sqrt{d}}\right)}{2\, d^{3/2}}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^{\nu} + 2^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(-\left((-1)^{\nu} \left(\sqrt{\pi}\, (b+2 c k-c \nu)\right) e^{-\frac{(b+2 c k-c \nu)^2}{4 (d+2 f k-f \nu)}+2 g k-g \nu} \operatorname{erfi}\left(\frac{b+c (2 k-\nu)+2 (d+2 f k-f \nu) \sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)\right) \Big/ \left(2 (d+2 f k-f \nu)^{3/2}\right) - \frac{\left(\sqrt{\pi}\, (b+c (\nu-2 k))\right) e^{-\frac{(b+c (\nu-2 k))^2}{4 (d+f (\nu-2 k))}-2 g k+g \nu} \operatorname{erfi}\left(\frac{b+c (\nu-2 k)+2 (d-2 f k+f \nu) \sqrt{z}}{2\sqrt{d+f (\nu-2 k)}}\right)}{2 (d-2 f k+f \nu)^{3/2}} + \frac{(-1)^{\nu} e^{2 g k-g \nu+(d+2 f k-f \nu) z+(b+2 c k-c \nu) \sqrt{z}}}{d+2 f k-f \nu} + \frac{e^{-2 g k+g \nu+(d-2 f k+f \nu) z+(b-2 c k+c \nu) \sqrt{z}}}{d-2 f k+f \nu}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.2166.01

$$\int e^{b z^2+d z+e} \sinh^{\nu}\left(c z^2+f z+g\right) dz = \frac{i^{\nu}\, 2^{-\nu-1} \sqrt{\pi}\, (1-\nu \bmod 2)}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} e^{e-\frac{d^2}{4b}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right) + 2^{-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{(d+f (\nu-2 k))^2}{4 (b+c (\nu-2 k))}+e+g (\nu-2 k)} \operatorname{erfi}\left(\frac{d-2 f k+f \nu+2 b z-4 c k z+2 c \nu z}{2\sqrt{b-2 c k+c \nu}}\right)}{\sqrt{b-2 c k+c \nu}} - \frac{e^{\frac{1}{4}\left(-\frac{(d+2 f k-f \nu)^2}{b+2 c k-c \nu}+4 e+8 g k-4 g \nu+4 \pi i \nu\right)} \operatorname{erf}\left(\frac{d+2 f k-f \nu+2 b z+4 c k z-2 c \nu z}{2\sqrt{-b-2 c k+c \nu}}\right)}{\sqrt{-b-2 c k+c \nu}}\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2167.01

$$\int e^{\sqrt{z}\, b+d z+e} \sinh^{\nu}\left(\sqrt{z}\, c+f z+g\right) dz = \left(\frac{e^{\sqrt{z}\, b+e+d z}}{d}-\frac{b\sqrt{\pi}}{2 d^{3/2}}\, e^{e-\frac{b^2}{4 d}} \operatorname{erfi}\left(\frac{b+2 d\sqrt{z}}{2\sqrt{d}}\right)\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}+ 2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(-\left((-1)^{\nu}\sqrt{\pi}\,(b+2 c k-c\nu)\, e^{-\frac{(b+2 c k-c \nu)^2}{4(d+2 f k-f \nu)}+e+2 g k-g \nu} \operatorname{erfi}\left(\frac{b+c(2k-\nu)+2(d+2 f k-f\nu)\sqrt{z}}{2\sqrt{d+2 f k-f \nu}}\right)\right) \Big/ \left(2(d+2 f k-f\nu)^{3/2}\right)-\frac{\sqrt{\pi}\,(b+c(\nu-2k))\, e^{-\frac{(b+c(\nu-2k))^2}{4(d+f(\nu-2k))}+e-2 g k+g\nu} \operatorname{erfi}\left(\frac{b+c(\nu-2k)+2(d-2 f k+f\nu)\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{2(d-2 f k+f\nu)^{3/2}}+ \frac{(-1)^{\nu}\, e^{e+2 g k-g\nu+(d+2 f k-f\nu) z+(b+2 c k-c\nu)\sqrt{z}}}{d+2 f k-f \nu}+\frac{e^{e-2 g k+g \nu+(d-2 f k+f \nu) z+(b-2 c k+c \nu)\sqrt{z}}}{d-2 f k+f \nu}\right) /; \nu\in\mathbb{N}^+$$

Involving powers of sinh and rational functions of exp

Involving $\left(a+b\, e^{d z}\right)^{\beta} \sinh^{\nu}(c z)$

01.19.21.2168.01

$$\int \frac{\sinh^{\nu}(c z)}{\left(a+b\, e^{d z}\right)^n}\, dz = \frac{1}{a^n}\, 2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k e^{c(\nu-2k) z}}{2 c(\nu-2k)}\binom{\nu}{k} \left({}_2F_1\left(\frac{c(\nu-2k)}{d}, n; \frac{d-2 c k+c\nu}{d}; -\frac{b\, e^{d z}}{a}\right)-e^{-2 c z \nu+i\pi\nu+4 c k z}\, {}_2F_1\left(\frac{c(2k-\nu)}{d}, n; \frac{d+2 c k-c\nu}{d}; -\frac{b\, e^{d z}}{a}\right)\right)- \left(\frac{i}{2}\right)^{\nu}\frac{e^{-d n z}\,(1-\nu \bmod 2)}{d\, n\, b^n}\binom{\nu}{\frac{\nu}{2}}\, {}_2F_1\left(n, n; n+1; -\frac{a\, e^{-d z}}{b}\right) /; n\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

Involving $e^{p z} \sinh^{\nu}(c z)\left(a+b\, e^{d z}\right)^{-n}$

01.19.21.2169.01

$$\int \frac{e^{p z} \sinh^{\nu}(c z)}{\left(a+b e^{d z}\right)^{n}} \, dz = 2^{-\nu} a^{-n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k} \binom{\nu}{k} \left(\frac{e^{i \pi \nu+(2 c k+p-c \nu) z}}{2 c k+p-c \nu} \, {}_{2}F_{1}\left(\frac{2 c k+p-c \nu}{d}, n; \frac{d+2 c k+p-c \nu}{d}; -\frac{b e^{d z}}{a}\right) + \frac{e^{(p+c(\nu-2 k)) z}}{p+c(\nu-2 k)} \, {}_{2}F_{1}\left(\frac{p+c(\nu-2 k)}{d}, n; \frac{d-2 c k+p+c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) + \left(\frac{i}{2}\right)^{\nu} \frac{a^{-n} e^{p z} (1-\nu \bmod 2)}{p} \binom{\nu}{\frac{\nu}{2}} {}_{2}F_{1}\left(\frac{p}{d}, n; \frac{p}{d}+1; -\frac{b e^{d z}}{a}\right) /; n \in \mathbb{N}^{+} \land \nu \in \mathbb{N}^{+}$$

Involving powers of sinh and algebraic functions of exp

Involving $\left(a+b e^{d z}\right)^{\beta} \sinh^{\nu}(c z)$

01.19.21.2170.01

$$\int \left(a+b e^{d z}\right)^{\beta} \sinh^{\nu}(c z) \, dz = \frac{(1-\nu \bmod 2)}{d \beta} \binom{\nu}{\frac{\nu}{2}} \left(\frac{i}{2}\right)^{\nu} \left(\frac{e^{-d z} a}{b}+1\right)^{-\beta} \left(a+b e^{d z}\right)^{\beta} {}_{2}F_{1}\left(-\beta, -\beta; 1-\beta; -\frac{a e^{-d z}}{b}\right) + 2^{1-\nu} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \left(a+b e^{d z}\right)^{\beta} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^{k} e^{c(\nu-2 k) z}}{2 c(\nu-2 k)} \binom{\nu}{k} \left({}_{2}F_{1}\left(\frac{c(\nu-2 k)}{d}, -\beta; \frac{d-2 c k+c \nu}{d}; -\frac{b e^{d z}}{a}\right) - e^{-2 c z \nu+i \pi \nu+4 c k z} \, {}_{2}F_{1}\left(\frac{c(2 k-\nu)}{d}, -\beta; \frac{d+2 c k-c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) /; \nu \in \mathbb{N}^{+}$$

Involving $e^{p z}\left(a+b e^{d z}\right)^{\beta} \sinh^{\nu}(c z)$

01.19.21.2171.01

$$\int e^{p z} \left(a+b e^{d z}\right)^{\beta} \sinh^{\nu}(c z) \, dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{p z} (1-\nu \bmod 2)}{p} \left(a+b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} {}_{2}F_{1}\left(\frac{p}{d}, -\beta; \frac{p}{d}+1; -\frac{b e^{d z}}{a}\right) + 2^{-\nu} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \left(a+b e^{d z}\right)^{\beta} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k} \binom{\nu}{k} \left(\frac{e^{i \pi \nu+(2 c k+p-c \nu) z}}{2 c k+p-c \nu} \, {}_{2}F_{1}\left(\frac{2 c k+p-c \nu}{d}, -\beta; \frac{d+2 c k+p-c \nu}{d}; -\frac{b e^{d z}}{a}\right) + \frac{e^{(p+c(\nu-2 k)) z}}{p+c(\nu-2 k)} \, {}_{2}F_{1}\left(\frac{p+c(\nu-2 k)}{d}, -\beta; \frac{d-2 c k+p+c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) /; \nu \in \mathbb{N}^{+}$$

Involving products of the direct function and exponential function

Involving products of two direct functions and exponential function

Involving $e^{b z} \sinh(c z) \sinh(a z)$

01.19.21.2172.01

$$\int e^{b z} \sinh(c z) \sinh(a z) \, dz = \left(e^{b z} \left(a \cosh(a z) \left(2 b c \cosh(c z) + \left(a^2 - b^2 - c^2\right) \sinh(c z)\right) - \sinh(a z) \left(c \left(a^2 + b^2 - c^2\right) \cosh(c z) + b \left(a^2 - b^2 + c^2\right) \sinh(c z)\right)\right)\right) / ((a - b - c)(a + b - c)(a - b + c)(a + b + c))$$

01.19.21.2173.01

$$\int e^{c z} \sinh(c z) \sinh(a z) \, dz = \frac{\left(\left(-1 + e^{2 c z}\right) a^2 + 4 c^2\right) \cosh(a z) - 2 a c e^{2 c z} \sinh(a z)}{2 \left(a^3 - 4 a c^2\right)}$$

Involving $e^{p z} \sinh(c z) \sinh(a z + b)$

01.19.21.2174.01

$$\int e^{p z} \sinh(c z) \sinh(b + a z) \, dz = \frac{1}{2} e^{p z} \left(\frac{\cosh((a - c) z) (p \cosh(b) + (c - a) \sinh(b))}{(a - c - p)(a - c + p)} + \frac{\cosh((a + c) z) ((a + c) \sinh(b) - p \cosh(b))}{(a + c - p)(a + c + p)} + \frac{((a + c) \cosh(b) - p \sinh(b)) \sinh((a + c) z)}{(a + c - p)(a + c + p)} - \frac{((a - c) \cosh(b) - p \sinh(b)) \sinh((a - c) z)}{(a - c - p)(a - c + p)} \right)$$

Involving $e^{p z} \sinh(c z + d) \sinh(a z + b)$

01.19.21.2175.01

$$\int e^{p z} \sinh(d + c z) \sinh(b + a z) \, dz = \frac{1}{2} e^{p z} \left(\frac{\cosh((a - c) z) (p \cosh(b - d) + (c - a) \sinh(b - d))}{(a - c - p)(a - c + p)} + \frac{\cosh((a + c) z) ((a + c) \sinh(b + d) - p \cosh(b + d))}{(a + c - p)(a + c + p)} + \frac{((a + c) \cosh(b + d) - p \sinh(b + d)) \sinh((a + c) z)}{(a + c - p)(a + c + p)} - \frac{((a - c) \cosh(b - d) - p \sinh(b - d)) \sinh((a - c) z)}{(a - c - p)(a - c + p)} \right)$$

Involving $e^{p z^r} \sinh(b z) \sinh(c z)$

01.19.21.2176.01

$$\int e^{p z^2} \sinh(b z) \sinh(c z) \, dz = \frac{\sqrt{\pi}}{8 \sqrt{p}} e^{-\frac{(b+c)^2}{4 p}} \left(\text{erfi}\left(\frac{-b - c + 2 p z}{2 \sqrt{p}} \right) - e^{\frac{b c}{p}} \text{erfi}\left(\frac{b - c + 2 p z}{2 \sqrt{p}} \right) - e^{\frac{b c}{p}} \text{erfi}\left(\frac{-b + c + 2 p z}{2 \sqrt{p}} \right) + \text{erfi}\left(\frac{b + c + 2 p z}{2 \sqrt{p}} \right) \right)$$

01.19.21.2177.01

$$\int e^{p\sqrt{z}}\sinh(b z)\sinh(c z)\,dz = \frac{1}{8}\left(\frac{4 e^{p\sqrt{z}}\sinh((b+c)z)}{b+c} - \frac{4 e^{p\sqrt{z}}\sinh((b-c)z)}{b-c} - \frac{e^{\frac{p^2}{4b-4c}}\, p\sqrt{\pi}\,\operatorname{erf}\left(\frac{2(b-c)\sqrt{z}-p}{2\sqrt{b-c}}\right)}{(b-c)^{3/2}} + \frac{e^{\frac{p^2}{4(b+c)}}\, p\sqrt{\pi}\,\operatorname{erf}\left(\frac{2(b+c)\sqrt{z}-p}{2\sqrt{b+c}}\right)}{(b+c)^{3/2}} + \frac{e^{\frac{p^2}{4c-4b}}\, p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\sqrt{z}\,(b-c)+p}{2\sqrt{b-c}}\right)}{(b-c)^{3/2}} - \frac{e^{-\frac{p^2}{4(b+c)}}\, p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\sqrt{z}\,(b+c)+p}{2\sqrt{b+c}}\right)}{(b+c)^{3/2}}\right)$$

Involving $e^{p z}\sinh(b z^r)\sinh(c z)$

01.19.21.2178.01

$$\int e^{p z}\sinh(b z^2)\sinh(c z)\,dz = \frac{\sqrt{\pi}}{8\sqrt{b}}\, e^{-\frac{(c+p)^2}{4b}}\left(-e^{\frac{(c+p)^2}{2b}}\operatorname{erf}\left(\frac{-c-p+2bz}{2\sqrt{b}}\right) + e^{\frac{c^2+p^2}{2b}}\operatorname{erf}\left(\frac{c-p+2bz}{2\sqrt{b}}\right) - e^{\frac{cp}{b}}\operatorname{erfi}\left(\frac{-c+p+2bz}{2\sqrt{b}}\right) + \operatorname{erfi}\left(\frac{c+p+2bz}{2\sqrt{b}}\right)\right)$$

01.19.21.2179.01

$$\int e^{p z}\sinh\left(b\sqrt{z}\right)\sinh(c z)\,dz = \frac{1}{8}\left(-\frac{b\, e^{\frac{b^2}{4c-4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{2(c-p)\sqrt{z}-b}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}} + \frac{b\, e^{-\frac{b^2}{4(c+p)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-2(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}} - \frac{b\, e^{\frac{b^2}{4c-4p}}\sqrt{\pi}\,\operatorname{erf}\left(\frac{b+2(c-p)\sqrt{z}}{2\sqrt{c-p}}\right)}{(c-p)^{3/2}} - \frac{b\, e^{-\frac{b^2}{4(c+p)}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2(c+p)\sqrt{z}}{2\sqrt{c+p}}\right)}{(c+p)^{3/2}} + \frac{4 e^{(p-c)z}\sinh\left(b\sqrt{z}\right)}{c-p} + \frac{4 e^{(c+p)z}\sinh\left(b\sqrt{z}\right)}{c+p}\right)$$

Involving $e^{p z^r}\sinh(b z^r)\sinh(c z)$

01.19.21.2180.01

$$\int e^{p z^2}\sinh(b z^2)\sinh(c z)\,dz = \frac{\sqrt{\pi}}{8(p-b)(b+p)}\, e^{\frac{c^2 p}{2b^2-2p^2}}\left(e^{\frac{c^2}{4(b+p)}}\sqrt{p-b}\,(b+p)\operatorname{erfi}\left(\frac{-c-2bz+2pz}{2\sqrt{p-b}}\right) - e^{\frac{c^2}{4(b+p)}}\sqrt{p-b}\,(b+p)\operatorname{erfi}\left(\frac{c+2(p-b)z}{2\sqrt{p-b}}\right) + e^{\frac{c^2}{4p-4b}}(b-p)\sqrt{b+p}\left(\operatorname{erfi}\left(\frac{2(b+p)z-c}{2\sqrt{b+p}}\right) - \operatorname{erfi}\left(\frac{c+2(b+p)z}{2\sqrt{b+p}}\right)\right)\right)$$

01.19.21.2181.01

$$\int e^{p\sqrt{z}}\sinh\left(b\sqrt{z}\right)\sinh(c\,z)\,dz = \frac{1}{8\,c^{3/2}}\,e^{-\frac{b^2+2\,p\,b+4\,c\,\sqrt{z}\,b+p^2+4\,c^2\,z}{4\,c}}\left(2\sqrt{c}\,e^{\frac{(b+p)^2}{4\,c}+p\sqrt{z}}\left(-1+e^{2\,b\,\sqrt{z}}\right)\left(1+e^{2\,c\,z}\right) - e^{\frac{b^2+2\left(\sqrt{z}\,c+p\right)b+p^2+2\,c^2\,z}{2\,c}}\,(b+p)\sqrt{\pi}\,\operatorname{erf}\left(\frac{-b-p+2\,c\,\sqrt{z}}{2\sqrt{c}}\right) - e^{\frac{b^2+2\,c\,\sqrt{z}\,b+p^2+2\,c^2\,z}{2\,c}}\,(b-p)\sqrt{\pi}\,\operatorname{erf}\left(\frac{b-p+2\,c\,\sqrt{z}}{2\sqrt{c}}\right) - e^{\sqrt{z}\,b+c\,z}\,(b+p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+p+2\,c\,\sqrt{z}}{2\sqrt{c}}\right) + e^{\frac{p\,b}{c}+\sqrt{z}\,b+c\,z}\,(b-p)\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-p-2\,c\,\sqrt{z}}{2\sqrt{c}}\right)\right)$$

Involving $e^{p\,z}\sinh(b\,z^r)\sinh(c\,z^r)$

01.19.21.2182.01

$$\int e^{p\,z}\sinh\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = \frac{\sqrt{\pi}}{8}\left(-\frac{e^{\frac{p^2}{4\,b-4\,c}}\operatorname{erf}\left(\frac{-p+2\,b\,z-2\,c\,z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}} + \frac{e^{\frac{p^2}{4\,(b+c)}}\operatorname{erf}\left(\frac{2\,(b+c)\,z-p}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} + \frac{e^{-\frac{p^2}{4\,(b+c)}}\operatorname{erfi}\left(\frac{p+2\,(b+c)\,z}{2\sqrt{b+c}}\right)}{\sqrt{b+c}} - \frac{e^{\frac{p^2}{4\,c-4\,b}}\operatorname{erfi}\left(\frac{p+2\,b\,z-2\,c\,z}{2\sqrt{b-c}}\right)}{\sqrt{b-c}}\right)$$

01.19.21.2183.01

$$\int e^{p\,z}\sinh\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = -\frac{1}{8\,p^{3/2}}\left(-(b+c)\,e^{-\frac{(b+c)^2}{4\,p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-b-c+2\,p\,\sqrt{z}}{2\sqrt{p}}\right) - (b-c)\,e^{-\frac{(b-c)^2}{4\,p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-c+2\,p\,\sqrt{z}}{2\sqrt{p}}\right) + (b-c)\,e^{-\frac{(b-c)^2}{4\,p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-b+c+2\,p\,\sqrt{z}}{2\sqrt{p}}\right) + (b+c)\,e^{-\frac{(b+c)^2}{4\,p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+c+2\,p\,\sqrt{z}}{2\sqrt{p}}\right) - 8\,e^{p\,z}\sqrt{p}\,\sinh\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)\right)$$

Involving $e^{p\,z^r}\sinh(b\,z^r)\sinh(c\,z^r)$

01.19.21.2184.01

$$\int e^{p\,z^r}\sinh(b\,z^r)\sinh(c\,z^r)\,dz = \frac{z}{4\,r}\left(\Gamma\left(\frac{1}{r},\,(-b+c-p)\,z^r\right)\left((-b+c-p)\,z^r\right)^{-1/r} - \left((b+c-p)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},\,(b+c-p)\,z^r\right) + \left(-(-b+c+p)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},\,-(-b+c+p)\,z^r\right) - \left(-(b+c+p)\,z^r\right)^{-1/r}\Gamma\left(\frac{1}{r},\,-(b+c+p)\,z^r\right)\right)$$

01.19.21.2185.01

$$\int e^{p\,z^2}\sinh\left(b\,z^2\right)\sinh\left(c\,z^2\right)dz = \left(\sqrt{\pi}\left(\sqrt{-b-c+p}\,\sqrt{b-c+p}\,(-b+c+p)\sqrt{b+c+p}\,\operatorname{erfi}\left(\sqrt{-b-c+p}\,z\right) - (b+c-p)\left((b-c-p)\sqrt{b+c+p}\,\operatorname{erfi}\left(\sqrt{b-c+p}\,z\right) + \sqrt{b-c+p}\left((-b+c+p)\operatorname{erfi}\left(\sqrt{b+c+p}\,z\right) - \sqrt{-b+c+p}\,\sqrt{b+c+p}\,\operatorname{erfi}\left(\sqrt{-b+c+p}\,z\right)\right)\right)\right)\right)\Big/\left(8\,(b-c-p)\,(b+c-p)\sqrt{b-c+p}\,\sqrt{b+c+p}\right)$$

01.19.21.2186.01

$$\int e^{p\sqrt{z}} \sinh\left(b\sqrt{z}\right)\sinh\left(c\sqrt{z}\right)dz = \left(e^{p\sqrt{z}}\left(-e^{-b\sqrt{z}}+e^{b\sqrt{z}}\right)\left(-e^{-c\sqrt{z}}+e^{c\sqrt{z}}\right)\left(e^{2c\sqrt{z}}\left(\frac{e^{2b\sqrt{z}}\left((b+c+p)\sqrt{z}-1\right)}{(b+c+p)^2}-\frac{\sqrt{z}}{-b+c+p}+\frac{1}{(-b+c+p)^2}\right)+\frac{e^{2b\sqrt{z}}\left(1-(b-c+p)\sqrt{z}\right)}{(b-c+p)^2}-\frac{\sqrt{z}}{b+c-p}-\frac{1}{(b+c-p)^2}\right)\right)\Big/\left(2\left(-1+e^{2b\sqrt{z}}\right)\left(-1+e^{2c\sqrt{z}}\right)\right)$$

Involving $e^{b z^r+e}\sinh\left(a z^r+q\right)\sinh\left(c z^r+g\right)$

01.19.21.2187.01

$$\int e^{b z^r+e}\sinh(a z^r+q)\sinh(c z^r+g)\,dz = \frac{z}{4r}\left(-e^{e+g+q}\,\Gamma\left(\frac{1}{r},(-a-b-c)z^r\right)((-a-b-c)z^r)^{-1/r}+e^{e+g-q}((a-b-c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(a-b-c)z^r\right)+e^{e-g+q}((-a-b+c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-a-b+c)z^r\right)-e^{e-g-q}((a-b+c)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(a-b+c)z^r\right)\right)$$

01.19.21.2188.01

$$\int e^{b z^2+e}\sinh\left(a z^2+q\right)\sinh\left(c z^2+g\right)dz = \frac{1}{8}e^{e-i(i g+i q)}\sqrt{\pi}\left(\frac{e^{2i(i g+i q)}\operatorname{erfi}\left(\sqrt{-a+b-c}\,z\right)}{\sqrt{-a+b-c}}+\frac{\operatorname{erfi}\left(\sqrt{-i(i a+i b+i c)}\,z\right)}{\sqrt{-i(i a+i b+i c)}}-\frac{e^{-2g}\operatorname{erfi}\left(\sqrt{a+b-c}\,z\right)}{\sqrt{a+b-c}}-\frac{e^{-2q}\operatorname{erfi}\left(\sqrt{-a+b+c}\,z\right)}{\sqrt{-a+b+c}}\right)$$

01.19.21.2189.01

$$\int e^{\sqrt{z}\,b+e}\sinh\left(\sqrt{z}\,a+q\right)\sinh\left(\sqrt{z}\,c+g\right)dz = -\frac{1}{2}\left(\frac{e^{\sqrt{z}(-a+b+c)+e+g-q}\left(\sqrt{z}\,b+(c-a)\sqrt{z}-1\right)}{(-a+b+c)^2}+\frac{e^{\sqrt{z}(a+b+c)+e+g+q+i\pi}\left(\sqrt{z}\,b+(a+c)\sqrt{z}-1\right)}{(a+b+c)^2}+\frac{e^{\sqrt{z}(a+b-c)+e-g+q}\left(\sqrt{z}\,b-(c-a)\sqrt{z}-1\right)}{(-a-b+c)^2}+\frac{e^{\sqrt{z}(-a+b-c)+e-g-q-i\pi}\left(\sqrt{z}\,b-(a+c)\sqrt{z}-1\right)}{(a-b+c)^2}\right)$$

Involving $e^{b z^r+d z+e}\sinh\left(a z^r+p z+q\right)\sinh\left(c z^r+f z+g\right)$

01.19.21.2190.01

$$\int e^{b z^2+d z+e} \sinh\left(a z^2 + p z + q\right) \sinh\left(c z^2 + f z + g\right) dz = \frac{1}{8} \sqrt{\pi} \left(-\frac{e^{e+g-q-\frac{-d^2-2 f d+2 p d-f^2-p^2+2 f p}{4 (a-b-c)}} \operatorname{erf}\left(\frac{-d-f+p+2 a z-2 b z-2 c z}{2 \sqrt{a-b-c}}\right)}{\sqrt{a-b-c}} + \frac{e^{e-g-q-\frac{-d^2+2 f d+2 p d-f^2-p^2-2 f p}{4 (a-b+c)}} \operatorname{erf}\left(\frac{-d+f+p+2 a z-2 b z+2 c z}{2 \sqrt{a-b+c}}\right)}{\sqrt{a-b+c}} + \frac{e^{e+g+q-\frac{d^2+2 f d+2 p d+f^2+p^2+2 f p}{4 (a+b+c)}} \operatorname{erfi}\left(\frac{d+f+p+2 a z+2 b z+2 c z}{2 \sqrt{a+b+c}}\right)}{\sqrt{a+b+c}} - \frac{e^{e-g+q-\frac{d^2-2 f d+2 p d+f^2+p^2-2 f p}{4 (a+b-c)}} \operatorname{erfi}\left(\frac{d-f+p+2 a z+2 b z-2 c z}{2 \sqrt{a+b-c}}\right)}{\sqrt{a+b-c}}\right)$$

01.19.21.2191.01

$$\int e^{\sqrt{z}\, b+d z+e} \sinh\left(\sqrt{z}\, a + p z + q\right) \sinh\left(\sqrt{z}\, c + f z + g\right) dz = \frac{1}{4} e^{e-g-q} \left(-\frac{e^{\sqrt{z}\, (-a+b+c)+2 g+(d+f-p) z}}{d+f-p} - \frac{e^{\sqrt{z}\, (a+b-c)+2 q+(d-f+p) z}}{d-f+p} + \frac{e^{\sqrt{z}\, (a+b+c)+2 g+2 q+(d+f+p) z}}{d+f+p} + \frac{e^{(d-f-p) z-(a-b+c) \sqrt{z}}}{d-f-p}\right) - \frac{1}{8 (d-f-p)^{3/2}} \left((a-b+c)\, e^{\frac{a^2-2 b a+2 c a+b^2+c^2-2 b c-4 d e+4 e f+4 d g-4 f g+4 e p-4 g p+4 d q-4 f q-4 p q}{4 (-d+f+p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{a-b+c-2 d \sqrt{z} + 2 f \sqrt{z} + 2 p \sqrt{z}}{2 \sqrt{d-f-p}}\right)\right) + \frac{1}{8 (d+f-p)^{3/2}} \left((a-b-c)\, e^{-\frac{a^2-2 (b+c) a+b^2+c^2+2 b c-4 d e-4 e f-4 d g-4 f g+4 e p+4 g p+4 d q+4 f q-4 p q}{4 (d+f-p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{a-b-c-2 d \sqrt{z} - 2 f \sqrt{z} + 2 p \sqrt{z}}{2 \sqrt{d+f-p}}\right)\right) + \frac{1}{8 (d-f+p)^{3/2}} \left((a+b-c)\, e^{-\frac{a^2+2 (b-c) a+b^2+c^2-2 b c-4 d e+4 e f+4 d g-4 f g-4 e p+4 g p-4 d q+4 f q-4 p q}{4 (d-f+p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{a+b-c+2 d \sqrt{z} - 2 f \sqrt{z} + 2 p \sqrt{z}}{2 \sqrt{d-f+p}}\right)\right) - \frac{1}{8 (d+f+p)^{3/2}} \left((a+b+c)\, e^{-\frac{a^2+2 (b+c) a+b^2+c^2+2 b c-4 d e-4 e f-4 d g-4 f g-4 e p-4 g p-4 d q-4 f q-4 p q}{4 (d+f+p)}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{a+b+c+2 d \sqrt{z} + 2 f \sqrt{z} + 2 p \sqrt{z}}{2 \sqrt{d+f+p}}\right)\right)$$

Involving products of two direct functions and rational functions of exp

Involving $\sinh(e\, z) \sinh(c\, z) \left(a + b\, e^{d z}\right)^{-n}$

01.19.21.2192.01

$$\int \frac{\sinh(e\,z)\sinh(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz = \frac{1}{4}\,a^{-n}\left(\frac{1}{c-e}\left(e^{(e-c)\,z}\,{}_2F_1\!\left(\frac{e-c}{d},\,n;\,\frac{-c+d+e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(c-e)\,z}\,{}_2F_1\!\left(\frac{c-e}{d},\,n;\,\frac{c+d-e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)+\frac{1}{c+e}\left(e^{(c+e)\,z}\,{}_2F_1\!\left(\frac{c+e}{d},\,n;\,\frac{c+d+e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(-c-e)\,z}\,{}_2F_1\!\left(-\frac{c+e}{d},\,n;\,\frac{-c+d-e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\;/;\;n\in\mathbb{N}^+$$

Involving $e^{p\,z}\sinh(e\,z)\sinh(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.2193.01

$$\int \frac{e^{p\,z}\sinh(e\,z)\sinh(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz = \frac{1}{4\,a^n}\left(\frac{1}{(c+e-p)\,(c+e+p)}\left(e^{(c+e+p)\,z}\,(c+e-p)\,{}_2F_1\!\left(\frac{c+e+p}{d},\,n;\,\frac{c+d+e+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(-c-e+p)\,z}\,(c+e+p)\,{}_2F_1\!\left(-\frac{c+e-p}{d},\,n;\,\frac{-c+d-e+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)-\frac{1}{(c-e-p)\,(c-e+p)}\left(e^{(c-e+p)\,z}\,(c-e-p)\,{}_2F_1\!\left(\frac{c-e+p}{d},\,n;\,\frac{c+d-e+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(-c+e+p)\,z}\,(c-e+p)\,{}_2F_1\!\left(\frac{-c+e+p}{d},\,n;\,\frac{-c+d+e+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\;/;\;n\in\mathbb{N}^+$$

Involving products of two direct functions and algebraic functions of exp

Involving $\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e\,z)\sinh(c\,z)$

01.19.21.2194.01

$$\int \left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e\,z)\sinh(c\,z)\,dz = \frac{e^{-2\,(c+e)\,z}\left(a+b\,e^{d\,z}\right)^{\beta}}{4\,(c-e)\,(c+e)}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\left(-(c+e)\,e^{(3\,c+e)\,z}\,{}_2F_1\!\left(\frac{c-e}{d},\,-\beta;\,\frac{c+d-e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+(c+e)\,e^{(c+3\,e)\,z}\,{}_2F_1\!\left(\frac{e-c}{d},\,-\beta;\,\frac{-c+d+e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+(c-e)\,e^{(c+e)\,z}\left(e^{2\,(c+e)\,z}\,{}_2F_1\!\left(\frac{c+e}{d},\,-\beta;\,\frac{c+d+e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-{}_2F_1\!\left(-\frac{c+e}{d},\,-\beta;\,-\frac{c-d+e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)$$

Involving $e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e\,z)\sinh(c\,z)$

01.19.21.2195.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^{\beta}\sinh(e\,z)\sinh(c\,z)\,dz = \frac{1}{4}\left(a+b\,e^{dz}\right)^{\beta}\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\left(\frac{1}{(c+e-p)(c+e+p)}\left(e^{(c+e+p)z}(c+e-p)\,{}_2F_1\left(\frac{c+e+p}{d},-\beta;\frac{c+d+e+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{-(c+e-p)z}(c+e+p)\,{}_2F_1\left(-\frac{c+e-p}{d},-\beta;\frac{-c+d-e+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)-\frac{1}{(c-e-p)(c-e+p)}\left(e^{(c-e+p)z}(c-e-p)\,{}_2F_1\left(\frac{c-e+p}{d},-\beta;\frac{c+d-e+p}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-c+e+p)z}(c-e+p)\,{}_2F_1\left(\frac{-c+e+p}{d},-\beta;\frac{-c+d+e+p}{d};-\frac{b\,e^{dz}}{a}\right)\right)\right)$$

Involving products of several direct functions and exponential function

Involving $e^{pz}\sinh(a\,z)\sinh(b\,z)\sinh(c\,z)$

01.19.21.2196.01

$$\int e^{pz}\sinh(a\,z)\sinh(b\,z)\sinh(c\,z)\,dz = \frac{1}{4}e^{pz}\left(\frac{(-a+b+c)\cosh((a-b-c)z)+p\sinh((a-b-c)z)}{(a-b-c+p)(-a+b+c+p)}+\frac{(a+b-c)\cosh((a+b-c)z)-p\sinh((a+b-c)z)}{(a+b-c+p)(-a-b+c+p)}+\frac{(a-b+c)\cosh((a-b+c)z)-p\sinh((a-b+c)z)}{(-a+b-c+p)(a-b+c+p)}+\frac{(a+b+c)\cosh((a+b+c)z)-p\sinh((a+b+c)z)}{(a+b+c-p)(a+b+c+p)}\right)$$

Involving $e^{pz}\prod_{k=1}^{n}\sinh(a_k\,z)$

01.19.21.2197.01

$$\int e^{pz}\prod_{k=1}^{n}\sinh(a_k\,z)\,dz = 2^{-n}\,e^{pz}\sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1}\sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1}\cdots\sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1}\left(\frac{(-1)^{\sum_{j=1}^{n}\frac{1}{4}(2k_j+2)}\left(p\cosh\left(z\sum_{j=1}^{n}k_j\,a_j\right)-\sum_{j=1}^{n}k_j\,a_j\sinh\left(z\sum_{j=1}^{n}k_j\,a_j\right)\right)}{p^2-\left(\sum_{j=1}^{n}k_j\,a_j\right)^2}\right)$$

Involving products of powers of two direct functions and exponential function

Involving product of power of the direct function, the direct function and exponential function

Involving $e^{bz}\sinh(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.2198.01

$$\int e^{bz}\sinh(cz)\sinh^{\nu}(az)\,dz = \frac{1}{(c+b-a\nu)(c-b+a\nu)}\,2^{-\nu-1}\,e^{(b-c)z}\,(-e^{-az}+e^{az})^{\nu}\left(1-e^{2az}\right)^{-\nu}\left(e^{2cz}(c-b+a\nu)\,{}_2F_1\!\left(\frac{c+b-a\nu}{2a},-\nu;\frac{-\nu a+2a+c+b}{2a};e^{2az}\right)+(c+b-a\nu)\,{}_2F_1\!\left(-\frac{c-b+a\nu}{2a},-\nu;-\frac{c-b+a(\nu-2)}{2a};e^{2az}\right)\right)$$

01.19.21.2199.01

$$\int e^{bz}\sinh(cz)\sinh^{\nu}(az)\,dz = -i^{\nu}\,2^{-\nu-1}\left(\frac{e^{(b-c)z}}{b-c}-\frac{e^{(b+c)z}}{b+c}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(b+c-2ak+a\nu)z}}{b+c-2ak+a\nu}+\frac{e^{(b-c-2ak+a\nu)z}}{-b+c+2ak-a\nu}+\frac{e^{i\pi\nu+(b+c+2ak-a\nu)z}}{b+c+2ak-a\nu}+\frac{e^{i\pi\nu+(b-c+2ak-a\nu)z}}{-b+c-2ak+a\nu}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sinh(cz+d)\sinh^{\nu}(az)$

01.19.21.2200.01

$$\int e^{pz}\sinh(d+cz)\sinh^{\nu}(az)\,dz = \frac{1}{2}\,e^{-d}\left(1-e^{-2az}\right)^{-\nu}\sinh^{\nu}(az)\left(\frac{e^{(p-c)z}}{c-p-a\nu}\,{}_2F_1\!\left(-\frac{-c+p+a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{c-p}{a}-\nu+2\right);e^{-2az}\right)+\frac{e^{2d+(c+p)z}}{c+p+a\nu}\,{}_2F_1\!\left(-\frac{c+p+a\nu}{2a},-\nu;-\frac{c+p+a(\nu-2)}{2a};e^{-2az}\right)\right)$$

01.19.21.2201.01

$$\int e^{pz}\sinh(d+cz)\sinh^{\nu}(az)\,dz = -i^{\nu}\,2^{-\nu-1}\left(\frac{e^{(p-c)z-d}}{p-c}-\frac{e^{d+(c+p)z}}{c+p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+2^{-\nu-1}\,e^{d}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(-c-2ak+p+a\nu)z-2d}}{c+(2ak-p-a\nu)}+\frac{e^{-2d+i\pi\nu+(-c+2ak+p-a\nu)z}}{c-(2ak+p-a\nu)}+\frac{e^{i\pi\nu+(c+2ak+p-a\nu)z}}{c+(2ak+p-a\nu)}+\frac{e^{(c-2ak+p+a\nu)z}}{c-2ak+p+a\nu}\right)\binom{\nu}{k}\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sinh(cz)\sinh^{\nu}(az+b)$

01.19.21.2202.01

$$\int e^{pz}\sinh(cz)\sinh^{\nu}(b+az)\,dz = \frac{1}{2}\left(1-e^{-2(b+az)}\right)^{-\nu}\sinh^{\nu}(b+az)\left(\frac{1}{c-p-a\nu}\left(e^{(p-c)z}\,{}_2F_1\!\left(-\frac{-c+p+a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{c-p}{a}-\nu+2\right);e^{-2(b+az)}\right)\right)+\frac{1}{c+p+a\nu}\left(e^{(c+p)z}\,{}_2F_1\!\left(-\frac{c+p+a\nu}{2a},-\nu;-\frac{c+p+a(\nu-2)}{2a};e^{-2(b+az)}\right)\right)\right)$$

01.19.21.2203.01

$$\int e^{p z} \sinh(c z) \sinh^{\nu}(b + a z) \, dz = -i^{\nu} 2^{-\nu-1} \left(\frac{e^{(p-c) z}}{p - c} - \frac{e^{(c+p) z}}{c + p} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \left(\frac{e^{2 b \nu + (-c - 2 a k + p + a \nu) z}}{c + (2 a k - p - a \nu)} + \frac{e^{4 b k + i \pi \nu + (-c + 2 a k + p - a \nu) z}}{c - (2 a k + p - a \nu)} + \frac{e^{4 b k + i \pi \nu + (c + 2 a k + p - a \nu) z}}{c + (2 a k + p - a \nu)} + \frac{e^{2 b \nu + (c - 2 a k + p + a \nu) z}}{c - 2 a k + p + a \nu} \right) \binom{\nu}{k} /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sinh(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.2204.01

$$\int e^{p z} \sinh(d + c z) \sinh^{\nu}(b + a z) \, dz = \frac{1}{2} e^{-d} \left(1 - e^{-2 (b + a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \left(\frac{e^{(p-c) z}}{c - p - a \nu} \, {}_2F_1\!\left(-\frac{-c + p + a \nu}{2 a}, -\nu; \frac{1}{2} \left(\frac{c - p}{a} - \nu + 2\right); e^{-2 (b + a z)}\right) + \frac{e^{2 d + (c+p) z}}{c + p + a \nu} \, {}_2F_1\!\left(-\frac{c + p + a \nu}{2 a}, -\nu; -\frac{c + p + a (\nu - 2)}{2 a}; e^{-2 (b + a z)}\right) \right)$$

01.19.21.2205.01

$$\int e^{p z} \sinh(c z + d) \sinh^{\nu}(a z + b) \, dz = -i^{\nu} 2^{-\nu-1} \left(\frac{e^{(p-c) z - d}}{p - c} - \frac{e^{d + (c+p) z}}{c + p} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{d - 2 b k - b \nu} \left(\frac{e^{-2 d + 2 b \nu + (-c - 2 a k + p + a \nu) z}}{c + (2 a k - p - a \nu)} + \frac{e^{-2 d + 4 b k + i \pi \nu + (-c + 2 a k + p - a \nu) z}}{c - (2 a k + p - a \nu)} + \frac{e^{4 b k + i \pi \nu + (c + 2 a k + p - a \nu) z}}{c + (2 a k + p - a \nu)} + \frac{e^{2 b \nu + (c - 2 a k + p + a \nu) z}}{c - 2 a k + p + a \nu} \right) \binom{\nu}{k} /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sinh(b z) \sinh^{\nu}(c z)$

01.19.21.2206.01

$$\int e^{p z^2} \sinh(b z) \sinh^{\nu}(c z) \, dz = \frac{i^{\nu} 2^{-\nu-2} \sqrt{\pi} \, (1 - \nu \bmod 2)}{\sqrt{p}} e^{-\frac{b^2}{4 p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erfi}\left(\frac{b + 2 p z}{2 \sqrt{p}}\right) + \operatorname{erfi}\left(\frac{b - 2 p z}{2 \sqrt{p}}\right) \right) + \frac{2^{-\nu-2} \sqrt{\pi}}{\sqrt{p}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} e^{-\frac{b^2 + 2 c (2 k + \nu) b + c^2 (\nu - 2 k)^2}{4 p}} \left(e^{\frac{2 b c k}{p}} \operatorname{erfi}\left(\frac{b - 2 c k + c \nu + 2 p z}{2 \sqrt{p}}\right) + e^{\frac{b c \nu}{p} + i \pi \nu} \operatorname{erfi}\left(\frac{b + 2 c k - c \nu + 2 p z}{2 \sqrt{p}}\right) + e^{\frac{2 b c k}{p} + i \pi \nu} \operatorname{erfi}\left(\frac{b - 2 c k + c \nu - 2 p z}{2 \sqrt{p}}\right) + e^{\frac{b c \nu}{p}} \operatorname{erfi}\left(\frac{b + 2 c k - c \nu - 2 p z}{2 \sqrt{p}}\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2207.01

$$\int e^{p\sqrt{z}}\sinh(b z)\sinh^{\nu}(c z)\,dz = \left(\frac{i}{2}\right)^{\nu}\left(\frac{e^{p\sqrt{z}}\cosh(b z)}{b} - \frac{e^{\frac{p^2}{4b}}\,p\sqrt{\pi}\,\mathrm{erf}\left(\frac{2b\sqrt{z}-p}{2\sqrt{b}}\right)}{4b^{3/2}} - \frac{e^{-\frac{p^2}{4b}}\,p\sqrt{\pi}\,\mathrm{erfi}\left(\frac{2\sqrt{z}\,b+p}{2\sqrt{b}}\right)}{4b^{3/2}}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) + 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(-\frac{\left((-1)^{\nu}p\sqrt{\pi}\right)e^{\frac{p^2}{4(b-2ck+c\nu)}}\,\mathrm{erf}\left(\frac{2\sqrt{z}\,b-p-4ck\sqrt{z}+2c\nu\sqrt{z}}{2\sqrt{b-2ck+c\nu}}\right)}{2(b-2ck+c\nu)^{3/2}} - \frac{\left(p\sqrt{\pi}\right)e^{\frac{p^2}{4(b+2ck-c\nu)}}\,\mathrm{erf}\left(\frac{2\sqrt{z}\,b-p+4ck\sqrt{z}-2c\nu\sqrt{z}}{2\sqrt{b+2ck-c\nu}}\right)}{2(b+2ck-c\nu)^{3/2}} -\right.$$
$$\frac{\left(p\sqrt{\pi}\right)e^{-\frac{p^2}{4(b-2ck+c\nu)}}\,\mathrm{erfi}\left(\frac{2\sqrt{z}\,b+p-4ck\sqrt{z}+2c\nu\sqrt{z}}{2\sqrt{b-2ck+c\nu}}\right)}{2(b-2ck+c\nu)^{3/2}} - \frac{\left((-1)^{\nu}p\sqrt{\pi}\right)e^{-\frac{p^2}{4(b+2ck-c\nu)}}\,\mathrm{erfi}\left(\frac{2\sqrt{z}\,b+p+4ck\sqrt{z}-2c\nu\sqrt{z}}{2\sqrt{b+2ck-c\nu}}\right)}{2(b+2ck-c\nu)^{3/2}} +$$
$$\left.\frac{e^{\sqrt{z}\,p+(b-2ck+c\nu)z}}{b-2ck+c\nu} + \frac{(-1)^{\nu}e^{p\sqrt{z}-(b-2ck+c\nu)z}}{b-2ck+c\nu} + \frac{(-1)^{\nu}e^{\sqrt{z}\,p+(b+2ck-c\nu)z}}{b+2ck-c\nu} + \frac{e^{p\sqrt{z}-(b+2ck-c\nu)z}}{b+2ck-c\nu}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z}\sinh\left(b z^r\right)\sinh^{\nu}(c z)$

01.19.21.2208.01

$$\int e^{p z}\sinh\left(b z^2\right)\sinh^{\nu}(c z)\,dz = \frac{i^{\nu}\,2^{-\nu-2}\sqrt{\pi}\,(1-\nu \bmod 2)}{\sqrt{b}}\,e^{-\frac{p^2}{4b}}\binom{\nu}{\frac{\nu}{2}}\left(e^{\frac{p^2}{2b}}\,\mathrm{erf}\left(\frac{p-2bz}{2\sqrt{b}}\right) + \mathrm{erfi}\left(\frac{p+2bz}{2\sqrt{b}}\right)\right) + \frac{2^{-\nu-2}\sqrt{\pi}}{\sqrt{b}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{-\frac{p^2+2c(2k+\nu)p+c^2(2k+\nu)^2}{4b}}$$
$$\left(-e^{\frac{\left(4k^2+\nu^2\right)c^2+2p\nu c+p^2}{2b}}\,\mathrm{erf}\left(\frac{2ck-p-c\nu+2bz}{2\sqrt{b}}\right) - e^{\frac{\left(4k^2+\nu^2\right)c^2+4kpc+p^2+2\pi i b\nu}{2b}}\,\mathrm{erf}\left(\frac{-p+c(\nu-2k)+2bz}{2\sqrt{b}}\right) +\right.$$
$$\left.e^{\frac{\left(2kc^2+pc+\pi i b\right)\nu}{b}}\,\mathrm{erfi}\left(\frac{2ck+p-c\nu+2bz}{2\sqrt{b}}\right) + e^{\frac{2ck(p+c\nu)}{b}}\,\mathrm{erfi}\left(\frac{p+c(\nu-2k)+2bz}{2\sqrt{b}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2209.01

$$\int e^{p z} \sinh\left(b \sqrt{z}\right) \sinh^{\nu}(c z)\, dz = \left(\frac{i}{2}\right)^{\nu} \left(\frac{b\sqrt{\pi}}{4 p^{3/2}} e^{-\frac{b^2}{4p}} \left(\operatorname{erfi}\left(\frac{b - 2p\sqrt{z}}{2\sqrt{p}}\right) - \operatorname{erfi}\left(\frac{b + 2p\sqrt{z}}{2\sqrt{p}}\right)\right) + \frac{e^{p z} \sinh\left(b\sqrt{z}\right)}{p}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{(2ck+p-c\nu)z - b\sqrt{z}} \left(-1 + e^{2b\sqrt{z}}\right)}{2ck + p - c\nu} + \frac{e^{(-2ck+p+c\nu)z - b\sqrt{z}} \left(-1 + e^{2b\sqrt{z}}\right)}{p + c(\nu - 2k)} - \frac{b\sqrt{\pi}\, e^{-\frac{b^2}{4(-2ck+p+c\nu)}} \operatorname{erfi}\left(\frac{b - 4ck\sqrt{z} + 2p\sqrt{z} + 2c\nu\sqrt{z}}{2\sqrt{-2ck+p+c\nu}}\right)}{2(-2ck + p + c\nu)^{3/2}} + \frac{b\sqrt{\pi}\, e^{-\frac{b^2}{4(-2ck+p+c\nu)}} \operatorname{erfi}\left(\frac{b + 4ck\sqrt{z} - 2p\sqrt{z} - 2c\nu\sqrt{z}}{2\sqrt{-2ck+p+c\nu}}\right)}{2(-2ck + p + c\nu)^{3/2}} + \frac{(-1)^{\nu} b\sqrt{\pi}\, e^{-\frac{b^2}{4(2ck+p-c\nu)}} \operatorname{erfi}\left(\frac{b - 4ck\sqrt{z} - 2p\sqrt{z} + 2c\nu\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{2(2ck + p - c\nu)^{3/2}} - \frac{(-1)^{\nu} b\sqrt{\pi}\, e^{-\frac{b^2}{4(2ck+p-c\nu)}} \operatorname{erfi}\left(\frac{b + 4ck\sqrt{z} + 2p\sqrt{z} - 2c\nu\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{2(2ck + p - c\nu)^{3/2}}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sinh(b z) \sinh^{\nu}(c z^r)$

01.19.21.2210.01

$$\int e^{p z} \sinh(b z) \sinh^{\nu}\left(c z^2\right) dz = i^{\nu}\, 2^{-\nu-1} \left(\frac{e^{(b+p)z}}{b+p} + \frac{e^{(p-b)z}}{b-p}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + \frac{2^{-\nu-2}\sqrt{\pi}}{\sqrt{c}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{\nu - 2k}} \binom{\nu}{k} e^{\frac{b^2 + 2pb + p^2}{4(c\nu - 2ck)}} \left(e^{i\pi\nu} \operatorname{erf}\left(\frac{-b - p - 4ckz + 2c\nu z}{2\sqrt{c}\sqrt{\nu - 2k}}\right) - e^{\frac{bp}{2ck - c\nu} + i\pi\nu} \operatorname{erf}\left(\frac{b - p + 2c(\nu - 2k)z}{2\sqrt{c}\sqrt{\nu - 2k}}\right) + e^{\frac{(b+p)^2}{4ck - 2c\nu}} \operatorname{erfi}\left(\frac{b + p + 2c(\nu - 2k)z}{2\sqrt{c}\sqrt{\nu - 2k}}\right) + e^{\frac{b^2 + p^2}{4ck - 2c\nu}} \operatorname{erfi}\left(\frac{b - p + 4ckz - 2c\nu z}{2\sqrt{c}\sqrt{\nu - 2k}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2211.01

$$\int e^{p z} \sinh(b z) \sinh^{\nu}\left(c \sqrt{z}\right) dz = i^{-\nu} 2^{-\nu-1} \left(\frac{e^{(b+p) z}}{b+p} - \frac{e^{(p-b) z}}{p-b}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{c\, e^{-\frac{(c \nu - 2 c k)^2}{4 (p-b)}} \operatorname{erfi}\left(\frac{2 \sqrt{z} (b-p) + c (2 k - \nu)}{2 \sqrt{p-b}}\right) \sqrt{\pi} (2 k - \nu)}{(p-b) \sqrt{p-b}} + \frac{(-1)^{\nu} c\, e^{-\frac{(2 c k - c \nu)^2}{4 (b+p)}} \operatorname{erfi}\left(\frac{2 \sqrt{z} (b+p) + c (2 k - \nu)}{2 \sqrt{b+p}}\right) \sqrt{\pi} (2 k - \nu)}{(-b-p) \sqrt{b+p}} - \frac{(-1)^{\nu} \left(2 e^{(p-b) z - (c \nu - 2 c k) \sqrt{z}}\right)}{p-b} + \frac{(-1)^{\nu} \left(2 e^{\sqrt{z} (2 c k - c \nu) + (b+p) z}\right)}{b+p} + \frac{(-1)^{\nu} c\, e^{-\frac{c^2 (\nu - 2 k)^2}{4 (p-b)}} \operatorname{erfi}\left(\frac{c (\nu - 2 k) - 2 (p-b) \sqrt{z}}{2 \sqrt{p-b}}\right) \sqrt{\pi} (\nu - 2 k)}{(p-b) \sqrt{p-b}} + \frac{c\, e^{-\frac{c^2 (\nu - 2 k)^2}{4 (b+p)}} \operatorname{erfi}\left(\frac{c (2 k - \nu) - 2 (b+p) \sqrt{z}}{2 \sqrt{b+p}}\right) \sqrt{\pi} (\nu - 2 k)}{(b+p) \sqrt{b+p}} - \frac{2 e^{(p-b) z - (2 c k - c \nu) \sqrt{z}}}{p-b} + \frac{2 e^{\sqrt{z} (c \nu - 2 c k) + (b+p) z}}{b+p}\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sinh\left(b z^r\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.2212.01

$$\int e^{p z} \sinh\left(b z^2\right) \sinh^{\nu}\left(c z^2\right) dz = \frac{i^{\nu} 2^{-\nu-2} e^{-\frac{p^2}{4 b}} \sqrt{\pi} (1 - \nu \bmod 2)}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{p^2}{2 b}} \operatorname{erf}\left(\frac{p - 2 b z}{2 \sqrt{b}}\right) + \operatorname{erfi}\left(\frac{p + 2 b z}{2 \sqrt{b}}\right)\right) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{e^{\frac{p^2}{-4 b - 8 c k + 4 c \nu} + i \pi \nu} \operatorname{erf}\left(\frac{p + 2 (b + 2 c k - c \nu) z}{2 \sqrt{-b - 2 c k + c \nu}}\right)}{\sqrt{-b - 2 c k + c \nu}} + \frac{e^{\frac{p^2}{-4 b + 8 c k - 4 c \nu}} \left(\operatorname{erfi}\left(\frac{p + 2 (b - 2 c k + c \nu) z}{2 \sqrt{b - 2 c k + c \nu}}\right) - e^{\frac{p^2}{2 b - 4 c k + 2 c \nu} + i \pi \nu} \operatorname{erf}\left(\frac{2 (b - 2 c k + c \nu) z - p}{2 \sqrt{b - 2 c k + c \nu}}\right)\right)}{\sqrt{b - 2 c k + c \nu}} - \frac{e^{\frac{p^2}{4 b + 8 c k - 4 c \nu}} \operatorname{erf}\left(\frac{2 (b + 2 c k - c \nu) z - p}{2 \sqrt{b + 2 c k - c \nu}}\right)}{\sqrt{b + 2 c k - c \nu}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2213.01

$$\int e^{pz}\sinh\left(b\sqrt{z}\right)\sinh^{\nu}\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\left(-\frac{b\,e^{-\frac{b^2}{4p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2p\sqrt{z}-b}{2\sqrt{p}}\right)}{p^{3/2}}+\frac{4e^{pz}\sinh\left(b\sqrt{z}\right)}{p}-\frac{b\,e^{-\frac{b^2}{4p}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}\right)+$$
$$2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{\sqrt{\pi}}{p^{3/2}}\left(-(-1)^{\nu}e^{-\frac{(b+c(\nu-2k))^2}{4p}}(b+c(\nu-2k))\operatorname{erfi}\left(\frac{-b+2ck-c\nu+2p\sqrt{z}}{2\sqrt{p}}\right)-\right.\right.$$
$$(-1)^{\nu}e^{-\frac{(b+2ck-c\nu)^2}{4p}}(b+2ck-c\nu)\operatorname{erfi}\left(\frac{b+2ck-c\nu+2p\sqrt{z}}{2\sqrt{p}}\right)-e^{-\frac{(b+c(\nu-2k))^2}{4p}}(b+c(\nu-2k))$$
$$\left.\operatorname{erfi}\left(\frac{b+c(\nu-2k)+2p\sqrt{z}}{2\sqrt{p}}\right)+e^{-\frac{(b+2ck-c\nu)^2}{4p}}(b+2ck-c\nu)\operatorname{erfi}\left(\frac{b+2ck-c\nu-2p\sqrt{z}}{2\sqrt{p}}\right)\right)+$$
$$\left.\frac{4i}{p}e^{pz-\frac{i\pi\nu}{2}}\left(\sin\left(\frac{\pi\nu}{2}-i(b-2ck+c\nu)\sqrt{z}\right)-\sin\left(\frac{\pi\nu}{2}+i(b+2ck-c\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{p z^r}\sinh(b z)\sinh^{\nu}(c z^r)$

01.19.21.2214.01

$$\int e^{pz^2}\sinh(bz)\sinh^{\nu}\left(cz^2\right)dz = \frac{i^{\nu}\,2^{-\nu-2}\sqrt{\pi}\,(1-\nu\bmod 2)}{\sqrt{p}}e^{-\frac{b^2}{4p}}\binom{\nu}{\frac{\nu}{2}}\left(\operatorname{erfi}\left(\frac{b+2pz}{2\sqrt{p}}\right)+\operatorname{erfi}\left(\frac{b-2pz}{2\sqrt{p}}\right)\right)-$$
$$2^{-\nu-2}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((-1)^k\binom{\nu}{k}e^{\frac{b^2}{8ck-4p-4c\nu}}\left(e^{\frac{1}{4}\left(\frac{1}{-2ck+p+c\nu}+\frac{1}{-2ck-p+c\nu}\right)b^2+i\pi\nu}\sqrt{c(\nu-2k)-p}\right.\right.$$
$$\sqrt{p+c(\nu-2k)}\left(\operatorname{erf}\left(\frac{b+2(2ck+p-c\nu)z}{2\sqrt{c(\nu-2k)-p}}\right)+\operatorname{erf}\left(\frac{b-2(2ck+p-c\nu)z}{2\sqrt{c(\nu-2k)-p}}\right)\right)+$$
$$\left.\left.(2ck+p-c\nu)\left(\operatorname{erfi}\left(\frac{b+2(-2ck+p+c\nu)z}{2\sqrt{-2ck+p+c\nu}}\right)+\operatorname{erfi}\left(\frac{b+4ckz-2pz-2c\nu z}{2\sqrt{-2ck+p+c\nu}}\right)\right)\right)\right)\Big/$$
$$\left((-2ck-p+c\nu)\sqrt{p+c(\nu-2k)}\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2215.01

$$\int e^{p\sqrt{z}} \sinh(b\,z) \sinh^{\nu}\!\left(c\sqrt{z}\right) dz = i^{-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4\, e^{p\sqrt{z}} \cosh(b\,z)}{b} + \frac{e^{\frac{p^2}{4b}}\, p\sqrt{\pi}\, \mathrm{erfi}\!\left(\frac{p-2b\sqrt{z}}{2\sqrt{-b}}\right)}{(-b)^{3/2}} - \frac{e^{-\frac{p^2}{4b}}\, p\sqrt{\pi}\, \mathrm{erfi}\!\left(\frac{2\sqrt{z}\, b+p}{2\sqrt{b}}\right)}{b^{3/2}} \right) (1-\nu \bmod 2) + \frac{1}{b}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(4\, e^{i\pi\nu+(2ck+p-c\nu)\sqrt{z}} \cosh(b\,z) + 4\, e^{(p+c(\nu-2k))\sqrt{z}} \cosh(b\,z) + \frac{e^{-\frac{(-2cik+ip+ic\nu)^2}{4b}} \sqrt{\pi}\, (2ck-p-c\nu)\, \mathrm{erfi}\!\left(\frac{-2\sqrt{z}\, b+p-c(2k-\nu)}{2\sqrt{-b}}\right)}{\sqrt{-b}} + \frac{(-1)^{\nu} e^{\frac{(p-c(\nu-2k))^2}{4b}} \sqrt{\pi}\, (c(\nu-2k)-p)\, \mathrm{erfi}\!\left(\frac{-2\sqrt{z}\, b+p-c(\nu-2k)}{2\sqrt{-b}}\right)}{\sqrt{-b}} - \frac{(-1)^{\nu} e^{\frac{(2ick+ip-ic\nu)^2}{4b}} \sqrt{\pi}\, (2ck+p-c\nu)\, \mathrm{erfi}\!\left(\frac{2\sqrt{z}\, b+p+c(2k-\nu)}{2\sqrt{b}}\right)}{\sqrt{b}} - \frac{e^{\frac{(ip+ci(\nu-2k))^2}{4b}} \sqrt{\pi}\, (p+c(\nu-2k))\, \mathrm{erfi}\!\left(\frac{2\sqrt{z}\, b+p-c(2k-\nu)}{2\sqrt{b}}\right)}{\sqrt{b}} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $z^n\, e^{p z^r} \sinh\left(b\, z^r\right) \sinh^{\nu}(c\, z)$

01.19.21.2216.01

$$\int e^{p z^2} \sinh(b z^2) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-\nu-2} \sqrt{\pi}\, (1 - \nu \bmod 2)}{(b-p)(b+p)} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt{p-b}\, (b+p) \operatorname{erfi}\left(\sqrt{p-b}\, z\right) + (b-p) \sqrt{b+p}\, \operatorname{erfi}\left(\sqrt{b+p}\, z\right)\right) - 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{b-p}\, \sqrt{b+p}} \left((-1)^k \binom{\nu}{k} e^{-c^2 \left(\frac{k^2}{b+p} + \frac{\nu k}{b-p} + \frac{\nu^2}{4(b+p)}\right)} \left(e^{\frac{2 i \pi \nu b^2 + c^2 (4k^2+\nu^2) b - 2 i p^2 \pi \nu}{2(b^2-p^2)}} \sqrt{b+p}\, \operatorname{erf}\left(\frac{c(\nu-2k) + 2(b-p) z}{2\sqrt{b-p}}\right) + e^{\frac{b c^2 (4k^2+\nu^2)}{2(b^2-p^2)}} \sqrt{b+p}\, \operatorname{erf}\left(\frac{2ck - c\nu + 2bz - 2pz}{2\sqrt{b-p}}\right) + \sqrt{b-p} \left(e^{\left(\frac{2bkc^2}{b^2-p^2} + i\pi\right)\nu} \operatorname{erfi}\left(\frac{c(\nu-2k) - 2(b+p) z}{2\sqrt{b+p}}\right) - e^{\frac{2bc^2 k\nu}{b^2-p^2}} \operatorname{erfi}\left(\frac{c(\nu-2k) + 2(b+p) z}{2\sqrt{b+p}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2217.01

$$\int e^{p\sqrt{z}} \sinh(b\sqrt{z}) \sinh^\nu(c z)\, dz = \frac{1}{(b-p)^2 (b+p)^2} \left(2^{1-\nu} e^{\sqrt{z}\, p + \frac{i\pi\nu}{2}} \left(b\left(2p + (b-p)(b+p)\sqrt{z}\right) \cosh(b\sqrt{z}) - \left(b^2 + p^2 + (b-p) p (b+p) \sqrt{z}\right) \sinh(b\sqrt{z})\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{\sqrt{z}\,(p-b) - \frac{i\pi\nu}{2} + c(\nu-2k) z} \left(-1 + e^{2b\sqrt{z}}\right) - e^{\sqrt{z}\,(p-b) + \frac{i\pi\nu}{2} + c(2k-\nu) z} \left(-1 + e^{2b\sqrt{z}}\right)}{c(\nu-2k)} + \frac{\sqrt{\pi}}{2 c^{3/2} (\nu-2k)^{3/2}} \left(e^{\frac{b^2 + 2pb + p^2 + 2ci\pi\nu^2 - 4\pi i c k \nu}{4c\nu - 8ck}} (b+p) \operatorname{erf}\left(\frac{-b - p + 2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2k}}\right) + e^{\frac{b^2 - 2pb + p^2 + 2ci\pi\nu^2 - 4\pi i c k \nu}{4c\nu - 8ck}} (b-p) \operatorname{erf}\left(\frac{b - p + 2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2k}}\right) + e^{\frac{b^2 - 2pb + p^2 + 2ci\pi\nu^2 - 4\pi i c k \nu}{8ck - 4c\nu}} (b-p) \operatorname{erfi}\left(\frac{b - p + 2c(2k-\nu)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2k}}\right) - e^{\frac{b^2 + 2pb + p^2 + 2ci\pi\nu^2 - 4\pi i c k \nu}{8ck - 4c\nu}} (b+p) \operatorname{erfi}\left(\frac{b + p + 2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2k}}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sinh(b z^r) \sinh^\nu(c z^r)$

01.19.21.2218.01

$$\int e^{p z^r} \sinh(b z^r) \sinh^\nu(c z^r)\, dz = \frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Big((-1)^{\nu+1} \Gamma\Big(\frac{1}{r}, (-b-p-2cs+c\nu) z^r\Big) ((-b-p-2cs+c\nu) z^r)^{-1/r} + (-1)^\nu ((b-p-2cs+c\nu) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (b-p-2cs+c\nu) z^r\Big) - ((-b-p+2cs-c\nu) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (-b-p+2cs-c\nu) z^r\Big) + ((b-p+2cs-c\nu) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (b-p+2cs-c\nu) z^r\Big) \Big) - \frac{1}{r} \left(2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{i\pi\nu}{2}} ((-b-p) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (-b-p) z^r\Big) - e^{\frac{i\pi\nu}{2}} ((b-p) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (b-p) z^r\Big) \right) (1 - \nu \bmod 2) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2219.01

$$\int e^{p z^2} \sinh(b z^2) \sinh^\nu(c z^2)\, dz = \frac{1}{(p-b)(b+p)} \left(i^\nu 2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left((p-b) \sqrt{b+p}\, \operatorname{erfi}\left(\sqrt{b+p}\, z\right) - \sqrt{p-b}\, (b+p) \operatorname{erfi}\left(\sqrt{p-b}\, z\right) \right) (1 - \nu \bmod 2) \right) + i^{\nu+1} 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(\Big(e^{\frac{1}{2} i\pi(\nu-1)} \sqrt{b+p+c(2k-\nu)}\, (-b+p-c(2k-\nu)) \operatorname{erfi}\left(\sqrt{b+p+c(2k-\nu)}\, z\right) + e^{-\frac{1}{2} i\pi(\nu-1)} (b+p+c(2k-\nu)) \sqrt{-b+p-c(2k-\nu)}\, \operatorname{erfi}\left(\sqrt{-b+p-c(2k-\nu)}\, z\right) \Big) \Big/ ((-b+p-c(2k-\nu))(b+p+c(2k-\nu))) + \Big(e^{-\frac{1}{2} i\pi(\nu+1)} \sqrt{b+p+c(\nu-2k)}\, (-b+p-c(\nu-2k)) \operatorname{erfi}\left(\sqrt{b+p+c(\nu-2k)}\, z\right) + e^{\frac{1}{2} i\pi(\nu+1)} (b+p+c(\nu-2k)) \sqrt{-b+p-c(\nu-2k)}\, \operatorname{erfi}\left(\sqrt{-b+p-c(\nu-2k)}\, z\right) \Big) \Big/ ((-b+p-c(\nu-2k))(b+p+c(\nu-2k))) \Bigg) /; \nu \in \mathbb{N}^+$$

01.19.21.2220.01

$$\int e^{p\sqrt{z}}\sinh\left(b\sqrt{z}\right)\sinh^{\nu}\left(c\sqrt{z}\right)dz = i^{\nu+1}2^{-\nu}e^{\frac{i\pi}{2}+(p-b)\sqrt{z}}\left(\frac{e^{2\left(b\sqrt{z}-\frac{i\pi}{2}\right)}\left(\sqrt{z}\,b+p\sqrt{z}-1\right)}{(b+p)^2}+\frac{\sqrt{z}}{p-b}-\frac{1}{(b-p)^2}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)+ i^{\nu+1}2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{(-b+p-c(2k-\nu))\sqrt{z}-\frac{1}{2}i\pi(\nu-1)}\left(\frac{e^{2\left(\sqrt{z}\,(b+c(2k-\nu))+\frac{1}{2}i\pi(\nu-1)\right)}\left(\sqrt{z}\,p+(b+c(2k-\nu))\sqrt{z}-1\right)}{(b+p+c(2k-\nu))^2}+\frac{\sqrt{z}}{-b+p-c(2k-\nu)}-\frac{1}{(b-p+c(2k-\nu))^2}\right)+ e^{\frac{1}{2}i\pi(\nu+1)+(-b+p-c(\nu-2k))\sqrt{z}}\left(\frac{e^{2\left((b+c(\nu-2k))\sqrt{z}-\frac{1}{2}i\pi(\nu+1)\right)}\left(\sqrt{z}\,p+(b+c(\nu-2k))\sqrt{z}-1\right)}{(b+p+c(\nu-2k))^2}+ \frac{\sqrt{z}}{-b+p-c(\nu-2k)}-\frac{1}{(b-p+c(\nu-2k))^2}\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sinh\left(a z^r+q\right)\sinh^{\nu}\left(c z^r+g\right)$

01.19.21.2221.01

$$\int e^{b z^r+e}\sinh(a z^r+q)\sinh^{\nu}(c z^r+g)\,dz = \frac{2^{-\nu-1}z}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{\nu+1}e^{e+q+2gs-g\nu}\,\Gamma\left(\frac{1}{r},(-a-b-2cs+c\nu)z^r\right)((-a-b-2cs+c\nu)z^r)^{-1/r}+(-1)^{\nu}e^{e-q+2gs-g\nu} ((a-b-2cs+c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(a-b-2cs+c\nu)z^r\right)-e^{e+q-2gs+g\nu}((-a-b+2cs-c\nu)z^r)^{-1/r} \Gamma\left(\frac{1}{r},(-a-b+2cs-c\nu)z^r\right)+e^{e-q-2gs+g\nu}((a-b+2cs-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(a-b+2cs-c\nu)z^r\right)\right)- \frac{2^{-\nu-1}z}{r}\binom{\nu}{\frac{\nu}{2}}\left(e^{e+q+\frac{i\pi\nu}{2}}((-a-b)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-a-b)z^r\right)-e^{e-q+\frac{i\pi\nu}{2}}((a-b)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(a-b)z^r\right)\right)(1-\nu \bmod 2)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2222.01

$$\int e^{b z^2+e} \sinh\left(a z^2+q\right) \sinh^\nu\left(c z^2+g\right) dz = -2^{-\nu-2} i^{-\nu} e^{e-q} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\frac{\operatorname{erfi}\left(\sqrt{b-a}\, z\right)}{\sqrt{b-a}} - \frac{e^{2q} \operatorname{erfi}\left(\sqrt{a+b}\, z\right)}{\sqrt{a+b}}\right)(1-\nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e+q-g(\nu-2s)} \left(\frac{(-1)^\nu \operatorname{erfi}\left(\sqrt{a+b-c(\nu-2s)}\, z\right)}{\sqrt{a+b-c(\nu-2s)}} - \frac{e^{2(g(\nu-2s)-q)} \operatorname{erfi}\left(\sqrt{-a+b+c(\nu-2s)}\, z\right)}{\sqrt{-a+b+c(\nu-2s)}}\right) - e^{e-q-g(\nu-2s)} \left(\frac{(-1)^\nu \operatorname{erfi}\left(\sqrt{-a+b-c(\nu-2s)}\, z\right)}{\sqrt{-a+b-c(\nu-2s)}} - \frac{e^{2(q+g(\nu-2s))} \operatorname{erfi}\left(\sqrt{a+b+c(\nu-2s)}\, z\right)}{\sqrt{a+b+c(\nu-2s)}}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2223.01

$$\int e^{\sqrt{z}\, b+e} \sinh\left(\sqrt{z}\, a+q\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-\nu} i^{-\nu} \left(\frac{e^{\sqrt{z}\,(a+b)+e+q} \left(\sqrt{z}\, a+b\sqrt{z}-1\right)}{(a+b)^2} - \frac{e^{\sqrt{z}\,(b-a)+e-q} \left(-\sqrt{z}\, a+b\sqrt{z}-1\right)}{(a-b)^2}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) + 2^{-\nu} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \left(\frac{(-1)^\nu \left(e^{e+q-g(\nu-2s)+(a+b-c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b-(c(\nu-2s)-a)\sqrt{z}-1\right)\right)}{(-a-b+c(\nu-2s))^2} - \frac{(-1)^\nu \left(e^{e-q-g(\nu-2s)+(-a+b-c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b-(a+c(\nu-2s))\sqrt{z}-1\right)\right)}{(a-b+c(\nu-2s))^2} + \frac{e^{e+q+g(\nu-2s)+(a+b+c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b+(a+c(\nu-2s))\sqrt{z}-1\right)}{(a+b+c(\nu-2s))^2} - \frac{e^{e-q+g(\nu-2s)+(-a+b+c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b+(c(\nu-2s)-a)\sqrt{z}-1\right)}{(-a+b+c(\nu-2s))^2}\right) \binom{\nu}{s} /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sinh\left(a z^r+p z+q\right) \sinh^\nu\left(c z^r+f z+g\right)$

01.19.21.2224.01

$$\int e^{b z^2+d z+e} \sinh\left(a z^2 + p z + q\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz ==$$

$$i^{\nu} 2^{-\nu-2} e^{e-q} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{e^{2 q - \frac{(d+p)^2}{4(a+b)}} \operatorname{erfi}\left(\frac{d+p+2(a+b) z}{2\sqrt{a+b}}\right)}{\sqrt{a+b}} - \frac{e^{\frac{(d-p)^2}{4(a-b)}} \operatorname{erf}\left(\frac{-d+p+2 a z-2 b z}{2\sqrt{a-b}}\right)}{\sqrt{a-b}} \right) +$$

$$2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\left(e^{\frac{1}{4}\left(-\frac{(d+2 f k+p-f \nu)^2}{a+b+2 c k-c \nu}+4 e+8 g k+4 q-4 g \nu+4 \pi i \nu\right)} \right.\right.$$

$$\left.\operatorname{erf}\left(\frac{d+2 f k+p-f \nu+2 a z+2 b z+4 c k z-2 c \nu z}{2\sqrt{-a-b-2 c k+c \nu}}\right)\right) \Big/ \left(\sqrt{-a-b-2 c k+c \nu}\right) +$$

$$\left(e^{\frac{1}{4}\left(\frac{(-d+p+f(\nu-2 k))^2}{a-b+c(\nu-2 k)}+4 e+8 g k-4 q-4 g \nu+4 \pi i \nu\right)} \operatorname{erf}\left(\frac{d+2 f k-p-f \nu-2 a z+2 b z+4 c k z-2 c \nu z}{2\sqrt{a-b-2 c k+c \nu}}\right)\right) \Big/$$

$$\left(\sqrt{a-b-2 c k+c \nu}\right) - \frac{e^{\frac{1}{4}\left(\frac{(d-p+f(\nu-2 k))^2}{a-b+2 c k-c \nu}+4 e-8 g k-4 q+4 g \nu\right)} \operatorname{erfi}\left(\frac{d-2 f k-p+f \nu-2 a z+2 b z-4 c k z+2 c \nu z}{2\sqrt{-a+b-2 c k+c \nu}}\right)}{\sqrt{-a+b-2 c k+c \nu}} +$$

$$\left. \frac{e^{\frac{1}{4}\left(-\frac{(d+p+f(\nu-2 k))^2}{a+b+c(\nu-2 k)}+4 e-8 g k+4 q+4 g \nu\right)} \operatorname{erfi}\left(\frac{d-2 f k+p+f \nu+2 a z+2 b z-4 c k z+2 c \nu z}{2\sqrt{a+b-2 c k+c \nu}}\right)}{\sqrt{a+b-2 c k+c \nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2225.01

$$\int e^{\sqrt{z}\, b+d z+e} \sinh\left(\sqrt{z}\, a+p z+q\right) \sinh^{\nu}\left(\sqrt{z}\, c+f z+g\right) dz =$$

$$\left(\frac{i}{2}\right)^{\nu} \left(\frac{(a-b)\sqrt{\pi}}{4(d-p)^{3/2}} e^{-\frac{a^2-2 b a+b^2-4(d-p)(e-q)}{4(d-p)}} \operatorname{erfi}\left(\frac{a-b+2(p-d)\sqrt{z}}{2\sqrt{d-p}}\right) - \frac{(a+b)\sqrt{\pi}}{4(d+p)^{3/2}} e^{-\frac{a^2+2 b a+b^2-4(d+p)(e+q)}{4(d+p)}}\right.$$

$$\left.\operatorname{erfi}\left(\frac{a+b+2(d+p)\sqrt{z}}{2\sqrt{d+p}}\right) - \frac{e^{-\sqrt{z}\,(a-b)+e-q+(d-p) z}}{2(d-p)} + \frac{e^{\sqrt{z}\,(a+b)+e+q+(d+p) z}}{2(d+p)}\right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) +$$

$$2^{-\nu-1} i^{\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{\sqrt{\pi}\,(a-b+2 c k-c \nu)}{2(d-2 k f-p+f \nu)^{3/2}} e^{\frac{(a+b+2 c k-c \nu)^2}{4(-d+2 f k+p-f \nu)}+e+2 g k+q-g \nu+\frac{i \pi \nu}{2}+\frac{a b+c(2 k-\nu) b+(4 g k+2 q-2 g \nu+i \pi \nu)(-d+2 f k+p-f \nu)}{d-p+f(\nu-2 k)}}\right.$$

$$\operatorname{erfi}\left(\frac{a-b+2 c k-c \nu-2 d\sqrt{z}+4 f k\sqrt{z}+2 p\sqrt{z}-2 f \nu\sqrt{z}}{2\sqrt{d-2 k f-p+f \nu}}\right) +$$

$$\frac{\sqrt{\pi}\,(a-b+c(\nu-2 k))}{2(d+2 f k-p-f \nu)^{3/2}} e^{e+2 g k+q-g \nu+\frac{i \pi \nu}{2}-\frac{(a+b+2 c k-c \nu)^2-4(2 q(-d-2 f k+p+f \nu)+a(b+2 c k-c \nu))}{4(d+2 f k-p-f \nu)}}$$

$$\operatorname{erfi}\left(\frac{a-b-2 c k+c \nu-2 d\sqrt{z}-4 f k\sqrt{z}+2 p\sqrt{z}+2 f \nu\sqrt{z}}{2\sqrt{d+2 f k-p-f \nu}}\right) -$$

$$\frac{e^{-\sqrt{z}\,(a-b+2 c k-c \nu)+\frac{1}{2}(2 e-4 g k-2 q+2 g \nu-i \pi \nu)+(d-2 f k-p+f \nu) z}}{d-2 f k-p+f \nu} -$$

$$\frac{\sqrt{\pi}\,(a+b+c(\nu-2 k))}{2(d-2 k f+p+f \nu)^{3/2}} e^{-\frac{(a+b+2 c k-c \nu)^2}{4(d+p+f(\nu-2 k))}+e+2 g k+q-g \nu+\frac{i \pi \nu}{2}+\frac{a c(2 k-\nu)+b c(2 k-\nu)-(d-2 f k+p+f \nu)(4 g k-2 g \nu+i \pi \nu)}{d+p+f(\nu-2 k)}}$$

$$\operatorname{erfi}\left(\frac{a+b-2 c k+c \nu+2 d\sqrt{z}-4 f k\sqrt{z}+2 p\sqrt{z}+2 f \nu\sqrt{z}}{2\sqrt{d-2 k f+p+f \nu}}\right) +$$

$$\frac{e^{\sqrt{z}\,(a+b-2 c k+c \nu)+\frac{1}{2}(2 e-4 g k+2 q+2 g \nu-i \pi \nu)+(d-2 f k+p+f \nu) z}}{d-2 f k+p+f \nu} - \frac{e^{-\sqrt{z}\,(a-b-2 c k+c \nu)+\frac{1}{2}(2 e+4 g k-2 q-2 g \nu+i \pi \nu)+(d+2 f k-p-f \nu) z}}{d+2 f k-p-f \nu} +$$

$$\frac{e^{\frac{1}{2}(2 e+4 g k+2 q-2 g \nu+i \pi \nu)+(d+2 f k+p-f \nu) z+(a+b+2 c k-c \nu)\sqrt{z}}}{d+2 f k+p-f \nu} -$$

$$\frac{\sqrt{\pi}\,(a+b+2 c k-c \nu)}{2(d+2 f k+p-f \nu)^{3/2}} e^{\frac{1}{2}(2 e+4 g k+2 q-2 g \nu+i \pi \nu)-\frac{a^2+2 b a+4 c k a-2 c \nu a+b^2+4 c^2 k^2+c^2 \nu^2+4 b c k-2 b c \nu-4 c^2 k \nu}{4(d+2 f k+p-f \nu)}}$$

$$\left.\left.\operatorname{erfi}\left(\frac{a+b+2 c k-c \nu+2 d\sqrt{z}+4 f k\sqrt{z}+2 p\sqrt{z}-2 f \nu\sqrt{z}}{2\sqrt{d+2 f k+p-f \nu}}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving product of power of the direct function, the direct function and rational functions of exp

Involving $\sinh(e\,z)\sinh^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.2226.01

$$\int \frac{\sinh(e\,z)\sinh^{\nu}(c\,z)}{\left(a+b\,e^{d\,z}\right)^{n}}\,dz = \left(\frac{i}{2}\right)^{\nu+1} a^{-n}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\Bigg(\frac{1}{-e-2\,c\,s+c\,\nu}\cos\left(\frac{1}{2}\pi(1-\nu)\right)\Bigg(e^{(-e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{-e-2\,c\,s+c\,\nu}{d},n;\frac{d-e-2\,c\,s+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)-$$

$$e^{(e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{e+2\,c\,s-c\,\nu}{d},n;\frac{d+e+2\,c\,s-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)+$$

$$\frac{1}{-e+2\,c\,s-c\,\nu}\cos\left(\frac{1}{2}\pi(\nu+1)\right)\Bigg(e^{(-e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{-e+2\,c\,s-c\,\nu}{d},n;\frac{d-e+2\,c\,s-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)-$$

$$e^{(e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{e-2\,c\,s+c\,\nu}{d},n;\frac{d+e-2\,c\,s+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)+$$

$$\frac{i}{-e-2\,c\,s+c\,\nu}\sin\left(\frac{1}{2}\pi(1-\nu)\right)\Bigg(e^{(-e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{-e-2\,c\,s+c\,\nu}{d},n;\frac{d-e-2\,c\,s+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+$$

$$e^{(e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{e+2\,c\,s-c\,\nu}{d},n;\frac{d+e+2\,c\,s-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)+$$

$$\frac{i}{-e+2\,c\,s-c\,\nu}\sin\left(\frac{1}{2}\pi(\nu+1)\right)\Bigg(e^{(e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{e-2\,c\,s+c\,\nu}{d},n;\frac{d+e-2\,c\,s+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+$$

$$e^{(-e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{-e+2\,c\,s-c\,\nu}{d},n;\frac{d-e+2\,c\,s-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Bigg)+$$

$$\frac{1}{e}\left(\frac{i}{2}\right)^{\nu+1}a^{-n}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\left(e^{-\frac{1}{2}(i\pi)+e\,z}\,{}_2F_1\left(\frac{e}{d},n;\frac{d+e}{d};-\frac{b\,e^{d\,z}}{a}\right)-e^{\frac{i\pi}{2}-e\,z}\,{}_2F_1\left(-\frac{e}{d},n;\frac{d-e}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)/;\,n\in$$

$$\mathbb{N}^{+}\bigwedge\nu\in$$

$$\mathbb{N}^{+}$$

Involving $e^{p\,z}\sinh(e\,z)\sinh^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.2227.01

$$\int \frac{e^{pz}\sinh(ez)\sinh^{\nu}(cz)}{\left(a+be^{dz}\right)^{n}}\,dz = \left(\frac{i}{2}\right)^{\nu+1}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\left(\left(\cos\left(\frac{1}{2}\pi(1-\nu)\right)\left(e^{(-e+p-2cs+c\nu)z}(-e-p-2cs+c\nu)\,{}_2F_1\left(\frac{-e+p-2cs+c\nu}{d},n;\frac{d-e+p-2cs+c\nu}{d};-\frac{be^{dz}}{a}\right)-e^{(e+p+2cs-c\nu)z}(-e+p-2cs+c\nu)\,{}_2F_1\left(\frac{e+p+2cs-c\nu}{d},n;\frac{d+e+p+2cs-c\nu}{d};-\frac{be^{dz}}{a}\right)\right)\right)\Big/((-e-p-2cs+c\nu)(-e+p-2cs+c\nu))+\left(\cos\left(\frac{1}{2}\pi(\nu+1)\right)\left(e^{(-e+p+2cs-c\nu)z}(-e-p+2cs-c\nu)\,{}_2F_1\left(\frac{-e+p+2cs-c\nu}{d},n;\frac{d-e+p+2cs-c\nu}{d};-\frac{be^{dz}}{a}\right)-e^{(e+p-2cs+c\nu)z}(-e+p+2cs-c\nu)\,{}_2F_1\left(\frac{e+p-2cs+c\nu}{d},n;\frac{d+e+p-2cs+c\nu}{d};-\frac{be^{dz}}{a}\right)\right)\right)\Big/((-e-p+2cs-c\nu)(-e+p+2cs-c\nu))+\left(i\left(e^{(-e+p-2cs+c\nu)z}(-e-p-2cs+c\nu)\,{}_2F_1\left(\frac{-e+p-2cs+c\nu}{d},n;\frac{d-e+p-2cs+c\nu}{d};-\frac{be^{dz}}{a}\right)+e^{(e+p+2cs-c\nu)z}(-e+p-2cs+c\nu)\,{}_2F_1\left(\frac{e+p+2cs-c\nu}{d},n;\frac{d+e+p+2cs-c\nu}{d};-\frac{be^{dz}}{a}\right)\right)\sin\left(\frac{1}{2}\pi(1-\nu)\right)\right)\Big/((-e-p-2cs+c\nu)(-e+p-2cs+c\nu))+\left(i\left(e^{(e+p-2cs+c\nu)z}(-e+p+2cs-c\nu)\,{}_2F_1\left(\frac{e+p-2cs+c\nu}{d},n;\frac{d+e+p-2cs+c\nu}{d};-\frac{be^{dz}}{a}\right)+e^{(-e+p+2cs-c\nu)z}(-e-p+2cs-c\nu)\,{}_2F_1\left(\frac{-e+p+2cs-c\nu}{d},n;\frac{d-e+p+2cs-c\nu}{d};-\frac{be^{dz}}{a}\right)\right)\sin\left(\frac{1}{2}\pi(\nu+1)\right)\right)\Big/((-e-p+2cs-c\nu)(-e+p+2cs-c\nu))\right)\right)a^{-n}+\frac{1}{(e-p)(e+p)}\left(\left(\frac{i}{2}\right)^{\nu+1}a^{-n}\binom{\nu}{\frac{\nu}{2}}\left(e^{-\frac{1}{2}(i\pi)+(e+p)z}(e-p)\,{}_2F_1\left(\frac{e+p}{d},n;\frac{d+e+p}{d};-\frac{be^{dz}}{a}\right)-e^{\frac{i\pi}{2}+(p-e)z}(e+p)\,{}_2F_1\left(\frac{p-e}{d},n;\frac{d-e+p}{d};-\frac{be^{dz}}{a}\right)\right)(1-\nu \bmod 2)\right)\;/;\;n\in\mathbb{N}^{+}\land\nu\in\mathbb{N}^{+}$$

Involving product of power of the direct function, the direct function and algebraic functions of exp

Involving $\left(a+b\,e^{d\,z}\right)^{\beta}\sinh(e\,z)\sinh^{\nu}(c\,z)$

01.19.21.2228.01

$$\int \left(a+b\,e^{d z}\right)^{\beta} \sinh(e z) \sinh^{\nu}(c z)\, dz = \left(\frac{i}{2}\right)^{\nu+1} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \left(a+b\,e^{d z}\right)^{\beta}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{-e-2 c s+c \nu} \cos\left(\frac{1}{2}\pi(1-\nu)\right)\left(e^{(-e-2 c s+c \nu) z}\, {}_2F_1\left(\frac{-e-2 c s+c \nu}{d}, -\beta; \frac{d-e-2 c s+c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) - \right.\right.$$

$$\left. e^{(e+2 c s-c \nu) z}\, {}_2F_1\left(\frac{e+2 c s-c \nu}{d}, -\beta; \frac{d+e+2 c s-c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right) +$$

$$\frac{1}{-e+2 c s-c \nu} \cos\left(\frac{1}{2}\pi(\nu+1)\right)\left(e^{(-e+2 c s-c \nu) z}\, {}_2F_1\left(\frac{-e+2 c s-c \nu}{d}, -\beta; \frac{d-e+2 c s-c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) - \right.$$

$$\left. e^{(e-2 c s+c \nu) z}\, {}_2F_1\left(\frac{e-2 c s+c \nu}{d}, -\beta; \frac{d+e-2 c s+c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right) +$$

$$\frac{i}{-e-2 c s+c \nu} \sin\left(\frac{1}{2}\pi(1-\nu)\right)\left(e^{(-e-2 c s+c \nu) z}\, {}_2F_1\left(\frac{-e-2 c s+c \nu}{d}, -\beta; \frac{d-e-2 c s+c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) + \right.$$

$$\left. e^{(e+2 c s-c \nu) z}\, {}_2F_1\left(\frac{e+2 c s-c \nu}{d}, -\beta; \frac{d+e+2 c s-c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right) +$$

$$\frac{i}{-e+2 c s-c \nu} \sin\left(\frac{1}{2}\pi(\nu+1)\right)\left(e^{(e-2 c s+c \nu) z}\, {}_2F_1\left(\frac{e-2 c s+c \nu}{d}, -\beta; \frac{d+e-2 c s+c \nu}{d}; -\frac{b\,e^{d z}}{a}\right) + \right.$$

$$\left.\left. e^{(-e+2 c s-c \nu) z}\, {}_2F_1\left(\frac{-e+2 c s-c \nu}{d}, -\beta; \frac{d-e+2 c s-c \nu}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right) +$$

$$\frac{1}{e}\left(\frac{i}{2}\right)^{\nu+1} \left(a+b\,e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a}+1\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} \left(e^{-\frac{1}{2}(i\pi)+e z}\, {}_2F_1\left(\frac{e}{d}, -\beta; \frac{d+e}{d}; -\frac{b\,e^{d z}}{a}\right) - \right.$$

$$\left. e^{\frac{i\pi}{2}-e z}\, {}_2F_1\left(-\frac{e}{d}, -\beta; \frac{d-e}{d}; -\frac{b\,e^{d z}}{a}\right)\right)(1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta} \sinh(e z) \sinh^{\nu}(c z)$

01.19.21.2229.01

$$\int e^{p z} \left(a + b\, e^{d z}\right)^{\beta} \sinh(e z) \sinh^{\nu}(c z)\, dz = \left(\frac{i}{2}\right)^{\nu+1} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \left(a + b\, e^{d z}\right)^{\beta} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\Bigg(\Bigg(e^{(-e+p-2 c s+c \nu) z} (-e - p - 2 c s + c \nu)\, {}_2F_1\left(\frac{-e+p-2 c s+c \nu}{d}, -\beta; \frac{d-e+p-2 c s+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(e+p+2 c s-c \nu) z} (-e + p - 2 c s + c \nu)\, {}_2F_1\left(\frac{e+p+2 c s-c \nu}{d}, -\beta; \frac{d+e+p+2 c s-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \cos\left(\frac{1}{2} \pi (1-\nu)\right) \Bigg/ ((-e-p-2 c s+c \nu)(-e+p-2 c s+c \nu)) + \Bigg(e^{(-e+p+2 c s-c \nu) z} (-e - p + 2 c s - c \nu)\, {}_2F_1\left(\frac{-e+p+2 c s-c \nu}{d}, -\beta; \frac{d-e+p+2 c s-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(e+p-2 c s+c \nu) z} (-e + p + 2 c s - c \nu)\, {}_2F_1\left(\frac{e+p-2 c s+c \nu}{d}, -\beta; \frac{d+e+p-2 c s+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \cos\left(\frac{1}{2} \pi (\nu+1)\right) \Bigg/ ((-e-p+2 c s-c \nu)(-e+p+2 c s-c \nu)) + i \sin\left(\frac{1}{2} \pi (1-\nu)\right) \Bigg(e^{(-e+p-2 c s+c \nu) z} (-e - p - 2 c s + c \nu)\, {}_2F_1\left(\frac{-e+p-2 c s+c \nu}{d}, -\beta; \frac{d-e+p-2 c s+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(e+p+2 c s-c \nu) z} (-e + p - 2 c s + c \nu)\, {}_2F_1\left(\frac{e+p+2 c s-c \nu}{d}, -\beta; \frac{d+e+p+2 c s-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ ((-e-p-2 c s+c \nu)(-e+p-2 c s+c \nu)) + i \sin\left(\frac{1}{2} \pi (\nu+1)\right) \Bigg(e^{(e+p-2 c s+c \nu) z} (-e + p + 2 c s - c \nu)\, {}_2F_1\left(\frac{e+p-2 c s+c \nu}{d}, -\beta; \frac{d+e+p-2 c s+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-e+p+2 c s-c \nu) z} (-e - p + 2 c s - c \nu)\, {}_2F_1\left(\frac{-e+p+2 c s-c \nu}{d}, -\beta; \frac{d-e+p+2 c s-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Bigg/ ((-e-p+2 c s-c \nu)(-e+p+2 c s-c \nu))\Bigg) + \frac{1}{(e-p)(e+p)} \left(\frac{i}{2}\right)^{\nu+1} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} \Bigg(e^{-\frac{1}{2}(i \pi) + (e+p) z} (e-p)\, {}_2F_1\left(\frac{e+p}{d}, -\beta; \frac{d+e+p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{\frac{i \pi}{2} + (p-e) z} (e+p)\, {}_2F_1\left(\frac{p-e}{d}, -\beta; \frac{d-e+p}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) (1 - \nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+$$

Involving products of powers of two direct functions and exponential function

Involving $e^{b z} \sinh^{\mu}(c z) \sinh^{\nu}(a z)$

01.19.21.2230.01

$$\int e^{b z} \sinh^{\mu}(c z) \sinh^{\nu}(a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{b z} \left(1 - e^{2 c z}\right)^{-\mu} (1 - \nu \bmod 2) \sinh^{\mu}(c z)}{b - c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(\frac{b - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{b}{c} - \mu + 2\right); e^{2 c z}\right) + 2^{-\nu} \left(1 - e^{2 c z}\right)^{-\mu} \sinh^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{(b + a(\nu - 2k)) z}}{b + a(\nu - 2k) - c \mu} {}_2F_1\left(\frac{b + a(\nu - 2k) - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{b + a(\nu - 2k)}{c} - \mu + 2\right); e^{2 c z}\right) + \frac{e^{i \pi \nu + (b - a(\nu - 2k)) z}}{b - a(\nu - 2k) - c \mu} {}_2F_1\left(\frac{b - a(\nu - 2k) - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{b - a(\nu - 2k)}{c} - \mu + 2\right); e^{2 c z}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2231.01

$$\int e^{b z} \sinh^{m}(c z) \sinh^{\nu}(a z)\, dz = \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{i}{2}\right)^{m+\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{\frac{i \pi m}{2} + (b + 2 c k - c m) z}}{b + 2 c k - c m} + \frac{e^{(b - 2 c k + c m) z - \frac{i m \pi}{2}}}{b - 2 c k + c m}\right) \binom{m}{k} + \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\frac{i}{2}\right)^{m+\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{\frac{i \pi \nu}{2} + (b + 2 a k - a \nu) z}}{b + 2 a k - a \nu} + \frac{e^{(b - 2 a k + a \nu) z - \frac{i \pi \nu}{2}}}{b - 2 a k + a \nu}\right) \binom{\nu}{k} + 2^{-m-\nu} e^{b z} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{(2 c k - c m + 2 a s - a \nu) z} \binom{\nu}{s} \left(-\frac{e^{i \pi (m + \nu)}}{-b + c(m - 2k) - 2 a s + a \nu} + \frac{e^{2 (c (m - 2k) z + a(\nu - 2 s) z)}}{b + c(m - 2k) - 2 a s + a \nu} + \frac{e^{i \pi \nu + 2 c (m - 2k) z}}{b + c(m - 2k) + 2 a s - a \nu} + \frac{e^{i m \pi - 2 a (2 s - \nu) z}}{b + 2 c k - c m - 2 a s + a \nu}\right) + \frac{e^{b z}\, (1 - m \bmod 2)(1 - \nu \bmod 2)}{b} \left(\frac{i}{2}\right)^{m+\nu} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sinh^{m}(c z) \sinh^{\nu}(a z + b)$

01.19.21.2232.01

$$\int e^{p z} \sinh^{\mu}(c z) \sinh^{\nu}(b + a z)\, dz = \frac{\left(\frac{i}{2}\right)^{\nu} e^{p z} \left(1 - e^{2 c z}\right)^{-\mu} (1 - \nu \bmod 2) \sinh^{\mu}(c z)}{p - c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(\frac{p - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{p}{c} - \mu + 2\right); e^{2 c z}\right) + 2^{-\nu} \left(1 - e^{2 c z}\right)^{-\mu} \sinh^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b(\nu - 2k)} \binom{\nu}{k} \left(\frac{e^{(p + a(\nu - 2k)) z}}{p + a(\nu - 2k) - c \mu} {}_2F_1\left(\frac{p + a(\nu - 2k) - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{p + a(\nu - 2k)}{c} - \mu + 2\right); e^{2 c z}\right) + \left(e^{2 i \left(\frac{\pi \nu}{2} + b i (\nu - 2k)\right) + (p - a(\nu - 2k)) z} {}_2F_1\left(\frac{p - a(\nu - 2k) - c \mu}{2 c}, -\mu; \frac{1}{2}\left(\frac{p - a(\nu - 2k)}{c} - \mu + 2\right); e^{2 c z}\right)\right) \Big/ (p - a(\nu - 2k) - c \mu)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2233.01

$$\int e^{p z} \sinh^m(c z) \sinh^\nu(b + a z)\, dz = \frac{1}{p + a \nu}\left(2^{-m} i^{-m} e^{p z} \left(1 - e^{2 i (i b + i a z)}\right)^{-\nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{i (i p + i a \nu)}{2 a}, -\nu; \frac{1}{2}\left(-\frac{p}{a} - \nu + 2\right); e^{2 i (i b + i a z)}\right) (1 - m \bmod 2) \sinh^\nu(b + a z)\right) + i^{1-m} 2^{-m} i^{-m} \left(1 - e^{2 i (i b + i a z)}\right)^{-\nu} \sinh^\nu(b + a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(e^{(p - c (m - 2 k)) z} {}_2F_1\left(\frac{i (2 i c k - i c m + i p + i a \nu)}{2 a}, -\nu; \frac{i (2 i c k - i c m + i p + a i (\nu - 2))}{2 a}; e^{2 i (i b + i a z)}\right)\right) \Big/ (2 i c k - i c m + i p + i a \nu) + \left(e^{i \pi m + (c (m - 2 k) + p) z} {}_2F_1\left(\frac{i (c i (m - 2 k) + i p + i a \nu)}{2 a}, -\nu; \frac{i (-2 c i k + i c m + i p + a i (\nu - 2))}{2 a}; e^{2 i (i b + i a z)}\right)\right) \Big/ (c i (m - 2 k) + i p + i a \nu)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2234.01

$$\int e^{p z} \sinh^m(c z) \sinh^\nu(b + a z)\, dz = \frac{e^{p z} (1 - \nu \bmod 2) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) \left(\frac{i}{2}\right)^{m+\nu}}{p} + 2^{-m-\nu} i^{m+\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{\frac{i \pi m}{2} + (2 c k - c m + p) z}}{2 c k - c m + p} + \frac{e^{(-2 c k + c m + p) z - \frac{i m \pi}{2}}}{-2 c k + c m + p}\right) + 2^{-m-\nu} i^{m+\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{\frac{1}{2} (4 b k - 2 b \nu + i \pi \nu) + (2 a k + p - a \nu) z}}{2 a k + p - a \nu} + \frac{e^{\frac{1}{2} (-4 b k + 2 b \nu - i \pi \nu) + (-2 a k + p + a \nu) z}}{-2 a k + p + a \nu}\right) + 2^{-m-\nu} e^{p z} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} e^{c (2 k - m) z + (2 s - \nu) (b + a z)} \left(\frac{e^{i m \pi - 2 (2 s - \nu) (b + a z)}}{2 c k - c m + p - 2 a s + a \nu} + \frac{e^{2 (b (\nu - 2 s) + a z (\nu - 2 s) + c (m - 2 k) z)}}{c (m - 2 k) + p - 2 a s + a \nu} + \frac{e^{i \pi \nu + 2 c (m - 2 k) z}}{c (m - 2 k) + p + 2 a s - a \nu} - \frac{e^{i \pi (m + \nu)}}{c (m - 2 k) - p - 2 a s + a \nu}\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sinh^\mu(c z + d) \sinh^\nu(a z + b)$

01.19.21.2235.01

$$\int e^{pz}\sinh^{\mu}(d+cz)\sinh^{\nu}(b+az)\,dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{pz}\left(1-e^{2(d+cz)}\right)^{-\mu}(1-\nu \bmod 2)\sinh^{\mu}(d+cz)}{p-c\mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(\frac{p-c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{p}{c}-\mu+2\right); e^{2(d+cz)}\right) + 2^{-\nu}\left(1-e^{2(d+cz)}\right)^{-\mu}\sinh^{\mu}(d+cz) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{b(\nu-2k)}\binom{\nu}{k}\left(\frac{e^{(p+a(\nu-2k))z}}{p+a(\nu-2k)-c\mu}\,{}_2F_1\left(\frac{p+a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{p+a(\nu-2k)}{c}-\mu+2\right); e^{2(d+cz)}\right) + \frac{e^{2i\left(\frac{\pi\nu}{2}+b\,i(\nu-2k)\right)+(p-a(\nu-2k))z}}{p-a(\nu-2k)-c\mu}\,{}_2F_1\left(\frac{p-a(\nu-2k)-c\mu}{2c}, -\mu; \frac{1}{2}\left(\frac{p-a(\nu-2k)}{c}-\mu+2\right); e^{2(d+cz)}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2236.01

$$\int e^{pz}\sinh^{m}(d+cz)\sinh^{\nu}(b+az)\,dz = \frac{e^{pz}(1-\nu \bmod 2)(1-m \bmod 2)}{p}\left(\frac{i}{2}\right)^{m+\nu}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} + 2^{-m-\nu} i^{m+\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{e^{\frac{1}{2}(4dk-2dm+i m\pi)+(2ck-cm+p)z}}{2ck-cm+p}+\frac{e^{\frac{1}{2}(-4dk+2dm-i m\pi)+(-2ck+cm+p)z}}{-2ck+cm+p}\right) + 2^{-m-\nu} i^{m+\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{\frac{1}{2}(4bk-2b\nu+i\pi\nu)+(2ak+p-a\nu)z}}{2ak+p-a\nu}+\frac{e^{\frac{1}{2}(-4bk+2b\nu-i\pi\nu)+(-2ak+p+a\nu)z}}{-2ak+p+a\nu}\right) + 2^{-m-\nu}e^{pz}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}e^{(2s-\nu)(b+az)+(2k-m)(d+cz)}\left(\frac{e^{i m\pi-2(2s-\nu)(b+az)}}{2ck-cm+p-2as+a\nu}+\frac{e^{2(d(m-2k)+cz(m-2k)+b(\nu-2s)+a(\nu-2s)z)}}{c(m-2k)+p-2as+a\nu}+\frac{e^{2d(m-2k)+2cz(m-2k)+i\pi\nu}}{c(m-2k)+p+2as-a\nu}-\frac{e^{i\pi(m+\nu)}}{c(m-2k)-p-2as+a\nu}\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sinh^m(b z) \sinh^\nu(c z)$

01.19.21.2237.01

$$\int e^{p z^2} \sinh^m(b z) \sinh^\nu(c z)\, dz = \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}\, (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{b^2 (m-2s)^2 - 2\pi i m p}{4p}} \operatorname{erfi}\left(\frac{2 p z - b(m-2s)}{2\sqrt{p}}\right) + e^{-\frac{b^2 (m-2s)^2 + 2\pi i m p}{4p}} \operatorname{erfi}\left(\frac{b(m-2s) + 2 p z}{2\sqrt{p}}\right)\right) + \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{c^2 (\nu-2k)^2 - 2\pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{2 p z - c(\nu-2k)}{2\sqrt{p}}\right) + e^{-\frac{c^2 (\nu-2k)^2 + 2\pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{c(\nu-2k) + 2 p z}{2\sqrt{p}}\right)\right) + \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(e^{-\frac{(b(m-2s)+c(2k-\nu))^2 - 2 i p \pi (\nu-m)}{4p}} \operatorname{erfi}\left(\frac{b(m-2s) + c(2k-\nu) + 2 p z}{2\sqrt{p}}\right) + e^{-\frac{(-b(m-2s)-c(2k-\nu))^2 + 2 i p \pi (\nu-m)}{4p}} \operatorname{erfi}\left(\frac{-b(m-2s) - c(2k-\nu) + 2 p z}{2\sqrt{p}}\right) + e^{-\frac{(b(m-2s)+c(\nu-2k))^2 + 2 i p \pi (m+\nu)}{4p}} \operatorname{erfi}\left(\frac{b(m-2s) + c(\nu-2k) + 2 p z}{2\sqrt{p}}\right) + e^{-\frac{(-b(m-2s)-c(\nu-2k))^2 - 2 i p \pi (m+\nu)}{4p}} \operatorname{erfi}\left(\frac{-b(m-2s) - c(\nu-2k) + 2 p z}{2\sqrt{p}}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2238.01

$$\int e^{p\sqrt{z}} \sinh^m(b z) \sinh^\nu(c z)\, dz = \frac{i^{m+\nu} 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z} - 1\right)(1 - m \bmod 2)(1 - \nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + i^{m+\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s e^{\frac{i m \pi}{2}} \binom{m}{s} \left(-\frac{e^{\frac{p^2}{4b(m-2s)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p - 2b(m-2s)\sqrt{z}}{2\sqrt{-b(m-2s)}}\right)}{(-b(m-2s))^{3/2}} + \frac{2 e^{-i\pi m + b(m-2s) z + p\sqrt{z}}}{b(m-2s)} - \frac{2 e^{p\sqrt{z} - b(m-2s) z}}{b(m-2s)} - \frac{e^{-\frac{p^2}{4b(m-2s)} - i m \pi} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2b(m-2s)\sqrt{z}}{2\sqrt{b(m-2s)}}\right)}{(b(m-2s))^{3/2}} \right) + i^{m+\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{\frac{i\pi\nu}{2}} \binom{\nu}{k} \left(-\frac{e^{\frac{p^2}{4c(\nu-2k)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p - 2c(\nu-2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} + \frac{2 e^{\sqrt{z}\, p - i\pi\nu + c(\nu-2k) z}}{c(\nu-2k)} - \frac{2 e^{p\sqrt{z} - c(\nu-2k) z}}{c(\nu-2k)} - \frac{e^{-\frac{p^2}{4c(\nu-2k)} - i\pi\nu} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p + 2c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} \right) +$$

$$i^{m+v}\, 2^{-m-v-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{k} \left(e^{-\frac{1}{2} i \pi (v-m)} \left(\frac{2\, e^{\sqrt{z}\, p + i \pi (v-m) + (b (m-2s) + c (2k-v)) z}}{b (m-2s) + c (2k-v)} - \frac{e^{i \pi (v-m) - \frac{p^2}{4 (b (m-2s) + c (2k-v))}}\, p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 (b (m-2s) + c (2k-v)) \sqrt{z}}{2 \sqrt{b (m-2s) + c (2k-v)}} \right)}{(b (m-2s) + c (2k-v))^{3/2}} + \frac{2\, e^{\sqrt{z}\, p + (-b (m-2s) - c (2k-v)) z}}{-b (m-2s) - c (2k-v)} - \frac{e^{-\frac{p^2}{4 (-b (m-2s) - c (2k-v))}}\, p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 (-b (m-2s) - c (2k-v)) \sqrt{z}}{2 \sqrt{-b (m-2s) - c (2k-v)}} \right)}{(-b (m-2s) - c (2k-v))^{3/2}} \right) + e^{\frac{1}{2} i \pi (m+v)} \left(\frac{2\, e^{\sqrt{z}\, p - i \pi (m+v) + (b (m-2s) + c (v-2k)) z}}{b (m-2s) + c (v-2k)} - \frac{e^{-\frac{p^2}{4 (b (m-2s) + c (v-2k))} - i \pi (m+v)}\, p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 (b (m-2s) + c (v-2k)) \sqrt{z}}{2 \sqrt{b (m-2s) + c (v-2k)}} \right)}{(b (m-2s) + c (v-2k))^{3/2}} + \frac{2\, e^{\sqrt{z}\, p + (-b (m-2s) - c (v-2k)) z}}{-b (m-2s) - c (v-2k)} - \frac{e^{-\frac{p^2}{4 (-b (m-2s) - c (v-2k))}}\, p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 (-b (m-2s) - c (v-2k)) \sqrt{z}}{2 \sqrt{-b (m-2s) - c (v-2k)}} \right)}{(-b (m-2s) - c (v-2k))^{3/2}} \right) \right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $e^{p z} \sinh^m(b z^r) \sinh^v(c z)$

01.19.21.2239.01

$$\int e^{p z} \sinh^m(b z^2) \sinh^\nu(c z)\, dz = \left(\frac{i}{2}\right)^{m+\nu} \frac{e^{p z}(1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$

$$2^{-m-\nu+1} e^{p z} i^{m+\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(\cosh(c(\nu - 2k) z)\left(p \cos\left(\frac{\pi \nu}{2}\right) - i c (2k - \nu) \sin\left(\frac{\pi \nu}{2}\right)\right) +\right.\right.$$

$$\left.\left.\left(c(2k - \nu)\cos\left(\frac{\pi \nu}{2}\right) - i p \sin\left(\frac{\pi \nu}{2}\right)\right) \sinh(c(\nu - 2k) z)\right)\right) \Big/ ((2 c k + p - c \nu)(p + c(\nu - 2k))) -$$

$$\frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{b} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^s}{m - 2s} \binom{m}{s} \left(e^{\frac{p^2 + 2 b i m \pi (m-2s)}{4 b (m-2s)}} \sqrt{-b(m-2s)}\, \operatorname{erfi}\left(\frac{p - 2b(m-2s) z}{2\sqrt{-b(m-2s)}}\right) -\right.$$

$$\left. e^{-\frac{p^2 + 2 b i m \pi (m-2s)}{4 b (m-2s)}} \sqrt{b(m-2s)}\, \operatorname{erfi}\left(\frac{p + 2b(m-2s) z}{2\sqrt{b(m-2s)}}\right)\right) - \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{b}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^{k+s}}{m - 2s} \binom{\nu}{k} \left(e^{\frac{(p - c(2k-\nu))^2 - 2 i b \pi (m-2s)(\nu - m)}{4 b (m-2s)}} \sqrt{-b(m-2s)}\, \operatorname{erfi}\left(\frac{p - c(2k - \nu) - 2b(m-2s) z}{2\sqrt{-b(m-2s)}}\right) +\right.$$

$$e^{\frac{(p - c(\nu-2k))^2 + 2 b i \pi (m-2s)(m+\nu)}{4 b (m-2s)}} \sqrt{-b(m-2s)}\, \operatorname{erfi}\left(\frac{p - c(\nu - 2k) - 2b(m-2s) z}{2\sqrt{-b(m-2s)}}\right) -$$

$$e^{-\frac{(p + c(2k-\nu))^2 - 2 i b \pi (m-2s)(\nu - m)}{4 b (m-2s)}} \sqrt{b(m-2s)}\, \operatorname{erfi}\left(\frac{p + c(2k - \nu) + 2b(m-2s) z}{2\sqrt{b(m-2s)}}\right) -$$

$$\left. e^{-\frac{(p + c(\nu-2k))^2 + 2 b i \pi (m-2s)(m+\nu)}{4 b (m-2s)}} \sqrt{b(m-2s)}\, \operatorname{erfi}\left(\frac{p + c(\nu - 2k) + 2b(m-2s) z}{2\sqrt{b(m-2s)}}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2240.01

$$\int e^{p z} \sinh^m\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = \frac{i^{\nu-m}\, 2^{-m-\nu}\, e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$
$$i^{-m} (-1)^\nu\, 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(p-c(\nu-2k))z}}{p - c(\nu - 2k)} + \frac{e^{(p+c(\nu-2k))z - i\pi\nu}}{p + c(\nu - 2k)} \right) \binom{\nu}{k} +$$
$$i^\nu\, 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{b\, e^{-\frac{b^2 (m-2s)^2}{4p} - i m \pi} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - b(m-2s)}{2\sqrt{p}}\right)}{p^{3/2}} + \right.$$
$$\left. \frac{b\, e^{-\frac{b^2 (m-2s)^2}{4p}} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{-2\sqrt{z}\, p - b(m-2s)}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{2\, e^{b\sqrt{z}\,(m-2s) + p z}}{p} + \frac{2\, e^{-i\pi m + p z - b(m-2s)\sqrt{z}}}{p} \right) +$$
$$i^{\nu-m}\, 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(e^{-\frac{1}{2} i\pi(\nu-m)} \left(\frac{b\, e^{i\pi(\nu-m) - \frac{b^2 (m-2s)^2}{4(p+c(2k-\nu))}} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{2(p+c(2k-\nu))\sqrt{z} - b(m-2s)}{2\sqrt{p+c(2k-\nu)}}\right)}{(p + c(2k - \nu))^{3/2}} + \right.\right.$$
$$\frac{b\, e^{-\frac{b^2 (m-2s)^2}{4(p-c(2k-\nu))}} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{2(c(2k-\nu)-p)\sqrt{z} - b(m-2s)}{2\sqrt{p-c(2k-\nu)}}\right)}{(p - c(2k - \nu))^{3/2}} +$$
$$\left. \frac{2\, e^{-b\sqrt{z}\,(m-2s) + i\pi(\nu-m) + (p+c(2k-\nu))z}}{p + c(2k - \nu)} + \frac{2\, e^{b\sqrt{z}\,(m-2s) + (p-c(2k-\nu))z}}{p - c(2k - \nu)} \right) +$$
$$e^{\frac{1}{2} i\pi(m+\nu)} \left(\frac{b\, e^{-\frac{b^2 (m-2s)^2}{4(p+c(\nu-2k))} - i\pi(m+\nu)} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{2(p+c(\nu-2k))\sqrt{z} - b(m-2s)}{2\sqrt{p+c(\nu-2k)}}\right)}{(p + c(\nu - 2k))^{3/2}} + \right.$$
$$\frac{b\, e^{-\frac{b^2 (m-2s)^2}{4(p-c(\nu-2k))}} \sqrt{\pi}\, (m - 2s) \operatorname{erfi}\left(\frac{2(c(\nu-2k)-p)\sqrt{z} - b(m-2s)}{2\sqrt{p-c(\nu-2k)}}\right)}{(p - c(\nu - 2k))^{3/2}} +$$
$$\left.\left. \frac{2\, e^{-b\sqrt{z}\,(m-2s) - i\pi(m+\nu) + (p+c(\nu-2k))z}}{p + c(\nu - 2k)} + \frac{2\, e^{b\sqrt{z}\,(m-2s) + (p-c(\nu-2k))z}}{p - c(\nu - 2k)} \right)\right) /;\, m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sinh^m(b z^r) \sinh^\nu(c z)$

01.19.21.2241.01

$$\int e^{p z^2} \sinh^m(b z^2) \sinh^\nu(c z) \, dz = \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi} (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + \frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (\nu-2s)^2 - 2\pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{2 p z - c(\nu - 2s)}{2\sqrt{p}}\right) + e^{-\frac{c^2 (\nu-2s)^2 + 2\pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{c(\nu - 2s) + 2 p z}{2\sqrt{p}}\right)\right) + i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \sqrt{p - b(m-2k)} \, (b(m-2k) + p) \operatorname{erfi}\left(\frac{2 p z - 2 b (m-2k) z}{2\sqrt{p - b(m-2k)}}\right) + e^{-\frac{1}{2} i m \pi} (p - b(m-2k)) \sqrt{b(m-2k) + p} \operatorname{erfi}\left(\sqrt{b(m-2k) + p}\, z\right)\right)\right) \Big/ ((p - b(m-2k))(b(m-2k) + p)) + i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+s} \binom{m}{k} \left(\left(e^{-\frac{c^2 (\nu-2s)^2 + 2 i (p - b(2k-m)) \pi (m-\nu)}{4(p - b(2k-m))}} \sqrt{p - b(2k-m)} \, (b(2k-m) + p) \operatorname{erfi}\left(\frac{-c(\nu - 2s) - 2 b (2k-m) z + 2 p z}{2\sqrt{p - b(2k-m)}}\right) + e^{-\frac{c^2 (\nu-2s)^2 - 2 i (b(2k-m)+p) \pi (m-\nu)}{4(b(2k-m)+p)}} (p - b(2k-m)) \sqrt{b(2k-m) + p} \operatorname{erfi}\left(\frac{c(\nu-2s) + 2(b(2k-m)+p) z}{2\sqrt{b(2k-m)+p}}\right)\right) \Big/ ((p - b(2k-m))(b(2k-m)+p)) + \left(e^{-\frac{c^2 (\nu-2s)^2 - 2 i (p - b(m-2k)) \pi (m+\nu)}{4(p - b(m-2k))}} \sqrt{p - b(m-2k)} \, (b(m-2k) + p) \operatorname{erfi}\left(\frac{-c(\nu-2s) - 2 b(m-2k) z + 2 p z}{2\sqrt{p - b(m-2k)}}\right) + e^{-\frac{c^2(\nu-2s)^2 + 2 i (b(m-2k)+p) \pi (m+\nu)}{4(b(m-2k)+p)}} (p - b(m-2k)) \sqrt{b(m-2k)+p} \operatorname{erfi}\left(\frac{c(\nu-2s) + 2(b(m-2k)+p) z}{2\sqrt{b(m-2k)+p}}\right)\right) \Big/ ((p - b(m-2k))(b(m-2k)+p)) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2242.01

$$\int e^{p\sqrt{z}} \sinh^m\left(b\sqrt{z}\right) \sinh^\nu(c z) \, dz = \frac{i^{m+\nu} 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z} - 1\right) (1 - m \bmod 2)(1 - \nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + (-1)^m i^\nu 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s$$

$$e^{(p-b(m-2s))\sqrt{z}}\left(\frac{e^{2\left(b(m-2s)\sqrt{z}-\frac{i m\pi}{2}\right)}\left(\sqrt{z}\,p+b(m-2s)\sqrt{z}-1\right)}{(p+b(m-2s))^2}+\frac{\sqrt{z}}{p-b(m-2s)}-\frac{1}{(b(m-2s)-p)^2}\right)\binom{m}{s}+$$

$$(-1)^v i^m 2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(-\frac{e^{\frac{p^2}{4c(v-2k)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2c(v-2k)\sqrt{z}}{2\sqrt{-c(v-2k)}}\right)}{(-c(v-2k))^{3/2}}+\right.$$

$$\left.\frac{2e^{\sqrt{z}\,p-i\pi v+c(v-2k)z}}{c(v-2k)}-\frac{2e^{p\sqrt{z}-c(v-2k)z}}{c(v-2k)}-\frac{e^{-\frac{p^2}{4c(v-2k)}-i\pi v}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+2c(v-2k)\sqrt{z}}{2\sqrt{c(v-2k)}}\right)}{(c(v-2k))^{3/2}}\right)+$$

$$i^{m+v}2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\left(e^{-\frac{1}{2}i\pi(v-m)}\left(\frac{2e^{\sqrt{z}\,(p+b(m-2s))+i\pi(v-m)+c(2k-v)z}}{c(2k-v)}-\right.\right.$$

$$\frac{2e^{(p-b(m-2s))\sqrt{z}-c(2k-v)z}}{c(2k-v)}-\frac{b\,e^{\frac{(p-b(m-2s))^2}{4c(2k-v)}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{-p+b(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{-c(2k-v)}}\right)}{(-c(2k-v))^{3/2}}-$$

$$\frac{e^{\frac{(p-b(m-2s))^2}{4c(2k-v)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-b(m-2s)-2c(2k-v)\sqrt{z}}{2\sqrt{-c(2k-v)}}\right)}{(-c(2k-v))^{3/2}}-\frac{e^{i\pi(v-m)-\frac{(p+b(m-2s))^2}{4c(2k-v)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p+b(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{c(2k-v)}}\right)}{(c(2k-v))^{3/2}}-$$

$$\left.\frac{b\,e^{i\pi(v-m)-\frac{(p+b(m-2s))^2}{4c(2k-v)}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{p+b(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{c(2k-v)}}\right)}{(c(2k-v))^{3/2}}\right)+$$

$$e^{\frac{1}{2}i\pi(m+v)}\left(\frac{2e^{\sqrt{z}\,(p+b(m-2s))-i\pi(m+v)+c(v-2k)z}}{c(v-2k)}-\frac{2e^{(p-b(m-2s))\sqrt{z}-c(v-2k)z}}{c(v-2k)}-\right.$$

$$\frac{b\,e^{\frac{(p-b(m-2s))^2}{4c(v-2k)}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{-p+b(m-2s)+2c(v-2k)\sqrt{z}}{2\sqrt{-c(v-2k)}}\right)}{(-c(v-2k))^{3/2}}-$$

$$\frac{e^{\frac{(p-b(m-2s))^2}{4c(v-2k)}}\, p\sqrt{\pi}\ \text{erfi}\left(\frac{p-b(m-2s)-2c(v-2k)\sqrt{z}}{2\sqrt{-c(v-2k)}}\right)}{(-c(v-2k))^{3/2}} - \frac{e^{-\frac{(p+b(m-2s))^2}{4c(v-2k)}-i\pi(m+v)}\, p\sqrt{\pi}\ \text{erfi}\left(\frac{p+b(m-2s)+2c(v-2k)\sqrt{z}}{2\sqrt{c(v-2k)}}\right)}{(c(v-2k))^{3/2}} - \left.\left.\frac{b\, e^{-\frac{(p+b(m-2s))^2}{4c(v-2k)}-i\pi(m+v)}\sqrt{\pi}\ (m-2s)\,\text{erfi}\left(\frac{p+b(m-2s)+2c(v-2k)\sqrt{z}}{2\sqrt{c(v-2k)}}\right)}{(c(v-2k))^{3/2}}\right)\right)\right) /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $e^{p z}\sinh^m(b z^r)\sinh^v(c z^r)$

01.19.21.2243.01

$$\int e^{p z}\sinh^m(b z^2)\sinh^v(c z^2)\,dz =$$

$$\left(\frac{i}{2}\right)^{m+v}\frac{e^{p z}(1-m \bmod 2)(1-v \bmod 2)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} - \frac{i^{m+v}2^{-m-v-1}\sqrt{\pi}}{b}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^s}{m-2s}\binom{m}{s}$$
$$\left(e^{\frac{p^2+2bim\pi(m-2s)}{4b(m-2s)}}\sqrt{-b(m-2s)}\ \text{erfi}\left(\frac{p-2b(m-2s)z}{2\sqrt{-b(m-2s)}}\right) - e^{-\frac{p^2+2bim\pi(m-2s)}{4b(m-2s)}}\sqrt{b(m-2s)}\ \text{erfi}\left(\frac{p+2b(m-2s)z}{2\sqrt{b(m-2s)}}\right)\right) -$$
$$\frac{i^{m+v}2^{-m-v-1}\sqrt{\pi}}{c}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k}{v-2k}\binom{v}{k}$$
$$\left(e^{\frac{p^2+2ci\pi v(v-2k)}{4c(v-2k)}}\sqrt{-c(v-2k)}\ \text{erfi}\left(\frac{p-2c(v-2k)z}{2\sqrt{-c(v-2k)}}\right) - e^{-\frac{p^2+2ci\pi v(v-2k)}{4c(v-2k)}}\sqrt{c(v-2k)}\ \text{erfi}\left(\frac{p+2c(v-2k)z}{2\sqrt{c(v-2k)}}\right)\right) +$$
$$2^{-m-v-1}i^{m+v}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\left(\frac{1}{b(m-2s)+c(2k-v)}\left(e^{-\frac{p^2-2i\pi(b(m-2s)+c(2k-v))(v-m)}{4(b(m-2s)+c(2k-v))}}\sqrt{b(m-2s)+c(2k-v)}\right.\right.$$
$$\text{erfi}\left(\frac{p+2(b(m-2s)+c(2k-v))z}{2\sqrt{b(m-2s)+c(2k-v)}}\right) - e^{-\frac{p^2+2i\pi(-b(m-2s)-c(2k-v))(v-m)}{4(-b(m-2s)-c(2k-v))}}\sqrt{-b(m-2s)-c(2k-v)}$$
$$\left.\text{erfi}\left(\frac{p-2(b(m-2s)+c(2k-v))z}{2\sqrt{-b(m-2s)-c(2k-v)}}\right)\right) + \frac{1}{b(m-2s)+c(v-2k)}\left(e^{-\frac{p^2+2i\pi(m+v)(b(m-2s)+c(v-2k))}{4(b(m-2s)+c(v-2k))}}\right.$$
$$\sqrt{b(m-2s)+c(v-2k)}\ \text{erfi}\left(\frac{p+2(b(m-2s)+c(v-2k))z}{2\sqrt{b(m-2s)+c(v-2k)}}\right) - e^{-\frac{p^2-2i\pi(m+v)(-b(m-2s)-c(v-2k))}{4(-b(m-2s)-c(v-2k))}}$$
$$\left.\left.\sqrt{-b(m-2s)-c(v-2k)}\ \text{erfi}\left(\frac{p-2(b(m-2s)+c(v-2k))z}{2\sqrt{-b(m-2s)-c(v-2k)}}\right)\right)\right) /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2244.01

$$\int e^{p z} \sinh^m\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-m-\nu} 2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} + 2^{-m-\nu-1} i^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s e^{\frac{i m \pi}{2}} \binom{m}{s} \left(\frac{4 e^{p z - \frac{i m \pi}{2}} \cos\left(\frac{m \pi}{2} - i b (m - 2 s) \sqrt{z}\right)}{p} + \frac{b e^{-\frac{b^2 (m-2s)^2}{4 p} - i m \pi} \sqrt{\pi} (m - 2 s) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - b (m - 2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} - \right.$$

$$\left. \frac{b e^{-\frac{(b m - 2 b s)^2}{4 p}} \sqrt{\pi} (m - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z} p + b (m - 2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) + 2^{-m-\nu-1} i^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{\frac{i \pi \nu}{2}} \binom{\nu}{k} \left(\frac{4 e^{p z - \frac{i \pi \nu}{2}} \cos\left(c i \sqrt{z} (2 k - \nu) + \frac{\pi \nu}{2}\right)}{p} + \frac{c e^{-\frac{c^2 (\nu - 2 k)^2}{4 p} - i \pi \nu} \sqrt{\pi} (\nu - 2 k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (\nu - 2 k)}{2 \sqrt{p}}\right)}{p^{3/2}} - \right.$$

$$\left. \frac{c e^{-\frac{(c \nu - 2 c k)^2}{4 p}} \sqrt{\pi} (\nu - 2 k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (2 k - \nu)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) + 2^{-m-\nu-1} i^{-m-\nu}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi (\nu - m)} \left(\frac{4 e^{p z - \frac{1}{2} i \pi (m - \nu)} \cos\left(\frac{1}{2} \pi (\nu - m) + (2 i c k + i b m - 2 i b s - i c \nu) \sqrt{z}\right)}{p} + \frac{1}{p^{3/2}} \right. \right.$$

$$\left. \left(e^{\frac{(2 i c k + i b m - 2 i b s - i c \nu)^2}{4 p}} \sqrt{\pi} (2 i c k + i b m - 2 i b s - i c \nu) \operatorname{erf}\left(\frac{2 i \sqrt{z} p + b i (m - 2 s) + c i (2 k - \nu)}{2 \sqrt{p}}\right) \right) \right) +$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(-2 c i k - i b m + 2 i b s + i c \nu)^2}{4 p} + i \pi (\nu - m)} \sqrt{\pi} (2 i c k + i b m - 2 i b s - i c \nu) \right.$$

$$\left. \left. \operatorname{erf}\left(\frac{-2 i \sqrt{z} p + b i (m - 2 s) + c i (2 k - \nu)}{2 \sqrt{p}}\right) \right) \right) +$$

$$e^{\frac{1}{2} i \pi (m + \nu)} \left(\frac{4 e^{p z - \frac{1}{2} i \pi (m + \nu)} \cos\left(\frac{1}{2} \pi (m + \nu) + (2 i c k - i b m + 2 i b s - i c \nu) \sqrt{z}\right)}{p} - \right.$$

$$\frac{1}{p^{3/2}}\left(e^{\frac{(b\,i\,(m-2\,s)+c\,i\,(v-2\,k))^2}{4\,p}}\sqrt{\pi}\,(b\,i\,(m-2\,s)+c\,i\,(v-2\,k))\,\mathrm{erf}\left(\frac{-2\,i\,\sqrt{z}\,p-i\,b\,(m-2\,s)+c\,i\,(2\,k-v)}{2\,\sqrt{p}}\right)\right)-$$
$$\frac{1}{p^{3/2}}\left(i\,e^{\frac{(b\,i\,(m-2\,s)+c\,i\,(v-2\,k))^2}{4\,p}-i\,\pi\,(m+v)}\sqrt{\pi}\,(b\,i\,(m-2\,s)+c\,i\,(v-2\,k))\right.$$
$$\left.\left.\left.\mathrm{erfi}\left(\frac{2\,\sqrt{z}\,p-b\,(m-2\,s)-c\,(v-2\,k)}{2\,\sqrt{p}}\right)\right)\right)\right)\text{/; } m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $e^{p\,z^r}\sinh^m(b\,z^r)\sinh^v(c\,z^r)$

01.19.21.2245.01

$$\int e^{p\,z^r}\sinh^m(b\,z^r)\sinh^v(c\,z^r)\,dz = -\frac{i^{v-m}\,2^{-m-v}\,z\,(-p\,z^r)^{-1/r}\,(1-m\bmod 2)\,(1-v\bmod 2)}{r}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(\frac{1}{r},-p\,z^r\right)-$$
$$\frac{2^{-m-v}\,z}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,e^{\frac{i\,\pi\,v}{2}}\,\Gamma\left(\frac{1}{r},(-2\,b\,k+b\,m-p)\,z^r\right)((-2\,b\,k+b\,m-p)\,z^r)^{-1/r}+\right.$$
$$\left.e^{\frac{i\,\pi\,v}{2}}\,((2\,b\,k-b\,m-p)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,b\,k-b\,m-p)\,z^r\right)\right)-$$
$$\frac{i^{-m}\,2^{-m-v}\,z}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,\Gamma\left(\frac{1}{r},(-2\,c\,k-p+c\,v)\,z^r\right)((-2\,c\,k-p+c\,v)\,z^r)^{-1/r}+\right.$$
$$\left.((2\,c\,k-p-c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,c\,k-p-c\,v)\,z^r\right)\right)-\frac{(-1)^m\,2^{-m-v}\,z}{r}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,\Gamma\left(\frac{1}{r},(-2\,b\,k+b\,m-p-2\,c\,s+c\,v)\,z^r\right)((-2\,b\,k+b\,m-p-2\,c\,s+c\,v)\,z^r)^{-1/r}+\right.$$
$$(-1)^{m+v}\,((2\,b\,k-b\,m-p-2\,c\,s+c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,b\,k-b\,m-p-2\,c\,s+c\,v)\,z^r\right)+$$
$$((-2\,b\,k+b\,m-p+2\,c\,s-c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-2\,b\,k+b\,m-p+2\,c\,s-c\,v)\,z^r\right)+$$
$$\left.(-1)^m\,((2\,b\,k-b\,m-p+2\,c\,s-c\,v)\,z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,b\,k-b\,m-p+2\,c\,s-c\,v)\,z^r\right)\right)\text{/; } m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2246.01

$$\int e^{p z^2} \sinh^m(b z^2) \sinh^v(c z^2)\, dz = \frac{i^{m+v} 2^{-m-v-1} \sqrt{\pi}\, (1 - m \bmod 2)(1 - v \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + i^{m+v} 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^s \binom{m}{s} \left(e^{-\frac{1}{2} i m \pi} \sqrt{p + b(m-2s)}\, (p - b(m-2s)) \operatorname{erfi}\left(\sqrt{p + b(m-2s)}\, z\right) + e^{\frac{i m \pi}{2}} (p + b(m-2s)) \sqrt{p - b(m-2s)}\, \operatorname{erfi}\left(\sqrt{p - b(m-2s)}\, z\right)\right)\right) \Big/ ((p - b(m-2s))(p + b(m-2s))) + i^{m+v} 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left((-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \sqrt{p + c(v-2k)}\, (p - c(v-2k)) \operatorname{erfi}\left(\sqrt{p + c(v-2k)}\, z\right) + e^{\frac{i \pi v}{2}} (p + c(v-2k)) \sqrt{p - c(v-2k)}\, \operatorname{erfi}\left(\sqrt{p - c(v-2k)}\, z\right)\right)\right) \Big/ ((p - c(v-2k))(p + c(v-2k))) + i^{m+v} 2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{k} \left(\left(e^{\frac{1}{2} i \pi (v-m)} \sqrt{p + b(m-2s) + c(2k-v)}\, (p - b(m-2s) - c(2k-v)) \operatorname{erfi}\left(\sqrt{p + b(m-2s) + c(2k-v)}\, z\right) + e^{-\frac{1}{2} i \pi (v-m)} (p + b(m-2s) + c(2k-v)) \sqrt{p - b(m-2s) - c(2k-v)}\, \operatorname{erfi}\left(\sqrt{p - b(m-2s) - c(2k-v)}\, z\right)\right) \Big/ ((p - b(m-2s) - c(2k-v))(p + b(m-2s) + c(2k-v))) + \left(e^{-\frac{1}{2} i \pi (m+v)} \sqrt{p + b(m-2s) + c(v-2k)}\, (p - b(m-2s) - c(v-2k)) \operatorname{erfi}\left(\sqrt{p + b(m-2s) + c(v-2k)}\, z\right) + e^{\frac{1}{2} i \pi (m+v)} (p + b(m-2s) + c(v-2k)) \sqrt{p - b(m-2s) - c(v-2k)}\, \operatorname{erfi}\left(\sqrt{p - b(m-2s) - c(v-2k)}\, z\right)\right) \Big/ ((p - b(m-2s) - c(v-2k))(p + b(m-2s) + c(v-2k)))\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2247.01

$$\int e^{p\sqrt{z}}\sinh^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = e^{p\sqrt{z}}\left(\frac{p\sqrt{z}-1}{p^2}+\frac{\sqrt{z}}{p}-\frac{1}{p^2}\right)\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)\left(\frac{i}{2}\right)^{m+\nu}+2^{-m-\nu+1}i^{m+\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s$$

$$\binom{m}{s}e^{\frac{i\pi m}{2}+(p-b(m-2s))\sqrt{z}}\left(\frac{e^{2\left(b(m-2s)\sqrt{z}-\frac{i m\pi}{2}\right)}\left(\sqrt{z}\,p+b(m-2s)\sqrt{z}-1\right)}{(p+b(m-2s))^2}+\frac{\sqrt{z}}{p-b(m-2s)}-\frac{1}{(b(m-2s)-p)^2}\right)+$$

$$2^{-m-\nu+1}i^{m+\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{\frac{i\pi\nu}{2}+(p-c(\nu-2k))\sqrt{z}}$$

$$\left(\frac{e^{2\left(c(\nu-2k)\sqrt{z}-\frac{i\pi\nu}{2}\right)}\left(\sqrt{z}\,p+c(\nu-2k)\sqrt{z}-1\right)}{(p+c(\nu-2k))^2}+\frac{\sqrt{z}}{p-c(\nu-2k)}-\frac{1}{(c(\nu-2k)-p)^2}\right)+$$

$$2^{-m-\nu+1}i^{m+\nu}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+s}\binom{\nu}{k}\left(e^{(p-b(m-2s)-c(2k-\nu))\sqrt{z}-\frac{1}{2}i\pi(\nu-m)}\left(\left(e^{2\left(\sqrt{z}\,(b(m-2s)+c(2k-\nu))+\frac{1}{2}i\pi(\nu-m)\right)}\right.\right.\right.$$

$$\left.\left(\sqrt{z}\,p+(b(m-2s)+c(2k-\nu))\sqrt{z}-1\right)\right)\Big/(p+b(m-2s)+c(2k-\nu))^2+$$

$$\left.\frac{\sqrt{z}}{p-b(m-2s)-c(2k-\nu)}-\frac{1}{(-p+b(m-2s)+c(2k-\nu))^2}\right)+e^{\frac{1}{2}i\pi(m+\nu)+(p-b(m-2s)-c(\nu-2k))\sqrt{z}}$$

$$\left(\left(e^{2\left((b(m-2s)+c(\nu-2k))\sqrt{z}-\frac{1}{2}i\pi(m+\nu)\right)}\left(\sqrt{z}\,p+(b(m-2s)+c(\nu-2k))\sqrt{z}-1\right)\right)\Big/\right.$$

$$(p+b(m-2s)+c(\nu-2k))^2+\frac{\sqrt{z}}{p-b(m-2s)-c(\nu-2k)}-$$

$$\left.\left.\frac{1}{(-p+b(m-2s)+c(\nu-2k))^2}\right)\right)/;\, m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sinh^m\left(a z^r+q\right)\sinh^\nu\left(c z^r+g\right)$

01.19.21.2248.01

$$\int e^{b z^r+e} \sinh^m(a z^r+q) \sinh^v(c z^r+g) \, dz = -\frac{i^{v-m} 2^{-m-v} e^e z (-b z^r)^{-1/r} (1-m \bmod 2)(1-v \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) -$$
$$\frac{2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big((-1)^m e^{e+2kq-mq+\frac{i\pi v}{2}} \Gamma\left(\frac{1}{r}, (-b-2ak+am) z^r\right) ((-b-2ak+am) z^r)^{-1/r} +$$
$$e^{e-2kq+mq+\frac{i\pi v}{2}} ((-b+2ak-am) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2ak-am) z^r\right) \Big) -$$
$$\frac{i^{-m} 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \Big((-1)^v e^{e+2gk-gv} \Gamma\left(\frac{1}{r}, (-b-2ck+cv) z^r\right) ((-b-2ck+cv) z^r)^{-1/r} +$$
$$e^{e-2gk+gv} ((-b+2ck-cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2ck-cv) z^r\right) \Big) -$$
$$\frac{(-1)^m 2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{e+2kq-mq+2gs-gv} \Gamma\left(\frac{1}{r}, (-b-2ak+am-2cs+cv) z^r\right)$$
$$((-b-2ak+am-2cs+cv) z^r)^{-1/r} + (-1)^{m+v} e^{e-2kq+mq+2gs-gv}$$
$$((-b+2ak-am-2cs+cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2ak-am-2cs+cv) z^r\right) + e^{e+2kq-mq-2gs+gv}$$
$$((-b-2ak+am+2cs-cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-2ak+am+2cs-cv) z^r\right) + (-1)^m e^{e-2kq+mq-2gs+gv}$$
$$((-b+2ak-am+2cs-cv) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2ak-am+2cs-cv) z^r\right) \Big) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2249.01

$$\int e^{b z^2+e} \sinh^m(a z^2+q) \sinh^\nu(c z^2+g)\, dz = \frac{2^{-m-\nu-1} i^{-m-\nu} e^e \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}(\sqrt{b}\, z)(1-m \bmod 2)(1-\nu \bmod 2)}{\sqrt{b}} + 2^{-m-\nu-1} i^{-m-\nu} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k e^{e-(m-2k)q-\frac{i m \pi}{2}} \binom{m}{k} \left(\frac{e^{2\left(\frac{i \pi m}{2}+(m-2k)q\right)} \operatorname{erfi}\left(\sqrt{b+a(m-2k)}\, z\right)}{\sqrt{b+a(m-2k)}} + \frac{\operatorname{erfi}\left(\sqrt{b-a(m-2k)}\, z\right)}{\sqrt{b-a(m-2k)}} \right) +$$

$$2^{-m-\nu-1} i^{-m-\nu} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k e^{e-g(\nu-2k)-\frac{i\pi\nu}{2}} \binom{\nu}{k}$$

$$\left(\frac{e^{2\left(\frac{i\pi\nu}{2}+g(\nu-2k)\right)} \operatorname{erfi}\left(\sqrt{b+c(\nu-2k)}\, z\right)}{\sqrt{b+c(\nu-2k)}} + \frac{\operatorname{erfi}\left(\sqrt{b-c(\nu-2k)}\, z\right)}{\sqrt{b-c(\nu-2k)}} \right) + 2^{-m-\nu-1} i^{-m-\nu} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \left(e^{e-(m-2k)q-\frac{1}{2} i\pi(m+\nu)-g(\nu-2s)} \left(\frac{e^{2\left((m-2k)q+\frac{1}{2} i\pi(m+\nu)+g(\nu-2s)\right)} \operatorname{erfi}\left(\sqrt{b+a(m-2k)+c(\nu-2s)}\, z\right)}{\sqrt{b+a(m-2k)+c(\nu-2s)}} + \right.\right.$$

$$\left. \frac{\operatorname{erfi}\left(\sqrt{b-a(m-2k)-c(\nu-2s)}\, z\right)}{\sqrt{b-a(m-2k)-c(\nu-2s)}} \right) +$$

$$e^{e+(m-2k)q-\frac{1}{2} i\pi(\nu-m)-g(\nu-2s)} \left(\frac{e^{2\left(-(m-2k)q+\frac{1}{2} i\pi(\nu-m)+g(\nu-2s)\right)} \operatorname{erfi}\left(\sqrt{b-a(m-2k)+c(\nu-2s)}\, z\right)}{\sqrt{b-a(m-2k)+c(\nu-2s)}} + \right.$$

$$\left.\left. \frac{\operatorname{erfi}\left(\sqrt{b+a(m-2k)-c(\nu-2s)}\, z\right)}{\sqrt{b+a(m-2k)-c(\nu-2s)}} \right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2250.01

$$\int e^{\sqrt{z}\, b+e} \sinh^m\left(\sqrt{z}\, a+q\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{i^{-m-\nu} 2^{-m-\nu+1} e^{\sqrt{z}\, b+e} \left(b\sqrt{z}-1\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{b^2} +$$
$$i^{-m-\nu} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{e+(m-2k)q+(b+a(m-2k))\sqrt{z}+\frac{i m \pi}{2}} \left(\sqrt{z}\, b+a(m-2k)\sqrt{z}-1\right)}{(b+a(m-2k))^2} + \right.$$
$$\left. \frac{e^{e-(m-2k)q+(b-a(m-2k))\sqrt{z}-\frac{i m \pi}{2}} \left(\sqrt{z}\, b-a(m-2k)\sqrt{z}-1\right)}{(a(m-2k)-b)^2} \right) \binom{m}{k} +$$
$$i^{-m-\nu} 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{e+\frac{i\pi\nu}{2}+g(\nu-2k)+(b+c(\nu-2k))\sqrt{z}} \left(\sqrt{z}\, b+c(\nu-2k)\sqrt{z}-1\right)}{(b+c(\nu-2k))^2} + \right.$$
$$\left. \frac{e^{e-g(\nu-2k)+(b-c(\nu-2k))\sqrt{z}-\frac{i\pi\nu}{2}} \left(\sqrt{z}\, b-c(\nu-2k)\sqrt{z}-1\right)}{(c(\nu-2k)-b)^2} \right) \binom{\nu}{k} + i^{-m-\nu} 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \left(\left(e^{e-(m-2k)q+\frac{1}{2} i\pi(\nu-m)+g(\nu-2s)+(b-a(m-2k)+c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b+(c(\nu-2s)-a(m-2k))\sqrt{z}-1\right) \right) \Big/ \right.$$
$$(b-a(m-2k)+c(\nu-2s))^2 + \left(e^{e+(m-2k)q+\frac{1}{2} i\pi(m+\nu)+g(\nu-2s)+(b+a(m-2k)+c(\nu-2s))\sqrt{z}} \right.$$
$$\left. \left(\sqrt{z}\, b+(a(m-2k)+c(\nu-2s))\sqrt{z}-1\right) \right) \Big/ (b+a(m-2k)+c(\nu-2s))^2 +$$
$$\left(e^{e+(m-2k)q-\frac{1}{2} i\pi(\nu-m)-g(\nu-2s)+(b+a(m-2k)-c(\nu-2s))\sqrt{z}} \left(\sqrt{z}\, b-(c(\nu-2s)-a(m-2k))\sqrt{z}-1\right) \right) \Big/$$
$$(-b-a(m-2k)+c(\nu-2s))^2 + \left(e^{e-(m-2k)q-\frac{1}{2} i\pi(m+\nu)-g(\nu-2s)+(b-a(m-2k)-c(\nu-2s))\sqrt{z}} \right.$$
$$\left. \left. \left(\sqrt{z}\, b-(a(m-2k)+c(\nu-2s))\sqrt{z}-1\right) \right) \Big/ (-b+a(m-2k)+c(\nu-2s))^2 \right) \binom{\nu}{s} \;/;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sinh^m\left(a z^r+p z+q\right) \sinh^\nu\left(c z^r+f z+g\right)$

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$$\int e^{b z^2+d z+e} \sinh^m\left(a z^2+p z+q\right) \sinh^\nu\left(c z^2+f z+g\right) dz =$$
$$\frac{i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi}\, (1-m \bmod 2)(1-\nu \bmod 2)}{\sqrt{b}} e^{-\frac{d^2-4be}{4b}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right) +$$
$$i^{m+\nu} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^s \binom{m}{s} \left(e^{-\frac{(d+p(m-2s))^2-4(b+a(m-2s))\left(e+q(m-2s)-\frac{i m \pi}{2}\right)}{4(b+a(m-2s))}} \sqrt{b+a(m-2s)}\, (b-a(m-2s)) \right. \right.$$

$$\operatorname{erfi}\Bigg(\frac{d+p\,(m-2\,s)+2\,(b+a\,(m-2\,s))\,z}{2\,\sqrt{b+a\,(m-2\,s)}}\Bigg)+e^{-\frac{(d-p\,(m-2\,s))^2-4\,(b-a\,(m-2\,s))\left(e-q\,(m-2\,s)+\frac{i\,m\,\pi}{2}\right)}{4\,(b-a\,(m-2\,s))}}\,(b+a\,(m-2\,s))$$

$$\sqrt{b-a\,(m-2\,s)}\;\operatorname{erfi}\Bigg(\frac{d-p\,(m-2\,s)+2\,b\,z-2\,a\,(m-2\,s)\,z}{2\,\sqrt{b-a\,(m-2\,s)}}\Bigg)\Bigg)\Bigg)\Bigg/\,((b-a\,(m-2\,s))\,(b+a\,(m-2\,s)))+i^{m+v}$$

$$2^{-m-v-1}\,\sqrt{\pi}\,\binom{m}{\frac{m}{2}}\,(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\Bigg((-1)^k\binom{v}{k}\Bigg(e^{-\frac{(d+f\,(v-2\,k))^2-4\,(b+c\,(v-2\,k))\left(e+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}\right)}{4\,(b+c\,(v-2\,k))}}\,\sqrt{b+c\,(v-2\,k)}\;(b-c\,(v-2\,k))\operatorname{erfi}\Bigg($$

$$\frac{d+f\,(v-2\,k)+2\,(b+c\,(v-2\,k))\,z}{2\,\sqrt{b+c\,(v-2\,k)}}\Bigg)+e^{-\frac{(d-f\,(v-2\,k))^2-4\,(b-c\,(v-2\,k))\left(e+\frac{i\,\pi\,v}{2}-g\,(v-2\,k)\right)}{4\,(b-c\,(v-2\,k))}}\,(b+c\,(v-2\,k))\,\sqrt{b-c\,(v-2\,k)}$$

$$\operatorname{erfi}\Bigg(\frac{d-f\,(v-2\,k)+2\,b\,z-2\,c\,(v-2\,k)\,z}{2\,\sqrt{b-c\,(v-2\,k)}}\Bigg)\Bigg)\Bigg)\Bigg/\,((b-c\,(v-2\,k))\,(b+c\,(v-2\,k)))+i^{m+v}\,2^{-m-v-1}\,\sqrt{\pi}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\Bigg(\Bigg(e^{-\frac{(d+p\,(m-2\,s)+f\,(2\,k-v))^2-4\,(b+a\,(m-2\,s)+c\,(2\,k-v))\left(e+q\,(m-2\,s)+g\,(2\,k-v)+\frac{1}{2}\,i\,\pi\,(v-m)\right)}{4\,(b+a\,(m-2\,s)+c\,(2\,k-v))}}\,\sqrt{b+a\,(m-2\,s)+c\,(2\,k-v)}$$

$$(b-a\,(m-2\,s)-c\,(2\,k-v))\operatorname{erfi}\Bigg(\frac{d+p\,(m-2\,s)+f\,(2\,k-v)+2\,(b+a\,(m-2\,s)+c\,(2\,k-v))\,z}{2\,\sqrt{b+a\,(m-2\,s)+c\,(2\,k-v)}}\Bigg)+$$

$$e^{-\frac{(d-p\,(m-2\,s)-f\,(2\,k-v))^2-4\,(b-a\,(m-2\,s)-c\,(2\,k-v))\left(e-q\,(m-2\,s)-g\,(2\,k-v)-\frac{1}{2}\,i\,\pi\,(v-m)\right)}{4\,(b-a\,(m-2\,s)-c\,(2\,k-v))}}$$

$$(b+a\,(m-2\,s)+c\,(2\,k-v))\,\sqrt{b-a\,(m-2\,s)-c\,(2\,k-v)}$$

$$\operatorname{erfi}\Bigg(\frac{d-p\,(m-2\,s)-f\,(2\,k-v)+2\,b\,z-2\,(a\,(m-2\,s)+c\,(2\,k-v))\,z}{2\,\sqrt{b-a\,(m-2\,s)-c\,(2\,k-v)}}\Bigg)\Bigg)\Bigg/$$

$$((b-a\,(m-2\,s)-c\,(2\,k-v))\,(b+a\,(m-2\,s)+c\,(2\,k-v)))+$$

$$\Bigg(e^{-\frac{(d+p\,(m-2\,s)+f\,(v-2\,k))^2-4\,(b+a\,(m-2\,s)+c\,(v-2\,k))\left(e+q\,(m-2\,s)+g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)}{4\,(b+a\,(m-2\,s)+c\,(v-2\,k))}}\,\sqrt{b+a\,(m-2\,s)+c\,(v-2\,k)}$$

$$(b-a\,(m-2\,s)-c\,(v-2\,k))\operatorname{erfi}\Bigg(\frac{d+p\,(m-2\,s)+f\,(v-2\,k)+2\,(b+a\,(m-2\,s)+c\,(v-2\,k))\,z}{2\,\sqrt{b+a\,(m-2\,s)+c\,(v-2\,k)}}\Bigg)+$$

$$e^{-\frac{(d-p\,(m-2\,s)-f\,(v-2\,k))^2-4\,(b-a\,(m-2\,s)-c\,(v-2\,k))\left(e-q\,(m-2\,s)-g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)\right)}{4\,(b-a\,(m-2\,s)-c\,(v-2\,k))}}$$

$$(b+a\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{b-a\,(m-2\,s)-c\,(v-2\,k)}$$

$$\operatorname{erfi}\Bigg(\frac{d-p\,(m-2\,s)-f\,(v-2\,k)+2\,b\,z-2\,(a\,(m-2\,s)+c\,(v-2\,k))\,z}{2\,\sqrt{b-a\,(m-2\,s)-c\,(v-2\,k)}}\Bigg)\Bigg)\Bigg/$$

$$((b-a\,(m-2\,s)-c\,(v-2\,k))\,(b+a\,(m-2\,s)+c\,(v-2\,k)))\Bigg)\,/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int e^{\sqrt{z}\, b+d z+e} \sinh^m\left(\sqrt{z}\, a+p z+q\right) \sinh^\nu\left(\sqrt{z}\, c+f z+g\right) dz = i^{m+\nu} 2^{-m-\nu-2} e^e \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4 e^{\sqrt{z}\, b+d z}}{d} - \frac{2 b e^{-\frac{b^2}{4 d}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}}\right)}{d^{3/2}}\right) (1-m \bmod 2)(1-\nu \bmod 2) +$$

$$i^{m+\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s e^{e-q(m-2s)+\frac{i m \pi}{2}} \binom{m}{s}$$

$$\left(\frac{2 e^{\sqrt{z}\,(b+a(m-2s))+2\left(q(m-2s)-\frac{i m \pi}{2}\right)+(d+p(m-2s)) z}}{d+p(m-2s)} - \frac{b e^{2\left(q(m-2s)-\frac{i m \pi}{2}\right)-\frac{(b+a(m-2s))^2}{4(d+p(m-2s))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+a(m-2s)+2(d+p(m-2s))\sqrt{z}}{2\sqrt{d+p(m-2s)}}\right)}{(d+p(m-2s))^{3/2}} - \right.$$

$$\frac{a e^{2\left(q(m-2s)-\frac{i m \pi}{2}\right)-\frac{(b+a(m-2s))^2}{4(d+p(m-2s))}} \sqrt{\pi}\, (m-2s) \operatorname{erfi}\left(\frac{b+a(m-2s)+2(d+p(m-2s))\sqrt{z}}{2\sqrt{d+p(m-2s)}}\right)}{(d+p(m-2s))^{3/2}} +$$

$$\frac{2 e^{\sqrt{z}\,(b-a(m-2s))+(d-p(m-2s)) z}}{d-p(m-2s)} - \frac{a e^{-\frac{(b-a(m-2s))^2}{4(d-p(m-2s))}} \sqrt{\pi}\, (m-2s) \operatorname{erfi}\left(\frac{-b+a(m-2s)+2(p(m-2s)-d)\sqrt{z}}{2\sqrt{d-p(m-2s)}}\right)}{(d-p(m-2s))^{3/2}} -$$

$$\left.\frac{b e^{-\frac{(b-a(m-2s))^2}{4(d-p(m-2s))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b-a(m-2s)+2(d-p(m-2s))\sqrt{z}}{2\sqrt{d-p(m-2s)}}\right)}{(d-p(m-2s))^{3/2}}\right) + i^{m+\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{e+\frac{i \pi \nu}{2}-g(\nu-2k)}$$

$$\binom{\nu}{k} \left(\frac{2 e^{\sqrt{z}\,(b+c(\nu-2k))+2\left(g(\nu-2k)-\frac{i \pi \nu}{2}\right)+(d+f(\nu-2k)) z}}{d+f(\nu-2k)} - \frac{b e^{2\left(g(\nu-2k)-\frac{i \pi \nu}{2}\right)-\frac{(b+c(\nu-2k))^2}{4(d+f(\nu-2k))}} \sqrt{\pi}\, \operatorname{erfi}\left(\frac{b+c(\nu-2k)+2(d+f(\nu-2k))\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{(d+f(\nu-2k))^{3/2}} - \right.$$

$$\frac{c e^{2\left(g(\nu-2k)-\frac{i \pi \nu}{2}\right)-\frac{(b+c(\nu-2k))^2}{4(d+f(\nu-2k))}} \sqrt{\pi}\, (\nu-2k) \operatorname{erfi}\left(\frac{b+c(\nu-2k)+2(d+f(\nu-2k))\sqrt{z}}{2\sqrt{d+f(\nu-2k)}}\right)}{(d+f(\nu-2k))^{3/2}} +$$

$$\frac{2 e^{\sqrt{z}\,(b-c(\nu-2k))+(d-f(\nu-2k)) z}}{d-f(\nu-2k)} - \frac{c e^{-\frac{(b-c(\nu-2k))^2}{4(d-f(\nu-2k))}} \sqrt{\pi}\, (\nu-2k) \operatorname{erfi}\left(\frac{-b+c(\nu-2k)+2(f(\nu-2k)-d)\sqrt{z}}{2\sqrt{d-f(\nu-2k)}}\right)}{(d-f(\nu-2k))^{3/2}} -$$

$$\left.\frac{b\, e^{-\frac{(b-c\,(v-2\,k))^2}{4\,(d-f\,(v-2\,k))}}\,\sqrt{\pi}\;\mathrm{erfi}\left(\frac{b-c\,(v-2\,k)+2\,(d-f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d-f\,(v-2\,k)}}\right)}{(d-f\,(v-2\,k))^{3/2}}\right) + i^{m+v}\,2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}$$

$$\left(e^{e-q\,(m-2\,s)-g\,(2\,k-v)-\frac{1}{2}\,i\,\pi\,(v-m)}\left(\left(2\,e^{\sqrt{z}\,(b+a\,(m-2\,s)+c\,(2\,k-v))+2\left(q\,(m-2\,s)+g\,(2\,k-v)+\frac{1}{2}\,i\,\pi\,(v-m)\right)+(d+p\,(m-2\,s)+f\,(2\,k-v))\,z}\right)\right/\right.\right.$$

$$(d+p\,(m-2\,s)+f\,(2\,k-v)) - \left(b\,e^{2\left(q\,(m-2\,s)+g\,(2\,k-v)+\frac{1}{2}\,i\,\pi\,(v-m)\right)-\frac{(b+a\,(m-2\,s)+c\,(2\,k-v))^2}{4\,(d+p\,(m-2\,s)+f\,(2\,k-v))}}\right.$$

$$\left.\left.\sqrt{\pi}\;\mathrm{erfi}\left(\frac{b+a\,(m-2\,s)+c\,(2\,k-v)+2\,(d+p\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{d+p\,(m-2\,s)+f\,(2\,k-v)}}\right)\right)\right/$$

$$(d+p\,(m-2\,s)+f\,(2\,k-v))^{3/2} - \left(e^{2\left(q\,(m-2\,s)+g\,(2\,k-v)+\frac{1}{2}\,i\,\pi\,(v-m)\right)-\frac{(b+a\,(m-2\,s)+c\,(2\,k-v))^2}{4\,(d+p\,(m-2\,s)+f\,(2\,k-v))}}\,\sqrt{\pi}\,(a\,(m-2\,s)+\right.$$

$$\left.\left.c\,(2\,k-v))\,\mathrm{erfi}\left(\frac{b+a\,(m-2\,s)+c\,(2\,k-v)+2\,(d+p\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{d+p\,(m-2\,s)+f\,(2\,k-v)}}\right)\right)\right/$$

$$(d+p\,(m-2\,s)+f\,(2\,k-v))^{3/2} + \frac{2\,e^{\sqrt{z}\,(b-a\,(m-2\,s)-c\,(2\,k-v))+(d-p\,(m-2\,s)-f\,(2\,k-v))\,z}}{d-p\,(m-2\,s)-f\,(2\,k-v)} -$$

$$\left(e^{-\frac{(b-a\,(m-2\,s)-c\,(2\,k-v))^2}{4\,(d-p\,(m-2\,s)-f\,(2\,k-v))}}\,\sqrt{\pi}\,(a\,(m-2\,s)+c\,(2\,k-v))\right.$$

$$\left.\left.\mathrm{erfi}\left(\frac{-b+a\,(m-2\,s)+c\,(2\,k-v)+2\,(-d+p\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{d-p\,(m-2\,s)-f\,(2\,k-v)}}\right)\right)\right/$$

$$(d-p\,(m-2\,s)-f\,(2\,k-v))^{3/2} - \left(b\,e^{-\frac{(b-a\,(m-2\,s)-c\,(2\,k-v))^2}{4\,(d-p\,(m-2\,s)-f\,(2\,k-v))}}\,\sqrt{\pi}\right.$$

$$\left.\left.\mathrm{erfi}\left(\frac{b-a\,(m-2\,s)-c\,(2\,k-v)+2\,(d-p\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{d-p\,(m-2\,s)-f\,(2\,k-v)}}\right)\right)\right/$$

$$\left.(d-p\,(m-2\,s)-f\,(2\,k-v))^{3/2}\right) + e^{e-q\,(m-2\,s)-g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\left(\left(2\,e^{\sqrt{z}\,(b+a\,(m-2\,s)+c\,(v-2\,k))+2\left(q\,(m-2\,s)+g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)+(d+p\,(m-2\,s)+f\,(v-2\,k))\,z}\right)\right/$$

$$(d+p\,(m-2\,s)+f\,(v-2\,k)) - \Bigg(b\,e^{2\left(q\,(m-2\,s)+g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)-\frac{(b+a\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d+p\,(m-2\,s)+f\,(v-2\,k))}}$$

$$\sqrt{\pi}\;\operatorname{erfi}\left(\frac{b+a\,(m-2\,s)+c\,(v-2\,k)+2\,(d+p\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d+p\,(m-2\,s)+f\,(v-2\,k)}}\right)\Bigg)\Big/$$

$$(d+p\,(m-2\,s)+f\,(v-2\,k))^{3/2} - \Bigg(e^{2\left(q\,(m-2\,s)+g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)-\frac{(b+a\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d+p\,(m-2\,s)+f\,(v-2\,k))}}\,\sqrt{\pi}\,(a\,(m-2\,s)+$$

$$c\,(v-2\,k))\operatorname{erfi}\left(\frac{b+a\,(m-2\,s)+c\,(v-2\,k)+2\,(d+p\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d+p\,(m-2\,s)+f\,(v-2\,k)}}\right)\Bigg)\Big/$$

$$(d+p\,(m-2\,s)+f\,(v-2\,k))^{3/2} + \frac{2\,e^{\sqrt{z}\,(b-a\,(m-2\,s)-c\,(v-2\,k))+(d-p\,(m-2\,s)-f\,(v-2\,k))\,z}}{d-p\,(m-2\,s)-f\,(v-2\,k)} -$$

$$\Bigg(e^{-\frac{(b-a\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(d-p\,(m-2\,s)-f\,(v-2\,k))}}\,\sqrt{\pi}\,(a\,(m-2\,s)+c\,(v-2\,k))$$

$$\operatorname{erfi}\left(\frac{-b+a\,(m-2\,s)+c\,(v-2\,k)+2\,(-d+p\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d-p\,(m-2\,s)-f\,(v-2\,k)}}\right)\Bigg)\Big/$$

$$(d-p\,(m-2\,s)-f\,(v-2\,k))^{3/2} - \Bigg(b\,e^{-\frac{(b-a\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(d-p\,(m-2\,s)-f\,(v-2\,k))}}\,\sqrt{\pi}$$

$$\operatorname{erfi}\left(\frac{b-a\,(m-2\,s)-c\,(v-2\,k)+2\,(d-p\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d-p\,(m-2\,s)-f\,(v-2\,k)}}\right)\Bigg)\Big/$$

$$(d-p\,(m-2\,s)-f\,(v-2\,k))^{3/2}\Bigg)\Bigg)\;/;\; m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving product of powers of two direct functions and rational functions of exp

Involving $\sinh^m(e\,z)\,\sinh^v(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

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$$\int\frac{\sinh^m(e\,z)\,\sinh^v(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz ==$$

$$\frac{1}{a^n}\Bigg(\Bigg(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{s}\Bigg(\frac{1}{2\,e\,k-e\,m+2\,c\,s-c\,v}\Bigg(\cos\Big(\frac{1}{2}\,\pi\,(m+v)\Big)\Big(e^{(2\,e\,k-e\,m+2\,c\,s-c\,v)\,z}\;{}_2F_1\Big(\frac{2\,e\,k-e\,m+2\,c\,s-c\,v}{d},$$

$$n;\ \frac{d+2ek-em+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Big)-e^{(-2ek+em-2cs+cv)z}$$

$$\,_2F_1\Big(\frac{-2ek+em-2cs+cv}{d},n;\ \frac{d-2ek+em-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Big)\Big)\Big)+$$

$$\frac{1}{2ek-em-2cs+cv}\Big(\cos\Big(\frac{1}{2}\pi(m-v)\Big)\Big(e^{(2ek-em-2cs+cv)z}\,_2F_1\Big(\frac{2ek-em-2cs+cv}{d},$$

$$n;\ \frac{d+2ek-em-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Big)-e^{(-2ek+em+2cs-cv)z}$$

$$\,_2F_1\Big(\frac{-2ek+em+2cs-cv}{d},n;\ \frac{d-2ek+em+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Big)\Big)+$$

$$\frac{1}{2ek-em-2cs+cv}\Big(i\Big(e^{(2ek-em-2cs+cv)z}\,_2F_1\Big(\frac{2ek-em-2cs+cv}{d},n;$$

$$\frac{d+2ek-em-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Big)+e^{(-2ek+em+2cs-cv)z}$$

$$\,_2F_1\Big(\frac{-2ek+em+2cs-cv}{d},n;\ \frac{d-2ek+em+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Big)\sin\Big(\frac{1}{2}\pi(m-v)\Big)\Big)+$$

$$\frac{1}{2ek-em+2cs-cv}\Big(i\Big(e^{(-2ek+em-2cs+cv)z}\,_2F_1\Big(\frac{-2ek+em-2cs+cv}{d},n;$$

$$\frac{d-2ek+em-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Big)+e^{(2ek-em+2cs-cv)z}\,_2F_1\Big(\frac{2ek-em+2cs-cv}{d},$$

$$n;\ \frac{d+2ek-em+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Big)\sin\Big(\frac{1}{2}\pi(m+v)\Big)\Big)\Big)\Big)\Big)\Big(\frac{i}{2}\Big)^{m+v}\Bigg)-$$

$$\frac{\left(\frac{i}{2}\right)^{m+v}e^{-dnz}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,_2F_1\Big(n,n;n+1;-\frac{a\,e^{-dz}}{b}\Big)(m\bmod 2-1)(v\bmod 2-1)}{b^n\,d\,n}+\frac{1}{e\,a^n}$$

$$\Bigg(\Big(\frac{i}{2}\Big)^{m+v}$$

$$\binom{v}{\frac{v}{2}}$$

$$(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2k}$$

$$\Big((-1)^k\binom{m}{k}\Big(e^{e(m-2k)z-\frac{i m\pi}{2}}\,_2F_1\Big(\frac{e(m-2k)}{d},n;\ \frac{d+e(m-2k)}{d};-\frac{b\,e^{dz}}{a}\Big)-$$

$$e^{\frac{i m \pi}{2}-e(m-2k)z}\,{}_2F_1\left(-\frac{e(m-2k)}{d}, n; \frac{d-e(m-2k)}{d}; -\frac{b\,e^{d z}}{a}\right)\Bigg)\Bigg)\Bigg) +$$

$$\frac{1}{c\,a^n}\left(\left(\frac{i}{2}\right)^{m+v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{v-2s}\left((-1)^s\binom{v}{s}\left(e^{c(v-2s)z-\frac{i\pi v}{2}}\,{}_2F_1\left(\frac{c(v-2s)}{d}, n; \frac{d+c(v-2s)}{d}; -\frac{b\,e^{d z}}{a}\right)-\right.\right.\right.$$

$$\left.\left.\left.e^{\frac{i\pi v}{2}-c(v-2s)z}\,{}_2F_1\left(-\frac{c(v-2s)}{d}, n; \frac{d-c(v-2s)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right)\right) /; n\in\mathbb{N}^+\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $e^{p z}\sinh^m(e z)\sinh^v(c z)\left(a+b\,e^{d z}\right)^{-n}$

01.19.21.2254.01

$$\int\frac{e^{p z}\sinh^m(e z)\sinh^v(c z)}{\left(a+b\,e^{d z}\right)^n}\,dz = \frac{1}{a^n}\left(\frac{i}{2}\right)^{m+v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{(e(m-2k)+p)z-\frac{i m\pi}{2}}(e(m-2k)-p)\,{}_2F_1\left(\frac{e(m-2k)+p}{d}, n; \frac{d+e(m-2k)+p}{d}; -\frac{b\,e^{d z}}{a}\right)-\right.\right.$$

$$\left.\left.e^{\frac{i\pi m}{2}+(p-e(m-2k))z}(e(m-2k)+p)\,{}_2F_1\left(\frac{p-e(m-2k)}{d}, n; \frac{d-e(m-2k)+p}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right) \Big/$$

$$((e(m-2k)-p)(e(m-2k)+p)) + \frac{1}{a^n}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\frac{i}{2}\right)^{m+v}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left((-1)^s\binom{v}{s}\left(e^{(p+c(v-2s))z-\frac{i\pi v}{2}}(c(v-2s)-p)\,{}_2F_1\left(\frac{p+c(v-2s)}{d}, n; \frac{d+p+c(v-2s)}{d}; -\frac{b\,e^{d z}}{a}\right)-\right.\right.$$

$$\left.\left.e^{\frac{i\pi v}{2}+(p-c(v-2s))z}(p+c(v-2s))\,{}_2F_1\left(\frac{p-c(v-2s)}{d}, n; \frac{d+p-c(v-2s)}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right) \Big/$$

$$((c(v-2s)-p)(p+c(v-2s))) + \frac{1}{a^n}\left(\frac{i}{2}\right)^{m+v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{s}$$

$$\left(\left(\cos\left(\frac{1}{2}\pi(m+v)\right)\left(e^{(2ek-em+p+2cs-cv)z}(2ek-em-p+2cs-cv)\,{}_2F_1\left(\frac{2ek-em+p+2cs-cv}{d}, n;\right.\right.\right.\right.$$

$$\left.\frac{d+2ek-em+p+2cs-cv}{d}; -\frac{b\,e^{d z}}{a}\right) - e^{(-2ek+em+p-2cs+cv)z}(2ek-em+p+2cs-cv)$$

$$\left.\left.{}_2F_1\left(\frac{-2ek+em+p-2cs+cv}{d}, n; \frac{d-2ek+em+p-2cs+cv}{d}; -\frac{b\,e^{d z}}{a}\right)\right)\right) \Big/$$

$$((2ek-em-p+2cs-cv)(2ek-em+p+2cs-cv)) +$$

$$\left(\cos\left(\frac{1}{2}\pi(m-v)\right)\left(e^{(2ek-em+p-2cs+cv)z}(2ek-em-p-2cs+cv)\,{}_2F_1\left(\frac{2ek-em+p-2cs+cv}{d}, n;\right.\right.\right.$$

$$\frac{d+2ek-em+p-2cs+cv}{d}; -\frac{b e^{dz}}{a}\Big) - e^{(-2ek+em+p+2cs-cv)z} (2ek-em+p-2cs+cv)$$

$$\,_2F_1\left(\frac{-2ek+em+p+2cs-cv}{d}, n; \frac{d-2ek+em+p+2cs-cv}{d}; -\frac{b e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg/$$

$$((2ek-em-p-2cs+cv)(2ek-em+p-2cs+cv)) +$$

$$\Bigg(i\Bigg(e^{(2ek-em+p-2cs+cv)z} (2ek-em-p-2cs+cv)\,_2F_1\Bigg(\frac{2ek-em+p-2cs+cv}{d}, n;$$

$$\frac{d+2ek-em+p-2cs+cv}{d}; -\frac{b e^{dz}}{a}\Bigg) + e^{(-2ek+em+p+2cs-cv)z} (2ek-em+p-2cs+cv)$$

$$\,_2F_1\left(\frac{-2ek+em+p+2cs-cv}{d}, n; \frac{d-2ek+em+p+2cs-cv}{d}; -\frac{b e^{dz}}{a}\right)\Bigg)$$

$$\sin\left(\frac{1}{2}\pi(m-v)\right)\Bigg)\Bigg/((2ek-em-p-2cs+cv)(2ek-em+p-2cs+cv)) +$$

$$\Bigg(i\Bigg(e^{(-2ek+em+p-2cs+cv)z} (2ek-em+p+2cs-cv)\,_2F_1\Bigg(\frac{-2ek+em+p-2cs+cv}{d}, n;$$

$$\frac{d-2ek+em+p-2cs+cv}{d}; -\frac{b e^{dz}}{a}\Bigg) + e^{(2ek-em+p+2cs-cv)z} (2ek-em-p+2cs-cv)$$

$$\,_2F_1\left(\frac{2ek-em+p+2cs-cv}{d}, n; \frac{d+2ek-em+p+2cs-cv}{d}; -\frac{b e^{dz}}{a}\right)\Bigg)$$

$$\sin\left(\frac{1}{2}\pi(m+v)\right)\Bigg)\Bigg/((2ek-em-p+2cs-cv)(2ek-em+p+2cs-cv))\Bigg) +$$

$$\left(\frac{i}{2}\right)^{m+v} \frac{e^{pz}\,(1-m \bmod 2)(1-v \bmod 2)}{a^n\, p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \,_2F_1\left(\frac{p}{d}, n; \frac{d+p}{d}; -\frac{b e^{dz}}{a}\right) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving product of powers of two direct functions and algebraic functions of exp

Involving $\left(a+b e^{dz}\right)^{\beta} \sinh^m(ez) \sinh^v(cz)$

01.19.21.2255.01

$$\int \left(a+b e^{dz}\right)^{\beta} \sinh^m(ez) \sinh^v(cz)\, dz = \frac{1}{e}\left(\frac{i}{2}\right)^{m+v} \left(\frac{e^{dz} b}{a}+1\right)^{-\beta} \left(a+b e^{dz}\right)^{\beta} \binom{v}{\frac{v}{2}}$$

$$(1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k}{m-2k} \binom{m}{k} \left(e^{e(m-2k)z-\frac{i m \pi}{2}} \,_2F_1\left(\frac{e(m-2k)}{d}, -\beta; \frac{d+e(m-2k)}{d}; -\frac{b e^{dz}}{a}\right) -\right.$$

$$e^{\frac{i m \pi}{2} - e(m-2k)z} \, {}_2F_1\left(-\frac{e(m-2k)}{d}, -\beta; \frac{d - e(m-2k)}{d}; -\frac{b e^{dz}}{a}\right)\Bigg) + \frac{1}{c}\left(\frac{i}{2}\right)^{m+\nu} \left(\frac{e^{dz} b}{a} + 1\right)^{-\beta} \left(a + b e^{dz}\right)^{\beta}$$

$$\binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^s}{\nu - 2s} \binom{\nu}{s} \left(e^{c(\nu-2s)z - \frac{i\pi\nu}{2}} \, {}_2F_1\left(\frac{c(\nu-2s)}{d}, -\beta; \frac{d + c(\nu-2s)}{d}; -\frac{b e^{dz}}{a}\right) - \right.$$

$$\left. e^{\frac{i\pi\nu}{2} - c(\nu-2s)z} \, {}_2F_1\left(-\frac{c(\nu-2s)}{d}, -\beta; \frac{d - c(\nu-2s)}{d}; -\frac{b e^{dz}}{a}\right)\right) +$$

$$\left(\frac{i}{2}\right)^{m+\nu} \left(\frac{e^{dz} b}{a} + 1\right)^{-\beta} \left(a + b e^{dz}\right)^{\beta} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{s}$$

$$\left(\cos\left(\frac{1}{2}\pi(m+\nu)\right)\left(e^{(2ek - em + 2cs - c\nu)z} \, {}_2F_1\left(\frac{2ek - em + 2cs - c\nu}{d}, -\beta; \frac{d + 2ek - em + 2cs - c\nu}{d}; -\frac{b e^{dz}}{a}\right) - \right.\right.$$

$$\left. e^{(-2ek + em - 2cs + c\nu)z} \, {}_2F_1\left(\frac{-2ek + em - 2cs + c\nu}{d}, -\beta; \frac{d - 2ek + em - 2cs + c\nu}{d}; -\frac{b e^{dz}}{a}\right)\right) \Big/$$

$$(2ek - em + 2cs - c\nu) + \cos\left(\frac{1}{2}\pi(m-\nu)\right)\left(e^{(2ek - em - 2cs + c\nu)z} \, {}_2F_1\left(\frac{2ek - em - 2cs + c\nu}{d}, \right.\right.$$

$$\left. -\beta; \frac{d + 2ek - em - 2cs + c\nu}{d}; -\frac{b e^{dz}}{a}\right) - e^{(-2ek + em + 2cs - c\nu)z} \, {}_2F_1\left(\frac{-2ek + em + 2cs - c\nu}{d}, \right.$$

$$\left.\left. -\beta; \frac{d - 2ek + em + 2cs - c\nu}{d}; -\frac{b e^{dz}}{a}\right)\right) \Big/ (2ek - em - 2cs + c\nu) + i \sin\left(\frac{1}{2}\pi(m-\nu)\right)$$

$$\left(e^{(2ek - em - 2cs + c\nu)z} \, {}_2F_1\left(\frac{2ek - em - 2cs + c\nu}{d}, -\beta; \frac{d + 2ek - em - 2cs + c\nu}{d}; -\frac{b e^{dz}}{a}\right) + \right.$$

$$\left. e^{(-2ek + em + 2cs - c\nu)z} \, {}_2F_1\left(\frac{-2ek + em + 2cs - c\nu}{d}, -\beta; \frac{d - 2ek + em + 2cs - c\nu}{d}; -\frac{b e^{dz}}{a}\right)\right) \Big/$$

$$(2ek - em - 2cs + c\nu) + i \sin\left(\frac{1}{2}\pi(m+\nu)\right)\left(e^{(-2ek + em - 2cs + c\nu)z} \, {}_2F_1\left(\frac{-2ek + em - 2cs + c\nu}{d}, \right.\right.$$

$$\left. -\beta; \frac{d - 2ek + em - 2cs + c\nu}{d}; -\frac{b e^{dz}}{a}\right) + e^{(2ek - em + 2cs - c\nu)z} \, {}_2F_1\left(\frac{2ek - em + 2cs - c\nu}{d}, \right.$$

$$\left.\left.\left. -\beta; \frac{d + 2ek - em + 2cs - c\nu}{d}; -\frac{b e^{dz}}{a}\right)\right) \Big/ (2ek - em + 2cs - c\nu)\right) +$$

$$\frac{1}{d\beta}\left(\frac{i}{2}\right)^{m+\nu} \left(\frac{e^{-dz} a}{b} + 1\right)^{-\beta} \left(a + b e^{dz}\right)^{\beta} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\beta, -\beta; 1 - \beta; -\frac{a e^{-dz}}{b}\right)$$

$$(m \bmod 2 - 1)$$

$$(\nu \bmod 2 - 1) \,/;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{pz}\left(a + b e^{dz}\right)^{\beta} \sinh^m(ez) \sinh^{\nu}(cz)$

01.19.21.2256.01

$$\int e^{p z}\left(a+b e^{d z}\right)^{\beta} \sinh^m(e z)\sinh^{\nu}(c z)\, dz = \frac{1}{p}\left(\left(\frac{i}{2}\right)^{m+\nu} e^{p z}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\, {}_2F_1\left(\frac{p}{d}, -\beta; \frac{d+p}{d}; -\frac{b e^{d z}}{a}\right)(1-m \bmod 2)(1-\nu \bmod 2)\right) +$$

$$2^{-m-\nu}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\left(a+b e^{d z}\right)^{\beta} i^{m+\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{(e(m-2k)+p)z-\frac{i m\pi}{2}}(e(m-2k)-p)\, {}_2F_1\left(\frac{e(m-2k)+p}{d}, -\beta; \frac{d+e(m-2k)+p}{d}; -\frac{b e^{d z}}{a}\right)-\right.\right.$$

$$\left.\left. e^{\frac{i\pi m}{2}+(p-e(m-2k))z}(e(m-2k)+p)\, {}_2F_1\left(\frac{p-e(m-2k)}{d}, -\beta; \frac{d-e(m-2k)+p}{d}; -\frac{b e^{d z}}{a}\right)\right)\right)\Big/$$

$$((e(m-2k)-p)(e(m-2k)+p)) + 2^{-m-\nu}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\left(a+b e^{d z}\right)^{\beta} i^{m+\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((-1)^s\binom{\nu}{s}\left(e^{(p+c(\nu-2s))z-\frac{i\pi\nu}{2}}(c(\nu-2s)-p)\, {}_2F_1\left(\frac{p+c(\nu-2s)}{d}, -\beta; \frac{d+p+c(\nu-2s)}{d}; -\frac{b e^{d z}}{a}\right)-\right.\right.$$

$$\left.\left. e^{\frac{i\pi\nu}{2}+(p-c(\nu-2s))z}(p+c(\nu-2s))\, {}_2F_1\left(\frac{p-c(\nu-2s)}{d}, -\beta; \frac{d+p-c(\nu-2s)}{d}; -\frac{b e^{d z}}{a}\right)\right)\right)\Big/$$

$$((c(\nu-2s)-p)(p+c(\nu-2s))) + 2^{-m-\nu}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\left(a+b e^{d z}\right)^{\beta} i^{m+\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+s}\binom{\nu}{s}\left(\left(\left(e^{(2ek-em+p-2cs+c\nu)z}(2ek-em-p-2cs+c\nu)\, {}_2F_1\left(\frac{2ek-em+p-2cs+c\nu}{d}, -\beta;\right.\right.\right.\right.$$

$$\left.\frac{d+2ek-em+p-2cs+c\nu}{d}; -\frac{b e^{d z}}{a}\right) - e^{(-2ek+em+p+2cs-c\nu)z}(2ek-em+p-2cs+c\nu)$$

$${}_2F_1\left(\frac{-2ek+em+p+2cs-c\nu}{d}, -\beta; \frac{d-2ek+em+p+2cs-c\nu}{d}; -\frac{b e^{d z}}{a}\right)\Big)$$

$$\left.\cos\left(\frac{1}{2}\pi(m-\nu)\right)\right)\Big/((2ek-em-p-2cs+c\nu)(2ek-em+p-2cs+c\nu)) +$$

$$\left(\left(e^{(2ek-em+p+2cs-c\nu)z}(2ek-em-p+2cs-c\nu)\, {}_2F_1\left(\frac{2ek-em+p+2cs-c\nu}{d}, -\beta;\right.\right.\right.$$

$$\left.\frac{d+2ek-em+p+2cs-c\nu}{d}; -\frac{b e^{d z}}{a}\right) - e^{(-2ek+em+p-2cs+c\nu)z}(2ek-em+p+2cs-c\nu)$$

$${}_2F_1\left(\frac{-2ek+em+p-2cs+c\nu}{d}, -\beta; \frac{d-2ek+em+p-2cs+c\nu}{d}; -\frac{b e^{d z}}{a}\right)\Big)$$

$$\left.\cos\left(\frac{1}{2}\pi(m+\nu)\right)\right)\Big/((2ek-em-p+2cs-c\nu)(2ek-em+p+2cs-c\nu)) +$$

$$\Bigg(i\Bigg(e^{(2ek-em+p-2cs+cv)z}(2ek-em-p-2cs+cv)\,{}_2F_1\Bigg(\frac{2ek-em+p-2cs+cv}{d},-\beta;\frac{d+2ek-em+p-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Bigg)+e^{(-2ek+em+p+2cs-cv)z}(2ek-em+p-2cs+cv)\,{}_2F_1\Bigg(\frac{-2ek+em+p+2cs-cv}{d},-\beta;\frac{d-2ek+em+p+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Bigg)\Bigg)\sin\Bigg(\frac{1}{2}\pi(m-v)\Bigg)\Bigg)\Big/((2ek-em-p-2cs+cv)(2ek-em+p-2cs+cv))+\Bigg(i\Bigg(e^{(-2ek+em+p-2cs+cv)z}(2ek-em+p+2cs-cv)\,{}_2F_1\Bigg(\frac{-2ek+em+p-2cs+cv}{d},-\beta;\frac{d-2ek+em+p-2cs+cv}{d};-\frac{b\,e^{dz}}{a}\Bigg)+e^{(2ek-em+p+2cs-cv)z}(2ek-em-p+2cs-cv)\,{}_2F_1\Bigg(\frac{2ek-em+p+2cs-cv}{d},-\beta;\frac{d+2ek-em+p+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\Bigg)\Bigg)\sin\Bigg(\frac{1}{2}\pi(m+v)\Bigg)\Bigg)\Big/((2ek-em-p+2cs-cv)(2ek-em+p+2cs-cv))\Bigg)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving rational functions of the direct function and exponential function

Involving exp

Involving $\frac{e^{pz}}{a+b\sinh(cz)}$

01.19.21.2257.01

$$\int\frac{e^{pz}}{a+b\sinh(cz)}\,dz=-\frac{e^{(c+p)z}}{b\sqrt{a^2+b^2}\,(c+p)}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+p}{c},1;\frac{p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+p}{c},1;\frac{p}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)$$

01.19.21.2258.01

$$\int\frac{e^{cz}}{a+b\sinh(cz)}\,dz=\frac{1}{bc}\left(\frac{2a}{\sqrt{a^2+b^2}}\tanh^{-1}\left(\frac{a+b\,e^{cz}}{\sqrt{a^2+b^2}}\right)+\log\left(2\,e^{cz}\,a+b\,e^{2cz}-b\right)\right)$$

01.19.21.2259.01

$$\int\frac{e^{cz}}{i+\sinh(cz)}\,dz=\frac{1}{c}\left(\frac{2i}{i+e^{cz}}-2\,i\tan^{-1}(e^{cz})+\log\left(1+e^{2cz}\right)\right)$$

01.19.21.2260.01

$$\int\frac{e^{cz}}{i-\sinh(cz)}\,dz=\frac{1}{c}\left(\frac{2i}{-i+e^{cz}}-2\,i\tan^{-1}(e^{cz})-\log\left(1+e^{2cz}\right)\right)$$

Involving $e^{p z}(a + b \sinh(c z))^{-n}$

01.19.21.2261.01

$$\int \frac{e^{p z}}{(a + b \sinh(c z))^2} \, dz = \frac{1}{b (a^2 + b^2)^{3/2} (c + p)} \left(e^{(c+p) z} \left(-a \left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c+p}{c}, 1; \frac{p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + a \left(a - \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c+p}{c}, 1; \frac{p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) + \left(a^2 + \sqrt{a^2 + b^2} \, a + b^2 \right) {}_2F_1\left(\frac{c+p}{c}, 2; \frac{p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(-a^2 + \sqrt{a^2 + b^2} \, a - b^2 \right) {}_2F_1\left(\frac{c+p}{c}, 2; \frac{p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right)$$

01.19.21.2262.01

$$\int \frac{e^{c z}}{(a + b \sinh(c z))^2} \, dz = \frac{2}{b (a^2 + b^2) c} \left(\frac{b^2}{\sqrt{-a^2 - b^2}} \tan^{-1}\left(\frac{a + b e^{c z}}{\sqrt{-a^2 - b^2}} \right) + \frac{-2 e^{c z} a^2 + b a - b^2 e^{c z}}{2 e^{c z} a + b \left(-1 + e^{2 c z} \right)} \right)$$

Involving $\frac{e^{p z}}{a + b \sinh^2(c z)}$

01.19.21.2263.01

$$\int \frac{e^{p z}}{a + b \sinh^2(c z)} \, dz = \frac{1}{\sqrt{a} \sqrt{a - b} \, b (p - 2 c)} \left(e^{(p - 2 c) z} \left(\left(2 a + 2 \sqrt{a - b} \sqrt{a} - b \right) {}_2F_1\left(1 - \frac{p}{2 c}, 1; 2 - \frac{p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a - b} \sqrt{a} + b} \right) + \left(-2 a + 2 \sqrt{a - b} \sqrt{a} + b \right) {}_2F_1\left(1 - \frac{p}{2 c}, 1; 2 - \frac{p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a - b} \sqrt{a} + b} \right) \right) \right)$$

01.19.21.2264.01

$$\int \frac{e^{c z}}{a + b \sinh^2(c z)} \, dz = \frac{1}{\sqrt{a} \sqrt{a - b} \sqrt{b} \, c} \left(\sqrt{2 a + 2 \sqrt{a - b} \sqrt{a} - b} \, \tan^{-1}\left(\frac{\sqrt{b} \, e^{c z}}{\sqrt{2 a + 2 \sqrt{a - b} \sqrt{a} - b}} \right) - \sqrt{2 a - 2 \sqrt{a - b} \sqrt{a} - b} \, \tan^{-1}\left(\frac{\sqrt{b} \, e^{c z}}{\sqrt{2 a - 2 \sqrt{a - b} \sqrt{a} - b}} \right) \right)$$

Involving $e^{p z} \left(a + b \sinh^2(c z) \right)^{-n}$

01.19.21.2265.01

$$\int \frac{e^{p z}}{\left(a+b \sinh^2(c z)\right)^2} \, dz = \frac{1}{2 a^{3/2} (a-b)^{3/2} b (2 c+p)} \left(e^{(2 c+p) z} \left((2 a-b) \left(2 a+2 \sqrt{a-b} \sqrt{a}-b\right) {}_2F_1\left(\frac{p}{2 c}+1, 1; \frac{p}{2 c}+2; \frac{b e^{2 c z}}{-2 a+2 \sqrt{a-b} \sqrt{a}+b}\right)+ (2 a-b) \left(-2 a+2 \sqrt{a-b} \sqrt{a}+b\right) {}_2F_1\left(\frac{p}{2 c}+1, 1; \frac{p}{2 c}+2; \frac{b e^{2 c z}}{-2 a-2 \sqrt{a-b} \sqrt{a}+b}\right)+ 2 \sqrt{a} \left(\left(-2 a^{3/2}-2 \sqrt{a-b}\, a+2 b \sqrt{a}+\sqrt{a-b}\, b\right) {}_2F_1\left(\frac{p}{2 c}+1, 2; \frac{p}{2 c}+2; \frac{b e^{2 c z}}{-2 a+2 \sqrt{a-b} \sqrt{a}+b}\right)+ \left(2 a^{3/2}-2 \sqrt{a-b}\, a-2 b \sqrt{a}+\sqrt{a-b}\, b\right) {}_2F_1\left(\frac{p}{2 c}+1, 2; \frac{p}{2 c}+2; \frac{b e^{2 c z}}{-2 a-2 \sqrt{a-b} \sqrt{a}+b}\right)\right)\right)\right)$$

01.19.21.2266.01

$$\int \frac{e^{c z}}{\left(a+b \sinh^2(c z)\right)^2} \, dz = -\frac{1}{2 a^{3/2} (a-b)^{3/2} \sqrt{b}\, c} \left(\frac{1}{b \left(-1+e^{2 c z}\right)^2+4 a e^{2 c z}} \left(\sqrt{2 a+2 \sqrt{a-b} \sqrt{a}-b} \left(-2 a+\sqrt{a-b} \sqrt{a}+b\right) \left(b \left(-1+e^{2 c z}\right)^2+4 a e^{2 c z}\right) \tan^{-1}\left(\frac{\sqrt{b}\, e^{c z}}{\sqrt{2 a+2 \sqrt{a-b} \sqrt{a}-b}}\right)-2 \sqrt{a} \sqrt{a-b} \sqrt{b}\, e^{c z} \left(2 e^{2 c z} a-b e^{2 c z}+b\right)\right)+ \left(2 a+\sqrt{a-b} \sqrt{a}-b\right) \sqrt{2 a-2 \sqrt{a-b} \sqrt{a}-b} \tan^{-1}\left(\frac{\sqrt{b}\, e^{c z}}{\sqrt{2 a-2 \sqrt{a-b} \sqrt{a}-b}}\right)\right)$$

Involving $\frac{e^{p z} \sinh(d z)}{a+b \sinh(c z)}$

01.19.21.2267.01

$$\int \frac{e^{p z} \sinh(d z)}{a + b \sinh(c z)} \, dz = \frac{1}{2 b \sqrt{a^2 + b^2}} \left(\frac{1}{c - d + p} \left(e^{(c-d+p) z} \left(\left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c - d + p}{c}, 1; \frac{p - d}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a\right) {}_2F_1\left(\frac{c - d + p}{c}, 1; \frac{p - d}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) - \frac{1}{c + d + p} \left(e^{(c+d+p) z} \left(\left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c + d + p}{c}, 1; \frac{d + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a\right) {}_2F_1\left(\frac{c + d + p}{c}, 1; \frac{d + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) \right)$$

01.19.21.2268.01

$$\int \frac{e^{p z} \sinh(c z)}{a + b \sinh(c z)} \, dz = \frac{1}{2 b \sqrt{a^2 + b^2}} \left(\frac{1}{p} \left(e^{p z} \left(\left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{p}{c}, 1; \frac{p - c}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a\right) {}_2F_1\left(\frac{p}{c}, 1; \frac{p - c}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) - \frac{1}{2 c + p} \left(e^{(2 c+p) z} \left(\left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{2 c + p}{c}, 1; \frac{c + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a\right) {}_2F_1\left(\frac{2 c + p}{c}, 1; \frac{c + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) \right)$$

01.19.21.2269.01

$$\int \frac{e^{c z} \sinh(c z)}{a + b \sinh(c z)} \, dz = \frac{2 \, a^2}{b^2 \sqrt{-a^2 - b^2} \; c} \tan^{-1}\left(\frac{a + b e^{c z}}{\sqrt{-a^2 - b^2}} \right) - \frac{\log\left(2 e^{c z} a + b e^{2 c z} - b\right) a}{b^2 c} + \frac{e^{c z}}{b c}$$

Involving $e^{p z} (a + b \sinh(c z))^{-n} \sinh(d z)$

01.19.21.2270.01

$$\int \frac{e^{p z} \sinh(d z)}{(a + b \sinh(c z))^2} \, dz = \frac{1}{2 b \left(a^2 + b^2\right)^{3/2}} \left(\frac{1}{c + d + p} \left(e^{(c+d+p) z} \left(-a \left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c + d + p}{c}, 1; \frac{d + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) + a \left(a - \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c + d + p}{c}, 1; \frac{d + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}\right) + \left(a^2 + \sqrt{a^2 + b^2}\, a + b^2\right) {}_2F_1\left(\frac{c + d + p}{c}, 2; \frac{d + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) + \left(-a^2 + \sqrt{a^2 + b^2}\, a - b^2\right) {}_2F_1\left(\frac{c + d + p}{c}, 2; \frac{d + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}\right)\right)\right) - \frac{1}{c - d + p} \left(e^{(c-d+p) z} \left(-a \left(a + \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c - d + p}{c}, 1; \frac{p - d}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) + a \left(a - \sqrt{a^2 + b^2}\right) {}_2F_1\left(\frac{c - d + p}{c}, 1; \frac{p - d}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}\right) + \left(a^2 + \sqrt{a^2 + b^2}\, a + b^2\right) {}_2F_1\left(\frac{c - d + p}{c}, 2; \frac{p - d}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) + \left(-a^2 + \sqrt{a^2 + b^2}\, a - b^2\right) {}_2F_1\left(\frac{c - d + p}{c}, 2; \frac{p - d}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}\right)\right)\right)\right)$$

Involving $\frac{e^{p z} \sinh(d z)}{a+b \sinh^2(c z)}$

01.19.21.2271.01

$$\int \frac{e^{p z} \sinh(d z)}{a + b \sinh^2(c z)} \, dz = \frac{1}{2 \sqrt{a} \sqrt{a-b} \, b} \left(\frac{1}{-2 c + d + p} \left(e^{(-2 c + d + p) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d+p}{2 c}, 1; 2 - \frac{d+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d+p}{2 c}, 1; 2 - \frac{d+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\right)\right) - \frac{1}{-2 c - d + p} \left(e^{(-2 c - d + p) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c + d - p}{2 c}, 1; \frac{4 c + d - p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + d - p}{2 c}, 1; \frac{4 c + d - p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\right)\right)\right)$$

01.19.21.2272.01

$$\int \frac{e^{p z} \sinh(c z)}{b \sinh^2(c z) + a} \, dz = \frac{1}{2 \sqrt{a} \sqrt{a-b} \, b} \left(\frac{1}{p - c} \left(e^{(p - c) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{c+p}{2 c}, 1; 2 - \frac{c+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{c+p}{2 c}, 1; 2 - \frac{c+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\right)\right) - \frac{1}{p - 3 c} \left(e^{(p - 3 c) z} \left(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(\frac{3 c - p}{2 c}, 1; \frac{5 c - p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(\frac{3 c - p}{2 c}, 1; \frac{5 c - p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\right)\right)\right)$$

Involving $e^{p z} \left(a + b \sinh^2(c z)\right)^{-n} \sinh(d z)$

01.19.21.2273.01

$$\int \frac{e^{p z} \sinh(d z)}{\left(a + b \sinh^2(c z)\right)^2} \, dz = \frac{1}{4 a^{3/2} (a - b)^{3/2} b}$$

$$\left(\frac{1}{2 c + d + p} \left(e^{(2 c + d + p) z} \left((2 a - b) \left(2 a + 2 \sqrt{a - b} \sqrt{a} - b\right) {}_2F_1\left(\frac{d + p}{2 c} + 1, 1; \frac{d + p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a + 2 \sqrt{a - b} \sqrt{a} + b}\right) + \right.\right.\right.$$

$$(2 a - b) \left(-2 a + 2 \sqrt{a - b} \sqrt{a} + b\right) {}_2F_1\left(\frac{d + p}{2 c} + 1, 1; \frac{d + p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a - 2 \sqrt{a - b} \sqrt{a} + b}\right) + 2 \sqrt{a}$$

$$\left(\left(-2 a^{3/2} - 2 \sqrt{a - b} \, a + 2 b \sqrt{a} + \sqrt{a - b} \, b\right) {}_2F_1\left(\frac{d + p}{2 c} + 1, 2; \frac{d + p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a + 2 \sqrt{a - b} \sqrt{a} + b}\right) + \right.$$

$$\left(2 a^{3/2} - 2 \sqrt{a - b} \, a - 2 b \sqrt{a} + \sqrt{a - b} \, b\right)$$

$$\left.\left.\left. {}_2F_1\left(\frac{d + p}{2 c} + 1, 2; \frac{d + p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a - 2 \sqrt{a - b} \sqrt{a} + b}\right)\right)\right)\right) -$$

$$\frac{1}{2 c - d + p} \left(e^{(2 c - d + p) z} \left((2 a - b) \left(2 a + 2 \sqrt{a - b} \sqrt{a} - b\right) {}_2F_1\left(\frac{p - d}{2 c} + 1, 1; \frac{p - d}{2 c} + 2; \frac{b e^{2 c z}}{-2 a + 2 \sqrt{a - b} \sqrt{a} + b}\right) + \right.\right.$$

$$(2 a - b) \left(-2 a + 2 \sqrt{a - b} \sqrt{a} + b\right) {}_2F_1\left(\frac{p - d}{2 c} + 1, 1; \frac{p - d}{2 c} + 2; \frac{b e^{2 c z}}{-2 a - 2 \sqrt{a - b} \sqrt{a} + b}\right) + 2 \sqrt{a}$$

$$\left(\left(-2 a^{3/2} - 2 \sqrt{a - b} \, a + 2 b \sqrt{a} + \sqrt{a - b} \, b\right) {}_2F_1\left(\frac{p - d}{2 c} + 1, 2; \frac{p - d}{2 c} + 2; \frac{b e^{2 c z}}{-2 a + 2 \sqrt{a - b} \sqrt{a} + b}\right) + \right.$$

$$\left(2 a^{3/2} - 2 \sqrt{a - b} \, a - 2 b \sqrt{a} + \sqrt{a - b} \, b\right)$$

$$\left.\left.\left.\left. {}_2F_1\left(\frac{p - d}{2 c} + 1, 2; \frac{p - d}{2 c} + 2; \frac{b e^{2 c z}}{-2 a - 2 \sqrt{a - b} \sqrt{a} + b}\right)\right)\right)\right)\right)$$

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a + b \sinh(c z)}$

01.19.21.2274.01

$$\int \frac{e^{pz}\sinh(ez)\sinh(dz)}{a+b\sinh(cz)}\,dz = \frac{1}{4b\sqrt{a^2+b^2}}\left(-\frac{1}{c-d-e+p}\left(e^{(c-d-e+p)z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-e+p}{c},1;2-\frac{d+e-p}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c-d-e+p}{c},1;2-\frac{d+e-p}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+\frac{1}{c+d-e+p}\left(e^{(c+d-e+p)z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-e+p}{c},1;\frac{d-e+p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+d-e+p}{c},1;\frac{d-e+p}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+\frac{1}{c-d+e+p}\left(e^{(c-d+e+p)z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+e+p}{c},1;\frac{-d+e+p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c-d+e+p}{c},1;\frac{-d+e+p}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-\frac{1}{c+d+e+p}\left(e^{(c+d+e+p)z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+e+p}{c},1;\frac{d+e+p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+d+e+p}{c},1;\frac{d+e+p}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)\right)$$

Involving $e^{pz}\sinh(ez)\sinh(dz)(a+b\sinh(cz))^{-n}$

01.19.21.2275.01

$$\int \frac{e^{pz}\sinh(ez)\sinh(dz)}{(a+b\sinh(cz))^2}\,dz = \frac{1}{4}\left(\left(e^{(c-d-e+p)z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-e+p}{c},1;\frac{-d-e+p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-e+p}{c},1;\frac{-d-e+p}{c}+2;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)+\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d-e+p}{c},2;\frac{-d-e+p}{c}+2;\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right)\right.\right.\right.$$

$$
{}_2F_1\left(\frac{c-d-e+p}{c}, 2; \frac{-d-e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg) \Bigg/ \left(b\left(a^2+b^2\right)^{3/2}(c-d-e+p)\right) +
$$

$$
\Bigg(e^{(c+d+e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+e+p}{c}, 1; \frac{d+e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) +
$$

$$
a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+e+p}{c}, 1; \frac{d+e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right) +
$$

$$
\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d+e+p}{c}, 2; \frac{d+e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) + \left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right)
$$

$$
{}_2F_1\left(\frac{c+d+e+p}{c}, 2; \frac{d+e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg) \Bigg/ \left(b\left(a^2+b^2\right)^{3/2}(c+d+e+p)\right) -
$$

$$
\Bigg(e^{(c+d-e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-e+p}{c}, 1; \frac{d-e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) +
$$

$$
a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-e+p}{c}, 1; \frac{d-e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right) +
$$

$$
\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d-e+p}{c}, 2; \frac{d-e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) + \left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right)
$$

$$
{}_2F_1\left(\frac{c+d-e+p}{c}, 2; \frac{d-e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg) \Bigg/ \left(b\left(a^2+b^2\right)^{3/2}(c+d-e+p)\right) -
$$

$$
\Bigg(e^{(c-d+e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+e+p}{c}, 1; \frac{-d+e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) +
$$

$$
a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+e+p}{c}, 1; \frac{-d+e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right) +
$$

$$
\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d+e+p}{c}, 2; \frac{-d+e+p}{c}+2; \frac{b\,e^{c z}}{\sqrt{a^2+b^2}-a}\right) + \left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right)
$$

$$
{}_2F_1\left(\frac{c-d+e+p}{c}, 2; \frac{-d+e+p}{c}+2; -\frac{b\,e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg) \Bigg/ \left(b\left(a^2+b^2\right)^{3/2}(c-d+e+p)\right)\Bigg)
$$

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a+b \sinh^2(c z)}$

01.19.21.2276.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{a + b \sinh^2(c z)} \, dz = \frac{1}{4} \Bigg(\Bigg(e^{(-2 c-d-e+p) z} \Bigg(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{-d-e+p}{2 c}, 1; 2 - \frac{-d-e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{-d-e+p}{2 c}, 1; 2 - \frac{-d-e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \sqrt{a-b} \, b (-2 c - d - e + p)\right) + \Bigg(e^{(-2 c+d+e+p) z} \Bigg(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d+e+p}{2 c}, 1; 2 - \frac{d+e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d+e+p}{2 c}, 1; 2 - \frac{d+e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \sqrt{a-b} \, b (-2 c + d + e + p)\right) - \Bigg(e^{(-2 c+d-e+p) z} \Bigg(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d-e+p}{2 c}, 1; 2 - \frac{d-e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d-e+p}{2 c}, 1; 2 - \frac{d-e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \sqrt{a-b} \, b (-2 c + d - e + p)\right) - \Bigg(e^{(-2 c-d+e+p) z} \Bigg(\left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(1 - \frac{-d+e+p}{2 c}, 1; 2 - \frac{-d+e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(1 - \frac{-d+e+p}{2 c}, 1; 2 - \frac{-d+e+p}{2 c}; \frac{b e^{-2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right)\Bigg)\Bigg) \Big/ \left(\sqrt{a} \sqrt{a-b} \, b (-2 c - d + e + p)\right)\Bigg)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) \left(a + b \sinh^2(c z)\right)^{-n}$

01.19.21.2277.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{\left(a + b \sinh^2(c z)\right)^2} \, dz = \frac{1}{4} \Bigg(\Bigg(e^{(2 c-d-e+p) z} \Bigg((2 a - b) \left(2 a + 2 \sqrt{a-b} \sqrt{a} - b\right) {}_2F_1\left(\frac{-d-e+p}{2 c} + 1, 1; \frac{-d-e+p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a + 2 \sqrt{a-b} \sqrt{a} + b}\right) + (2 a - b) \left(-2 a + 2 \sqrt{a-b} \sqrt{a} + b\right) {}_2F_1\left(\frac{-d-e+p}{2 c} + 1, 1; \frac{-d-e+p}{2 c} + 2; \frac{b e^{2 c z}}{-2 a - 2 \sqrt{a-b} \sqrt{a} + b}\right) + 2 \sqrt{a} \Bigg(\left(-2 a^{3/2} - 2 \sqrt{a-b} \, a + 2 b \sqrt{a} + \sqrt{a-b} \, b\right) {}_2F_1\left(\frac{-d-e+p}{2 c} + 1, 2; \frac{-d-e+p}{2 c} + 2;\right.$$

$$\begin{aligned}
&\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{-d-e+p}{2c}+\\
&1,2;\frac{-d-e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\Big(2a^{3/2}(a-b)^{3/2}\,b\,(2c-d-e+p)\Big)+\\
&\Bigg(e^{(2c+d+e+p)z}\Bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\Bigg(\frac{d+e+p}{2c}+1,1;\frac{d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\Bigg(\frac{d+e+p}{2c}+1,1;\frac{d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&2\sqrt{a}\Bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{d+e+p}{2c}+1,2;\frac{d+e+p}{2c}+2;\\
&\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{d+e+p}{2c}+\\
&1,2;\frac{d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\Big(2a^{3/2}(a-b)^{3/2}\,b\,(2c+d+e+p)\Big)-\\
&\Bigg(e^{(2c+d-e+p)z}\Bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\Bigg(\frac{d-e+p}{2c}+1,1;\frac{d-e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\Bigg(\frac{d-e+p}{2c}+1,1;\frac{d-e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&2\sqrt{a}\Bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{d-e+p}{2c}+1,2;\frac{d-e+p}{2c}+2;\\
&\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{d-e+p}{2c}+\\
&1,2;\frac{d-e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\Big(2a^{3/2}(a-b)^{3/2}\,b\,(2c+d-e+p)\Big)-\\
&\Bigg(e^{(2c-d+e+p)z}\Bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\Bigg(\frac{-d+e+p}{2c}+1,1;\frac{-d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\Bigg(\frac{-d+e+p}{2c}+1,1;\frac{-d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\\
&2\sqrt{a}\Bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{-d+e+p}{2c}+1,2;\frac{-d+e+p}{2c}+2;\\
&\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\Bigg(\frac{-d+e+p}{2c}+\\
&1,2;\frac{-d+e+p}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/\Big(2a^{3/2}(a-b)^{3/2}\,b\,(2c-d+e+p)\Big)\Bigg)
\end{aligned}$$

Involving algebraic functions of the direct function and exponential function

Involving exp

Involving $e^{p z} (a + b \sinh(d z))^{\beta}$

01.19.21.2278.01

$$\int e^{p z} (a + b \sinh(d z))^{\beta} \, dz = \frac{1}{p - d \beta} \left(e^{p z} \left(\frac{e^{d z} b}{a - \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} \left(\frac{e^{d z} b}{a + \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} (a + b \sinh(d z))^{\beta} F_1\left(\frac{p}{d} - \beta; -\beta, -\beta; \frac{p}{d} - \beta + 1; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a} \right) \right)$$

Involving $e^{p z} \left(a + b \sinh^2(d z)\right)^{\beta}$

01.19.21.2279.01

$$\int e^{p z} \left(a + b \sinh^2(d z)\right)^{\beta} dz = \frac{1}{p - 2 d \beta} \left(e^{p z} \left(\frac{e^{2 d z} b}{2 a - b + 2 \sqrt{a (a - b)}} + 1 \right)^{-\beta} \left(1 - \frac{b e^{2 d z}}{-2 a + b + 2 \sqrt{a (a - b)}} \right)^{-\beta} \left(\frac{1}{4} b e^{-2 d z} \left(-1 + e^{2 d z}\right)^2 + a \right)^{\beta} F_1\left(\frac{p}{2 d} - \beta; -\beta, -\beta; \frac{p}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2 \sqrt{a (a - b)}} \right) \right)$$

Involving $e^{p z} (a + b \sinh(d z))^{\beta} \sinh(c z)$

01.19.21.2280.01

$$\int e^{p z} (a + b \sinh(d z))^{\beta} \sinh(c z) \, dz = \frac{1}{2 (c + p - d \beta) (c - p + d \beta)} \left(\frac{e^{d z} b}{a - \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} \left(\frac{e^{d z} b}{a + \sqrt{a^2 + b^2}} + 1 \right)^{-\beta} (a + b \sinh(d z))^{\beta} \left(e^{(c+p) z} (c - p + d \beta) F_1\left(\frac{c + p - d \beta}{d}; -\beta, -\beta; \frac{c + d + p - d \beta}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a} \right) + e^{(p-c) z} (c + p - d \beta) F_1\left(-\frac{c - p + d \beta}{d}; -\beta, -\beta; \frac{-c + d + p - d \beta}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a} \right) \right)$$

Involving $e^{p z} \left(a + b \sinh^2(d z)\right)^{\beta} \sinh(c z)$

01.19.21.2281.01

$$\int e^{p z} \left(a + b \sinh^2(d z)\right)^{\beta} \sinh(c z) \, dz = \left(\left(\frac{e^{2 d z} b}{2 a - b + 2 \sqrt{a (a - b)}} + 1\right)^{-\beta} \left(1 - \frac{b e^{2 d z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)^{-\beta} \left(\frac{1}{4} b e^{-2 d z} \left(-1 + e^{2 d z}\right)^2 + a\right)^{\beta} \left(e^{(c+p) z} (c - p + 2 d \beta) F_1\left(\frac{c + p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{c + p}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right) + e^{(p-c) z} (c + p - 2 d \beta) F_1\left(-\frac{c - p + 2 d \beta}{2 d}; -\beta, -\beta; \frac{p - c}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)\right)\right) \Big/ (2 (c + p - 2 d \beta) (c - p + 2 d \beta))$$

Involving $e^{p z} \sinh(e z) \sinh(c z) (a + b \sinh(d z))^{\beta}$

01.19.21.2282.01

$$\int e^{p z} \sinh(e z) \sinh(c z) (a + b \sinh(d z))^{\beta} \, dz = \frac{1}{4} \left(\frac{e^{d z} b}{a - \sqrt{a^2 + b^2}} + 1\right)^{-\beta} \left(\frac{e^{d z} b}{a + \sqrt{a^2 + b^2}} + 1\right)^{-\beta} (a + b \sinh(d z))^{\beta} \left(-\frac{e^{(c-e+p) z}}{c - e + p - d \beta} F_1\left(\frac{c - e + p - d \beta}{d}; -\beta, -\beta; \frac{c + d - e + p - d \beta}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a}\right) + \frac{e^{(-c+e+p) z}}{c - e - p + d \beta} F_1\left(\frac{-c + e + p - d \beta}{d}; -\beta, -\beta; \frac{-c + d + e + p - d \beta}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a}\right) + \frac{e^{(c+e+p) z}}{c + e + p - d \beta} F_1\left(\frac{c + e + p - d \beta}{d}; -\beta, -\beta; \frac{c + d + e + p - d \beta}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a}\right) - \frac{e^{-(c+e-p) z}}{c + e - p + d \beta} F_1\left(-\frac{c + e - p + d \beta}{d}; -\beta, -\beta; -\frac{c + e - p + d (\beta - 1)}{d}; -\frac{b e^{d z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{d z}}{\sqrt{a^2 + b^2} - a}\right)\right)$$

Involving $e^{p z} \sinh(e z) \sinh(c z) \left(a + b \sinh^2(d z)\right)^{\beta}$

01.19.21.2283.01

$$\int e^{p z} \sinh(e z) \sinh(c z) \left(a + b \sinh^2(d z)\right)^{\beta} dz = \frac{1}{4}\left(\frac{e^{2 d z} b}{2 a - b + 2\sqrt{a (a - b)}} + 1\right)^{-\beta} \left(1 - \frac{b e^{2 d z}}{-2 a + b + 2\sqrt{a (a - b)}}\right)^{-\beta} \left(\frac{1}{4} b e^{-2 d z} \left(-1 + e^{2 d z}\right)^2 + a\right)^{\beta} \left(-\frac{e^{(c - e + p) z}}{c - e + p - 2 d \beta} F_1\left(\frac{c - e + p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{c - e + p}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2\sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2\sqrt{a (a - b)}}\right) + \frac{e^{(-c + e + p) z}}{c - e - p + 2 d \beta} F_1\left(\frac{-c + e + p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{-c + e + p}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2\sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2\sqrt{a (a - b)}}\right) + \frac{e^{(c + e + p) z}}{c + e + p - 2 d \beta} F_1\left(\frac{c + e + p - 2 d \beta}{2 d}; -\beta, -\beta; \frac{c + e + p}{2 d} - \beta + 1; \frac{b e^{2 d z}}{-2 a + b - 2\sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2\sqrt{a (a - b)}}\right) - \frac{e^{-(c + e - p) z}}{c + e - p + 2 d \beta} F_1\left(-\frac{c + e - p + 2 d \beta}{2 d}; -\beta, -\beta; -\frac{c + e - p + 2 d (\beta - 1)}{2 d}; \frac{b e^{2 d z}}{-2 a + b - 2\sqrt{a (a - b)}}, \frac{b e^{2 d z}}{-2 a + b + 2\sqrt{a (a - b)}}\right)\right)$$

Involving functions of the direct function, exponential and a power functions

Involving powers of the direct function, exponential and a power functions

Involving powers of sin, exp and power

Involving $z^{\alpha-1} e^{p z} \sinh^{\nu}(a z)$

01.19.21.2284.01

$$\int z^{\alpha-1} e^{p z} \sinh^{\nu}(a z)\, dz = -2^{-\nu} i^{-\nu} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z) (1 - \nu \bmod 2) - 2^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu} E_{1-\alpha}((a (\nu - 2 k) - p) z) + E_{1-\alpha}((-p - a (\nu - 2 k)) z)\right) /; \nu \in \mathbb{N}$$

01.19.21.2285.01

$$\int z^n e^{p z} \sinh^{\nu}(a z)\, dz = n!\, e^{p z} \sinh^{\nu}(a z) \left(1 - e^{-2 a z}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n - j)!\, (p + a \nu)^{j+1}}\; {}_{j+2}F_{j+1}\left(-\frac{p + a \nu}{2 a}, \ldots, -\frac{p + a \nu}{2 a}, -\nu; 1 - \frac{p + a \nu}{2 a}, \ldots, 1 - \frac{p + a \nu}{2 a}; e^{-2 a z}\right) /; n \in \mathbb{N}^+$$

01.19.21.2286.01

$$\int z^n e^{p z} \sinh^{\nu}(a z)\, dz = -(2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z) (1 - \nu \bmod 2) z^{n+1} - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} E_{-n}((a (\nu - 2 s) - p) z) + E_{-n}((-p - a (\nu - 2 s)) z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2287.01

$$\int z^n e^{pz} \sinh^\nu(a z)\, dz = -2^{-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{pz} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{pz} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}} \right) (-p)^{-n-1} - 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \left(\frac{(-1)^{-n} \operatorname{Ei}((p - a(\nu - 2s)) z)}{(-n-1)!} + e^{(p - a(\nu-2s)) z} \sum_{k=0}^{n} \frac{((a(\nu-2s) - p) z)^k}{(n+1)_{k-n}} - e^{(p - a(\nu-2s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu-2s) - p) z)^k}{(n+1)_{k-n}} \right) ((a(\nu-2s) - p) z)^{-n-1} + ((-p - a(\nu-2s)) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((p + a(\nu-2s)) z)}{(-n-1)!} + e^{(p + a(\nu-2s)) z} \sum_{k=0}^{n} \frac{((-p - a(\nu-2s)) z)^k}{(n+1)_{k-n}} - e^{(p + a(\nu-2s)) z} \sum_{k=n+1}^{-1} \frac{((-p - a(\nu-2s)) z)^k}{(n+1)_{k-n}} \right) \right) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2288.01

$$\int z^{n+\frac{1}{2}} e^{pz} \sinh^\nu(a z)\, dz = -2^{-\nu}\ i^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z) (1 - \nu \bmod 2) z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu E_{-n-\frac{1}{2}}((a(\nu-2s) - p) z) + E_{-n-\frac{1}{2}}((-p - a(\nu-2s)) z) \right) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2289.01

$$\int z^{n+\frac{1}{2}} e^{pz} \sinh^\nu(a z)\, dz = \frac{1}{\sqrt{z}} 2^{-\nu} i^{-\nu} (-1) \sqrt{-p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (-p)^{-n-2} \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{pz} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{pz} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) - 2^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \left(\operatorname{erfc}\left(\sqrt{(a(\nu-2s) - p) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(p - a(\nu-2s)) z} \sum_{k=0}^{n} \frac{((a(\nu-2s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(p - a(\nu-2s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu-2s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) ((a(\nu-2s) - p) z)^{-n-\frac{3}{2}} + ((-p - a(\nu-2s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p - a(\nu-2s)) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(p + a(\nu-2s)) z} \sum_{k=0}^{n} \frac{((-p - a(\nu-2s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(p + a(\nu-2s)) z} \sum_{k=n+1}^{-1} \frac{((-p - a(\nu-2s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \right) /;\ n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2290.01

$$\int z\, e^{b z} \sinh^2(a z)\, dz = \frac{1}{2\left(b^3 - 4 a^2 b\right)^2} \left(e^{b z} \left(-\left(-z\, b^3 + b^2 + 4 a^2 (b z + 1)\right) \cosh(2 a z)\, b^2 + 2 a \left(4 z a^2 + 2 b - b^2 z\right) \sinh(2 a z)\, b^2 - \left(b^2 - 4 a^2\right)^2 (b z - 1)\right)\right)$$

Involving $z^{\alpha-1} e^{p z+e} \sinh^{\nu}(a z)$

01.19.21.2291.01

$$\int z^n e^{e+p z} \sinh^{\nu}(a z)\, dz = n!\, e^{e+p z} \sinh^{\nu}(a z) \left(1 - e^{-2 a z}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n-j)!\, (p + a \nu)^{j+1}}\, {}_{j+2}F_{j+1}\!\left(-\frac{p + a \nu}{2 a}, \ldots, -\frac{p + a \nu}{2 a}, -\nu; 1 - \frac{p + a \nu}{2 a}, \ldots, 1 - \frac{p + a \nu}{2 a}; e^{-2 a z}\right) /; n \in \mathbb{N}^+$$

01.19.21.2292.01

$$\int z^{\alpha-1} e^{e+p z} \sinh^{\nu}(a z)\, dz = -2^{-\nu} i^{-\nu} e^{e} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z)\, (1 - \nu \bmod 2) - 2^{-\nu} z^{\alpha} e^{e} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu} E_{1-\alpha}((a (\nu - 2 k) - p) z) + E_{1-\alpha}((-p - a (\nu - 2 k)) z)\right) /; \nu \in \mathbb{N}$$

01.19.21.2293.01

$$\int z^n e^{e+p z} \sinh^{\nu}(a z)\, dz = -e^{e} (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z)\, (1 - \nu \bmod 2)\, z^{n+1} - 2^{-\nu} z^{n+1} e^{e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} E_{-n}((a (\nu - 2 s) - p) z) + E_{-n}((-p - a (\nu - 2 s)) z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2294.01

$$\int z^n e^{e+p z} \sinh^{\nu}(a z)\, dz = -2^{-\nu} e^{e} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}}\right) (-p)^{-n-1} - 2^{-\nu} z^{n+1} e^{e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} \left(\frac{(-1)^{-n} \operatorname{Ei}((p - a (\nu - 2 s)) z)}{(-n-1)!} + e^{(p - a (\nu - 2 s)) z} \sum_{k=0}^{n} \frac{((a (\nu - 2 s) - p) z)^k}{(n+1)_{k-n}} - e^{(p - a (\nu - 2 s)) z} \sum_{k=n+1}^{-1} \frac{((a (\nu - 2 s) - p) z)^k}{(n+1)_{k-n}}\right) ((a (\nu - 2 s) - p) z)^{-n-1} + ((-p - a (\nu - 2 s)) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((p + a (\nu - 2 s)) z)}{(-n-1)!} + e^{(p + a (\nu - 2 s)) z} \sum_{k=0}^{n} \frac{((-p - a (\nu - 2 s)) z)^k}{(n+1)_{k-n}} - e^{(p + a (\nu - 2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p - a (\nu - 2 s)) z)^k}{(n+1)_{k-n}}\right)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2295.01

$$\int z^{n+\frac{1}{2}} e^{e+p z} \sinh^{\nu}(a z) \, dz = -2^{-\nu} e^{e} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z) (1 - \nu \bmod 2) z^{n+\frac{3}{2}} - 2^{-\nu} z^{n+\frac{3}{2}} e^{e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} E_{-n-\frac{1}{2}}((a(\nu - 2 s) - p) z) + E_{-n-\frac{1}{2}}((-p - a(\nu - 2 s)) z) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2296.01

$$\int z^{n+\frac{1}{2}} e^{e+p z} \sinh^{\nu}(a z) \, dz = \frac{1}{\sqrt{z}} 2^{-\nu} e^{e} i^{-\nu} (-1) \sqrt{-p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (-p)^{-n-2} \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) - 2^{-\nu} z^{n+\frac{3}{2}} e^{e} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} \left(\operatorname{erfc}\left(\sqrt{(a(\nu - 2 s) - p) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(p - a(\nu - 2 s)) z} \sum_{k=0}^{n} \frac{((a(\nu - 2 s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(p - a(\nu - 2 s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu - 2 s) - p) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) ((a(\nu - 2 s) - p) z)^{-n-\frac{3}{2}} + ((-p - a(\nu - 2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p - a(\nu - 2 s)) z}\right) \Gamma\left(n + \frac{3}{2}\right) + e^{(p + a(\nu - 2 s)) z} \sum_{k=0}^{n} \frac{((-p - a(\nu - 2 s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} - e^{(p + a(\nu - 2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p - a(\nu - 2 s)) z)^{k+\frac{1}{2}}}{\left(n + \frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sinh^{\nu}(a z + b)$

01.19.21.2297.01

$$\int z^{n} e^{p z} \sinh^{\nu}(b + a z) \, dz = n! \, e^{p z} \sinh^{\nu}(b + a z) \left(1 - e^{-2(b + a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j}}{(n - j)! \, (p + a \nu)^{j+1}} \, {}_{j+2}F_{j+1}\left(-\frac{p + a \nu}{2 a}, \ldots, -\frac{p + a \nu}{2 a}, -\nu; 1 - \frac{p + a \nu}{2 a}, \ldots, 1 - \frac{p + a \nu}{2 a}; e^{-2(b + a z)}\right) /; n \in \mathbb{N}^{+}$$

01.19.21.2298.01

$$\int z^{\alpha-1} e^{p z} \sinh^{\nu}(b + a z) \, dz = -2^{-\nu} i^{-\nu} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z) (1 - \nu \bmod 2) - 2^{-\nu} i^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-\frac{1}{2} i (\pi \nu + 2 b i (2 k + \nu))} \binom{\nu}{k} \left(e^{-2 b \nu} E_{1-\alpha}((a(\nu - 2 k) - p) z) + e^{i(4 i b k + \pi \nu)} E_{1-\alpha}((-p - a(\nu - 2 k)) z) \right) /; \nu \in \mathbb{N}$$

01.19.21.2299.01

$$\int z^n e^{pz}\sinh^\nu(b+az)\,dz = -(2i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}E_{-n}(-pz)\,(1-\nu \bmod 2)\,z^{n+1} - i^{-\nu}\,2^{-\nu}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-\frac{1}{2}i(\pi\nu+2bi(2s+\nu))}\binom{\nu}{s}\left(e^{-2b\nu}E_{-n}((a(\nu-2s)-p)z)+e^{i(4ibs+\pi\nu)}E_{-n}((-p-a(\nu-2s))z)\right)/;\,n\in\mathbb{Z}\land\nu\in\mathbb{N}$$

01.19.21.2300.01

$$\int z^n e^{pz}\sinh^\nu(b+az)\,dz = -2^{-\nu}i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{(-1)^{-n}\operatorname{Ei}(pz)}{(-n-1)!}+e^{pz}\sum_{k=0}^{n}\frac{(-pz)^k}{(n+1)_{k-n}}-e^{pz}\sum_{k=n+1}^{-1}\frac{(-pz)^k}{(n+1)_{k-n}}\right)(-p)^{-n-1} - 2^{-\nu}i^{-\nu}z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-\frac{1}{2}i(\pi\nu+2bi(2s+\nu))}\binom{\nu}{s}\left(e^{-2b\nu}\left(\frac{(-1)^{-n}\operatorname{Ei}((p-a(\nu-2s))z)}{(-n-1)!}+e^{(p-a(\nu-2s))z}\sum_{k=0}^{n}\frac{((a(\nu-2s)-p)z)^k}{(n+1)_{k-n}}-e^{(p-a(\nu-2s))z}\sum_{k=n+1}^{-1}\frac{((a(\nu-2s)-p)z)^k}{(n+1)_{k-n}}\right)((a(\nu-2s)-p)z)^{-n-1}+e^{i(4ibs+\pi\nu)}((-p-a(\nu-2s))z)^{-n-1}\left(\frac{(-1)^{-n}\operatorname{Ei}((p+a(\nu-2s))z)}{(-n-1)!}+e^{(p+a(\nu-2s))z}\sum_{k=0}^{n}\frac{((-p-a(\nu-2s))z)^k}{(n+1)_{k-n}}-e^{(p+a(\nu-2s))z}\sum_{k=n+1}^{-1}\frac{((-p-a(\nu-2s))z)^k}{(n+1)_{k-n}}\right)\right)/;\,n\in\mathbb{Z}\land\nu\in\mathbb{N}$$

01.19.21.2301.01

$$\int z^{n+\frac{1}{2}} e^{pz}\sinh^\nu(b+az)\,dz = -2^{-\nu}i^{-\nu}\binom{\nu}{\frac{\nu}{2}}E_{-n-\frac{1}{2}}(-pz)\,(1-\nu \bmod 2)\,z^{n+\frac{3}{2}} - 2^{-\nu}i^{-\nu}z^{n+\frac{3}{2}}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-\frac{1}{2}i(\pi\nu+2bi(2s+\nu))}\binom{\nu}{s}\left(e^{-2b\nu}E_{-n-\frac{1}{2}}((a(\nu-2s)-p)z)+e^{i(4ibs+\pi\nu)}E_{-n-\frac{1}{2}}((-p-a(\nu-2s))z)\right)/;\,n\in\mathbb{Z}\land\nu\in\mathbb{N}$$

01.19.21.2302.01

$$\int z^{n+\frac{1}{2}} e^{p z} \sinh^{\nu}(b+a z) \, dz = \frac{1}{\sqrt{z}} 2^{-\nu} i^{-\nu} (-1) \sqrt{-p z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) (-p)^{-n-2} \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) - 2^{-\nu} i^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-\frac{1}{2} i (\pi \nu + 2 b i (2 s+\nu))} \binom{\nu}{s} \left(e^{-2 b \nu} \left(\operatorname{erfc}\left(\sqrt{(a(\nu-2 s)-p) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(p-a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((a(\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(p-a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) ((a(\nu-2 s)-p) z)^{-n-\frac{3}{2}} + e^{i(4 i b s+\pi \nu)} ((-p-a(\nu-2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p-a(\nu-2 s)) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(p+a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p-a(\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(p+a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-a(\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z+e} \sinh^{\nu}(a z+b)$

01.19.21.2303.01

$$\int z^n e^{e+p z} \sinh^{\nu}(b+a z) \, dz = n! \, e^{e+p z} \sinh^{\nu}(b+a z) \left(1-e^{-2(b+a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{\left((-1)^j z^{n-j}\right)}{(n-j)! \, (p+a \nu)^{j+1}} \, {}_{j+2}F_{j+1}\left(-\frac{p+a \nu}{2 a}, \ldots, -\frac{p+a \nu}{2 a}, -\nu; 1-\frac{p+a \nu}{2 a}, \ldots, 1-\frac{p+a \nu}{2 a}; e^{-2(b+a z)}\right) /; n \in \mathbb{N}^+$$

01.19.21.2304.01

$$\int z^{\alpha-1} e^{e+p z} \sinh^{\nu}(b+a z) \, dz = -2^{-\nu} i^{-\nu} e^e z^{\alpha} \binom{\nu}{\frac{\nu}{2}} E_{1-\alpha}(-p z) (1-\nu \bmod 2) - 2^{-\nu} i^{-\nu} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{e-\frac{1}{2} i (\pi \nu+2 b i (2 k+\nu))} \binom{\nu}{k} \left(e^{-2 b \nu} E_{1-\alpha}((a(\nu-2 k)-p) z) + e^{i(4 i b k+\pi \nu)} E_{1-\alpha}((-p-a(\nu-2 k)) z)\right) /; \nu \in \mathbb{N}$$

01.19.21.2305.01

$$\int z^n e^{e+p z} \sinh^{\nu}(b+a z) \, dz = e^e \left(-(2 i)^{-\nu}\right) \binom{\nu}{\frac{\nu}{2}} E_{-n}(-p z) (1-\nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{e-\frac{1}{2} i (\pi \nu+2 b i (2 s+\nu))} \binom{\nu}{s} \left(e^{-2 b \nu} E_{-n}((a(\nu-2 s)-p) z) + e^{i(4 i b s+\pi \nu)} E_{-n}((-p-a(\nu-2 s)) z)\right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2306.01

$$\int z^n e^{e+p z} \sinh^\nu(b+a z)\, dz = -2^{-\nu} e^e i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{(-1)^{-n} \operatorname{Ei}(p z)}{(-n-1)!} + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^k}{(n+1)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^k}{(n+1)_{k-n}} \right) (-p)^{-n-1} - 2^{-\nu} i^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{e-\frac{1}{2} i (\pi \nu + 2 b i (2 s+\nu))} \binom{\nu}{s} \left(e^{-2 b \nu} \left(\frac{(-1)^{-n} \operatorname{Ei}((p-a(\nu-2 s)) z)}{(-n-1)!} + e^{(p-a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((a(\nu-2 s)-p) z)^k}{(n+1)_{k-n}} - e^{(p-a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu-2 s)-p) z)^k}{(n+1)_{k-n}} \right) ((a(\nu-2 s)-p) z)^{-n-1} + e^{i(4 i b s+\pi \nu)} ((-p-a(\nu-2 s)) z)^{-n-1} \left(\frac{(-1)^{-n} \operatorname{Ei}((p+a(\nu-2 s)) z)}{(-n-1)!} + e^{(p+a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p-a(\nu-2 s)) z)^k}{(n+1)_{k-n}} - e^{(p+a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-a(\nu-2 s)) z)^k}{(n+1)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2307.01

$$\int z^{n+\frac{1}{2}} e^{e+p z} \sinh^\nu(b+a z)\, dz = -2^{-\nu} e^e i^{-\nu} \binom{\nu}{\frac{\nu}{2}} E_{-n-\frac{1}{2}}(-p z) (1-\nu \bmod 2) z^{n+\frac{3}{2}} - 2^{-\nu} i^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{e-\frac{1}{2} i (\pi \nu + 2 b i (2 s+\nu))} \binom{\nu}{s} \left(e^{-2 b \nu} E_{-n-\frac{1}{2}}((a(\nu-2 s)-p) z) + e^{i(4 i b s+\pi \nu)} E_{-n-\frac{1}{2}}((-p-a(\nu-2 s)) z) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

01.19.21.2308.01

$$\int z^{n+\frac{1}{2}} e^{e+p z} \sinh^\nu(b+a z)\, dz = \frac{1}{\sqrt{z}} 2^{-\nu} e^e i^{-\nu} (-1) \sqrt{-p z} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) (-p)^{-n-2} \left(\operatorname{erfc}\left(\sqrt{-p z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{p z} \sum_{k=0}^{n} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{p z} \sum_{k=n+1}^{-1} \frac{(-p z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) - 2^{-\nu} i^{-\nu} z^{n+\frac{3}{2}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{e-\frac{1}{2} i (\pi \nu + 2 b i (2 s+\nu))} \binom{\nu}{s} \left(e^{-2 b \nu} \left(\operatorname{erfc}\left(\sqrt{(a(\nu-2 s)-p) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(p-a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((a(\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(p-a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((a(\nu-2 s)-p) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) ((a(\nu-2 s)-p) z)^{-n-\frac{3}{2}} + e^{i(4 i b s+\pi \nu)} ((-p-a(\nu-2 s)) z)^{-n-\frac{3}{2}} \left(\operatorname{erfc}\left(\sqrt{(-p-a(\nu-2 s)) z}\right) \Gamma\left(n+\frac{3}{2}\right) + e^{(p+a(\nu-2 s)) z} \sum_{k=0}^{n} \frac{((-p-a(\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} - e^{(p+a(\nu-2 s)) z} \sum_{k=n+1}^{-1} \frac{((-p-a(\nu-2 s)) z)^{k+\frac{1}{2}}}{\left(n+\frac{3}{2}\right)_{k-n}} \right) \right) /; n \in \mathbb{Z} \land \nu \in \mathbb{N}$$

Involving $z^n\, e^{b z^r} \sinh^\nu(c\, z)$

01.19.21.2309.01

$$\int z^n\, e^{b z^2} \sinh^\nu(c\, z)\, dz = -2^{-\nu-1} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(c\,\nu-2\,c\,s)^2}{4\,b}} \sum_{q=0}^{n} 2^{q-n} (2\,c\,s - c\,\nu)^{n-q} (-2\,c\,s + c\,\nu + 2\,b\,z)^{q+1} \left(-\frac{(-2\,c\,s + c\,\nu + 2\,b\,z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2\,c\,s + c\,\nu + 2\,b\,z)^2}{4\,b} \right) + (-1)^\nu\, e^{-\frac{(2\,c\,s - c\,\nu)^2}{4\,b}} \sum_{q=0}^{n} 2^{q-n} (c\,\nu - 2\,c\,s)^{n-q} (2\,b\,z - c\,(\nu - 2\,s))^{q+1} \left(-\frac{(2\,b\,z - c\,(\nu - 2\,s))^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2\,b\,z - c\,(\nu - 2\,s))^2}{4\,b} \right) \right) \right) b^{-n-1} + 2^{-\nu-1} (-i^{-\nu})\, z^{n+1} \left(-b\,z^2\right)^{\frac{1}{2}(-n-1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b\,z^2 \right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2310.01

$$\int z^n e^{\sqrt{z}\, b} \sinh^\nu(c\, z)\, dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} (c\,(\nu-2s))^{-2n-2} \left(e^{\frac{b^2}{4c(2s-\nu)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2c\,(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2c\,(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{4c\,(2s-\nu)} \right) - 2c\,(2s-\nu) \sqrt{\frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{4c\,(2s-\nu)} \right) \right) + (-1)^\nu e^{\frac{b^2}{4c(\nu-2s)}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2c\,(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b-2c\,(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{4c\,(\nu-2s)} \right) - 2c\,(\nu-2s) \sqrt{\frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)}}\; \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{4c\,(\nu-2s)} \right) \right) \right) - 2^{1-\nu} i^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + e} \sinh^\nu(c\, z)$

01.19.21.2311.01

$$\int z^n e^{b z^2+e} \sinh^\nu(c z)\, dz = -2^{-\nu-1} b^{-n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e-\frac{(c\nu-2cs)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (2cs-c\nu)^{n-q} (-2cs+c\nu+2bz)^{q+1} \left(-\frac{(-2cs+c\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2cs+c\nu+2bz)^2}{4b}\right) + (-1)^\nu e^{e-\frac{(2cs-c\nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (c\nu-2cs)^{n-q} (2bz-c(\nu-2s))^{q+1} \left(-\frac{(2bz-c(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2bz-c(\nu-2s))^2}{4b}\right) \right) + 2^{-\nu-1} e^e (-i^{-\nu}) z^{n+1} \left(-bz^2\right)^{\frac{1}{2}(-n-1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -bz^2\right) (1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2312.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^\nu(c\,z)\,dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} (c\,(\nu-2s))^{-2n-2}$$

$$\Bigg(e^{\frac{b^2}{4c(2s-\nu)}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b-2c\,(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b-2c\,(2s-\nu)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\, \frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{4c\,(2s-\nu)}\right) -$$

$$2c\,(2s-\nu)\sqrt{\frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{c\,(2s-\nu)}}\ \Gamma\!\left(\frac{1}{2}(h+k+2),\, \frac{\left(b-2c\,(2s-\nu)\sqrt{z}\right)^2}{4c\,(2s-\nu)}\right)\Bigg) +$$

$$(-1)^\nu\, e^{\frac{b^2}{4c(\nu-2s)}+e} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, b^{-h-k+2n} \left(b-2c\,(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(b\left(b-2c\,(\nu-2s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+k+1),\, \frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{4c\,(\nu-2s)}\right) -$$

$$2c\,(\nu-2s)\sqrt{\frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{c\,(\nu-2s)}}\ \Gamma\!\left(\frac{1}{2}(h+k+2),\, \frac{\left(b-2c\,(\nu-2s)\sqrt{z}\right)^2}{4c\,(\nu-2s)}\right)\Bigg)\Bigg) -$$

$$2^{1-\nu}\, i^{-\nu}\, b^{-2(n+1)}\, e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\!\left(2(n+1),\, -b\sqrt{z}\right)(1-\nu \bmod 2)\ /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \sinh^\nu(c\,z)$

01.19.21.2313.01

$$\int z^n e^{b z^2+d z} \sinh^\nu(c z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(d-2cs+c\nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-d+2cs-c\nu)^{n-q} (d-2cs+c\nu+2bz)^{q+1} \left(-\frac{(d-2cs+c\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-2cs+c\nu+2bz)^2}{4b}\right) + (-1)^\nu e^{-\frac{(d+2cs-c\nu)^2}{4b}} \sum_{q=0}^{n} 2^{q-n} (-d-2cs+c\nu)^{n-q} (d+2cs-c\nu+2bz)^{q+1} \left(-\frac{(d+2cs-c\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2cs-c\nu+2bz)^2}{4b}\right) \right) \right) /;\, n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.19.21.2314.01

$$\int z^n e^{\sqrt{z}\, b+d z} \sinh^\nu(c z)\, dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{b^2}{4(d+c(\nu-2s))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+c(\nu-2s))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{d+c(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b+2(d+c(\nu-2s))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{4(d+c(\nu-2s))}\right) + 2\sqrt{-\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{d+c(\nu-2s)}} \right.\right.\right.$$

$$(d+c(v-2s))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2(d+c(v-2s))\sqrt{z}\right)^2}{4(d+c(v-2s))}\right)\Bigg)\Bigg)(d+c(v-2s))^{-2n-2}+$$

$$(-1)^v e^{-\frac{b^2}{4(d-c(v-2s))}}(d-c(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k b^{-h-k+2n}\left(b+2(d-c(v-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2(d-c(v-2s))\sqrt{z}\right)^2}{d-c(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2(d-c(v-2s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1),\,-\frac{\left(b+2(d-c(v-2s))\sqrt{z}\right)^2}{4(d-c(v-2s))}\Bigg)+2\sqrt{-\frac{\left(b+2(d-c(v-2s))\sqrt{z}\right)^2}{d-c(v-2s)}}$$

$$(d-c(v-2s))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2(d-c(v-2s))\sqrt{z}\right)^2}{4(d-c(v-2s))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{b z^r+d z+e} \sinh^v(c z)$

01.19.21.2315.01

$$\int z^n e^{b z^2+d z+e}\sinh^v(c z)\,dz = 2^{-v-1} b^{-n-1} e^{-\frac{d^2}{4b}}$$

$$\left(i^{-v} e^e \binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{q=0}^{n} 2^{q-n}(-d)^{n-q}(d+2bz)^{q+1}\left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d+2bz)^2}{4b}\right)-\right.$$

$$e^{\frac{d^2}{4b}+e}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d-2cs+cv)^2}{4b}}\sum_{q=0}^{n}2^{q-n}(-d+2cs-cv)^{n-q}(d-2cs+cv+2bz)^{q+1}$$

$$\left(-\frac{(d-2cs+cv+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d-2cs+cv+2bz)^2}{4b}\right)+$$

$$(-1)^v e^{-\frac{(d+2cs-cv)^2}{4b}}\sum_{q=0}^{n}2^{q-n}(-d-2cs+cv)^{n-q}(d+2cs-cv+2bz)^{q+1}$$

$$\left.\left(-\frac{(d+2cs-cv+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d+2cs-cv+2bz)^2}{4b}\right)\Bigg)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.2316.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh^\nu(c z)\, dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e-\frac{b^2}{4(d+c(\nu-2s))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d+c(\nu-2s))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{d+c(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2(d+c(\nu-2s))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{4(d+c(\nu-2s))}\right) + 2\sqrt{-\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{d+c(\nu-2s)}} (d+c(\nu-2s))\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d+c(\nu-2s))\sqrt{z}\right)^2}{4(d+c(\nu-2s))}\right)\right)\right) (d+c(\nu-2s))^{-2n-2} + (-1)^\nu e^{e-\frac{b^2}{4(d-c(\nu-2s))}} (d-c(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-c(\nu-2s))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d-c(\nu-2s))\sqrt{z}\right)^2}{d-c(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2(d-c(\nu-2s))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-c(\nu-2s))\sqrt{z}\right)^2}{4(d-c(\nu-2s))}\right) + 2\sqrt{-\frac{\left(b+2(d-c(\nu-2s))\sqrt{z}\right)^2}{d-c(\nu-2s)}} (d-c(\nu-2s))\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-c(\nu-2s))\sqrt{z}\right)^2}{4(d-c(\nu-2s))}\right)\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r} \sinh^v(f z + g)$

01.19.21.2317.01

$$\int z^n e^{b z^2} \sinh^v(g + f z)\, dz = -2^{-v-1} b^{-n-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(f v - 2 f s)^2}{4 b} - g(2 s - v)} \sum_{q=0}^{n} 2^{q-n} (2 f s - f v)^{n-q} (-2 f s + f v + 2 b z)^{q+1} \left(-\frac{(-2 f s + f v + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2 f s + f v + 2 b z)^2}{4 b} \right) + (-1)^v e^{-\frac{(2 f s - f v)^2}{4 b} - g(v - 2 s)} \sum_{q=0}^{n} 2^{q-n} (f v - 2 f s)^{n-q} (2 b z - f(v - 2 s))^{q+1} \left(-\frac{(2 b z - f(v - 2 s))^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 b z - f(v - 2 s))^2}{4 b} \right) \right) - 2^{-v-1} i^{-v} z^{n+1} \left(-b z^2 \right)^{\frac{1}{2}(-n-1)} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2 \right) (1 - v \bmod 2) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2318.01

$$\int z^n e^{\sqrt{z}\, b} \sinh^\nu(g + f z)\, dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{b^2}{4 f (2s-\nu)} - g(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2 f (2s-\nu) \sqrt{z}\right)^{h+k} \left(\frac{\left(b - 2 f (2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b - 2 f(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b - 2 f (2s-\nu)\sqrt{z}\right)^2}{4 f (2s-\nu)} \right) - 2 f (2s-\nu) \sqrt{\frac{\left(b - 2 f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b - 2 f(2s-\nu)\sqrt{z}\right)^2}{4 f(2s-\nu)} \right) \right) \right) (-f(2s-\nu))^{-2n-2} + (-1)^\nu e^{\frac{b^2}{4 f(\nu-2s)} - g(\nu-2s)} (-f(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b - 2 f(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b - 2 f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b - 2 f(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b - 2 f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)} \right) - 2 f(\nu-2s) \sqrt{\frac{\left(b - 2 f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b - 2 f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)} \right) \right) \right) - i^{-\nu} 2^{1-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + e} \sinh^\nu(f z + g)$

01.19.21.2319.01

$$\int z^n e^{b z^2+e} \sinh^\nu(g+f z)\, dz = -2^{-\nu-1} b^{-n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(f\nu-2fs)^2}{4b}+e-g(2s-\nu)} \sum_{q=0}^{n} 2^{q-n} (2fs-f\nu)^{n-q} (-2fs+f\nu+2bz)^{q+1} \left(-\frac{(-2fs+f\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2fs+f\nu+2bz)^2}{4b}\right) + (-1)^\nu e^{-\frac{(2fs-f\nu)^2}{4b}+e-g(\nu-2s)} \sum_{q=0}^{n} 2^{q-n} (f\nu-2fs)^{n-q} (2bz-f(\nu-2s))^{q+1} \left(-\frac{(2bz-f(\nu-2s))^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2bz-f(\nu-2s))^2}{4b}\right)\right) + 2^{-\nu-1} e^e (-i^{-\nu}) z^{n+1} \left(-bz^2\right)^{\frac{1}{2}(-n-1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -bz^2\right) (1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2320.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^\nu(g+f z)\, dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{b^2}{4 f (2s-\nu)}+e-g(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2f(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2f(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2f(2s-\nu)\sqrt{z}\right)^2}{4f(2s-\nu)}\right) - 2f(2s-\nu) \sqrt{\frac{\left(b-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2f(2s-\nu)\sqrt{z}\right)^2}{4f(2s-\nu)}\right) \right) \right) (-f(2s-\nu))^{-2n-2} + (-1)^\nu e^{\frac{b^2}{4f(\nu-2s)}+e-g(\nu-2s)} (-f(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b-2f(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b\left(b-2f(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)}\right) - 2f(\nu-2s) \sqrt{\frac{\left(b-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)}\right) \right) \right) - i^{-\nu} 2^{1-\nu} b^{-2(n+1)} e^{e} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+d z} \sinh^\nu(f z+g)$

01.19.21.2321.01

$$\int z^n e^{b z^2+d z} \sinh^\nu(g+f z)\,dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(d-2fs+f\nu)^2}{4b} - g(2s-\nu)} \sum_{q=0}^{n} 2^{q-n} (-d+2fs-f\nu)^{n-q} (d-2fs+f\nu+2bz)^{q+1} \left(-\frac{(d-2fs+f\nu+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-2fs+f\nu+2bz)^2}{4b}\right) + (-1)^\nu e^{-\frac{(d+2fs-f\nu)^2}{4b} - g(\nu-2s)} \sum_{q=0}^{n} 2^{q-n} (-d-2fs+f\nu)^{n-q} (d-f(\nu-2s)+2bz)^{q+1} \left(-\frac{(d-f(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d-f(\nu-2s)+2bz)^2}{4b}\right) \right) \right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2322.01

$$\int z^n e^{\sqrt{z}\, b+d z} \sinh^\nu(g+f z)\,dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{b^2}{4(d-f(2s-\nu))} - g(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2(d-f(2s-\nu))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{d-f(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b+2(d-f(2s-\nu))\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{4(d-f(2s-\nu))}\right) + 2\sqrt{-\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{d-f(2s-\nu)}}\right.\right.\right.$$

$$(d-f(2s-v))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2(d-f(2s-v))\sqrt{z}\right)^2}{4(d-f(2s-v))}\right)\Bigg)\Bigg)(d-f(2s-v))^{-2n-2}+$$

$$(-1)^v\,e^{-\frac{b^2}{4(d-f(v-2s))}-g(v-2s)}\,(d-f(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2(d-f(v-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2(d-f(v-2s))\sqrt{z}\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(b\left(b+2(d-f(v-2s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1),\,-\frac{\left(b+2(d-f(v-2s))\sqrt{z}\right)^2}{4(d-f(v-2s))}\Bigg)+2\sqrt{-\frac{\left(b+2(d-f(v-2s))\sqrt{z}\right)^2}{d-f(v-2s)}}$$

$$(d-f(v-2s))\,\Gamma\!\left(\frac{1}{2}(h+k+2),\,-\frac{\left(b+2(d-f(v-2s))\sqrt{z}\right)^2}{4(d-f(v-2s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{b z^r+d z+e}\,\sinh^v(f z+g)$

01.19.21.2323.01

$$\int z^n\,e^{b z^2+d z+e}\sinh^v(g+f z)\,dz = 2^{-v-1}\,b^{-n-1}\,e^{-\frac{d^2}{4b}}$$

$$\Bigg(i^{-v}\,e^e\binom{v}{\frac{v}{2}}(v\bmod 2-1)\sum_{q=0}^{n}2^{q-n}(-d)^{n-q}(d+2bz)^{q+1}\left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d+2bz)^2}{4b}\right)-$$

$$e^{\frac{d^2}{4b}}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d-2fs+fv)^2}{4b}+e-g(2s-v)}\sum_{q=0}^{n}2^{q-n}(-d+2fs-fv)^{n-q}(d-2fs+fv+2bz)^{q+1}$$

$$\left(-\frac{(d-2fs+fv+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d-2fs+fv+2bz)^2}{4b}\right)+$$

$$(-1)^v\,e^{-\frac{(d+2fs-fv)^2}{4b}+e-g(v-2s)}\sum_{q=0}^{n}2^{q-n}(-d-2fs+fv)^{n-q}(d-f(v-2s)+2bz)^{q+1}$$

$$\left(-\frac{(d-f(v-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(d-f(v-2s)+2bz)^2}{4b}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.2324.01

$$\int z^n e^{\sqrt{z}\, b+e+d\,z} \sinh^\nu(g+f\,z)\,dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2d\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2d\sqrt{z}\right)\right.\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}+$$

$$2^{-2n-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{b^2}{4(d-f(2s-\nu))}+e-g(2s-\nu)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^{h+k}\right.\right.$$

$$\left(-\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{d-f(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2(d-f(2s-\nu))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{4(d-f(2s-\nu))}\right)+2\sqrt{-\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{d-f(2s-\nu)}}$$

$$\left.\left.(d-f(2s-\nu))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-f(2s-\nu))\sqrt{z}\right)^2}{4(d-f(2s-\nu))}\right)\right)\right)(d-f(2s-\nu))^{-2n-2}+$$

$$(-1)^\nu e^{-\frac{b^2}{4(d-f(\nu-2s))}+e-g(\nu-2s)}(d-f(\nu-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,b^{-h-k+2n}\left(b+2(d-f(\nu-2s))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+2(d-f(\nu-2s))\sqrt{z}\right)^2}{d-f(\nu-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(b\left(b+2(d-f(\nu-2s))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+k+1), -\frac{\left(b+2(d-f(\nu-2s))\sqrt{z}\right)^2}{4(d-f(\nu-2s))}\right)+2\sqrt{-\frac{\left(b+2(d-f(\nu-2s))\sqrt{z}\right)^2}{d-f(\nu-2s)}}$$

$$\left.\left.(d-f(\nu-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2(d-f(\nu-2s))\sqrt{z}\right)^2}{4(d-f(\nu-2s))}\right)\right)\right)\right) /; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

Involving $z^n e^{b z} \sinh^v(c z^r)$

01.19.21.2325.01

$$\int z^n e^{b z} \sinh^v(c z^2)\, dz = (2 i)^{-v} (-b)^{-n-1} \binom{v}{\frac{v}{2}} \Gamma(n+1, -b z)\, (v \bmod 2 - 1) - 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{b^2}{8 c s - 4 c v}} \left(\sum_{q=0}^{n} 2^{q-n} (-b)^{n-q} (b - 4 c s z + 2 c v z)^{q+1} \left(-\frac{(b - 4 c s z + 2 c v z)^2}{c (v - 2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b - 4 c s z + 2 c v z)^2}{4 c (v - 2 s)} \right) \right) (-c (2 s - v))^{-n-1} + (-1)^v e^{\frac{b^2}{4 c v - 8 c s}} (-c (v - 2 s))^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-b)^{n-q} (b - 2 c (v - 2 s) z)^{q+1} \left(\frac{(b - 2 c (v - 2 s) z)^2}{c (v - 2 s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b - 2 c (v - 2 s) z)^2}{c (8 s - 4 v)} \right) \right) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2326.01

$$\int z^n e^{b z} \sinh^\nu\left(c \sqrt{z}\right) dz = 2^{-2 n-\nu-1} b^{-2 n-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-\frac{c^2 (\nu-2 s)^2}{4 b}} \binom{\nu}{s} \left((-1)^\nu \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c (\nu-2 s))^{-h-k+2 n} \left(2 b \sqrt{z} - c (\nu-2 s)\right)^{h+k} \left(-\frac{\left(2 b \sqrt{z} - c (\nu-2 s)\right)^2}{b}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2 b \sqrt{-\frac{\left(2 b \sqrt{z} - c (\nu-2 s)\right)^2}{b}} \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(2 b \sqrt{z} - c (\nu-2 s)\right)^2}{4 b}\right) - c (\nu-2 s) \left(2 b \sqrt{z} - c (\nu-2 s)\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(2 b \sqrt{z} - c (\nu-2 s)\right)^2}{4 b}\right)\right) + \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (c (\nu-2 s))^{-h-k+2 n} \left(2 \sqrt{z}\, b + c (\nu-2 s)\right)^{h+k} \left(-\frac{\left(2 \sqrt{z}\, b + c (\nu-2 s)\right)^2}{b}\right)^{\frac{1}{2} (-h-k-1)} \binom{k}{h} \binom{n}{k} \left(c (\nu-2 s) \left(2 \sqrt{z}\, b + c (\nu-2 s)\right) \Gamma\left(\frac{1}{2} (h+k+1), -\frac{\left(2 \sqrt{z}\, b + c (\nu-2 s)\right)^2}{4 b}\right) + 2 \sqrt{-\frac{\left(2 \sqrt{z}\, b + c (\nu-2 s)\right)^2}{b}}\, b\, \Gamma\left(\frac{1}{2} (h+k+2), -\frac{\left(2 \sqrt{z}\, b + c (\nu-2 s)\right)^2}{4 b}\right)\right)\right) - (2 i)^{-\nu} (-b)^{-n-1} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -b z) (1 - \nu \bmod 2) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{d z+e} \sinh^\nu\left(c z^r\right)$

01.19.21.2327.01

$$\int z^n e^{e+d z} \sinh^\nu(c z^2) \, dz = e^e (-(2 i)^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1 - \nu \bmod 2) (-d)^{-n-1} - i^{-\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-c(\nu-2k)}} \left(e^{\frac{d^2}{4c(\nu-2k)}+e-\frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (-c(\nu-2k))^{-n-\frac{1}{2}} (d - 2c(\nu-2k)z)^{q+1} \left(\frac{(d-2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) + \frac{1}{\sqrt{c(\nu-2k)}} \left(e^{-\frac{d^2}{4c(\nu-2k)}+e+\frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (c(\nu-2k))^{-n-\frac{1}{2}} (d+2c(\nu-2k)z)^{q+1} \left(-\frac{(d+2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2328.01

$$\int z^n e^{e+dz} \sinh^\nu\left(\sqrt{z}\, c\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (2s-\nu)^2}{4d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-\nu))^{-h-k+2n} \left(2d\sqrt{z} - c(2s-\nu)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2d \sqrt{-\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{4d} \right) - c(2s-\nu) \left(2d\sqrt{z} - c(2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{4d} \right) \right) \right) d^{-2n-2} + (-1)^\nu e^{-\frac{c^2(\nu-2s)^2}{4d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(\nu-2s))^{-h-k+2n} \left(2d\sqrt{z} - c(\nu-2s)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2d \sqrt{-\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{4d} \right) - c(\nu-2s) \left(2d\sqrt{z} - c(\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{4d} \right) \right) \right) d^{-2n-2} \right) - (2i)^{-\nu} (-d)^{-n-1} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -dz)\, (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r} \sinh^\nu\left(c z^r\right)$

01.19.21.2329.01

$$\int z^{\alpha-1} e^{b z^r} \sinh^\nu(c z^r) \, dz = -\frac{(2 i)^{-\nu} z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) (1 - \nu \bmod 2)}{r} - \frac{(2 i)^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i \pi \nu}{2}} \Gamma\left(\frac{\alpha}{r}, (c (\nu - 2 k) - b) z^r\right) ((c (\nu - 2 k) - b) z^r)^{-\frac{\alpha}{r}} + e^{\frac{i \pi \nu}{2}} ((-b - c (\nu - 2 k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c (\nu - 2 k)) z^r\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2330.01

$$\int z^n e^{b z^2} \sinh^\nu(c z^2) \, dz = -2^{-\nu-1} i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - \nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} i^{-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i \pi \nu}{2}} \Gamma\left(\frac{n+1}{2}, (c (\nu - 2 k) - b) z^2\right) \left((c (\nu - 2 k) - b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i \pi \nu}{2}} \left((-b - c (\nu - 2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - c (\nu - 2 k)) z^2\right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2331.01

$$\int z^n e^{\sqrt{z}\, b} \sinh^\nu\left(\sqrt{z}\, c\right) dz = -2^{1-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2 (n+1), -b \sqrt{z}\right) (1 - \nu \bmod 2) (-b)^{-2 (n+1)} - i^{-\nu} 2^{1-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i \pi \nu}{2}} \Gamma\left(2 (n+1), (c (\nu - 2 k) - b) \sqrt{z}\right) \left((c (\nu - 2 k) - b) \sqrt{z}\right)^{-2 (n+1)} + e^{\frac{i \pi \nu}{2}} \left((-b - c (\nu - 2 k)) \sqrt{z}\right)^{-2 (n+1)} \Gamma\left(2 (n+1), (-b - c (\nu - 2 k)) \sqrt{z}\right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \sinh^\nu(c z^r)$

01.19.21.2332.01

$$\int z^{\alpha-1} e^{b z^r + e} \sinh^\nu(c z^r) \, dz = -\frac{(2 i)^{-\nu} e^e z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) (1 - \nu \bmod 2)}{r} - \frac{(2 i)^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e-\frac{i \pi \nu}{2}} \Gamma\left(\frac{\alpha}{r}, (c (\nu - 2 k) - b) z^r\right) ((c (\nu - 2 k) - b) z^r)^{-\frac{\alpha}{r}} + e^{e+\frac{i \pi \nu}{2}} ((-b - c (\nu - 2 k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c (\nu - 2 k)) z^r\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2333.01

$$\int z^n e^{b z^2+e} \sinh^\nu(c z^2)\, dz = -2^{-\nu-1} e^e i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} i^{-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e-\frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, (c(\nu-2k)-b) z^2\right) \left((c(\nu-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+\frac{i\pi\nu}{2}} \left((-b-c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-c(\nu-2k)) z^2\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2334.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^\nu(\sqrt{z}\, c)\, dz = 2^{1-\nu} e^e (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-\nu \bmod 2) (-b)^{-2(n+1)} - i^{-\nu} 2^{1-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e-\frac{i\pi\nu}{2}} \Gamma\left(2(n+1), (c(\nu-2k)-b)\sqrt{z}\right) \left((c(\nu-2k)-b)\sqrt{z}\right)^{-2(n+1)} + e^{e+\frac{i\pi\nu}{2}} \left((-b-c(\nu-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c(\nu-2k))\sqrt{z}\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \sinh^\nu(c z^r)$

01.19.21.2335.01

$$\int z^n e^{b z^2+d z} \sinh^\nu(c z^2)\, dz = i^{-\nu} 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - i^{-\nu} b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{d^2}{4(b-2cs+c\nu)}} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz-4csz+2c\nu z)^{q+1} \left(-\frac{(d+2bz-4csz+2c\nu z)^2}{b-2cs+c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz-4csz+2c\nu z)^2}{4(b-2cs+c\nu)}\right) \right) (b-2cs+c\nu)^{-n-1} + e^{-\frac{d^2}{4(b+2cs-c\nu)}} (b+2cs-c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b+2cs-c\nu)z)^{q+1} \left(-\frac{(d+2(b+2cs-c\nu)z)^2}{b+2cs-c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+2cs-c\nu)z)^2}{4(b+2cs-c\nu)}\right) \right) \right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2336.01

$$\int z^n e^{\sqrt{z}\, b+d\, z} \sinh^\nu\left(\sqrt{z}\, c\right) dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(b-c(2s-\nu))^2}{4d}} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (b-c(2s-\nu))^{-h-k+2n} \left(b-c(2s-\nu)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(2s-\nu))\left(b-c(2s-\nu)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + (-1)^\nu e^{-\frac{(b-c(\nu-2s))^2}{4d}} \left(\sum_{k=0}^n \sum_{h=0}^k (-1)^{k-h} 4^k (b-c(\nu-2s))^{-h-k+2n} \left(b-c(\nu-2s)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(\nu-2s))\left(b-c(\nu-2s)+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{d}}\, d\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2}\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z + e} \sinh^\nu(c z^r)$

01.19.21.2337.01

$$\int z^n e^{b z^2 + d z + e} \sinh^\nu(c z^2)\, dz = i^{-\nu} 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - i^{-\nu} b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{d^2}{4(b-2cs+c\nu)}+e} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z - 4 c s z + 2 c \nu z)^{q+1} \left(-\frac{(d + 2 b z - 4 c s z + 2 c \nu z)^2}{b - 2 c s + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 b z - 4 c s z + 2 c \nu z)^2}{4(b - 2 c s + c \nu)}\right)\right) (b - 2 c s + c \nu)^{-n-1} + e^{-\frac{d^2}{4(b+2cs-c\nu)}+e} (b + 2 c s - c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2(b + 2 c s - c \nu) z)^{q+1} \left(-\frac{(d + 2(b + 2 c s - c\nu) z)^2}{b + 2 c s - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2(b + 2 c s - c \nu) z)^2}{4(b + 2 c s - c \nu)}\right)\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2338.01

$$\int z^n e^{\sqrt{z}\, b + e + d z} \sinh^\nu(\sqrt{z}\, c)\, dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(b - c(2s-\nu))^2}{4d}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b - c(2s - \nu))^{-h-k+2n} \left(b - c(2s - \nu) + 2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b - c(2s-\nu) + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \right.\right.$$

$$\binom{k}{h}\binom{n}{k}\left((b-c(2s-v))\left(b-c(2s-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)+2\right.$$

$$\left.\left.\sqrt{-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}+$$

$$(-1)^v e^{-\frac{(b-c(v-2s))^2}{4d}+e}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(b-c(v-2s))^{-h-k+2n}\left(b-c(v-2s)+2d\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((b-c(v-2s))\left(b-c(v-2s)+2d\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\left.d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n e^{d z} \sinh^v(c z^r + g)$

01.19.21.2339.01

$$\int z^n e^{dz} \sinh^\nu(c z^2 + g)\, dz = -(2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1 - \nu \bmod 2) (-d)^{-n-1} - i^{-\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-c(\nu-2k)}} \left(e^{\frac{d^2}{4c(\nu-2k)} - g(\nu-2k) - \frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (-c(\nu-2k))^{-n-\frac{1}{2}} (d - 2c(\nu-2k) z)^{q+1} \left(\frac{(d - 2c(\nu-2k) z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d - 2c(\nu-2k) z)^2}{4c(\nu-2k)} \right) \right) + \frac{1}{\sqrt{c(\nu-2k)}} \left(e^{-\frac{d^2}{4c(\nu-2k)} + \frac{i\pi\nu}{2} + g(\nu-2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (c(\nu-2k))^{-n-\frac{1}{2}} (d + 2c(\nu-2k) z)^{q+1} \left(-\frac{(d + 2c(\nu-2k) z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2c(\nu-2k) z)^2}{4c(\nu-2k)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2340.01

$$\int z^n e^{d z} \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (2s-\nu)^2}{4d} - g(2s-\nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-\nu))^{-h-k+2n} \left(2d\sqrt{z} - c(2s-\nu)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z}-c(2s-\nu)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c(2s-\nu)\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z}-c(2s-\nu)\right)^2}{4d}\right) - c(2s-\nu)\left(2d\sqrt{z}-c(2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z}-c(2s-\nu)\right)^2}{4d}\right)\right)\right) d^{-2n-2} + (-1)^\nu e^{-\frac{c^2(\nu-2s)^2}{4d} - g(\nu-2s)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(\nu-2s))^{-h-k+2n} \left(2d\sqrt{z}-c(\nu-2s)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z}-c(\nu-2s)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(2d\sqrt{-\frac{\left(2d\sqrt{z}-c(\nu-2s)\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z}-c(\nu-2s)\right)^2}{4d}\right) - c(\nu-2s)\left(2d\sqrt{z}-c(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z}-c(\nu-2s)\right)^2}{4d}\right)\right)\right) d^{-2n-2}\right) - (2i)^{-\nu} (-d)^{-n-1} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -dz)\,(1-\nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{d z+e} \sinh^\nu\left(c z^r + g\right)$

01.19.21.2341.01

$$\int z^n e^{e+d z} \sinh^\nu\left(c z^2 + g\right) dz = e^e \left(-(2 i)^{-\nu}\right) \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z) (1 - \nu \bmod 2) (-d)^{-n-1} - i^{-\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-c(\nu-2k)}} \left(e^{\frac{d^2}{4c(\nu-2k)} + e - g(\nu-2k) - \frac{i \pi \nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (-c(\nu-2k))^{-n-\frac{1}{2}} (d - 2c(\nu-2k)z)^{q+1} \left(\frac{(d-2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) + \frac{1}{\sqrt{c(\nu-2k)}} \left(e^{-\frac{d^2}{4c(\nu-2k)} + e + \frac{i\pi\nu}{2} + g(\nu-2k)} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (c(\nu-2k))^{-n-\frac{1}{2}} (d + 2c(\nu-2k)z)^{q+1} \left(-\frac{(d+2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) \right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2342.01

$$\int z^n e^{e+d z} \sinh^{\nu}\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (2s-\nu)^2}{4d} - g(2s-\nu)+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-\nu))^{-h-k+2n} \left(2d\sqrt{z} - c(2s-\nu)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2d \sqrt{-\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{d}} \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{4d}\right) - c(2s-\nu)\left(2d\sqrt{z} - c(2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z} - c(2s-\nu)\right)^2}{4d}\right)\right)\right) d^{-2n-2} + (-1)^{\nu} e^{-\frac{c^2(\nu-2s)^2}{4d} - g(\nu-2s)+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(\nu-2s))^{-h-k+2n} \left(2d\sqrt{z} - c(\nu-2s)\right)^{h+k} \left(-\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2d \sqrt{-\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{d}} \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{4d}\right) - c(\nu-2s)\left(2d\sqrt{z} - c(\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2d\sqrt{z} - c(\nu-2s)\right)^2}{4d}\right)\right)\right) d^{-2n-2} \right) - (2i)^{-\nu} (-d)^{-n-1} e^{e} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)\, (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r} \sinh^{\nu}\left(c z^r + g\right)$

01.19.21.2343.01

$$\int z^{\alpha-1} e^{b z^r} \sinh^\nu(c z^r + g)\, dz = -\frac{(2 i)^{-\nu} z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right)(1 - \nu \bmod 2)}{r} - \frac{(2 i)^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-g(\nu-2k) - \frac{i \pi \nu}{2}} \Gamma\left(\frac{\alpha}{r}, (c(\nu-2k) - b) z^r\right) ((c(\nu-2k)-b) z^r)^{-\frac{\alpha}{r}} + e^{\frac{i\pi\nu}{2} + g(\nu-2k)} ((-b - c(\nu-2k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c(\nu-2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2344.01

$$\int z^n e^{b z^2} \sinh^\nu(c z^2 + g)\, dz = -2^{-\nu-1} i^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right)(1 - \nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-\nu-1} i^{-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-g(\nu-2k) - \frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, (c(\nu-2k)-b) z^2\right) \left((c(\nu-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i\pi\nu}{2} + g(\nu-2k)} \left((-b - c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b - c(\nu-2k)) z^2\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2345.01

$$\int z^n e^{\sqrt{z}\, b} \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = -2^{1-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right)(1 - \nu \bmod 2)(-b)^{-2(n+1)} - i^{-\nu} 2^{1-\nu} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-g(\nu-2k) - \frac{i\pi\nu}{2}} \Gamma\left(2(n+1), (c(\nu-2k)-b)\sqrt{z}\right) \left((c(\nu-2k)-b)\sqrt{z}\right)^{-2(n+1)} + e^{\frac{i\pi\nu}{2} + g(\nu-2k)} \left((-b - c(\nu-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b - c(\nu-2k))\sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \sinh^\nu(c z^r + g)$

01.19.21.2346.01

$$\int z^{\alpha-1} e^{b z^r + e} \sinh^\nu(c z^r + g)\, dz = -\frac{(2 i)^{-\nu} e^e z^\alpha (-b z^r)^{-\frac{\alpha}{r}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right)(1 - \nu \bmod 2)}{r} - \frac{(2 i)^{-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e - g(\nu-2k) - \frac{i\pi\nu}{2}} \Gamma\left(\frac{\alpha}{r}, (c(\nu-2k)-b) z^r\right) ((c(\nu-2k)-b) z^r)^{-\frac{\alpha}{r}} + e^{e + \frac{i\pi\nu}{2} + g(\nu-2k)} ((-b - c(\nu-2k)) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b - c(\nu-2k)) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2347.01

$$\int z^n e^{b z^2+e} \sinh^v(c z^2+g)\, dz = -2^{-v-1} e^e i^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} i^{-v} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left(e^{e-g(v-2k)-\frac{i\pi v}{2}} \Gamma\left(\frac{n+1}{2}, (c(v-2k)-b) z^2\right) \left((c(v-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+\frac{i\pi v}{2}+g(v-2k)} \left((-b-c(v-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-c(v-2k)) z^2\right)\right) /; n \in \mathbb{N} \wedge v \in \mathbb{N}^+$$

01.19.21.2348.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^v\left(\sqrt{z}\, c+g\right) dz = 2^{1-v} e^e \left(-i^{-v}\right) \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - v \bmod 2) (-b)^{-2(n+1)} - i^{-v} 2^{1-v} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left(e^{e-g(v-2k)-\frac{i\pi v}{2}} \Gamma\left(2(n+1), (c(v-2k)-b)\sqrt{z}\right) \left((c(v-2k)-b)\sqrt{z}\right)^{-2(n+1)} + e^{e+\frac{i\pi v}{2}+g(v-2k)} \left((-b-c(v-2k))\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b-c(v-2k))\sqrt{z}\right)\right) /; n \in \mathbb{N} \wedge v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+d z} \sinh^v(c z^r+g)$

01.19.21.2349.01

$$\int z^n e^{b z^2+d z} \sinh^v(c z^2+g)\, dz = i^{-v} 2^{-v-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(\binom{v}{\frac{v}{2}} (v \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - i^{-v} b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{-\frac{d^2}{4(b-2cs+cv)}-g(2s-v)} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz-4csz+2cvz)^{q+1} \left(-\frac{(d+2bz-4csz+2cvz)^2}{b-2cs+cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz-4csz+2cvz)^2}{4(b-2cs+cv)}\right)\right) (b-2cs+cv)^{-n-1} + e^{-\frac{d^2}{4(b+2cs-cv)}-g(v-2s)} (b+2cs-cv)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2(b+2cs-cv)z)^{q+1} \left(-\frac{(d+2(b+2cs-cv)z)^2}{b+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2(b+2cs-cv)z)^2}{4(b+2cs-cv)}\right)\right)\right) /; n \in \mathbb{N} \wedge v \in \mathbb{N}^+$$

01.19.21.2350.01

$$\int z^n e^{\sqrt{z}\, b+d\, z} \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(b-c(2s-\nu))^2}{4d}-g(2s-\nu)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(2s-\nu))^{-h-k+2n} \left(b-c(2s-\nu)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(2s-\nu))\left(b-c(2s-\nu)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c(2s-\nu)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + (-1)^\nu e^{-\frac{(b-c(\nu-2s))^2}{4d}-g(\nu-2s)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(\nu-2s))^{-h-k+2n} \left(b-c(\nu-2s)+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(\nu-2s))\left(b-c(\nu-2s)+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b-c(\nu-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2}\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z + e} \sinh^\nu(c z^r + g)$

01.19.21.2351.01

$$\int z^n e^{b z^2 + d z + e} \sinh^\nu(c z^2 + g) \, dz = i^{-\nu} 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z)^{q+1} \left(-\frac{(d + 2 b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 b z)^2}{4 b} \right) - i^{-\nu} b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{d^2}{4(b - 2 c s + c \nu)} + e - g(2 s - \nu)} \left(\sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z - 4 c s z + 2 c \nu z)^{q+1} \left(-\frac{(d + 2 b z - 4 c s z + 2 c \nu z)^2}{b - 2 c s + c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 b z - 4 c s z + 2 c \nu z)^2}{4 (b - 2 c s + c \nu)} \right) \right) (b - 2 c s + c \nu)^{-n-1} + e^{-\frac{d^2}{4(b + 2 c s - c \nu)} + e - g(\nu - 2 s)} (b + 2 c s - c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 (b + 2 c s - c \nu) z)^{q+1} \left(-\frac{(d + 2 (b + 2 c s - c \nu) z)^2}{b + 2 c s - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 (b + 2 c s - c \nu) z)^2}{4 (b + 2 c s - c \nu)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2352.01

$$\int z^n e^{\sqrt{z}\, b + e + d z} \sinh^\nu(\sqrt{z}\, c + g) \, dz = 2^{-2n-\nu-1} e^{e - \frac{b^2}{4d}} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2 d \sqrt{z} \right)^{h+k} \left(-\frac{\left(b + 2 d \sqrt{z} \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 d \sqrt{z} \right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(b + 2 d \sqrt{z} \right)^2}{4 d} \right) + 2 \sqrt{-\frac{\left(b + 2 d \sqrt{z} \right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(b + 2 d \sqrt{z} \right)^2}{4 d} \right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(b - c(2s - \nu))^2}{4d} + e - g(2s - \nu)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b - c(2s - \nu))^{-h-k+2n} \left(b - c(2s - \nu) + 2 d \sqrt{z} \right)^{h+k} \left(-\frac{\left(b - c(2s - \nu) + 2 d \sqrt{z} \right)^2}{d} \right)^{\frac{1}{2}(-h-k-1)} \right. \right.$$

$$\binom{k}{h}\binom{n}{k}\left((b-c(2s-v))\left(b-c(2s-v)+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)+2\right.$$

$$\left.\left.\sqrt{-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b-c(2s-v)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}+$$

$$(-1)^v e^{-\frac{(b-c(v-2s))^2}{4d}+e-g(v-2s)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b-c(v-2s))^{-h-k+2n}\left(b-c(v-2s)+2d\sqrt{z}\right)^{h+k}\right.$$

$$\left(-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((b-c(v-2s))\left(b-c(v-2s)+2d\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\left.d\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b-c(v-2s)+2d\sqrt{z}\right)^2}{4d}\right)\right)\right)d^{-2n-2}\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{d\,z}\,\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2353.01

$$\int z^n e^{d z} \sinh^\nu(c z^2 + f z)\, dz = -2^{-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)\,(1 - \nu \bmod 2)\,(-d)^{-n-1} - 2^{-\nu-1} i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-c(\nu-2k)}} \left(e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)} - \frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-c(\nu-2k))^{-n-\frac{1}{2}} (f(\nu-2k)-d)^{n-q} (d - f(\nu-2k) - 2c(\nu-2k)z)^{q+1} \left(\frac{(d - f(\nu-2k) - 2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d - f(\nu-2k) - 2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) + \frac{1}{\sqrt{c(\nu-2k)}} \left(e^{\frac{i\pi\nu}{2} - \frac{(d+f(\nu-2k))^2}{4c(\nu-2k)}} \sum_{q=0}^{n} 2^{q-n} (c(\nu-2k))^{-n-\frac{1}{2}} (-d - f(\nu-2k))^{n-q} (d + f(\nu-2k) + 2c(\nu-2k)z)^{q+1} \left(-\frac{(d + f(\nu-2k) + 2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + f(\nu-2k) + 2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2354.01

$$\int z^n e^{d z} \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (2s-\nu)^2}{4(d - f(2s-\nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-\nu))^{-h-k+2n} \left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu) \right)^{h+k} \left(-\frac{\left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{d - f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2(d - f(2s-\nu)) \sqrt{-\frac{\left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{d - f(2s-\nu)}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{4(d - f(2s-\nu))} \right) - c(2s-\nu)\left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d - f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{4(d - f(2s-\nu))} \right) \right) \right) (d - f(2s-\nu))^{-2n-2} +$$

$$(-1)^{v}\, e^{-\frac{c^2 (v-2s)^2}{4(d-f(v-2s))}}\, (d-f(v-2s))^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-c(v-2s))^{-h-k+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)^{h+k} \left(-\frac{\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{d-f(v-2s)}}\;\Gamma\!\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(d-f(v-2s))}\right) - c(v-2s)\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(d-f(v-2s))}\right)\right)\right) -$$

$$(2i)^{-v}\,(-d)^{-n-1}\binom{v}{\frac{v}{2}}\Gamma(n+1, -d z)\,(1 - v \bmod 2)\; /;\; n \in \mathbb{N} \bigwedge$$

$$v \in \mathbb{N}^+$$

Involving $z^n\, e^{d z+e} \sinh^v\!\left(c z^r + f z\right)$

01.19.21.2355.01

$$\int z^n e^{e+d z} \sinh^\nu(c z^2 + f z)\, dz = -2^{-\nu} e^e i^{-\nu} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -d z)\,(1 - \nu \bmod 2)\,(-d)^{-n-1} - 2^{-\nu-1} i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-c(\nu-2k)}} \left(e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)}+e-\frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (-c(\nu-2k))^{-n-\frac{1}{2}} (f(\nu-2k)-d)^{n-q} (d - f(\nu-2k) - 2c(\nu-2k)z)^{q+1} \left(\frac{(d-f(\nu-2k)-2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d-f(\nu-2k)-2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) + \frac{1}{\sqrt{c(\nu-2k)}} \left(e^{-\frac{(d+f(\nu-2k))^2}{4c(\nu-2k)}+e+\frac{i\pi\nu}{2}} \sum_{q=0}^{n} 2^{q-n} (c(\nu-2k))^{-n-\frac{1}{2}} (-d - f(\nu-2k))^{n-q} (d + f(\nu-2k) + 2c(\nu-2k)z)^{q+1} \left(-\frac{(d+f(\nu-2k)+2c(\nu-2k)z)^2}{c(\nu-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f(\nu-2k)+2c(\nu-2k)z)^2}{4c(\nu-2k)} \right) \right) \right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2356.01

$$\int z^n e^{e+d z} \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (2s-\nu)^2}{4(d-f(2s-\nu))}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-\nu))^{-h-k+2n} \left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu) \right)^{h+k} \left(-\frac{\left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{d - f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2(d-f(2s-\nu)) \sqrt{-\frac{\left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{d-f(2s-\nu)}}\ \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{4(d-f(2s-\nu))} \right) - c(2s-\nu)\left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu)\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(2s-\nu))\sqrt{z} - c(2s-\nu)\right)^2}{4(d-f(2s-\nu))} \right) \right) \right) (d - f(2s-\nu))^{-2n-2} + $$

$$(-1)^{\nu}\, e^{-\frac{c^2 (\nu-2 s)^2}{4 (d-f (\nu-2 s))}+e} (d-f(\nu-2 s))^{-2 n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, (-c (\nu-2 s))^{-h-k+2 n}$$

$$\left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right)^{h+k} \left(-\frac{\left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right)^2}{d-f (\nu-2 s)}\right)^{\frac{1}{2} (-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(2 (d-f (\nu-2 s)) \sqrt{-\frac{\left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right)^2}{d-f (\nu-2 s)}}\ \Gamma\left(\frac{1}{2} (h+k+2),\right.\right.$$

$$\left.-\frac{\left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right)^2}{4 (d-f (\nu-2 s))}\right)-c (\nu-2 s) \left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right) \Gamma\Bigg($$

$$\left.\left.\frac{1}{2} (h+k+1),-\frac{\left(2 (d-f (\nu-2 s)) \sqrt{z}-c (\nu-2 s)\right)^2}{4 (d-f (\nu-2 s))}\right)\right)\right)-$$

$$(2 i)^{-\nu} (-d)^{-n-1}\, e^{e} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1,-d z)\, (1-\nu \bmod 2)\ /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n\, e^{b z^r} \sinh^{\nu}\left(c z^r+f z\right)$

01.19.21.2357.01

$$\int z^n e^{b z^2} \sinh^v(c z^2 + f z)\, dz = -2^{-v-1} i^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(f v-2 f s)^2}{4(b-2 c s+c v)}} \left(\sum_{q=0}^{n} 2^{q-n} (2 f s - f v)^{n-q} (f (v-2 s) + 2 (b - 2 c s + c v) z)^{q+1} \left(-\frac{(f (v-2 s) + 2 (b - 2 c s + c v) z)^2}{b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f (v-2 s) + 2 (b - 2 c s + c v) z)^2}{4 (b - 2 c s + c v)}\right)\right) (b - 2 c s + c v)^{-n-1} + (-1)^v e^{-\frac{(2 f s - f v)^2}{4(b+2 c s-c v)}} (b + 2 c s - c v)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (f v - 2 f s)^{n-q} (2 f s + 4 c z s - f v + 2 b z - 2 c v z)^{q+1} \left(-\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{b + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{4 (b + 2 c s - c v)}\right)\right) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2358.01

$$\int z^n e^{b\sqrt{z}} \sinh^{\nu}\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(b-c(2s-\nu))^2}{4f(2s-\nu)}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(2s-\nu))^{-h-k+2n} \left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(2s-\nu)) \left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{4f(2s-\nu)} \right) - 2f(2s-\nu) \sqrt{\frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{4f(2s-\nu)} \right) \right) \right) (-f(2s-\nu))^{-2n-2} + (-1)^{\nu} e^{\frac{(b-c(\nu-2s))^2}{4f(\nu-2s)}} (-f(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(\nu-2s))^{-h-k+2n} \left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(\nu-2s)) \left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)} \right) - 2f(\nu-2s) \sqrt{\frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{4f(\nu-2s)} \right) \right) \right) - 2^{1-\nu} i^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+e} \sinh^v(c z^r + f z)$

01.19.21.2359.01

$$\int z^n e^{b z^2+e} \sinh^v(c z^2 + f z)\, dz = -2^{-v-1} e^e i^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(f v-2 f s)^2}{4(b-2 c s+c v)}+e} \left(\sum_{q=0}^{n} 2^{q-n} (2 f s - f v)^{n-q} (f(v-2s) + 2(b-2cs+cv)z)^{q+1} \left(-\frac{(f(v-2s)+2(b-2cs+cv)z)^2}{b-2cs+cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f(v-2s)+2(b-2cs+cv)z)^2}{4(b-2cs+cv)}\right)\right) (b-2cs+cv)^{-n-1} + (-1)^v e^{-\frac{(2 f s-f v)^2}{4(b+2cs-cv)}+e} (b+2cs-cv)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (f v - 2 f s)^{n-q} (2 f s + 4 c z s - f v + 2 b z - 2 c v z)^{q+1} \left(-\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{b+2cs-cv}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{4(b+2cs-cv)}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2360.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^\nu\left(\sqrt{z}\, c+f z\right) dz = 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(b-c(2s-\nu))^2}{4 f (2s-\nu)}+e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(2s-\nu))^{-h-k+2n} \left(b-c(2s-\nu)-2 f(2s-\nu)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(2s-\nu)) \left(b-c(2s-\nu)- 2 f(2s-\nu)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{4 f(2s-\nu)} \right) - 2 f(2s-\nu) \sqrt{\frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{f(2s-\nu)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(2s-\nu)-2f(2s-\nu)\sqrt{z}\right)^2}{4 f(2s-\nu)} \right) \right) \right) (-f(2s-\nu))^{-2n-2} + (-1)^\nu e^{\frac{(b-c(\nu-2s))^2}{4 f(\nu-2s)}+e} (-f(\nu-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(\nu-2s))^{-h-k+2n} \left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(\nu-2s)) \left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)} \right) - 2 f(\nu-2s) \sqrt{\frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{f(\nu-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(\nu-2s)-2f(\nu-2s)\sqrt{z}\right)^2}{4 f(\nu-2s)} \right) \right) \right) - 2^{1-\nu} i^{-\nu} b^{-2(n+1)} e^e \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-\nu \bmod 2) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \sinh^\nu(c z^r + f z)$

01.19.21.2361.01

$$\int z^n e^{b z^2 + d z} \sinh^\nu(c z^2 + f z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(i^\nu \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(d-2fs+f\nu)^2}{4(b-2cs+c\nu)}} (b - 2 c s + c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d + 2 f s - f \nu)^{n-q} (d + f(\nu - 2s) + 2(b - 2cs + c\nu) z)^{q+1} \left(-\frac{(d + f(\nu-2s) + 2(b-2cs+c\nu)z)^2}{b - 2cs + c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + f(\nu-2s) + 2(b-2cs+c\nu)z)^2}{4(b-2cs+c\nu)}\right) + (-1)^\nu e^{-\frac{(d+2fs-f\nu)^2}{4(b+2cs-c\nu)}} (b + 2cs - c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d - 2fs + f\nu)^{n-q} (d + 2fs - f\nu + 2bz + 4csz - 2c\nu z)^{q+1} \left(-\frac{(d + 2fs - f\nu + 2bz + 4csz - 2c\nu z)^2}{b + 2cs - c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2fs - f\nu + 2bz + 4csz - 2c\nu z)^2}{4(b+2cs-c\nu)}\right) \right) \right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2362.01

$$\int z^n e^{\sqrt{z}\, b + d z} \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b + 2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b + 2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) \right) \right) d^{-2n-2} + 2^{-2n-\nu-1}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v e^{-\frac{(b+c(2s-v))^2}{4(d+f(2s-v))}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(b+c(2s-v))^{-h-k+2n}\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^{h+k}\right.\right.$$

$$\left(-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{d+f(2s-v)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\left((b+c(2s-v))\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{4(d+f(2s-v))}\right)+2\sqrt{-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{d+f(2s-v)}}$$

$$\left.\left.\left.(d+f(2s-v))\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{4(d+f(2s-v))}\right)\right)\right)\right)$$

$$(d+f(2s-v))^{-2n-2}+e^{-\frac{(b+c(v-2s))^2}{4(d+f(v-2s))}}(d+f(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(b+c(v-2s))^{-h-k+2n}$$

$$\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b+c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)+2\sqrt{-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}$$

$$\left.\left.\left.(d+f(v-2s))\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\right)\right)\right)/;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n e^{b z^r+d z+e}\sinh^v\left(c z^r+f z\right)$

01.19.21.2363.01

$$\int z^n e^{b z^2+d z+e} \sinh^\nu(c z^2 + f z)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4 b}} \left(i^\nu e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d + 2 b z)^{q+1} \left(-\frac{(d+2 b z)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2 b z)^2}{4 b}\right) - b^{n+1} e^{\frac{d^2}{4 b}} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(d-2 f s+f \nu)^2}{4 (b-2 c s+c \nu)}+e} (b - 2 c s + c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d + 2 f s - f \nu)^{n-q} (d + f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^{q+1} \left(-\frac{(d + f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{b - 2 c s + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + f (\nu - 2 s) + 2 (b - 2 c s + c \nu) z)^2}{4 (b - 2 c s + c \nu)}\right) + (-1)^\nu e^{-\frac{(d+2 f s-f \nu)^2}{4 (b+2 c s-c \nu)}+e} (b + 2 c s - c \nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d - 2 f s + f \nu)^{n-q} (d + 2 f s - f \nu + 2 b z + 4 c s z - 2 c \nu z)^{q+1} \left(-\frac{(d + 2 f s - f \nu + 2 b z + 4 c s z - 2 c \nu z)^2}{b + 2 c s - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + 2 f s - f \nu + 2 b z + 4 c s z - 2 c \nu z)^2}{4 (b + 2 c s - c \nu)}\right)\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2364.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh^\nu(\sqrt{z}\, c + f z)\, dz = 2^{-2 n-\nu-1} e^{e-\frac{b^2}{4 d}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2 n} \left(b + 2 d \sqrt{z}\right)^{h+k} \left(-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b \left(b + 2 d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{-\frac{\left(b + 2 d \sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h + k + 2), -\frac{\left(b + 2 d \sqrt{z}\right)^2}{4 d}\right)\right)\right) d^{-2 n-2} + 2^{-2 n-\nu-1}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v e^{e-\frac{(b+c(2s-v))^2}{4(d+f(2s-v))}} \Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c(2s-v))^{-h-k+2n} \left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{d+f(2s-v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\Bigg((b+c(2s-v))\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{4(d+f(2s-v))}\Bigg) + 2\sqrt{-\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{d+f(2s-v)}}$$

$$(d+f(2s-v))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c(2s-v)+2(d+f(2s-v))\sqrt{z}\right)^2}{4(d+f(2s-v))}\right)\Bigg)\Bigg)$$

$$(d+f(2s-v))^{-2n-2} + e^{e-\frac{(b+c(v-2s))^2}{4(d+f(v-2s))}} (d+f(v-2s))^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c(v-2s))^{-h-k+2n}$$

$$\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((b+c(v-2s))\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\Bigg) + 2\sqrt{-\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{d+f(v-2s)}}$$

$$(d+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+c(v-2s)+2(d+f(v-2s))\sqrt{z}\right)^2}{4(d+f(v-2s))}\right)\Bigg)\Bigg) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{d z} \sinh^v\left(c z^r + f z + g\right)$

01.19.21.2365.01

$$\int z^n e^{dz}\sinh^\nu\left(c z^2+f z+g\right)dz = -2^{-\nu} i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\Gamma(n+1,-d z)(1-\nu \bmod 2)(-d)^{-n-1}-2^{-\nu-1} i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{\sqrt{-c(\nu-2k)}}\left(e^{\frac{(d-f(\nu-2k))^2}{4c(\nu-2k)}-g(\nu-2k)-\frac{i\pi\nu}{2}}\sum_{q=0}^n 2^{q-n}(-c(\nu-2k))^{-n-\frac{1}{2}}(f(\nu-2k)-d)^{n-q}(d-f(\nu-2k)-2c(\nu-2k)z)^{q+1}\left(\frac{(d-f(\nu-2k)-2c(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(d-f(\nu-2k)-2c(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)+\frac{1}{\sqrt{c(\nu-2k)}}\left(e^{-\frac{(d+f(\nu-2k))^2}{4c(\nu-2k)}+\frac{i\pi\nu}{2}+g(\nu-2k)}\sum_{q=0}^n 2^{q-n}(c(\nu-2k))^{-n-\frac{1}{2}}(-d-f(\nu-2k))^{n-q}(d+f(\nu-2k)+2c(\nu-2k)z)^{q+1}\left(-\frac{(d+f(\nu-2k)+2c(\nu-2k)z)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(d+f(\nu-2k)+2c(\nu-2k)z)^2}{4c(\nu-2k)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2366.01

$$\int z^n e^{dz}\sinh^\nu\left(\sqrt{z}\,c+g+f z\right)dz = 2^{-2n-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2(2s-\nu)^2}{4(d-f(2s-\nu))}-g(2s-\nu)}\left(\sum_{k=0}^n\sum_{h=0}^k(-1)^{k-h}4^k(-c(2s-\nu))^{-h-k+2n}\left(2(d-f(2s-\nu))\sqrt{z}-c(2s-\nu)\right)^{h+k}\left(-\frac{\left(2(d-f(2s-\nu))\sqrt{z}-c(2s-\nu)\right)^2}{d-f(2s-\nu)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left(2(d-f(2s-\nu))\sqrt{-\frac{\left(2(d-f(2s-\nu))\sqrt{z}-c(2s-\nu)\right)^2}{d-f(2s-\nu)}}\,\Gamma\left(\frac{1}{2}(h+k+2),-\frac{\left(2(d-f(2s-\nu))\sqrt{z}-c(2s-\nu)\right)^2}{4(d-f(2s-\nu))}\right)-c(2s-\nu)\left(2(d-f(2s-\nu))\sqrt{z}-c(2s-\nu)\right)\right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(2s-v))\sqrt{z}-c(2s-v)\right)^2}{4(d-f(2s-v))}\right)\Bigg)\Bigg)(d-f(2s-v))^{-2n-2}+$$

$$(-1)^v e^{-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}-g(v-2s)}(d-f(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-c(v-2s))^{-h-k+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+k}\left(-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}}\,\Gamma\left(\frac{1}{2}(h+k+2),\right.\right.$$

$$\left.-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\right)-c(v-2s)\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\Bigg)\Bigg)\Bigg)-$$

$$(2i)^{-v}(-d)^{-n-1}\binom{v}{\frac{v}{2}}\Gamma(n+1,-dz)(1-v \bmod 2)\,/;\,n\in\mathbb{N}\bigwedge$$

$$v\in\mathbb{N}^+$$

Involving $z^n e^{dz+e}\sinh^v\left(cz^r+fz+g\right)$

01.19.21.2367.01

$$\int z^n e^{e+d z} \sinh^v\left(c z^2 + f z + g\right) dz = -2^{-v} e^e i^{-v} \binom{v}{\frac{v}{2}} \Gamma(n+1, -d z) (1 - v \bmod 2) (-d)^{-n-1} - 2^{-v-1} i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\frac{1}{\sqrt{-c (v-2k)}} \left(e^{\frac{(d-f(v-2k))^2}{4 c (v-2k)} + e - g (v-2k) - \frac{i \pi v}{2}} \sum_{q=0}^{n} 2^{q-n} (-c(v-2k))^{-n-\frac{1}{2}} (f(v-2k)-d)^{n-q} (d - f(v-2k) - 2c(v-2k)z)^{q+1} \left(\frac{(d - f(v-2k) - 2c(v-2k)z)^2}{c(v-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(d - f(v-2k) - 2c(v-2k)z)^2}{4c(v-2k)} \right) \right) + \frac{1}{\sqrt{c(v-2k)}} \left(e^{-\frac{(d+f(v-2k))^2}{4c(v-2k)} + e + \frac{i\pi v}{2} + g(v-2k)} \sum_{q=0}^{n} 2^{q-n} (c(v-2k))^{-n-\frac{1}{2}} (-d - f(v-2k))^{n-q} (d + f(v-2k) + 2c(v-2k)z)^{q+1} \left(-\frac{(d + f(v-2k) + 2c(v-2k)z)^2}{c(v-2k)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d + f(v-2k) + 2c(v-2k)z)^2}{4c(v-2k)} \right) \right) \right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2368.01

$$\int z^n e^{e+d z} \sinh^v\left(\sqrt{z}\, c + g + f z\right) dz = 2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{c^2 (2s-v)^2}{4(d-f(2s-v))} - g(2s-v) + e} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (-c(2s-v))^{-h-k+2n} \left(2(d - f(2s-v))\sqrt{z} - c(2s-v)\right)^{h+k} \left(-\frac{\left(2(d-f(2s-v))\sqrt{z} - c(2s-v)\right)^2}{d - f(2s-v)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(2(d - f(2s-v)) \sqrt{-\frac{\left(2(d-f(2s-v))\sqrt{z} - c(2s-v)\right)^2}{d - f(2s-v)}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(2(d-f(2s-v))\sqrt{z} - c(2s-v)\right)^2}{4(d - f(2s-v))} \right) - c(2s-v)\left(2(d-f(2s-v))\sqrt{z} - c(2s-v)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(2s-v))\sqrt{z}-c(2s-v)\right)^2}{4(d-f(2s-v))}\right)\Bigg)\Bigg)(d-f(2s-v))^{-2n-2} +$$

$$(-1)^v e^{-\frac{c^2(v-2s)^2}{4(d-f(v-2s))}-g(v-2s)+e}(d-f(v-2s))^{-2n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(-c(v-2s))^{-h-k+2n}$$

$$\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+k}\left(-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2(d-f(v-2s))\sqrt{-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{d-f(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\Bigg)-c(v-2s)\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+k+1), -\frac{\left(2(d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(d-f(v-2s))}\Bigg)\Bigg)\Bigg)-$$

$$(2i)^{-v}(-d)^{-n-1}e^e\binom{v}{\frac{v}{2}}\Gamma(n+1,-dz)(1-v \bmod 2)\;/;\; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n e^{b z^r} \sinh^v(c z^r + f z + g)$

01.19.21.2369.01

$$\int z^n e^{b z^2} \sinh^v(c z^2 + f z + g)\, dz = -2^{-v-1} i^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1 - v \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(f v - 2 f s)^2}{4(b - 2 c s + c v)} + g(v - 2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 f s - f v)^{n-q} (f (v - 2 s) + 2 (b - 2 c s + c v) z)^{q+1} \left(-\frac{(f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{b - 2 c s + c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f (v - 2 s) + 2 (b - 2 c s + c v) z)^2}{4 (b - 2 c s + c v)}\right) \right) (b - 2 c s + c v)^{-n-1} + (-1)^v e^{-\frac{(2 f s - f v)^2}{4(b + 2 c s - c v)} + g(2 s - v)} (b + 2 c s - c v)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (f v - 2 f s)^{n-q} (2 f s + 4 c z s - f v + 2 b z - 2 c v z)^{q+1} \left(-\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{b + 2 c s - c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 f s + 4 c z s - f v + 2 b z - 2 c v z)^2}{4 (b + 2 c s - c v)}\right) \right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2370.01

$$\int z^n e^{b\sqrt{z}} \sinh^v\left(\sqrt{z}\, c+g+f\, z\right) dz = 2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{(b-c(2s-v))^2}{4f(2s-v)}-g(2s-v)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(2s-v))^{-h-k+2n} \left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{f(2s-v)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(2s-v)) \left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{4f(2s-v)}\right) - 2f(2s-v) \sqrt{\frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{f(2s-v)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{4f(2s-v)}\right)\right)\right) (-f(2s-v))^{-2n-2} + (-1)^v e^{\frac{(b-c(v-2s))^2}{4f(v-2s)}-g(v-2s)} (-f(v-2s))^{-2n-2} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(v-2s))^{-h-k+2n} \left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left((b-c(v-2s)) \left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right) - 2f(v-2s) \sqrt{\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\right)\right) - 2^{1-v} i^{-v} b^{-2(n+1)} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - v \bmod 2) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n\, e^{b z^r+e} \sinh^v(c z^r + f z + g)$

01.19.21.2371.01

$$\int z^n e^{b z^2+e} \sinh^v(c z^2 + f z + g)\, dz = -2^{-v-1} e^e i^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right)(1 - v \bmod 2)\left(-b z^2\right)^{\frac{1}{2}(-n-1)} - 2^{-v-1} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(f v-2 f s)^2}{4(b-2 c s+c v)}+e+g(v-2 s)} \left(\sum_{q=0}^{n} 2^{q-n} (2 f s - f v)^{n-q} (f (v-2 s) + 2 (b - 2 c s + c v) z)^{q+1} \left(-\frac{(f (v-2 s)+2 (b-2 c s+c v) z)^2}{b-2 c s+c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(f (v-2 s)+2 (b-2 c s+c v) z)^2}{4 (b-2 c s+c v)}\right)\right) (b - 2 c s + c v)^{-n-1} + (-1)^v e^{-\frac{(2 f s-f v)^2}{4(b+2 c s-c v)}+e+g(2 s-v)} (b + 2 c s - c v)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (f v - 2 f s)^{n-q} (2 f s + 4 c z s - f v + 2 b z - 2 c v z)^{q+1} \left(-\frac{(2 f s+4 c z s-f v+2 b z-2 c v z)^2}{b+2 c s-c v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 f s+4 c z s-f v+2 b z-2 c v z)^2}{4 (b+2 c s-c v)}\right)\right) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2372.01

$$\int z^n e^{\sqrt{z}\, b+e} \sinh^v\left(\sqrt{z}\, c+g+f z\right) dz = 2^{-2n-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{(b-c(2s-v))^2}{4 f (2s-v)}+e-g(2s-v)} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(2s-v))^{-h-k+2n} \left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{f(2s-v)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(2s-v)) \left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{4f(2s-v)}\right) - 2f(2s-v) \sqrt{\frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{f(2s-v)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(2s-v)-2f(2s-v)\sqrt{z}\right)^2}{4f(2s-v)}\right) \right) \right) (-f(2s-v))^{-2n-2} + (-1)^v e^{\frac{(b-c(v-2s))^2}{4f(v-2s)}+e-g(v-2s)} (-f(v-2s))^{-2n-2} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b-c(v-2s))^{-h-k+2n} \left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+k} \left(\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)} \right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left((b-c(v-2s)) \left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right) - 2f(v-2s) \sqrt{\frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(b-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right) \right) \right) - 2^{1-v} i^{-v} b^{-2(n+1)} e^e \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1 - v \bmod 2) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r + d z} \sinh^v\left(c z^r + f z + g\right)$

01.19.21.2373.01

$$\int z^n e^{b z^2+d z} \sinh^\nu(c z^2 + f z + g)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \left(i^\nu \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{(d-2fs+f\nu)^2}{4(b-2cs+c\nu)}+g(\nu-2s)} (b-2cs+c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d+2fs-f\nu)^{n-q} (d+f(\nu-2s)+2(b-2cs+c\nu)z)^{q+1} \left(-\frac{(d+f(\nu-2s)+2(b-2cs+c\nu)z)^2}{b-2cs+c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f(\nu-2s)+2(b-2cs+c\nu)z)^2}{4(b-2cs+c\nu)}\right) + (-1)^\nu e^{-\frac{(d+2fs-f\nu)^2}{4(b+2cs-c\nu)}+g(2s-\nu)} (b+2cs-c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d-2fs+f\nu)^{n-q} (d+2fs-f\nu+2bz+4csz-2c\nu z)^{q+1} \left(-\frac{(d+2fs-f\nu+2bz+4csz-2c\nu z)^2}{b+2cs-c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2fs-f\nu+2bz+4csz-2c\nu z)^2}{4(b+2cs-c\nu)}\right)\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2374.01

$$\int z^n e^{\sqrt{z}\, b+d z} \sinh^\nu(\sqrt{z}\, c + g + f z)\, dz = 2^{-2n-\nu-1} e^{-\frac{b^2}{4d}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} (b+2d\sqrt{z})^{h+k} \left(-\frac{(b+2d\sqrt{z})^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(b (b+2d\sqrt{z}) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{(b+2d\sqrt{z})^2}{4d}\right) + 2\sqrt{-\frac{(b+2d\sqrt{z})^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{(b+2d\sqrt{z})^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{g(2s-\nu)-\frac{(b+c(2s-\nu))^2}{4(d+f(2s-\nu))}} \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c(2s-\nu))^{-h-k+2n} \right.\right.$$

$$\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b+c\,(2\,s-v))\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,s-v))}\right)+2\,\sqrt{-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,(2\,s-v)}}$$

$$\left.\left.(d+f\,(2\,s-v))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,s-v))}\right)\right)\right)$$

$$(d+f\,(2\,s-v))^{-2\,n-2}+e^{g\,(v-2\,s)-\frac{(b+c\,(v-2\,s))^2}{4\,(d+f\,(v-2\,s))}}\,(d+f\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b+c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\left.\left.(d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{b\,z^r+d\,z+e}\,\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.2375.01

$$\int z^n e^{b z^2+d z+e} \sinh^\nu(c z^2 + f z + g)\, dz = 2^{-\nu-1} b^{-n-1} e^{-\frac{d^2}{4b}} \Bigg(i^\nu e^e \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{q=0}^{n} 2^{q-n} (-d)^{n-q} (d+2bz)^{q+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - b^{n+1} e^{\frac{d^2}{4b}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{-\frac{(d-2fs+f\nu)^2}{4(b-2cs+c\nu)}+e+g(\nu-2s)} (b-2cs+c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d+2fs-f\nu)^{n-q} (d+f(\nu-2s)+2(b-2cs+c\nu)z)^{q+1} \left(-\frac{(d+f(\nu-2s)+2(b-2cs+c\nu)z)^2}{b-2cs+c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+f(\nu-2s)+2(b-2cs+c\nu)z)^2}{4(b-2cs+c\nu)}\right) + (-1)^\nu e^{-\frac{(d+2fs-f\nu)^2}{4(b+2cs-c\nu)}+e+g(2s-\nu)} (b+2cs-c\nu)^{-n-1} \sum_{q=0}^{n} 2^{q-n} (-d-2fs+f\nu)^{n-q} (d+2fs-f\nu+2bz+4csz-2c\nu z)^{q+1} \left(-\frac{(d+2fs-f\nu+2bz+4csz-2c\nu z)^2}{b+2cs-c\nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(d+2fs-f\nu+2bz+4csz-2c\nu z)^2}{4(b+2cs-c\nu)}\right)\Bigg)\Bigg) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2376.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sinh^\nu(\sqrt{z}\, c + g + f z)\, dz = 2^{-2n-\nu-1} e^{e-\frac{b^2}{4d}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k b^{-h-k+2n} \left(b+2d\sqrt{z}\right)^{h+k} \left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(b\left(b+2d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+k+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\, d\, \Gamma\left(\frac{1}{2}(h+k+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2n-2} + 2^{-2n-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{(b+c(2s-\nu))^2}{4(d+f(2s-\nu))}+e+g(2s-\nu)} \left(\sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (b+c(2s-\nu))^{-h-k+2n}\right.\right.$$

$$\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b+c\,(2\,s-v))\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,s-v))}\right)+2\,\sqrt{-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{d+f\,(2\,s-v)}}$$

$$\left.\left.(d+f\,(2\,s-v))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+c\,(2\,s-v)+2\,(d+f\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,s-v))}\right)\right)\right)$$

$$(d+f\,(2\,s-v))^{-2\,n-2}+e^{-\frac{(b+c\,(v-2\,s))^2}{4\,(d+f\,(v-2\,s))}+e+g\,(v-2\,s)}\,(d+f\,(v-2\,s))^{-2\,n-2}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(b+c\,(v-2\,s))^{-h-k+2\,n}$$

$$\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((b+c\,(v-2\,s))\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+k+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+f\,(v-2\,s)}}$$

$$\left.\left.(d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(b+c\,(v-2\,s)+2\,(d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving products of the direct functions, exponential and a power functions

Involving products of two direct functions, exponential and a power functions

Involving $z^{\alpha-1}\,e^{p\,z}\,\sinh(c\,z)\,\sinh(a\,z)$

01.19.21.2377.01

$$\int z^{\alpha-1} e^{p z} \sinh(c z) \sinh(a z) \, dz = \frac{1}{4} z^{\alpha} \left(-((a+c-p) z)^{-\alpha} \Gamma(\alpha, (a+c-p) z) + (-(a-c+p) z)^{-\alpha} \Gamma(\alpha, -(a-c+p) z) + (-(-a+c+p) z)^{-\alpha} \Gamma(\alpha, -(-a+c+p) z) - (-(a+c+p) z)^{-\alpha} \Gamma(\alpha, -(a+c+p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sinh(c z) \sinh(a z + b)$

01.19.21.2378.01

$$\int z^{\alpha-1} e^{p z} \sinh(c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b} z^{\alpha} \left(-e^{2 b} \Gamma(\alpha, (-a-c-p) z) ((-a-c-p) z)^{-\alpha} + ((a-c-p) z)^{-\alpha} \Gamma(\alpha, (a-c-p) z) + e^{2 b} ((-a+c-p) z)^{-\alpha} \Gamma(\alpha, (-a+c-p) z) - ((a+c-p) z)^{-\alpha} \Gamma(\alpha, (a+c-p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \sinh(c z + d) \sinh(a z + b)$

01.19.21.2379.01

$$\int z^{\alpha-1} e^{p z} \sinh(d + c z) \sinh(b + a z) \, dz = \frac{1}{4} e^{-b-d} z^{\alpha} \left(-e^{2 (b+d)} \Gamma(\alpha, (-a-c-p) z) ((-a-c-p) z)^{-\alpha} + e^{2 d} ((a-c-p) z)^{-\alpha} \Gamma(\alpha, (a-c-p) z) + e^{2 b} ((-a+c-p) z)^{-\alpha} \Gamma(\alpha, (-a+c-p) z) - ((a+c-p) z)^{-\alpha} \Gamma(\alpha, (a+c-p) z)\right)$$

Involving $z^{n} e^{p z^{r}} \sinh(b z) \sinh(c z)$

01.19.21.2380.01

$$\int z^{n} e^{p z^2} \sinh(b z) \sinh(c z) \, dz = -\frac{1}{8} p^{-n-1} \left(e^{-\frac{(-b-c)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (b+c)^{n-j} (-b-c+2 p z)^{j+1} \left(-\frac{(-b-c+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-b-c+2 p z)^2}{4 p}\right) - e^{-\frac{(b-c)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (c-b)^{n-j} (b-c+2 p z)^{j+1} \left(-\frac{(b-c+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b-c+2 p z)^2}{4 p}\right) - e^{-\frac{(c-b)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (b-c)^{n-j} (-b+c+2 p z)^{j+1} \left(-\frac{(-b+c+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-b+c+2 p z)^2}{4 p}\right) + e^{-\frac{(b+c)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (-b-c)^{n-j} (b+c+2 p z)^{j+1} \left(-\frac{(b+c+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b+c+2 p z)^2}{4 p}\right)\right) /; n \in \mathbb{N}$$

01.19.21.2381.01

$$\int z^n e^{p\sqrt{z}} \sinh(b z)\sinh(c z)\,dz = 2^{-2n-3}\left(e^{-\frac{p^2}{4(-b-c)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(2\sqrt{z}\,(-b-c)+p\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(-b-c)+p\right)^2}{-b-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(p\left(2\sqrt{z}\,(-b-c)+p\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(-b-c)+p\right)^2}{4(-b-c)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(-b-c)+p\right)^2}{-b-c}}\,(-b-c)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(-b-c)+p\right)^2}{4(-b-c)}\right)\right)\right)(-b-c)^{-2n-2}-(b-c)^{-2n-2}\,e^{-\frac{p^2}{4(b-c)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(2\sqrt{z}\,(b-c)+p\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(b-c)+p\right)^2}{b-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(p\left(2\sqrt{z}\,(b-c)+p\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(b-c)+p\right)^2}{4(b-c)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(b-c)+p\right)^2}{b-c}}\,(b-c)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(b-c)+p\right)^2}{4(b-c)}\right)\right)-(c-b)^{-2n-2}\,e^{-\frac{p^2}{4(c-b)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(2\sqrt{z}\,(c-b)+p\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(c-b)+p\right)^2}{c-b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(p\left(2\sqrt{z}\,(c-b)+p\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2\sqrt{z}\,(c-b)+p\right)^2}{4(c-b)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(c-b)+p\right)^2}{c-b}}\,(c-b)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,(c-b)+p\right)^2}{4(c-b)}\right)\right)+$$

$$(b+c)^{-2n-2}\, e^{-\frac{p^2}{4(b+c)}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, p^{-h-j+2n} \left(2\sqrt{z}\,(b+c)+p\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\,(b+c)+p\right)^2}{b+c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(2\sqrt{z}\,(b+c)+p\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(b+c)+p\right)^2}{4(b+c)}\right)+\right.$$

$$\left.\left. 2\sqrt{-\frac{\left(2\sqrt{z}\,(b+c)+p\right)^2}{b+c}}\,(b+c)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(b+c)+p\right)^2}{4(b+c)}\right)\right)\right) /;\, n\in\mathbb{N}$$

Involving $z^n\, e^{p z}\sinh\left(b z^r\right)\sinh(c z)$

01.19.21.2382.01

$$\int z^n\, e^{p z}\sinh\left(b z^2\right)\sinh(c z)\,dz = $$

$$\frac{1}{8}\left(e^{\frac{(c+p)^2}{4b}}\left(\sum_{j=0}^{n} 2^{j-n}(-c-p)^{n-j}(c+p-2bz)^{j+1}\left(\frac{(c+p-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(c+p-2bz)^2}{4b}\right)\right)(-b)^{-n-1} - \right.$$

$$(-b)^{-n-1}\, e^{\frac{(p-c)^2}{4b}} \sum_{j=0}^{n} 2^{j-n}(c-p)^{n-j}(-c+p-2bz)^{j+1}\left(\frac{(-c+p-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-c+p-2bz)^2}{4b}\right)+$$

$$b^{-n-1}\, e^{-\frac{(p-c)^2}{4b}} \sum_{j=0}^{n} 2^{j-n}(c-p)^{n-j}(-c+p+2bz)^{j+1}\left(-\frac{(-c+p+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-c+p+2bz)^2}{4b}\right)-$$

$$\left. b^{-n-1}\, e^{-\frac{(c+p)^2}{4b}} \sum_{j=0}^{n} 2^{j-n}(-c-p)^{n-j}(c+p+2bz)^{j+1}\left(-\frac{(c+p+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(c+p+2bz)^2}{4b}\right)\right) /;\, n\in\mathbb{N}$$

01.19.21.2383.01

$$\int z^n\, e^{p z}\sinh\left(b\sqrt{z}\right)\sinh(c z)\,dz = $$

$$2^{-2n-3}\left(e^{-\frac{b^2}{4(p-c)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(-b)^{-h-j+2n}\left(2(p-c)\sqrt{z}-b\right)^{h+j}\left(-\frac{\left(2(p-c)\sqrt{z}-b\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(2(p-c)\sqrt{-\frac{\left(2(p-c)\sqrt{z}-b\right)^2}{p-c}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(p-c)\sqrt{z}-b\right)^2}{4(p-c)}\right)-\right.$$

$$b\left(2(p-c)\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(p-c)\sqrt{z}-b\right)^2}{4(p-c)}\right)\Bigg)\Bigg)(p-c)^{-2n-2}-$$

$$e^{-\frac{b^2}{4(p-c)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j b^{-h-j+2n}\left(b+2(p-c)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2(p-c)\sqrt{z}\right)^2}{p-c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\right.$$

$$\binom{n}{j}\left(b\left(b+2(p-c)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b+2(p-c)\sqrt{z}\right)^2}{4(p-c)}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+2(p-c)\sqrt{z}\right)^2}{p-c}}\,(p-c)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b+2(p-c)\sqrt{z}\right)^2}{4(p-c)}\right)\right)\right)(p-c)^{-2n-2}-$$

$$e^{-\frac{b^2}{4(c+p)}}(c+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-b)^{-h-j+2n}\left(2(c+p)\sqrt{z}-b\right)^{h+j}\left(-\frac{\left(2(c+p)\sqrt{z}-b\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(c+p)\sqrt{-\frac{\left(2(c+p)\sqrt{z}-b\right)^2}{c+p}}\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(c+p)\sqrt{z}-b\right)^2}{4(c+p)}\right)-\right.$$

$$\left.b\left(2(c+p)\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(c+p)\sqrt{z}-b\right)^2}{4(c+p)}\right)\right)+$$

$$e^{-\frac{b^2}{4(c+p)}}(c+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j b^{-h-j+2n}\left(b+2(c+p)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2(c+p)\sqrt{z}\right)^2}{c+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\left(b+2(c+p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b+2(c+p)\sqrt{z}\right)^2}{4(c+p)}\right)+\right.$$

$$\left.\left.\left.2\sqrt{-\frac{\left(b+2(c+p)\sqrt{z}\right)^2}{c+p}}\,(c+p)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b+2(c+p)\sqrt{z}\right)^2}{4(c+p)}\right)\right)\right)\right)\Bigg/;\ n\in\mathbb{N}$$

Involving $z^n e^{p z^r} \sinh(b z^r) \sinh(c z)$

01.19.21.2384.01

$$\int z^n e^{p z^2} \sinh(b z^2) \sinh(c z)\, dz = \frac{1}{8\sqrt{p-b}\sqrt{b+p}} \Bigg(e^{-\frac{c^2 p}{2(p-b)(b+p)}} \Bigg(-e^{\frac{c^2}{4(b+p)}} \sqrt{b+p} \sum_{q=0}^{n} 2^{q-n} c^{n-q} (p-b)^{-n-\frac{1}{2}} (2(p-b)z-c)^{q+1} \left(-\frac{(2(p-b)z-c)^2}{p-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2(p-b)z-c)^2}{4(p-b)}\right) + e^{\frac{c^2}{4(b+p)}} \sqrt{b+p} \sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (p-b)^{-n-\frac{1}{2}} (c+2(p-b)z)^{q+1} \left(-\frac{(c+2(p-b)z)^2}{p-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+2(p-b)z)^2}{4(p-b)}\right) - e^{\frac{c^2}{4(p-b)}} \sqrt{p-b} \Bigg(\sum_{q=0}^{n} 2^{q-n} (-c)^{n-q} (b+p)^{-n-\frac{1}{2}} (c+2(b+p)z)^{q+1} \left(-\frac{(c+2(b+p)z)^2}{b+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c+2(b+p)z)^2}{4(b+p)}\right) - \sum_{q=0}^{n} 2^{q-n} c^{n-q} (b+p)^{-n-\frac{1}{2}} (2(b+p)z-c)^{q+1} \left(-\frac{(2(b+p)z-c)^2}{b+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2(b+p)z-c)^2}{4(b+p)}\right) \Bigg) \Bigg) \Bigg) /; n \in \mathbb{N}$$

01.19.21.2385.01

$$\int z^n e^{p\sqrt{z}} \sinh(b\sqrt{z}) \sinh(c z)\, dz = 2^{-2n-3} c^{-2n-2} \Bigg(e^{\frac{(p-b)^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-b)^{-h-j+2n} \left(-b+p-2c\sqrt{z}\right)^{h+j} \left(\frac{\left(-b+p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg((p-b)\left(-b+p-2c\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-b+p-2c\sqrt{z}\right)^2}{4c}\right) - 2c\sqrt{\frac{\left(-b+p-2c\sqrt{z}\right)^2}{c}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-b+p-2c\sqrt{z}\right)^2}{4c}\right) \Bigg) - e^{\frac{(b+p)^2}{4c}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b+p)^{-h-j+2n} \left(b+p-2c\sqrt{z}\right)^{h+j} \left(\frac{\left(b+p-2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left((b+p)\left(b+p-2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(b+p-2c\sqrt{z}\right)^2}{4c}\right)-\right.$$

$$\left.2c\sqrt{\frac{\left(b+p-2c\sqrt{z}\right)^2}{c}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(b+p-2c\sqrt{z}\right)^2}{4c}\right)\right)-$$

$$e^{-\frac{(p-b)^2}{4c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-b)^{-h-j+2n}\left(-b+p+2c\sqrt{z}\right)^{h+j}\left(-\frac{\left(-b+p+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((p-b)\left(-b+p+2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(-b+p+2c\sqrt{z}\right)^2}{4c}\right)+\right.$$

$$\left.2\sqrt{-\frac{\left(-b+p+2c\sqrt{z}\right)^2}{c}}\ c\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(-b+p+2c\sqrt{z}\right)^2}{4c}\right)\right)+$$

$$e^{-\frac{(b+p)^2}{4c}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+p)^{-h-j+2n}\left(b+p+2c\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+p+2c\sqrt{z}\right)^2}{c}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left((b+p)\left(b+p+2c\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(b+p+2c\sqrt{z}\right)^2}{4c}\right)+\right.$$

$$\left.\left.2\sqrt{-\frac{\left(b+p+2c\sqrt{z}\right)^2}{c}}\ c\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(b+p+2c\sqrt{z}\right)^2}{4c}\right)\right)\right)\ /;\ n\in\mathbb{N}$$

Involving $z^n\, e^{p z}\, \sinh(b z^r)\, \sinh(c z^r)$

01.19.21.2386.01

$$\int z^n e^{p z} \sinh(b z^2) \sinh(c z^2) \, dz = \frac{1}{8} \left(-(-b-c)^{-n-1} e^{-\frac{p^2}{4(-b-c)}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(-b-c)z)^{j+1} \left(-\frac{(p+2(-b-c)z)^2}{-b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(-b-c)z)^2}{4(-b-c)}\right) + (b-c)^{-n-1} e^{-\frac{p^2}{4(b-c)}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b-c)z)^{j+1} \left(-\frac{(p+2(b-c)z)^2}{b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b-c)z)^2}{4(b-c)}\right) + (c-b)^{-n-1} e^{-\frac{p^2}{4(c-b)}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(c-b)z)^{j+1} \left(-\frac{(p+2(c-b)z)^2}{c-b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(c-b)z)^2}{4(c-b)}\right) - (b+c)^{-n-1} e^{-\frac{p^2}{4(b+c)}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b+c)z)^{j+1} \left(-\frac{(p+2(b+c)z)^2}{b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b+c)z)^2}{4(b+c)}\right) \right) /; n \in \mathbb{N}$$

01.19.21.2387.01

$$\int z^n e^{p z} \sinh(b \sqrt{z}) \sinh(c \sqrt{z}) \, dz = -2^{-2n-3} p^{-2n-2} \left(-e^{-\frac{(-b-c)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-b-c)^{-h-i+2n} \left(-b-c+2p\sqrt{z}\right)^{h+i} \left(-\frac{\left(-b-c+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left((-b-c)\left(-b-c+2p\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(-b-c+2p\sqrt{z}\right)^2}{4p}\right) + 2\sqrt{-\frac{\left(-b-c+2p\sqrt{z}\right)^2}{p}} \, p \, \Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(-b-c+2p\sqrt{z}\right)^2}{4p}\right) \right) + e^{-\frac{(b-c)^2}{4p}} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (b-c)^{-h-i+2n} \left(b-c+2p\sqrt{z}\right)^{h+i} \left(-\frac{\left(b-c+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h} \binom{n}{i} \left((b-c)\left(b-c+2p\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(b-c+2p\sqrt{z}\right)^2}{4p}\right) + \right.$$

$$2\sqrt{-\frac{\left(b-c+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-c+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)+$$

$$e^{-\frac{(c-b)^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c-b)^{-h-i+2n}\left(-b+c+2p\sqrt{z}\right)^{h+i}\left(-\frac{\left(-b+c+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Bigg((c-b)\left(-b+c+2p\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+i+1),\,-\frac{\left(-b+c+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(-b+c+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),\,-\frac{\left(-b+c+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)-$$

$$e^{-\frac{(b+c)^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c)^{-h-i+2n}\left(b+c+2p\sqrt{z}\right)^{h+i}\left(-\frac{\left(b+c+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}$$

$$\binom{n}{i}\Bigg((b+c)\left(b+c+2p\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+c+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(b+c+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+c+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\,\sinh(b\,z^r)\,\sinh(c\,z^r)$

01.19.21.2388.01

$$\int z^{\alpha-1}\,e^{p\,z^r}\sinh(b\,z^r)\sinh(c\,z^r)\,dz = \frac{z^\alpha}{4r}\left(\Gamma\!\left(\frac{\alpha}{r},\,(-b+c-p)\,z^r\right)((-b+c-p)\,z^r)^{-\frac{\alpha}{r}} - ((b+c-p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(b+c-p)\,z^r\right)+\right.$$
$$\left.(-(-b+c+p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-(-b+c+p)\,z^r\right) - (-(b+c+p)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-(b+c+p)\,z^r\right)\right)$$

Involving $z^{\alpha-1}\,e^{b\,z^r+e}\,\sinh(a\,z^r+q)\,\sinh(c\,z^r+g)$

01.19.21.2389.01

$$\int z^{\alpha-1} e^{b z^r+e} \sinh(a z^r+q) \sinh(c z^r+g) \, dz = \frac{z^\alpha}{4 r} \left(-e^{e+g+q} \Gamma\left(\frac{\alpha}{r}, (-a-b-c) z^r\right) ((-a-b-c) z^r)^{-\frac{\alpha}{r}} + e^{e+g-q} ((a-b-c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (a-b-c) z^r\right) + e^{e-g+q} ((-a-b+c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-a-b+c) z^r\right) - e^{e-g-q} ((a-b+c) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (a-b+c) z^r\right)\right)$$

Involving $z^n e^{b z^r+d z+e} \sinh(a z^r+p z+q) \sinh(c z^r+f z+g)$

01.19.21.2390.01

$$\int z^n e^{b z^2+d z+e} \sinh(a z^2+p z+q) \sinh(c z^2+f z+g) \, dz = \frac{1}{8} \Bigg(-(-a+b-c)^{-n-1} e^{-\frac{(d-f-p)^2}{4(-a+b-c)}+e-g-q} \sum_{j=0}^{n} 2^{j-n} (-d+f+p)^{n-j} (d-f-p+2(-a+b-c) z)^{j+1} \left(-\frac{(d-f-p+2(-a+b-c) z)^2}{-a+b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f-p+2(-a+b-c) z)^2}{4(-a+b-c)}\right) + (a+b-c)^{-n-1} e^{-\frac{(d-f+p)^2}{4(a+b-c)}+e-g+q} \sum_{j=0}^{n} 2^{j-n} (-d+f-p)^{n-j} (d-f+p+2(a+b-c) z)^{j+1} \left(-\frac{(d-f+p+2(a+b-c) z)^2}{a+b-c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-f+p+2(a+b-c) z)^2}{4(a+b-c)}\right) + (-a+b+c)^{-n-1} e^{-\frac{(d+f-p)^2}{4(-a+b+c)}+e+g-q} \sum_{j=0}^{n} 2^{j-n} (-d-f+p)^{n-j} (d+f-p+2(-a+b+c) z)^{j+1} \left(-\frac{(d+f-p+2(-a+b+c) z)^2}{-a+b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f-p+2(-a+b+c) z)^2}{4(-a+b+c)}\right) - (a+b+c)^{-n-1} e^{-\frac{(d+f+p)^2}{4(a+b+c)}+e+g+q} \sum_{j=0}^{n} 2^{j-n} (-d-f-p)^{n-j} (d+f+p+2(a+b+c) z)^{j+1} \left(-\frac{(d+f+p+2(a+b+c) z)^2}{a+b+c}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f+p+2(a+b+c) z)^2}{4(a+b+c)}\right)\Bigg) /; n \in \mathbb{N}$$

01.19.21.2391.01

$$\int z^n e^{\sqrt{z}\, b+d z+e} \sinh\left(\sqrt{z}\, a+p z+q\right) \sinh\left(\sqrt{z}\, c+f z+g\right) dz = 2^{-2n-3} \Bigg(e^{-\frac{(-a+b-c)^2}{4(d-f-p)}+e-g-q} (d-f-p)^{-2n-2} \sum_{i=0}^{n} \sum_{h=0}^{i} (-1)^{i-h} 4^i (-a+b-c)^{-h-i+2n} \left(-a+b-c+2(d-f-p)\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-a+b-c+2\,(d-f-p)\,\sqrt{z}\right)^2}{d-f-p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((-a+b-c)\left(-a+b-c+2\,(d-f-p)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(-a+b-c+2\,(d-f-p)\,\sqrt{z}\right)^2}{4\,(d-f-p)}\right)+2\sqrt{-\frac{\left(-a+b-c+2\,(d-f-p)\,\sqrt{z}\right)^2}{d-f-p}}$$

$$(d-f-p)\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(-a+b-c+2\,(d-f-p)\,\sqrt{z}\right)^2}{4\,(d-f-p)}\right)\Bigg)\Bigg)-$$

$$e^{-\frac{(-a+b+c)^2}{4\,(d+f-p)}+e+g-q}\,(d+f-p)^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-a+b+c)^{-h-i+2n}\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)^2}{d+f-p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((-a+b+c)\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)^2}{4\,(d+f-p)}\right)+2\sqrt{-\frac{\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)^2}{d+f-p}}$$

$$(d+f-p)\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(-a+b+c+2\,(d+f-p)\,\sqrt{z}\right)^2}{4\,(d+f-p)}\right)\Bigg)\Bigg)-e^{-\frac{(a+b-c)^2}{4\,(d-f+p)}+e-g+q}\,(d-f+p)^{-2n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(a+b-c)^{-h-i+2n}\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)^2}{d-f+p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((a+b-c)\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)^2}{4\,(d-f+p)}\right)+$$

$$2\sqrt{-\frac{\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)^2}{d-f+p}}\,(d-f+p)\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(a+b-c+2\,(d-f+p)\,\sqrt{z}\right)^2}{4\,(d-f+p)}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{(a+b+c)^2}{4\,(d+f+p)}+e+g+q}\,(d+f+p)^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(a+b+c)^{-h-i+2n}\left(a+b+c+2\,(d+f+p)\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(a+b+c+2(d+f+p)\sqrt{z}\right)^2}{d+f+p}\right)^{\frac{1}{2}(-h-i-1)} \binom{i}{h}\binom{n}{i}\left((a+b+c)\left(a+b+c+2(d+f+p)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\frac{\left(a+b+c+2(d+f+p)\sqrt{z}\right)^2}{4(d+f+p)}\right)+2\sqrt{-\frac{\left(a+b+c+2(d+f+p)\sqrt{z}\right)^2}{d+f+p}}$$

$$\left.\left.(d+f+p)\,\Gamma\left(\frac{1}{2}(h+i+2), -\frac{\left(a+b+c+2(d+f+p)\sqrt{z}\right)^2}{4(d+f+p)}\right)\right)\right) /; n \in \mathbb{N}$$

Involving products of several direct functions, exponential and a power functions

Involving $z^{\alpha-1} e^{p z} \sinh(a z) \sinh(b z) \sinh(c z)$

01.19.21.2392.01

$$\int z^{\alpha-1} e^{p z} \sinh(a z) \sinh(b z) \sinh(c z)\, dz = \frac{1}{8} z^{\alpha} \left(-((a+b-c-p) z)^{-\alpha} \Gamma(\alpha, (a+b-c-p) z) - ((a-b+c-p) z)^{-\alpha} \Gamma(\alpha, (a-b+c-p) z) + ((a+b+c-p) z)^{-\alpha} \Gamma(\alpha, (a+b+c-p) z) - (-(a-b-c+p) z)^{-\alpha} \Gamma(\alpha, -(a-b-c+p) z) + (-(a+b-c+p) z)^{-\alpha} \Gamma(\alpha, -(a+b-c+p) z) + (-(a-b+c+p) z)^{-\alpha} \Gamma(\alpha, -(a-b+c+p) z) + (-(-a+b+c+p) z)^{-\alpha} \Gamma(\alpha, -(-a+b+c+p) z) - (-(a+b+c+p) z)^{-\alpha} \Gamma(\alpha, -(a+b+c+p) z)\right)$$

Involving $z^{\alpha-1} e^{p z} \prod_{k=1}^{n} \sinh(a_k z)$

01.19.21.2393.01

$$\int z^{\alpha-1} e^{p z} \prod_{k=1}^{n} \sinh(a_k z)\, dz = 2^{-n-1} z^{\alpha} \sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1} \cdots \sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1} \left((-1)^{\sum_{j=1}^{n} \frac{1}{4}(2 k_j+2)} \left(-\left(\left(\sum_{j=1}^{n} k_j a_j - p\right) z\right)^{-\alpha} \Gamma\left(\alpha, \left(\sum_{j=1}^{n} k_j a_j - p\right) z\right) - \left(-\left(p + \sum_{j=1}^{n} k_j a_j\right) z\right)^{-\alpha} \Gamma\left(\alpha, -\left(p + \sum_{j=1}^{n} k_j a_j\right) z\right)\right)\right)$$

01.19.21.2394.01

$$\int \frac{1}{z} e^{p z} \prod_{k=1}^{n} \sinh(a_k z)\, dz = \frac{1}{2^{n+1}} \sum_{\substack{k_1=-1\\ \Delta k_1=2}}^{1} \sum_{\substack{k_2=-1\\ \Delta k_2=2}}^{1} \cdots \sum_{\substack{k_n=-1\\ \Delta k_n=2}}^{1} \left((-1)^{\sum_{j=1}^{n} \frac{1}{4}(2 k_j+2)} \left(\mathrm{Ei}\left(\left(p - \sum_{j=1}^{n} k_j a_j\right) z\right) + \mathrm{Ei}\left(\left(p + \sum_{j=1}^{n} k_j a_j\right) z\right)\right)\right)$$

Involving products of powers of the direct function, exponential and a power functions

Involving product of power of the direct function, the direct function, exponential and a power functions

Involving $z^{\alpha-1} e^{b z} \sinh(c z) \sinh^{\nu}(a z)$

01.19.21.2395.01

$$\int z^{\alpha-1} e^{b z} \sinh(c z) \sinh^{\nu}(a z)\, dz = i^{\nu} 2^{-\nu-1} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} \left(((c-b) z)^{-\alpha} \Gamma(\alpha, (c-b) z) - (-(b+c) z)^{-\alpha} \Gamma(\alpha, (-b-c) z)\right) (1 - \nu \bmod 2) + 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Big(-(-1)^{\nu} \Gamma(\alpha, (-b-c-2 a k + a \nu) z) ((-b-c-2 a k + a \nu) z)^{-\alpha} + (-1)^{\nu} ((-b+c-2 a k + a \nu) z)^{-\alpha} \Gamma(\alpha, (-b+c-2 a k + a \nu) z) - ((-b-c+2 a k - a \nu) z)^{-\alpha} \Gamma(\alpha, (-b-c+2 a k - a \nu) z) + ((-b+c+2 a k - a \nu) z)^{-\alpha} \Gamma(\alpha, (-b+c+2 a k - a \nu) z)\Big) /; \nu \in \mathbb{N}^+$$

01.19.21.2396.01

$$\int z^n e^{b z} \sinh(c z) \sinh^{\nu}(a z)\, dz = \frac{1}{2} \left(1 - e^{2 a z}\right)^{-\nu} n! \sinh^{\nu}(a z) \left(e^{(b+c) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (b+c-a \nu)^{-p-1}}{(n-p)!} {}_{p+2}F_{p+1}\left(\frac{b+c-a \nu}{2 a}, \ldots, \frac{b+c-a \nu}{2 a}, -\nu; 1 + \frac{b+c-a \nu}{2 a}, \ldots, 1 + \frac{b+c-a \nu}{2 a}; e^{2 a z}\right) - e^{(b-c) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (b-c-a \nu)^{-p-1}}{(n-p)!} {}_{p+2}F_{p+1}\left(\frac{b-c-a \nu}{2 a}, \ldots, \frac{b-c-a \nu}{2 a}, -\nu; 1 + \frac{b-c-a \nu}{2 a}, \ldots, 1 + \frac{b-c-a \nu}{2 a}; e^{2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sinh(c z + d) \sinh^{\nu}(a z)$

01.19.21.2397.01

$$\int z^{\alpha-1} e^{p z} \sinh(d + c z) \sinh^{\nu}(a z)\, dz = i^{\nu} 2^{-\nu-1} e^{-d} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(((c-p) z)^{-\alpha} \Gamma(\alpha, (c-p) z) - e^{2 d} (-(c+p) z)^{-\alpha} \Gamma(\alpha, -(c+p) z)\right) + 2^{-\nu-1} z^{\alpha} e^{-d} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Big(e^{i \pi \nu} \Gamma(\alpha, (c - 2 a k - p + a \nu) z) ((c - 2 a k - p + a \nu) z)^{-\alpha} - e^{2 d} (-(c - 2 a k + p + a \nu) z)^{-\alpha} \Gamma(\alpha, -(c - 2 a k + p + a \nu) z) + ((c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (c + 2 a k - p - a \nu) z) - e^{2 d + i \pi \nu} (-(c + 2 a k + p - a \nu) z)^{-\alpha} \Gamma(\alpha, -(c + 2 a k + p - a \nu) z)\Big) /; \nu \in \mathbb{N}^+$$

01.19.21.2398.01

$$\int z^n e^{p z} \sinh(d + c z) \sinh^\nu(a z) \, dz = \frac{1}{2} \left(1 - e^{-2 a z}\right)^{-\nu} n! \sinh^\nu(a z) \left(e^{d + (c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c+p+a\nu}{2a}, \ldots, -\frac{c+p+a\nu}{2a}, -\nu; 1 - \frac{c+p+a\nu}{2a}, \ldots, 1 - \frac{c+p+a\nu}{2a}; e^{-2 a z}\right) - e^{(p-c) z - d} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-c+p+a\nu}{2a}, \ldots, -\frac{-c+p+a\nu}{2a}, -\nu; 1 - \frac{-c+p+a\nu}{2a}, \ldots, 1 - \frac{-c+p+a\nu}{2a}; e^{-2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sinh(c z) \sinh^\nu(a z + b)$

01.19.21.2399.01

$$\int z^{\alpha-1} e^{p z} \sinh(c z) \sinh^\nu(b + a z) \, dz = i^\nu 2^{-\nu-1} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(((c-p) z)^{-\alpha} \Gamma(\alpha, (c-p) z) - (-(c+p) z)^{-\alpha} \Gamma(\alpha, -(c+p) z)\right) + 2^{-\nu-1} z^\alpha \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} e^{-2 b k - b \nu} \left(e^{4 b k + i \pi \nu} \Gamma(\alpha, (c - 2 a k - p + a \nu) z) ((c - 2 a k - p + a \nu) z)^{-\alpha} - e^{2 b \nu} (-(c - 2 a k + p + a \nu) z)^{-\alpha} \Gamma(\alpha, -(c - 2 a k + p + a \nu) z) + e^{2 b \nu} ((c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (c + 2 a k - p - a \nu) z) - e^{4 b k + i \pi \nu} (-(c + 2 a k + p - a \nu) z)^{-\alpha} \Gamma(\alpha, -(c + 2 a k + p - a \nu) z)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2400.01

$$\int z^n e^{p z} \sinh(c z) \sinh^\nu(b + a z) \, dz = \frac{1}{2} \left(1 - e^{-2 (b + a z)}\right)^{-\nu} n! \sinh^\nu(b + a z) \left(e^{(c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{c+p+a\nu}{2a}, \ldots, -\frac{c+p+a\nu}{2a}, -\nu; 1 - \frac{c+p+a\nu}{2a}, \ldots, 1 - \frac{c+p+a\nu}{2a}; e^{-2 (b + a z)}\right) - e^{(p-c) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-c+p+a\nu}{2a}, \ldots, -\frac{-c+p+a\nu}{2a}, -\nu; 1 - \frac{-c+p+a\nu}{2a}, \ldots, 1 - \frac{-c+p+a\nu}{2a}; e^{-2 (b + a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sinh(c z + d) \sinh^\nu(a z + b)$

01.19.21.2401.01

$$\int z^{\alpha-1} e^{p z} \sinh(d + c z) \sinh^{\nu}(b + a z)\, dz == i^{\nu}\, 2^{-\nu-1} e^{-d} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(((c-p) z)^{-\alpha}\, \Gamma(\alpha, (c-p) z) - e^{2 d} (-(c+p) z)^{-\alpha}\, \Gamma(\alpha, -(c+p) z) \right) + 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} e^{-d-2 b k - b \nu} \left(e^{4 b k + i \pi \nu}\, \Gamma(\alpha, (c - 2 a k - p + a \nu) z) ((c - 2 a k - p + a \nu) z)^{-\alpha} - e^{2 (d + b \nu)} (-(c - 2 a k + p + a \nu) z)^{-\alpha}\, \Gamma(\alpha, -(c - 2 a k + p + a \nu) z) + e^{2 b \nu} ((c + 2 a k - p - a \nu) z)^{-\alpha}\, \Gamma(\alpha, (c + 2 a k - p - a \nu) z) - e^{2 d + 4 b k + i \pi \nu} (-(c + 2 a k + p - a \nu) z)^{-\alpha}\, \Gamma(\alpha, -(c + 2 a k + p - a \nu) z) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2402.01

$$\int z^{n} e^{p z} \sinh(d + c z) \sinh^{\nu}(b + a z)\, dz == \frac{1}{2} \left(1 - e^{-2 (b + a z)}\right)^{-\nu} n!\, \sinh^{\nu}(b + a z) \left(e^{d + (c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c + p + a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{c + p + a \nu}{2 a}, \ldots, -\frac{c + p + a \nu}{2 a}, -\nu; 1 - \frac{c + p + a \nu}{2 a}, \ldots, 1 - \frac{c + p + a \nu}{2 a}; e^{-2 (b + a z)}\right) - e^{(p - c) z - d} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-c + p + a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{-c + p + a \nu}{2 a}, \ldots, -\frac{-c + p + a \nu}{2 a}, -\nu; 1 - \frac{-c + p + a \nu}{2 a}, \ldots, 1 - \frac{-c + p + a \nu}{2 a}; e^{-2 (b + a z)}\right) \right) /;\ n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sinh(b z) \sinh^{\nu}(c z)$

01.19.21.2403.01

$$\int z^n e^{p z^2} \sinh(b z) \sinh^{\nu}(c z)\, dz = i\, 2^{-\nu-2} p^{-n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg((-1)^{\nu} e^{-\frac{(c(2s-\nu)-b)^2}{4p} - \frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (b - c(2s-\nu))^{n-j} (-b + c(2s-\nu) + 2pz)^{j+1} \left(-\frac{(-b + c(2s-\nu) + 2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-b + c(2s-\nu) + 2pz)^2}{4p}\right) + (-1)^{\nu} e^{\frac{i\pi}{2} - \frac{(b+c(2s-\nu))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-b - c(2s-\nu))^{n-j} (b + c(2s-\nu) + 2pz)^{j+1} \left(-\frac{(b + c(2s-\nu) + 2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b + c(2s-\nu) + 2pz)^2}{4p}\right) + e^{-\frac{(c(\nu-2s)-b)^2}{4p} - \frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} (b - c(\nu-2s))^{n-j} (-b + c(\nu-2s) + 2pz)^{j+1} \left(-\frac{(-b + c(\nu-2s) + 2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-b + c(\nu-2s) + 2pz)^2}{4p}\right) + e^{\frac{i\pi}{2} - \frac{(b+c(\nu-2s))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-b - c(\nu-2s))^{n-j} (b + c(\nu-2s) + 2pz)^{j+1} \left(-\frac{(b + c(\nu-2s) + 2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b + c(\nu-2s) + 2pz)^2}{4p}\right) \Bigg) - i^{\nu-1} 2^{-\nu-2} p^{-n-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(e^{-\frac{b^2}{4p} - \frac{i\pi}{2}} \sum_{j=0}^{n} 2^{j-n} b^{n-j} (2pz - b)^{j+1} \left(-\frac{(2pz-b)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(2pz-b)^2}{4p}\right) + e^{\frac{i\pi}{2} - \frac{b^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-b)^{n-j} (b + 2pz)^{j+1} \left(-\frac{(b+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b+2pz)^2}{4p}\right) \Bigg) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2404.01

$$\int z^n e^{p\sqrt{z}} \sinh(b z) \sinh^{\nu}(c z)\, dz = i^{\nu} 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(b^{-2n-2} e^{-\frac{p^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2\sqrt{z}\, b + p\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, b + p\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(p \left(2\sqrt{z}\, b + p\right) \Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, b + p\right)^2}{4b}\right) + 2 \sqrt{-\frac{\left(2\sqrt{z}\, b + p\right)^2}{b}}\, b\, \Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, b + p\right)^2}{4b}\right) \Bigg) -$$

$$(-b)^{-2n-2}\, e^{\frac{p^2}{4b}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, p^{-h-j+2n} \left(p-2b\sqrt{z}\right)^{h+j} \left(\frac{\left(p-2b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(p\left(p-2b\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(p-2b\sqrt{z}\right)^2}{4b}\right) - 2b\sqrt{\frac{\left(p-2b\sqrt{z}\right)^2}{b}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(p-2b\sqrt{z}\right)^2}{4b}\right)\right)\right) +$$

$$2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1}\, e^{-\frac{p^2}{4(c(2s-\nu)-b)}}\, (c(2s-\nu)-b)^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, p^{-h-j+2n} \left(p+2(c(2s-\nu)-b)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{\left(p+2(c(2s-\nu)-b)\sqrt{z}\right)^2}{c(2s-\nu)-b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(p\left(p+2(c(2s-\nu)-b)\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\, -\frac{\left(p+2(c(2s-\nu)-b)\sqrt{z}\right)^2}{4(c(2s-\nu)-b)}\right) + 2\sqrt{-\frac{\left(p+2(c(2s-\nu)-b)\sqrt{z}\right)^2}{c(2s-\nu)-b}}$$

$$\left.\left.(c(2s-\nu)-b)\,\Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(p+2(c(2s-\nu)-b)\sqrt{z}\right)^2}{4(c(2s-\nu)-b)}\right)\right)\right) +$$

$$(-1)^{\nu}\, e^{-\frac{p^2}{4(b+c(2s-\nu))}}\, (b+c(2s-\nu))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, p^{-h-j+2n} \left(p+2(b+c(2s-\nu))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2(b+c(2s-\nu))\sqrt{z}\right)^2}{b+c(2s-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(p\left(p+2(b+c(2s-\nu))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\, -\frac{\left(p+2(b+c(2s-\nu))\sqrt{z}\right)^2}{4(b+c(2s-\nu))}\right) + 2\sqrt{-\frac{\left(p+2(b+c(2s-\nu))\sqrt{z}\right)^2}{b+c(2s-\nu)}}$$

$$\left.\left.(b+c(2s-\nu))\,\Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(p+2(b+c(2s-\nu))\sqrt{z}\right)^2}{4(b+c(2s-\nu))}\right)\right)\right) -$$

$$e^{-\frac{p^2}{4(c(v-2s)-b)}} (c(v-2s)-b)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p + 2(c(v-2s)-b)\sqrt{z}\right)^{h+j} \left(-\frac{\left(p+2(c(v-2s)-b)\sqrt{z}\right)^2}{c(v-2s)-b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(p\left(p+2(c(v-2s)-b)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(p+2(c(v-2s)-b)\sqrt{z}\right)^2}{4(c(v-2s)-b)}\right) + 2\sqrt{-\frac{\left(p+2(c(v-2s)-b)\sqrt{z}\right)^2}{c(v-2s)-b}} (c(v-2s)-b)\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2(c(v-2s)-b)\sqrt{z}\right)^2}{4(c(v-2s)-b)}\right)\right) +$$

$$e^{-\frac{p^2}{4(b+c(v-2s))}} (b+c(v-2s))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p + 2(b+c(v-2s))\sqrt{z}\right)^{h+j} \left(-\frac{\left(p+2(b+c(v-2s))\sqrt{z}\right)^2}{b+c(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(p\left(p+2(b+c(v-2s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(p+2(b+c(v-2s))\sqrt{z}\right)^2}{4(b+c(v-2s))}\right) + 2\sqrt{-\frac{\left(p+2(b+c(v-2s))\sqrt{z}\right)^2}{b+c(v-2s)}} (b+c(v-2s))\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2(b+c(v-2s))\sqrt{z}\right)^2}{4(b+c(v-2s))}\right)\right)\Bigg) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n e^{p z} \sinh(b z^r) \sinh^v(c z)$

01.19.21.2405.01

$$\int z^n e^{pz}\sinh(bz^2)\sinh^\nu(cz)\,dz = -i^\nu 2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(b^{-n-1}e^{-\frac{p^2}{4b}}\sum_{j=0}^n 2^{j-n}(-p)^{n-j}(p+2bz)^{j+1}\left(-\frac{(p+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(p+2bz)^2}{4b}\right)-\right.$$
$$\left.(-b)^{-n-1}e^{\frac{p^2}{4b}}\sum_{j=0}^n 2^{j-n}(-p)^{n-j}(p-2bz)^{j+1}\left(\frac{(p-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(p-2bz)^2}{4b}\right)\right)-$$
$$2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{\nu-1}e^{\frac{(p+c(2s-\nu))^2}{4b}}(-b)^{-n-1}\sum_{j=0}^n 2^{j-n}(-p-c(2s-\nu))^{n-j}(p+c(2s-\nu)-2bz)^{j+1}\right.$$
$$\left(\frac{(p+c(2s-\nu)-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(p+c(2s-\nu)-2bz)^2}{4b}\right)-$$
$$e^{\frac{(p+c(\nu-2s))^2}{4b}}(-b)^{-n-1}\sum_{j=0}^n 2^{j-n}(-p-c(\nu-2s))^{n-j}(p+c(\nu-2s)-2bz)^{j+1}\left(\frac{(p+c(\nu-2s)-2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(p+c(\nu-2s)-2bz)^2}{4b}\right)+(-1)^\nu b^{-n-1}e^{-\frac{(p+c(2s-\nu))^2}{4b}}\sum_{j=0}^n 2^{j-n}(-p-c(2s-\nu))^{n-j}$$
$$(p+c(2s-\nu)+2bz)^{j+1}\left(-\frac{(p+c(2s-\nu)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(p+c(2s-\nu)+2bz)^2}{4b}\right)+$$
$$b^{-n-1}e^{-\frac{(p+c(\nu-2s))^2}{4b}}\sum_{j=0}^n 2^{j-n}(-p-c(\nu-2s))^{n-j}(p+c(\nu-2s)+2bz)^{j+1}\left(-\frac{(p+c(\nu-2s)+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(p+c(\nu-2s)+2bz)^2}{4b}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.2406.01

$$\int z^n e^{pz}\sinh\left(b\sqrt{z}\right)\sinh^\nu(cz)\,dz = 2^{-2n-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,p^{-2n-2}e^{\frac{i\pi\nu}{2}-\frac{b^2}{4p}}$$
$$\left(\sum_{j=0}^n\sum_{h=0}^j(-1)^{j-h}4^j b^{-h-j+2n}\left(b+2p\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\left(b+2p\sqrt{z}\right)\right.\right.$$
$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2p\sqrt{z}\right)^2}{4p}\right)+2\sqrt{-\frac{\left(b+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2p\sqrt{z}\right)^2}{4p}\right)\right)-$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-b)^{-h-j+2n}\left(2\,p\,\sqrt{z}\,-b\right)^{h+j}\left(-\frac{\left(2\,p\,\sqrt{z}\,-b\right)^{2}}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,p\,\sqrt{-\frac{\left(2\,p\,\sqrt{z}\,-b\right)^{2}}{p}}\right.$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,p\,\sqrt{z}\,-b\right)^{2}}{4\,p}\right)-b\left(2\,p\,\sqrt{z}\,-b\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,p\,\sqrt{z}\,-b\right)^{2}}{4\,p}\right)\right)\right)+$$

$$2^{-2n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\left((-1)^{\nu+1}\,e^{-\frac{b^{2}}{4(p+c(2s-\nu))}}\,(p+c\,(2\,s-\nu))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-b)^{-h-j+2n}\right.$$

$$\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)^{2}}{p+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)^{2}}{p+c\,(2\,s-\nu)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)^{2}}{4\,(p+c\,(2\,s-\nu))}\right)-\right.$$

$$\left.b\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\right)^{2}}{4\,(p+c\,(2\,s-\nu))}\right)\right)+$$

$$(-1)^{\nu}\,e^{-\frac{b^{2}}{4(p+c(2s-\nu))}}\,(p+c\,(2\,s-\nu))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,b^{-h-j+2n}\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)^{2}}{p+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)^{2}}{4\,(p+c\,(2\,s-\nu))}\right)+2\,\sqrt{-\frac{\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)^{2}}{p+c\,(2\,s-\nu)}}\;(p+c\,(2\,s-\nu))\,\Gamma\!\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+2),\,-\frac{\left(b+2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\right)^{2}}{4\,(p+c\,(2\,s-\nu))}\right)\right)-e^{-\frac{b^{2}}{4(p+c(\nu-2s))}}\,(p+c\,(\nu-2\,s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-b)^{-h-j+2n}\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)^{2}}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(p+c\,(v-2\,s))\sqrt{-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)^{2}}{p+c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)^{2}}{4\,(p+c\,(v-2\,s))}\right)-\right.$$

$$\left.b\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\right)^{2}}{4\,(p+c\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{b^{2}}{4\,(p+c\,(v-2\,s))}}\,(p+c\,(v-2\,s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,b^{-h-j+2n}\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{2}}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)\Gamma\!\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),-\frac{\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(p+c\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{2}}{p+c\,(v-2\,s)}}$$

$$\left.\left.(p+c\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(p+c\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^{+}$$

Involving $z^{n}\,e^{p\,z}\,\sinh(b\,z)\,\sinh^{v}\left(c\,z^{r}\right)$

01.19.21.2407.01

$$\int z^n e^{p z} \sinh(b z) \sinh^\nu\!\left(c z^2\right) dz = -2^{-\nu-1} i^\nu \binom{\nu}{\frac{\nu}{2}} \left(((-b-p) z)^{-n-1} \Gamma(n+1, (-b-p) z) - ((b-p) z)^{-n-1} \Gamma(n+1, (b-p) z)\right) (1 - \nu \bmod 2) z^{n+1} - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{(p-b)^2}{4 c (2 s-\nu)}} (c (2 s-\nu))^{-n-1} \sum_{j=0}^n 2^{j-n} (b-p)^{n-j} (-b+p+2 c (2 s-\nu) z)^{j+1} \left(-\frac{(-b+p+2 c (2 s-\nu) z)^2}{c (2 s-\nu)}\right)^{\frac{1}{2} (-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-b+p+2 c (2 s-\nu) z)^2}{4 c (2 s-\nu)}\right) + (-1)^\nu e^{-\frac{(b+p)^2}{4 c (2 s-\nu)}} (c (2 s-\nu))^{-n-1} \sum_{j=0}^n 2^{j-n} (-b-p)^{n-j} (b+p+2 c (2 s-\nu) z)^{j+1} \left(-\frac{(b+p+2 c (2 s-\nu) z)^2}{c (2 s-\nu)}\right)^{\frac{1}{2} (-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b+p+2 c (2 s-\nu) z)^2}{4 c (2 s-\nu)}\right) - e^{-\frac{(p-b)^2}{4 c (\nu-2 s)}} (c (\nu-2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (b-p)^{n-j} (-b+p+2 c (\nu-2 s) z)^{j+1} \left(-\frac{(-b+p+2 c (\nu-2 s) z)^2}{c (\nu-2 s)}\right)^{\frac{1}{2} (-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-b+p+2 c (\nu-2 s) z)^2}{4 c (\nu-2 s)}\right) + e^{-\frac{(b+p)^2}{4 c (\nu-2 s)}} (c (\nu-2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-b-p)^{n-j} (b+p+2 c (\nu-2 s) z)^{j+1} \left(-\frac{(b+p+2 c (\nu-2 s) z)^2}{c (\nu-2 s)}\right)^{\frac{1}{2} (-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b+p+2 c (\nu-2 s) z)^2}{4 c (\nu-2 s)}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2408.01

$$\int z^n e^{p z} \sinh(b z) \sinh^\nu\!\left(c \sqrt{z}\right) dz = -i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-b-p)^{-n-1} \Gamma(n+1, (-b-p) z) - (b-p)^{-n-1} \Gamma(n+1, (b-p) z)\right) (1 - \nu \bmod 2) + (-1)^{\nu-1} 2^{-2 n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{c^2 (2 s-\nu)^2}{4 (p-b)}} \left(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-c (2 s-\nu))^{-h-j+2 n} \left(2 (p-b) \sqrt{z} - c (2 s-\nu)\right)^{h+j} \left(-\frac{\left(2 (p-b) \sqrt{z} - c (2 s-\nu)\right)^2}{p-b}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 (p-b) \sqrt{-\frac{\left(2 (p-b) \sqrt{z} - c (2 s-\nu)\right)^2}{p-b}}\; \Gamma\!\left(\frac{1}{2} (h+j+2), -\frac{\left(2 (p-b) \sqrt{z} - c (2 s-\nu)\right)^2}{4 (p-b)}\right) - c \right.\right.\right.$$

$$(2s-v)\left(2(p-b)\sqrt{z}-c(2s-v)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(p-b)\sqrt{z}-c(2s-v)\right)^2}{4(p-b)}\right)\Bigg)\Bigg)$$

$$(p-b)^{-2n-2}+e^{-\frac{c^2(v-2s)^2}{4(p-b)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}\left(2(p-b)\sqrt{z}-c(v-2s)\right)^{h+j}\right.$$

$$\left(-\frac{\left(2(p-b)\sqrt{z}-c(v-2s)\right)^2}{p-b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2(p-b)\sqrt{-\frac{\left(2(p-b)\sqrt{z}-c(v-2s)\right)^2}{p-b}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(p-b)\sqrt{z}-c(v-2s)\right)^2}{4(p-b)}\right)-c(v-2s)\left(2(p-b)\sqrt{z}-c(v-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(p-b)\sqrt{z}-c(v-2s)\right)^2}{4(p-b)}\right)\Bigg)\Bigg)\Bigg)(p-b)^{-2n-2}+(-1)^{v+1}e^{-\frac{c^2(2s-v)^2}{4(b+p)}}(b+p)^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(2s-v))^{-h-j+2n}\left(2(b+p)\sqrt{z}-c(2s-v)\right)^{h+j}\left(-\frac{\left(2(b+p)\sqrt{z}-c(2s-v)\right)^2}{b+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(b+p)\sqrt{-\frac{\left(2(b+p)\sqrt{z}-c(2s-v)\right)^2}{b+p}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(2(b+p)\sqrt{z}-c(2s-v)\right)^2}{4(b+p)}\right)-\right.$$

$$\left.c(2s-v)\left(2(b+p)\sqrt{z}-c(2s-v)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(2(b+p)\sqrt{z}-c(2s-v)\right)^2}{4(b+p)}\right)\right)-$$

$$e^{-\frac{c^2(v-2s)^2}{4(b+p)}}(b+p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}\left(2(b+p)\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(b+p)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b+p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2\,(b+p)\,\sqrt{-\frac{\left(2\,(b+p)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b+p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(b+p)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(b+p)}\right)-c\,(v-2\,s)\right.$$

$$\left.\left(2\,(b+p)\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(b+p)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(b+p)}\right)\right)\Bigg) /;\, n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z}\, \sinh(b\,z^r)\, \sinh^v(c\,z^r)$

01.19.21.2409.01

$$\int z^n e^{p z} \sinh(b z^2) \sinh^\nu(c z^2) \, dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b^{-n-1} e^{-\frac{p^2}{4 b}} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p + 2 b z)^{j+1} \left(-\frac{(p + 2 b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 b z)^2}{4 b} \right) - (-b)^{-n-1} e^{\frac{p^2}{4 b}} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p - 2 b z)^{j+1} \left(\frac{(p - 2 b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(p - 2 b z)^2}{4 b} \right) \right) - 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{p^2}{4(c(2s-\nu)-b)}} (c(2s-\nu)-b)^{-n-1} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p + 2(c(2s-\nu)-b) z)^{j+1} \left(-\frac{(p + 2(c(2s-\nu)-b) z)^2}{c(2s-\nu)-b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2(c(2s-\nu)-b) z)^2}{4(c(2s-\nu)-b)} \right) + (-1)^\nu e^{-\frac{p^2}{4(b+c(2s-\nu))}} (b + c(2s-\nu))^{-n-1} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p + 2(b + c(2s-\nu)) z)^{j+1} \left(-\frac{(p + 2(b + c(2s-\nu)) z)^2}{b + c(2s-\nu)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2(b + c(2s-\nu)) z)^2}{4(b + c(2s-\nu))} \right) - e^{-\frac{p^2}{4(c(\nu-2s)-b)}} (c(\nu-2s)-b)^{-n-1} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p + 2(c(\nu-2s)-b) z)^{j+1} \left(-\frac{(p + 2(c(\nu-2s)-b) z)^2}{c(\nu-2s)-b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2(c(\nu-2s)-b) z)^2}{4(c(\nu-2s)-b)} \right) + e^{-\frac{p^2}{4(b+c(\nu-2s))}} (b + c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-p)^{n-j} (p + 2(b + c(\nu-2s)) z)^{j+1} \left(-\frac{(p + 2(b + c(\nu-2s)) z)^2}{b + c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2(b + c(\nu-2s)) z)^2}{4(b + c(\nu-2s))} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2410.01

$$\int z^n e^{p z} \sinh(b \sqrt{z}) \sinh^\nu(c \sqrt{z}) \, dz = 2^{-2n-\nu-2} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) p^{-2n-2} \left(e^{-\frac{b^2}{4p}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j b^{-h-j+2n} \left(b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(b + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b \left(b + 2 p \sqrt{z}\right) \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2p\sqrt{z}\right)^2}{4p}\right) + 2\sqrt{-\frac{\left(b+2p\sqrt{z}\right)^2}{p}}\; p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2p\sqrt{z}\right)^2}{4p}\right)\Bigg) -$$

$$e^{-\frac{b^2}{4p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b)^{-h-j+2n} \left(2p\sqrt{z}-b\right)^{h+j} \left(-\frac{\left(2p\sqrt{z}-b\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2p\sqrt{-\frac{\left(2p\sqrt{z}-b\right)^2}{p}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2p\sqrt{z}-b\right)^2}{4p}\right) - b\left(2p\sqrt{z}-b\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2p\sqrt{z}-b\right)^2}{4p}\right)\Bigg)\Bigg) +$$

$$(-1)^{v-1}\, 2^{-2n-v-2}\, p^{-2n-2} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v\, e^{-\frac{(-b-c(2s-v))^2}{4p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-b-c(2s-v))^{-h-j+2n}$$

$$\left(-b-c(2s-v)+2p\sqrt{z}\right)^{h+j} \left(-\frac{\left(-b-c(2s-v)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((-b-c(2s-v))\left(-b-c(2s-v)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-b-c(2s-v)+2p\sqrt{z}\right)^2}{4p}\right) +$$

$$2\sqrt{-\frac{\left(-b-c(2s-v)+2p\sqrt{z}\right)^2}{p}}\; p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-b-c(2s-v)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg) +$$

$$(-1)^{v+1}\, e^{-\frac{(b-c(2s-v))^2}{4p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b-c(2s-v))^{-h-j+2n} \left(b-c(2s-v)+2p\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-c(2s-v)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((b-c(2s-v))\left(b-c(2s-v)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-c(2s-v)+2p\sqrt{z}\right)^2}{4p}\right) +$$

$$2\sqrt{-\frac{\left(b-c(2s-v)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b-c(2s-v)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)+$$

$$e^{-\frac{(-b-c(v-2s))^2}{4p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b-c(v-2s))^{-h-j+2n}\left(-b-c(v-2s)+2p\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b-c(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-b-c(v-2s))\left(-b-c(v-2s)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(-b-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(-b-c(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-b-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)-$$

$$e^{-\frac{(b-c(v-2s))^2}{4p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-c(v-2s))^{-h-j+2n}\left(b-c(v-2s)+2p\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-c(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b-c(v-2s))\left(b-c(v-2s)+2p\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),-\frac{\left(b-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\Bigg)+2\sqrt{-\frac{\left(b-c(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),-\frac{\left(b-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{p z^r}\sinh(b z)\sinh^v(c z^r)$

01.19.21.2411.01

$$\int z^n e^{p z^2} \sinh(b z) \sinh^\nu(c z^2)\, dz = 2^{-\nu-2} e^{-\frac{b^2}{4p}} (-i^\nu) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$p^{-n-1} \left(\sum_{j=0}^{n} 2^{j-n} (-b)^{n-j} (b + 2 p z)^{j+1} \left(-\frac{(b+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b+2pz)^2}{4p}\right) - \right.$$

$$\left. \sum_{j=0}^{n} 2^{j-n} b^{n-j} (2 p z - b)^{j+1} \left(-\frac{(2pz-b)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2pz-b)^2}{4p}\right)\right) -$$

$$2^{-\nu-2} \sum_{h=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^h \binom{\nu}{h} \left(-e^{-\frac{b^2}{4(p+c(\nu-2h))}} (p + c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} b^{n-j} (2(p + c(\nu - 2h)) z - b)^{j+1} \right.$$

$$\left(-\frac{(2(p+c(\nu-2h))z-b)^2}{p+c(\nu-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(p+c(\nu-2h))z-b)^2}{4(p+c(\nu-2h))}\right) +$$

$$e^{-\frac{b^2}{4(p+c(\nu-2h))}} (p + c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-b)^{n-j} (b + 2(p + c(\nu-2h)) z)^{j+1}$$

$$\left(-\frac{(b+2(p+c(\nu-2h))z)^2}{p+c(\nu-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b+2(p+c(\nu-2h))z)^2}{4(p+c(\nu-2h))}\right) +$$

$$(-1)^{\nu+1} e^{-\frac{b^2}{4(p-c(\nu-2h))}} (p - c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} b^{n-j} (2(p - c(\nu-2h)) z - b)^{j+1}$$

$$\left(-\frac{(2(p-c(\nu-2h))z-b)^2}{p-c(\nu-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(p-c(\nu-2h))z-b)^2}{4(p-c(\nu-2h))}\right) +$$

$$(-1)^{\nu} e^{-\frac{b^2}{4(p-c(\nu-2h))}} (p - c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-b)^{n-j} (b + 2(p - c(\nu-2h)) z)^{j+1}$$

$$\left.\left(-\frac{(b+2(p-c(\nu-2h))z)^2}{p-c(\nu-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b+2(p-c(\nu-2h))z)^2}{4(p-c(\nu-2h))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2412.01

$$\int z^n e^{p\sqrt{z}} \sinh(b z) \sinh^\nu\left(c\sqrt{z}\right) dz = 2^{-2n-\nu-2} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, b^{-2n-2}$$

$$\left(e^{-\frac{p^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2\sqrt{z}\, b + p\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\, b + p\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(p\left(2\sqrt{z}\, b + p\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, b+p\right)^2}{4b}\right) + 2\sqrt{-\frac{\left(2\sqrt{z}\, b+p\right)^2}{b}}\, b\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, b+p\right)^2}{4b}\right)\Bigg) -$$

$$e^{\frac{p^2}{4b}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, p^{-h-j+2n}\left(p-2b\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p-2b\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(p-2b\sqrt{z}\right)^2}{4b}\right) - 2b\sqrt{\frac{\left(p-2b\sqrt{z}\right)^2}{b}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2b\sqrt{z}\right)^2}{4b}\right)\Bigg)\Bigg) +$$

$$(-1)^{\nu-1}\, 2^{-2n-\nu-2}\, b^{-2n-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg((-1)^{\nu}\, e^{\frac{(p-c(2s-\nu))^2}{4b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p-c(2s-\nu))^{-h-j+2n}$$

$$\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((p-c(2s-\nu))\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)^2}{4b}\right) -$$

$$2b\sqrt{\frac{\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)^2}{b}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, b+p-c(2s-\nu)\right)^2}{4b}\right)\Bigg) + e^{\frac{(p-c(\nu-2s))^2}{4b}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(p-c(\nu-2s))^{-h-j+2n}\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)^{h+j}\left(\frac{\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((p-c(\nu-2s))\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)^2}{4b}\right) -$$

$$2b\sqrt{\frac{\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)^2}{b}}\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-2\sqrt{z}\, b+p-c(\nu-2s)\right)^2}{4b}\right)\Bigg) +$$

$$(-1)^{v+1} e^{-\frac{(p-c(2s-v))^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-c(2s-v))^{-h-j+2n} \left(2\sqrt{z}\, b+p-c(2s-v)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\, b+p-c(2s-v)\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((p-c(2s-v))\left(2\sqrt{z}\, b+p-c(2s-v)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, b+p-c(2s-v)\right)^2}{4b}\right)+\right.$$

$$\left. 2\sqrt{-\frac{\left(2\sqrt{z}\, b+p-c(2s-v)\right)^2}{b}}\, b\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, b+p-c(2s-v)\right)^2}{4b}\right)\right)-$$

$$e^{-\frac{(p-c(v-2s))^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-c(v-2s))^{-h-j+2n} \left(2\sqrt{z}\, b+p-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\, b+p-c(v-2s)\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((p-c(v-2s))\left(2\sqrt{z}\, b+p-c(v-2s)\right) \Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\, b+p-c(v-2s)\right)^2}{4b}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\, b+p-c(v-2s)\right)^2}{b}}\, b\, \Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\, b+p-c(v-2s)\right)^2}{4b}\right)\right) /;\ n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n e^{p z^r} \sinh(b z^r) \sinh^v(c z)$

01.19.21.2413.01

$$\int z^n e^{p z^2} \sinh(b z^2) \sinh^\nu(c z)\, dz = 2^{-\nu-2} i^\nu \binom{\nu}{\frac{\nu}{2}} \left(\left((b-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (b-p) z^2\right) - \left((-b-p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-p) z^2\right)\right) (1-\nu \bmod 2) z^{n+1} + \frac{2^{-\nu-2}}{\sqrt{p-b}\sqrt{b+p}} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s e^{-\frac{c^2 p (\nu-2s)^2}{2(p-b)(b+p)}} \binom{\nu}{s} \left((-1)^\nu e^{\frac{c^2(\nu-2s)^2}{4(b+p)}} \sqrt{b+p} \sum_{q=0}^{n} 2^{q-n} (p-b)^{-n-\frac{1}{2}} (c(\nu-2s))^{n-q} (c(2s-\nu)+2(p-b)z)^{q+1} \left(-\frac{(c(2s-\nu)+2(p-b)z)^2}{p-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(2s-\nu)+2(p-b)z)^2}{4(p-b)}\right) + e^{\frac{c^2(\nu-2s)^2}{4(b+p)}} \sqrt{b+p} \sum_{q=0}^{n} (p-b)^{-n-\frac{1}{2}} \left(c\left(s-\frac{\nu}{2}\right)\right)^{n-q} (c(\nu-2s)+2(p-b)z)^{q+1} \left(-\frac{(c(\nu-2s)+2(p-b)z)^2}{p-b}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(\nu-2s)+2(p-b)z)^2}{4(p-b)}\right) - e^{\frac{c^2(\nu-2s)^2}{4(p-b)}} \sqrt{p-b} \left((-1)^\nu \sum_{q=0}^{n} 2^{q-n} (b+p)^{-n-\frac{1}{2}} (c(\nu-2s))^{n-q} (c(2s-\nu)+2(b+p)z)^{q+1} \left(-\frac{(c(2s-\nu)+2(b+p)z)^2}{b+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(2s-\nu)+2(b+p)z)^2}{4(b+p)}\right) + \sum_{q=0}^{n} (b+p)^{-n-\frac{1}{2}} \left(c\left(s-\frac{\nu}{2}\right)\right)^{n-q} (c(\nu-2s)+2(b+p)z)^{q+1} \left(-\frac{(c(\nu-2s)+2(b+p)z)^2}{b+p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(\nu-2s)+2(b+p)z)^2}{4(b+p)}\right) \right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.2414.01

$$\int z^n e^{p\sqrt{z}} \sinh\left(b\sqrt{z}\right) \sinh^\nu(c z)\, dz = -\left(\frac{i}{2}\right)^\nu \binom{\nu}{\frac{\nu}{2}} \left(\left((-b-p)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b-p)\sqrt{z}\right) - \left((b-p)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (b-p)\sqrt{z}\right)\right) (1-\nu \bmod 2) z^{n+1} - i\, 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{\frac{(p-b)^2}{4c(\nu-2s)} - \frac{i\pi}{2}} (-c(\nu-2s))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (p-b)^{-h-j+2n} \left(-b+p-2c(\nu-2s)\sqrt{z}\right)^{h+j} \left(\frac{\left(-b+p-2c(\nu-2s)\sqrt{z}\right)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((p-b)\left(-b+p-2c(\nu-2s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \right.\right.\right.$$

$$\frac{\left(-b+p-2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)-2c(v-2s)\sqrt{\frac{\left(-b+p-2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\,\frac{\left(-b+p-2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)\Bigg)\Bigg)+(-1)^{v}\,e^{\frac{(b+p)^2}{4c(v-2s)}+\frac{i\pi}{2}}\,(-c(v-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(b+p)^{-h-j+2n}\left(b+p-2c(v-2s)\sqrt{z}\right)^{h+j}\left(\frac{\left(b+p-2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+p)\left(b+p-2c(v-2s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\,\frac{\left(b+p-2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)-$$

$$2c(v-2s)\sqrt{\frac{\left(b+p-2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),\,\frac{\left(b+p-2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)\Bigg)+$$

$$e^{-\frac{(p-b)^2}{4c(v-2s)}-\frac{i\pi}{2}}\,(c(v-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(p-b)^{-h-j+2n}\left(-b+p+2c(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b+p+2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((p-b)\left(-b+p+2c(v-2s)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),\,-\frac{\left(-b+p+2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)+$$

$$2c(v-2s)\sqrt{-\frac{\left(-b+p+2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),\,-\frac{\left(-b+p+2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\Bigg)\Bigg)+$$

$$e^{\frac{i\pi}{2}-\frac{(b+p)^2}{4c(v-2s)}}\,(c(v-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(b+p)^{-h-j+2n}\left(b+p+2c(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+p+2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b+p)\left(b+p+2c(v-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+p+2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\right)+2c(v-2s)\right.$$

$$\left.\left.\sqrt{-\frac{\left(b+p+2c(v-2s)\sqrt{z}\right)^2}{c(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+p+2c(v-2s)\sqrt{z}\right)^2}{4c(v-2s)}\right)\right)\right)\right)\text{/; } n\in\mathbb{N}\wedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\,e^{p z^r}\sinh(b z^r)\sinh^v(c z^r)$

01.19.21.2415.01

$$\int z^{\alpha-1}e^{p z^r}\sinh(b z^r)\sinh^v(c z^r)\,dz =$$

$$\frac{2^{-v-1}z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^{v+1}\Gamma\left(\frac{\alpha}{r}, (-b-p-2cs+cv)z^r\right)((-b-p-2cs+cv)z^r)^{-\frac{\alpha}{r}}+\right.$$

$$(-1)^v((b-p-2cs+cv)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (b-p-2cs+cv)z^r\right)-((-b-p+2cs-cv)z^r)^{-\frac{\alpha}{r}}$$

$$\left.\Gamma\left(\frac{\alpha}{r}, (-b-p+2cs-cv)z^r\right)+((b-p+2cs-cv)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (b-p+2cs-cv)z^r\right)\right)-$$

$$\frac{1}{r}\left(2^{-v-1}z^\alpha\binom{v}{\frac{v}{2}}\left(e^{\frac{i\pi v}{2}}((-b-p)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-b-p)z^r\right)-e^{\frac{i\pi v}{2}}((b-p)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (b-p)z^r\right)\right)(1-v\bmod 2)\right)\text{/; } v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\,e^{b z^r+e}\sinh(a z^r+q)\sinh^v(c z^r+g)$

01.19.21.2416.01

$$\int z^{\alpha-1}e^{b z^r+e}\sinh(a z^r+q)\sinh^v(c z^r+g)\,dz =$$

$$\frac{2^{-v-1}z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^{v+1}e^{e+q+2gs-gv}\Gamma\left(\frac{\alpha}{r}, (-a-b-2cs+cv)z^r\right)((-a-b-2cs+cv)z^r)^{-\frac{\alpha}{r}}+(-1)^v e^{e-q+2gs-gv}\right.$$

$$((a-b-2cs+cv)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (a-b-2cs+cv)z^r\right)-e^{e+q-2gs+gv}((-a-b+2cs-cv)z^r)^{-\frac{\alpha}{r}}$$

$$\left.\Gamma\left(\frac{\alpha}{r}, (-a-b+2cs-cv)z^r\right)+e^{e-q-2gs+gv}((a-b+2cs-cv)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (a-b+2cs-cv)z^r\right)\right)-$$

$$\frac{2^{-v-1}z^\alpha}{r}\binom{v}{\frac{v}{2}}\left(e^{e+q+\frac{i\pi v}{2}}((-a-b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-a-b)z^r\right)-e^{e-q+\frac{i\pi v}{2}}((a-b)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (a-b)z^r\right)\right)(1-v\bmod 2)\text{/; } v\in\mathbb{N}^+$$

Involving $z^n\,e^{b z^r+d z+e}\sinh(a z^r+p z+q)\sinh^v(c z^r+f z+g)$

01.19.21.2417.01

$$\int z^n e^{b z^2+d z+e} \sinh\left(a z^2+p z+q\right) \sinh^{\nu}\left(c z^2+f z+g\right) dz ==$$

$$-i^{\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left((a+b)^{-n-1} e^{-\frac{(d+p)^2}{4(a+b)}+e+q} \sum_{j=0}^{n} 2^{j-n} (-d-p)^{n-j} (d+p+2(a+b)z)^{j+1} \left(-\frac{(d+p+2(a+b)z)^2}{a+b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+p+2(a+b)z)^2}{4(a+b)}\right) - (b-a)^{-n-1} e^{-\frac{(d-p)^2}{4(b-a)}+e-q} \sum_{j=0}^{n} 2^{j-n} (p-d)^{n-j} (d-p+2(b-a)z)^{j+1} \left(-\frac{(d-p+2(b-a)z)^2}{b-a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-p+2(b-a)z)^2}{4(b-a)}\right)\right) -$$

$$2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu+1} e^{-\frac{(d-p+f(2s-\nu))^2}{4(-a+b+c(2s-\nu))}+e-q+g(2s-\nu)} \left(\sum_{j=0}^{n} 2^{j-n} (-d+p-f(2s-\nu))^{n-j} (d-p+f(2s-\nu)+2(-a+b+c(2s-\nu))z)^{j+1} \left(-\frac{(d-p+f(2s-\nu)+2(-a+b+c(2s-\nu))z)^2}{-a+b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-p+f(2s-\nu)+2(-a+b+c(2s-\nu))z)^2}{4(-a+b+c(2s-\nu))}\right)\right) (-a+b+c(2s-\nu))^{-n-1} + (-1)^{\nu} e^{-\frac{(d+p+f(2s-\nu))^2}{4(a+b+c(2s-\nu))}+e+q+g(2s-\nu)} (a+b+c(2s-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-p-f(2s-\nu))^{n-j} (d+p+f(2s-\nu)+2(a+b+c(2s-\nu))z)^{j+1} \left(-\frac{(d+p+f(2s-\nu)+2(a+b+c(2s-\nu))z)^2}{a+b+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+p+f(2s-\nu)+2(a+b+c(2s-\nu))z)^2}{4(a+b+c(2s-\nu))}\right) -$$

$$e^{-\frac{(d-p+f(\nu-2s))^2}{4(-a+b+c(\nu-2s))}+e-q+g(\nu-2s)} (-a+b+c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+p-f(\nu-2s))^{n-j} (d-p+f(\nu-2s)+2(-a+b+c(\nu-2s))z)^{j+1} \left(-\frac{(d-p+f(\nu-2s)+2(-a+b+c(\nu-2s))z)^2}{-a+b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-p+f(\nu-2s)+2(-a+b+c(\nu-2s))z)^2}{4(-a+b+c(\nu-2s))}\right) +$$

$$e^{-\frac{(d+p+f(v-2s))^2}{4(a+b+c(v-2s))}+e+q+g(v-2s)} (a+b+c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-p-f(v-2s))^{n-j}$$

$$(d+p+f(v-2s)+2(a+b+c(v-2s))z)^{j+1} \left(-\frac{(d+p+f(v-2s)+2(a+b+c(v-2s))z)^2}{a+b+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+p+f(v-2s)+2(a+b+c(v-2s))z)^2}{4(a+b+c(v-2s))}\right)\Bigg) /; n \in \mathbb{N} \wedge v \in \mathbb{N}^+$$

01.19.21.2418.01

$$\int z^n e^{\sqrt{z}\, b+dz+e} \sinh\left(\sqrt{z}\, a+pz+q\right) \sinh^v\left(\sqrt{z}\, c+fz+g\right) dz = i^v 2^{-2n-v-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\Bigg(e^{-\frac{(a+b)^2}{4(d+p)}+e+q} (d+p)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (a+b)^{-h-j+2n} \left(a+b+2(d+p)\sqrt{z}\right)^{h+j} \left(-\frac{\left(a+b+2(d+p)\sqrt{z}\right)^2}{d+p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg((a+b)\left(a+b+2(d+p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(a+b+2(d+p)\sqrt{z}\right)^2}{4(d+p)}\right) +$$

$$2\sqrt{-\frac{\left(a+b+2(d+p)\sqrt{z}\right)^2}{d+p}}\, (d+p) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(a+b+2(d+p)\sqrt{z}\right)^2}{4(d+p)}\right)\Bigg) - e^{-\frac{(b-a)^2}{4(d-p)}+e-q}$$

$$(d-p)^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b-a)^{-h-j+2n} \left(-a+b+2(d-p)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-a+b+2(d-p)\sqrt{z}\right)^2}{d-p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg((b-a)\left(-a+b+2(d-p)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-a+b+2(d-p)\sqrt{z}\right)^2}{4(d-p)}\right) +$$

$$2\sqrt{-\frac{\left(-a+b+2(d-p)\sqrt{z}\right)^2}{d-p}}\, (d-p) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-a+b+2(d-p)\sqrt{z}\right)^2}{4(d-p)}\right)\Bigg)\Bigg) +$$

$$2^{-2n-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^{v+1} e^{-\frac{(-a+b+c(2s-v))^2}{4(d-p+f(2s-v))}+e-q+g(2s-v)} (d-p+f(2s-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-a+b+c\,(2\,s-v))^{-h-j+2\,n}\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{d-p+f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-a+b+c\,(2\,s-v))\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{4\,(d-p+f\,(2\,s-v))}\Bigg)+$$

$$2\,(d-p+f\,(2\,s-v))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{4\,(d-p+f\,(2\,s-v))}\right)$$

$$\sqrt{-\frac{\left(-a+b+c\,(2\,s-v)+2\,(d-p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{d-p+f\,(2\,s-v)}}\,\Bigg)+$$

$$(-1)^{v}\,e^{-\frac{(a+b+c\,(2\,s-v))^{2}}{4\,(d+p+f\,(2\,s-v))}+e+q+g\,(2\,s-v)}\,(d+p+f\,(2\,s-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(a+b+c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{d+p+f\,(2\,s-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((a+b+c\,(2\,s-v))\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\,\sqrt{z}\,\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{4\,(d+p+f\,(2\,s-v))}\Bigg)+$$

$$2\,\sqrt{-\frac{\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{2}}{d+p+f\,(2\,s-v)}}\,(d+p+f\,(2\,s-v))\,\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+2),\ -\frac{\left(a+b+c\,(2\,s-v)+2\,(d+p+f\,(2\,s-v))\sqrt{z}\right)^2}{4\,(d+p+f\,(2\,s-v))}\right)\right)-$$

$$e^{-\frac{(-a+b+c\,(v-2\,s))^2}{4\,(d-p+f\,(v-2\,s))}+e-q+g\,(v-2\,s)}\,(d-p+f\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-a+b+c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)^2}{d-p+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-a+b+c\,(v-2\,s))\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\ -\frac{\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d-p+f\,(v-2\,s))}\right)+$$

$$2\,(d-p+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d-p+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(-a+b+c\,(v-2\,s)+2\,(d-p+f\,(v-2\,s))\sqrt{z}\right)^2}{d-p+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{(a+b+c\,(v-2\,s))^2}{4\,(d+p+f\,(v-2\,s))}+e+q+g\,(v-2\,s)}\,(d+p+f\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(a+b+c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(a+b+c\,(v-2\,s)+2\,(d+p+f\,(v-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(a+b+c\,(v-2\,s)+2\,(d+p+f\,(v-2\,s))\sqrt{z}\right)^2}{d+p+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((a+b+c\,(v-2\,s))\left(a+b+c\,(v-2\,s)+2\,(d+p+f\,(v-2\,s))\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\frac{1}{2}(h+j+1), -\frac{\left(a+b+c(v-2s)+2(d+p+f(v-2s))\sqrt{z}\right)^2}{4(d+p+f(v-2s))}\Bigg) +$$

$$2(d+p+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(a+b+c(v-2s)+2(d+p+f(v-2s))\sqrt{z}\right)^2}{4(d+p+f(v-2s))}\right)$$

$$\sqrt{-\frac{\left(a+b+c(v-2s)+2(d+p+f(v-2s))\sqrt{z}\right)^2}{d+p+f(v-2s)}}\Bigg)\Bigg) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving product of powers of two direct functions, exponential and a power functions

Involving $z^{\alpha-1}\, e^{b z} \sinh^{\mu}(c z) \sinh^{\nu}(a z)$

01.19.21.2419.01

$$\int z^{\alpha-1} e^{b z} \sinh^m(c z) \sinh^v(a z)\, dz =$$

$$-i^{v-m}\, 2^{-m-v} z^{\alpha} (-b z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(\alpha, -b z)(1 - m \bmod 2)(1 - v \bmod 2) - 2^{-m-v} e^{\frac{i \pi v}{2}} z^{\alpha} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(\Gamma(\alpha, (-b + 2 c k - c m) z)((-b + 2 c k - c m) z)^{-\alpha} + (-1)^m ((c(m-2k) - b) z)^{-\alpha}\, \Gamma(\alpha, (c(m-2k) - b) z)\right) -$$

$$i^{-m}\, 2^{-m-v} z^{\alpha} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{i \pi v}\, \Gamma(\alpha, (-b - 2 a s + a v) z)((-b - 2 a s + a v) z)^{-\alpha} + \right.$$

$$\left. ((-b - a(v - 2s)) z)^{-\alpha}\, \Gamma(\alpha, (-b - a(v-2s)) z)\right) + 2^{-m-v} z^{\alpha}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{m+s} \binom{v}{s} \left(-e^{i \pi v}\, \Gamma(\alpha, (-b - 2 c k + c m - 2 a s + a v) z)((-b - 2 c k + c m - 2 a s + a v) z)^{-\alpha} - \right.$$

$$e^{i \pi m + i \pi v} ((-b + 2 c k - c m - 2 a s + a v) z)^{-\alpha}\, \Gamma(\alpha, (-b + 2 c k - c m - 2 a s + a v) z) -$$

$$((-b - 2 c k + c m + 2 a s - a v) z)^{-\alpha}\, \Gamma(\alpha, (-b - 2 c k + c m + 2 a s - a v) z) -$$

$$\left. e^{i m \pi} ((-b + 2 c k - c m + 2 a s - a v) z)^{-\alpha}\, \Gamma(\alpha, (-b + 2 c k - c m + 2 a s - a v) z)\right) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.2420.01

$$\int z^n e^{bz}\sinh^\mu(cz)\sinh^\nu(az)\,dz = e^{bz}\left(1-e^{2cz}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sinh^\mu(cz)\left(\frac{i}{2}\right)^\nu \sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(b-c\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{b-c\mu}{2c},\ldots,\frac{b-c\mu}{2c},-\mu;1+\frac{b-c\mu}{2c},\ldots,1+\frac{b-c\mu}{2c};e^{2cz}\right)+\left(1-e^{2cz}\right)^{-\mu} n!\,\sinh^\mu(cz)\left(\frac{i}{2}\right)^\nu\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(i^\nu e^{(b-a(\nu-2k))z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(b-a(\nu-2k)-c\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{b-a(-2k+\nu)-c\mu}{2c},\ldots,\frac{b-a(-2k+\nu)-c\mu}{2c},-\mu;1+\frac{b-a(-2k+\nu)-c\mu}{2c},\ldots,1+\frac{b-a(-2k+\nu)-c\mu}{2c};e^{2cz}\right)+i^{-\nu}e^{(b+a(\nu-2k))z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(b+a(\nu-2k)-c\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{b+a(\nu-2k)-c\mu}{2c},\ldots,\frac{b+a(\nu-2k)-c\mu}{2c},-\mu;1+\frac{b+a(\nu-2k)-c\mu}{2c},\ldots,1+\frac{b+a(\nu-2k)-c\mu}{2c};e^{2cz}\right)\right)\,/;\,\nu\in\mathbb{N}\land n\in\mathbb{N}$$

Involving $z^{\alpha-1} e^{pz}\sinh^m(cz)\sinh^\nu(az+b)$

01.19.21.2421.01

$$\int z^{\alpha-1}e^{pz}\sinh^m(cz)\sinh^\nu(b+az)\,dz = -i^{\nu-m}2^{-m-\nu}z^\alpha(-pz)^{-\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\Gamma(\alpha,-pz)(1-m\bmod 2)(1-\nu\bmod 2)-2^{-m-\nu}i^\nu z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\Gamma(\alpha,(2ck-cm-p)z)((2ck-cm-p)z)^{-\alpha}+(-1)^m((c(m-2k)-p)z)^{-\alpha}\Gamma(\alpha,(c(m-2k)-p)z)\right)-2^{-m-\nu}i^{-m}z^\alpha\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(e^{4bs+i\pi\nu}\Gamma(\alpha,(-p-2as+a\nu)z)((-p-2as+a\nu)z)^{-\alpha}+e^{2b\nu}((-p-a(\nu-2s))z)^{-\alpha}\Gamma(\alpha,(-p-a(\nu-2s))z)\right)+2^{-m-\nu}z^\alpha(-1)^m\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(-e^{4bs+i\pi\nu}\Gamma(\alpha,(-2ck+cm-p-2as+a\nu)z)((-2ck+cm-p-2as+a\nu)z)^{-\alpha}-e^{i\pi m+4bs+i\pi\nu}((2ck-cm-p-2as+a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-p-2as+a\nu)z)+e^{2b\nu}\left(-\Gamma(\alpha,(-2ck+cm-p+2as-a\nu)z)((-2ck+cm-p+2as-a\nu)z)^{-\alpha}-e^{im\pi}((2ck-cm-p+2as-a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-p+2as-a\nu)z)\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.2422.01

$$\int z^n e^{pz} \sinh^\mu(cz)\sinh^\nu(b+az)\,dz = 2^{-\nu} i^{-\nu} e^{pz}\left(1-e^{-2cz}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sinh^\mu(cz)$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{p+c\mu}{2c},\ldots,-\frac{p+c\mu}{2c},-\mu;1-\frac{p+c\mu}{2c},\ldots,1-\frac{p+c\mu}{2c};e^{-2cz}\right)+$$
$$2^{-\nu} i^{-\nu}\left(1-e^{-2cz}\right)^{-\mu} n!\sinh^\mu(cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{-\frac{1}{2}i\pi\nu-b(\nu-2k)+(p-a(\nu-2k))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a(\nu-2k)+c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{p-a(\nu-2k)+c\mu}{2c},\ldots,-\frac{p-a(\nu-2k)+c\mu}{2c},\right.$$
$$\left.-\mu;1-\frac{p-a(\nu-2k)+c\mu}{2c},\ldots,1-\frac{p-a(\nu-2k)+c\mu}{2c};e^{-2cz}\right)+e^{\frac{i\pi\nu}{2}+b(\nu-2k)+(p+a(\nu-2k))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+a(\nu-2k)+c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{p+a(\nu-2k)+c\mu}{2c},\ldots,-\frac{p+a(\nu-2k)+c\mu}{2c},\right.$$
$$\left.\left.-\mu;1-\frac{p+a(\nu-2k)+c\mu}{2c},\ldots,1-\frac{p+a(\nu-2k)+c\mu}{2c};e^{-2cz}\right)\right)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{pz} \sinh^m(cz+d)\sinh^\nu(az+b)$

01.19.21.2423.01

$$\int z^{\alpha-1} e^{pz}\sinh^m(cz+d)\sinh^\nu(az+b)\,dz = -i^{\nu-m}2^{-m-\nu}z^\alpha(-pz)^{-\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\Gamma(\alpha,-pz)(1-m \bmod 2)(1-\nu \bmod 2)-$$
$$2^{-m-\nu} i^{-m} z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{2dk+dm+\frac{1}{2}i\pi(\nu-m)}\binom{m}{k}$$
$$\left(e^{im\pi-4dk}\Gamma(\alpha,(2ck-cm-p)z)((2ck-cm-p)z)^{-\alpha}+e^{-2dm}((c(m-2k)-p)z)^{-\alpha}\Gamma(\alpha,(c(m-2k)-p)z)\right)-$$
$$2^{-m-\nu} i^{-m} z^\alpha\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}$$
$$\left(e^{4bs+i\pi\nu}\Gamma(\alpha,(-p-2as+a\nu)z)((-p-2as+a\nu)z)^{-\alpha}+e^{2b\nu}((-p-a(\nu-2s))z)^{-\alpha}\Gamma(\alpha,(-p-a(\nu-2s))z)\right)+$$
$$2^{-m-\nu}z^\alpha i^{-m}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{2dk+dm-2bs-b\nu-\frac{im\pi}{2}}\binom{\nu}{s}$$
$$\Big(-e^{-2dm+4bs+i\pi\nu}\Gamma(\alpha,(-2ck+cm-p-2as+a\nu)z)((-2ck+cm-p-2as+a\nu)z)^{-\alpha}-$$
$$e^{-4dk+4bs+i\pi\nu+im\pi}((2ck-cm-p-2as+a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-p-2as+a\nu)z)+$$
$$e^{2b\nu}\Big(-e^{-2dm}\Gamma(\alpha,(-2ck+cm-p+2as-a\nu)z)((-2ck+cm-p+2as-a\nu)z)^{-\alpha}-$$
$$e^{im\pi-4dk}((2ck-cm-p+2as-a\nu)z)^{-\alpha}\Gamma(\alpha,(2ck-cm-p+2as-a\nu)z)\Big)\Big)\,/;\, m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2424.01

$$\int z^n e^{p z} \sinh^\mu(d + c z) \sinh^\nu(b + a z)\, dz = 2^{-\nu} i^{-\nu} e^{p z} \left(1 - e^{-2 (d+c z)}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n! \, (1 - \nu \bmod 2) \sinh^\mu(d + c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{p + c\mu}{2c}, \ldots, -\frac{p + c\mu}{2c}, -\mu; 1 - \frac{p + c\mu}{2c}, \ldots, 1 - \frac{p + c\mu}{2c}; e^{-2 (d+c z)}\right) + 2^{-\nu} i^{-\nu} \left(1 - e^{-2 (d+c z)}\right)^{-\mu} n! \sinh^\mu(d + c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu - b (\nu - 2 k) + (p - a (\nu - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a (\nu - 2 k) + c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{p - a (\nu - 2 k) + c\mu}{2c}, \ldots, -\frac{p - a (\nu - 2 k) + c\mu}{2c}, -\mu; 1 - \frac{p - a (\nu - 2 k) + c\mu}{2c}, \ldots, 1 - \frac{p - a (\nu - 2 k) + c\mu}{2c}; e^{-2 (d+c z)}\right) + e^{\frac{i \pi \nu}{2} + b (\nu - 2 k) + (p + a (\nu - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a (\nu - 2 k) + c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{p + a (\nu - 2 k) + c\mu}{2c}, \ldots, -\frac{p + a (\nu - 2 k) + c\mu}{2c}, -\mu; 1 - \frac{p + a (\nu - 2 k) + c\mu}{2c}, \ldots, 1 - \frac{p + a (\nu - 2 k) + c\mu}{2c}; e^{-2 (d+c z)}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n e^{p z^r} \sinh^m(b z) \sinh^\nu(c z)$

01.19.21.2425.01

$$\int z^n e^{p z^2} \sinh^m(b z) \sinh^\nu(c z)\, dz = -i^{\nu-m} 2^{-m-\nu-1} z^{n+1} \left(-p z^2\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2) (1 - \nu \bmod 2) - i^{\nu-m} 2^{-m-\nu-1} p^{-n-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2} - \frac{b^2 (2 k - m)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (b (2 k - m))^{n-j} (2 p z - b (2 k - m))^{j+1} \left(-\frac{(2 p z - b (2 k - m))^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 p z - b (2 k - m))^2}{4 p}\right) + e^{-\frac{b^2 (m - 2 k)^2}{4 p} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (b (m - 2 k))^{n-j} (2 p z - b (m - 2 k))^{j+1} \left(-\frac{(2 p z - b (m - 2 k))^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2 p z - b (m - 2 k))^2}{4 p}\right)\right) - 2^{-m-\nu-1} p^{-n-1} i^{-m} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{-\frac{c^2 (2 k - \nu)^2}{4 p}} \sum_{j=0}^{n} 2^{j-n} (-c (2 k - \nu))^{n-j} (c (2 k - \nu) + 2 p z)^{j+1} \left(-\frac{(c (2 k - \nu) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c (2 k - \nu) + 2 p z)^2}{4 p}\right) + \right.$$

$$e^{-\frac{c^2 (v-2k)^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-c(v-2k))^{n-j} (c(v-2k)+2pz)^{j+1} \left(-\frac{(c(v-2k)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(c(v-2k)+2pz)^2}{4p}\right)\Bigg) - 2^{-m-v-1} p^{-n-1} i^{-m} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v e^{\frac{i m \pi}{2} - \frac{(c(2s-v)-b(2k-m))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (b(2k-m)-c(2s-v))^{n-j} (-b(2k-m)+c(2s-v)+2pz)^{j+1}$$

$$\left(-\frac{(-b(2k-m)+c(2s-v)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-b(2k-m)+c(2s-v)+2pz)^2}{4p}\right) +$$

$$(-1)^v e^{-\frac{(c(2s-v)-b(m-2k))^2}{4p} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (b(m-2k)-c(2s-v))^{n-j} (-b(m-2k)+c(2s-v)+2pz)^{j+1}$$

$$\left(-\frac{(-b(m-2k)+c(2s-v)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-b(m-2k)+c(2s-v)+2pz)^2}{4p}\right) +$$

$$e^{\frac{i m \pi}{2} - \frac{(c(v-2s)-b(2k-m))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (b(2k-m)-c(v-2s))^{n-j} (-b(2k-m)+c(v-2s)+2pz)^{j+1}$$

$$\left(-\frac{(-b(2k-m)+c(v-2s)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-b(2k-m)+c(v-2s)+2pz)^2}{4p}\right) +$$

$$e^{-\frac{(c(v-2s)-b(m-2k))^2}{4p} - \frac{i m \pi}{2}} \sum_{j=0}^{n} 2^{j-n} (b(m-2k)-c(v-2s))^{n-j} (-b(m-2k)+c(v-2s)+2pz)^{j+1}$$

$$\left(-\frac{(-b(m-2k)+c(v-2s)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-b(m-2k)+c(v-2s)+2pz)^2}{4p}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n e^{p\sqrt{z}} \sinh^m(bz) \sinh^v(cz) \, dz =$$

$$-i^{v-m} 2^{-m-v+1} \left(-p\sqrt{z}\right)^{-2(n+1)} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1 - m \bmod 2)(1 - v \bmod 2) +$$

$$i^v 2^{-m-2n-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{\frac{p^2}{4b(2k-m)}} (-b(2k-m))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p-2b(2k-m)\sqrt{z}\right)^{h+j} \left(\frac{\left(p-2b(2k-m)\sqrt{z}\right)^2}{b(2k-m)}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2b(2k-m)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(p-2b(2k-m)\sqrt{z}\right)^2}{4b(2k-m)}\right)-\right.$$

$$\left.\left. 2b(2k-m)\sqrt{\frac{\left(p-2b(2k-m)\sqrt{z}\right)^2}{b(2k-m)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2b(2k-m)\sqrt{z}\right)^2}{4b(2k-m)}\right)\right)\right) + (-1)^m e^{\frac{p^2}{4b(m-2k)}}$$

$$(-b(m-2k))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p-2b(m-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(p-2b(m-2k)\sqrt{z}\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2b(m-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(p-2b(m-2k)\sqrt{z}\right)^2}{4b(m-2k)}\right)-\right.$$

$$\left.\left.\left. 2b(m-2k)\sqrt{\frac{\left(p-2b(m-2k)\sqrt{z}\right)^2}{b(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(p-2b(m-2k)\sqrt{z}\right)^2}{4b(m-2k)}\right)\right)\right)\right) +$$

$$i^{-m} 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{-\frac{p^2}{4c(2k-\nu)}} (c(2k-\nu))^{-2n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p+2c(2k-\nu)\sqrt{z}\right)^{h+j} \left(-\frac{\left(p+2c(2k-\nu)\sqrt{z}\right)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2c(2k-\nu)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(p+2c(2k-\nu)\sqrt{z}\right)^2}{4c(2k-\nu)}\right)+\right.$$

$$\left. 2c(2k-\nu)\sqrt{-\frac{\left(p+2c(2k-\nu)\sqrt{z}\right)^2}{c(2k-\nu)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2c(2k-\nu)\sqrt{z}\right)^2}{4c(2k-\nu)}\right)\right) + e^{-\frac{p^2}{4c(\nu-2k)}}$$

$$(c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2\,n}\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)+\right.$$

$$\left.\left.2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s}\binom{v}{s}\left((-1)^{v}\,e^{-\frac{p^{2}}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}}\,(c\,(2\,s-v)-b\,(2\,k-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2\,n}\right.$$

$$\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)^{2}}{c\,(2\,s-v)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)^{2}}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)^{2}}{c\,(2\,s-v)-b\,(2\,k-m)}}\;(c\,(2\,s-v)-b\,(2\,k-m))$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(2\,k-m))\,\sqrt{z}\right)^{2}}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}\right)\right)+$$

$$(-1)^{m+v}\,e^{-\frac{p^{2}}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}}\,(c\,(2\,s-v)-b\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2\,n}$$

$$\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)^{2}}{c\,(2\,s-v)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{c\,(2\,s-v)-b\,(m-2\,k)}}\;(c\,(2\,s-v)-b\,(m-2\,k))$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(c\,(2\,s-v)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(c\,(2\,s-v)-b\,(m-2\,k))}\right)\right)+$$

$$e^{-\frac{p^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}}\,(c\,(v-2\,s)-b\,(2\,k-m))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}$$

$$\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)^2}{c\,(v-2\,s)-b\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)^2}{c\,(v-2\,s)-b\,(2\,k-m)}}\;(c\,(v-2\,s)-b\,(2\,k-m))$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(2\,k-m))\,\sqrt{z}\right)^2}{4\,(c\,(v-2\,s)-b\,(2\,k-m))}\right)\right)+$$

$$(-1)^m\,e^{-\frac{p^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}}\,(c\,(v-2\,s)-b\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}$$

$$\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{c\,(v-2\,s)-b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}\right)+\right.$$

$$2\sqrt{-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{c\,(v-2\,s)-b\,(m-2\,k)}}\;(c\,(v-2\,s)-b\,(m-2\,k))$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(c\,(v-2\,s)-b\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(c\,(v-2\,s)-b\,(m-2\,k))}\right)\right)\right)\Bigg/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\sinh^m\left(b\,z^r\right)\sinh^v(c\,z)$

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$$\int z^n\,e^{p\,z}\sinh^m\left(b\,z^2\right)\sinh^v(c\,z)\,dz = -i^{v-m}\,2^{-m-v}\,(-p)^{-n-1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2)-$$

$$2^{-m-v}\,i^{-m}\,z^{n+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,\Gamma(n+1,\,(-2\,c\,k-p+c\,v)\,z)\,((-2\,c\,k-p+c\,v)\,z)^{-n-1}+\right.$$

$$\left.((-p-c\,(v-2\,k))\,z)^{-n-1}\,\Gamma(n+1,\,(-p-c\,(v-2\,k))\,z)\right)-$$

$$i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{p^2}{4\,b\,(2\,k-m)}}\,(-b\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p-2\,b\,(2\,k-m)\,z)^{j+1}\right.$$

$$\left(\frac{(p-2\,b\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(p-2\,b\,(2\,k-m)\,z)^2}{4\,b\,(2\,k-m)}\right)+(-1)^m\,e^{\frac{p^2}{4\,b\,(m-2\,k)}}\,(-b\,(m-2\,k))^{-n-1}$$

$$\left.\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p-2\,b\,(m-2\,k)\,z)^{j+1}\left(\frac{(p-2\,b\,(m-2\,k)\,z)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(p-2\,b\,(m-2\,k)\,z)^2}{4\,b\,(m-2\,k)}\right)\right)-$$

$$i^{v-m}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(p+c\,(2\,s-v))^2}{4\,b\,(2\,k-m)}+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(-b\,(2\,k-m))^{-n-1}\right.$$

$$\sum_{j=0}^{n}2^{j-n}\,(-p-c\,(2\,s-v))^{n-j}\,(p+c\,(2\,s-v)-2\,b\,(2\,k-m)\,z)^{j+1}\left(\frac{(p+c\,(2\,s-v)-2\,b\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(p+c\,(2\,s-v)-2\,b\,(2\,k-m)\,z)^2}{4\,b\,(2\,k-m)}\right)+e^{\frac{(p+c\,(v-2\,s))^2}{4\,b\,(2\,k-m)}-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(-b\,(2\,k-m))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p - c(v-2s))^{n-j} (p + c(v-2s) - 2b(2k-m)z)^{j+1} \left(\frac{(p + c(v-2s) - 2b(2k-m)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(p + c(v-2s) - 2b(2k-m)z)^2}{4b(2k-m)}\right) + e^{\frac{(p+c(2s-v))^2}{4b(m-2k)} + \frac{i\pi v}{2} - \frac{i m\pi}{2}} (-b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p - c(2s-v))^{n-j} (p + c(2s-v) - 2b(m-2k)z)^{j+1} \left(\frac{(p + c(2s-v) - 2b(m-2k)z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(p + c(2s-v) - 2b(m-2k)z)^2}{4b(m-2k)}\right) + e^{\frac{(p+c(v-2s))^2}{4b(m-2k)} - \frac{i\pi v}{2} - \frac{i m\pi}{2}} (-b(m-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p - c(v-2s))^{n-j} (p + c(v-2s) - 2b(m-2k)z)^{j+1} \left(\frac{(p + c(v-2s) - 2b(m-2k)z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(p + c(v-2s) - 2b(m-2k)z)^2}{4b(m-2k)}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{pz} \sinh^m\left(b\sqrt{z}\right) \sinh^v(cz)\, dz = -i^{v-m}\, 2^{-m-v} (-p)^{-n-1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(n+1, -pz) (1 - m \bmod 2) (1 - v \bmod 2) -$$

$$2^{-m-v} i^{-m} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v\, \Gamma(n+1, (-2ck - p + cv)z) ((-2ck - p + cv)z)^{-n-1} + \right.$$

$$\left.((-p - c(v-2k))z)^{-n-1}\, \Gamma(n+1, (-p - c(v-2k))z)\right) + 2^{-m-2n-v-1} p^{-2n-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{\frac{i v\pi}{2} - \frac{b^2 (2k-m)^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j (-b(2k-m))^{-h-j+2n} \left(2p\sqrt{z} - b(2k-m)\right)^{h+j} \left(-\frac{\left(2p\sqrt{z} - b(2k-m)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h} \binom{n}{j} \left(2p\sqrt{-\frac{\left(2p\sqrt{z} - b(2k-m)\right)^2}{p}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2p\sqrt{z} - b(2k-m)\right)^2}{4p}\right) -\right.$$

$$\left.\left. b(2k-m)\left(2p\sqrt{z} - b(2k-m)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2p\sqrt{z} - b(2k-m)\right)^2}{4p}\right)\right)\right) + (-1)^m e^{\frac{i v\pi}{2} - \frac{b^2 (m-2k)^2}{4p}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2\,k))^{-h-j+2\,n}\,\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)^{h+j}\left(-\frac{\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\,\sqrt{-\frac{\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.b\,(m-2\,k)\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{4\,p}\right)\right)\right)+$$

$$2^{-m-2\,n-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu\,e^{-\frac{b^2\,(2\,k-m)^2}{4\,(p+c\,(2\,s-\nu))}}\,(p+c\,(2\,s-\nu))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(2\,k-m))^{-h-j+2\,n}\right.$$

$$\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)^2}{p+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)^2}{p+c\,(2\,s-\nu)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)^2}{4\,(p+c\,(2\,s-\nu))}\right)-b\,(2\,k-m)\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(2\,k-m)\right)^2}{4\,(p+c\,(2\,s-\nu))}\right)\right)+$$

$$(-1)^{m+\nu}\,e^{-\frac{b^2\,(m-2\,k)^2}{4\,(p+c\,(2\,s-\nu))}}\,(p+c\,(2\,s-\nu))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(m-2\,k)\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(2\,s-\nu))\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{p+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(p+c\,(2\,s-v))\sqrt{-\frac{\left(2\,(p+c\,(2\,s-v))\sqrt{z}-b\,(m-2\,k)\right)^2}{p+c\,(2\,s-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(p+c\,(2\,s-v))\sqrt{z}-b\,(m-2\,k)\right)^2}{4\,(p+c\,(2\,s-v))}\right)-b\,(m-2\,k)\left(2\,(p+c\,(2\,s-v))\sqrt{z}-b\,(m-2\,k)\right)$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(p+c\,(2\,s-v))\sqrt{z}-b\,(m-2\,k)\right)^2}{4\,(p+c\,(2\,s-v))}\right)\right)+$$

$$e^{-\frac{b^2\,(2\,k-m)^2}{4\,(p+c\,(v-2\,s))}}\,(p+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(2\,k-m))^{-h-j+2\,n}$$

$$\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)^2}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(p+c\,(v-2\,s))\sqrt{-\frac{\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)^2}{p+c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)^2}{4\,(p+c\,(v-2\,s))}\right)-b\,(2\,k-m)\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(2\,k-m)\right)^2}{4\,(p+c\,(v-2\,s))}\right)\right)+$$

$$(-1)^m\,e^{-\frac{b^2\,(m-2\,k)^2}{4\,(p+c\,(v-2\,s))}}\,(p+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-b\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(m-2\,k)\right)^{h+j}\left(-\frac{\left(2\,(p+c\,(v-2\,s))\sqrt{z}-b\,(m-2\,k)\right)^2}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(p+c\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{p+c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{4\,(p+c\,(v-2\,s))}\right)-b\,(m-2\,k)\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\,(m-2\,k)\right)$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(p+c\,(v-2\,s))\,\sqrt{z}\,-b\,(m-2\,k)\right)^2}{4\,(p+c\,(v-2\,s))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z^r}\,\sinh^m\!\left(b\,z^r\right)\sinh^v(c\,z)$

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$$\int z^n\,e^{p\,z^2}\,\sinh^m\!\left(b\,z^2\right)\sinh^v(c\,z)\,dz = -i^{m-v}\,2^{-m-v-1}\,z^{n+1}\left(-p\,z^2\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\!\left(\frac{n+1}{2},\,-p\,z^2\right)(1-m \bmod 2)\,(1-v \bmod 2)-$$

$$i^{-v}\,2^{-m-v-1}\,z^{n+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,\Gamma\!\left(\frac{n+1}{2},\,(-2\,b\,k+b\,m-p)\,z^2\right)\left((-2\,b\,k+b\,m-p)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.\left((-b\,(m-2\,k)-p)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(-b\,(m-2\,k)-p)\,z^2\right)\right)-(-1)^v\,i^m\,2^{-m-v-1}\,p^{-n-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{c^2\,(v-2\,k)^2}{4\,p}}\sum_{h=0}^{n}2^{h-n}\,(c\,(v-2\,k))^{n-h}\,(2\,p\,z-c\,(v-2\,k))^{h+1}\left(-\frac{(2\,p\,z-c\,(v-2\,k))^2}{p}\right)^{\frac{1}{2}(-h-1)}\binom{n}{h}\right.$$

$$\Gamma\!\left(\frac{h+1}{2},\,-\frac{(2\,p\,z-c\,(v-2\,k))^2}{4\,p}\right)+(-1)^v\,e^{-\frac{c^2\,(v-2\,k)^2}{4\,p}}\sum_{h=0}^{n}2^{h-n}\,(-c\,(v-2\,k))^{n-h}\,(c\,(v-2\,k)+2\,p\,z)^{h+1}$$

$$\left.\left(-\frac{(c\,(v-2\,k)+2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-h-1)}\binom{n}{h}\Gamma\!\left(\frac{h+1}{2},\,-\frac{(c\,(v-2\,k)+2\,p\,z)^2}{4\,p}\right)\right)-(-1)^v\,i^m\,2^{-m-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{j=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^j\binom{v}{j}\left(e^{\frac{i\,m\,\pi}{2}-\frac{c^2\,(v-2\,j)^2}{4\,(p-b\,(m-2\,k))}}\left(\sum_{h=0}^{n}2^{h-n}\,(c\,(v-2\,j))^{n-h}\,(2\,(p-b\,(m-2\,k))\,z-c\,(v-2\,j))^{h+1}\right.\right.$$

$$\left.\left(-\frac{(2\,(p-b\,(m-2\,k))\,z-c\,(v-2\,j))^2}{p-b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-1)}\binom{n}{h}\Gamma\!\left(\frac{h+1}{2},\,-\frac{(2\,(p-b\,(m-2\,k))\,z-c\,(v-2\,j))^2}{4\,(p-b\,(m-2\,k))}\right)\right)$$

$$(p-b\,(m-2\,k))^{-n-1}+e^{-\frac{c^2\,(v-2\,j)^2}{4\,(p-b\,(m-2\,k))}+i\,\pi\,v+\frac{i\,m\,\pi}{2}}\left(\sum_{h=0}^{n}2^{h-n}\,(-c\,(v-2\,j))^{n-h}\,(c\,(v-2\,j)+2\,(p-b\,(m-2\,k))\,z)^{h+1}\right.$$

$$\left(-\frac{(c\,(v-2\,j)+2\,(p-b\,(m-2\,k))\,z)^2}{p-b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h}\,\Gamma\!\left(\frac{h+1}{2},\,-\frac{(c\,(v-2\,j)+2\,(p-b\,(m-2\,k))\,z)^2}{4\,(p-b\,(m-2\,k))}\right)\Bigg)$$

$$(p-b\,(m-2\,k))^{-n-1}+e^{-\frac{c^2\,(v-2\,j)^2}{4\,(b\,(m-2\,k)+p)}-\frac{i\,m\,\pi}{2}}\,(b\,(m-2\,k)+p)^{-n-1}$$

$$\sum_{h=0}^{n}2^{h-n}\,(c\,(v-2\,j))^{n-h}\,(2\,(b\,(m-2\,k)+p)\,z-c\,(v-2\,j))^{h+1}\left(-\frac{(2\,(b\,(m-2\,k)+p)\,z-c\,(v-2\,j))^2}{b\,(m-2\,k)+p}\right)^{\frac{1}{2}(-h-1)}$$

$$\binom{n}{h}\,\Gamma\!\left(\frac{h+1}{2},\,-\frac{(2\,(b\,(m-2\,k)+p)\,z-c\,(v-2\,j))^2}{4\,(b\,(m-2\,k)+p)}\right)+e^{-\frac{c^2\,(v-2\,j)^2}{4\,(b\,(m-2\,k)+p)}+i\,\pi\,v-\frac{i\,m\,\pi}{2}}\,(b\,(m-2\,k)+p)^{-n-1}$$

$$\sum_{h=0}^{n}2^{h-n}\,(-c\,(v-2\,j))^{n-h}\,(c\,(v-2\,j)+2\,(b\,(m-2\,k)+p)\,z)^{h+1}\left(-\frac{(c\,(v-2\,j)+2\,(b\,(m-2\,k)+p)\,z)^2}{b\,(m-2\,k)+p}\right)^{\frac{1}{2}(-h-1)}$$

$$\binom{n}{h}\,\Gamma\!\left(\frac{h+1}{2},\,-\frac{(c\,(v-2\,j)+2\,(b\,(m-2\,k)+p)\,z)^2}{4\,(b\,(m-2\,k)+p)}\right)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\sqrt{z}}\,\sinh^m\!\left(b\sqrt{z}\right)\sinh^v(c\,z)\,dz = -i^{m-v}\,2^{-m-v+1}\,p^{-2\,(n+1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\!\left(2\,(n+1),\,-p\sqrt{z}\right)(1-m \bmod 2)\,(1-v \bmod 2)-$$

$$i^{-v}\,(-1)^m\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(\Gamma\!\left(2\,(n+1),\,(-2\,b\,k+b\,m-p)\sqrt{z}\right)(-2\,b\,k+b\,m-p)^{-2\,(n+1)}+$$

$$(-1)^m\,(b\,(m-2\,k)+p)^{-2\,(n+1)}\,\Gamma\!\left(2\,(n+1),\,(-b\,(m-2\,k)-p)\sqrt{z}\right)\Big)+(-1)^v\,i^m\,2^{-m-2\,n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{p^2}{4\,c\,(v-2\,k)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-2\,c\,(v-2\,k)\right.$$

$$\left.\left.\sqrt{\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)\right)(-c\,(v-2\,k))^{-2\,n-2}+$$

$$(-1)^v\,e^{-\frac{p^2}{4\,c\,(v-2\,k)}}\,(c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+\right.$$

$$\left.\left.\left. 2\,c\,(v-2\,k)\sqrt{-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\, -\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)\right)\right)+$$

$$(-1)^v\, i^m\, 2^{-m-2\,n-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(p-b\,(m-2\,k))^2}{4\,c\,(v-2\,s)}+\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-b\,(m-2\,k))^{-h-j+2\,n}\right.\right.$$

$$\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((p-b\,(m-2\,k))\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-$$

$$2\,c\,(v-2\,s)\sqrt{\frac{\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.\frac{\left(-b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)(-c\,(v-2\,s))^{-2\,n-2}+$$

$$e^{\frac{(b\,(m-2\,k)+p)^2}{4\,c\,(v-2\,s)}-\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)+p)^{-h-j+2\,n}\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b\,(m-2\,k)+p)\right.$$

$$\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-$$

$$2\,c\,(v-2\,s)\sqrt{\frac{\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.\frac{\left(b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)(-c\,(v-2\,s))^{-2\,n-2}+(-1)^v\,e^{\frac{i\,m\,\pi}{2}-\frac{(p-b\,(m-2\,k))^2}{4\,c\,(v-2\,s)}}$$

$$(c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-b\,(m-2\,k))^{-h-j+2\,n}\left(-b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-b\,(m-2\,k))\left(-b\,(m-2\,k)+\right.\right.$$

$$\left.p+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+$$

$$2\,c\,(v-2\,s)\sqrt{-\frac{\left(-b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)+(-1)^v\,e^{-\frac{(b\,(m-2\,k)+p)^2}{4\,c\,(v-2\,s)}-\frac{i\,m\,\pi}{2}}$$

$$(c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)+p)^{-h-j+2\,n}\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b\,(m-2\,k)+p)\right.$$

$$\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+$$

$$2\,c\,(v-2\,s)\,\sqrt{-\frac{\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{\left(b\,(m-2\,k)+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z}\,\sinh^m(b\,z^r)\,\sinh^v(c\,z^r)$

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$$\int z^n\,e^{p\,z}\,\sinh^m(b\,z^2)\,\sinh^v(c\,z^2)\,dz =$$

$$-i^{v-m}\,2^{-m-v}\,(-p)^{-n-1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2)-i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{p^2}{4\,b\,(2\,k-m)}}\,(-b\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p-2\,b\,(2\,k-m)\,z)^{j+1}\left(\frac{(p-2\,b\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(p-2\,b\,(2\,k-m)\,z)^2}{4\,b\,(2\,k-m)}\right)+(-1)^m\,e^{\frac{p^2}{4\,b\,(m-2\,k)}}\,(-b\,(m-2\,k))^{-n-1}$$

$$\left.\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p-2\,b\,(m-2\,k)\,z)^{j+1}\left(\frac{(p-2\,b\,(m-2\,k)\,z)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(p-2\,b\,(m-2\,k)\,z)^2}{4\,b\,(m-2\,k)}\right)\right)-$$

$$i^{-m}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{-\frac{p^2}{4\,c\,(2\,k-v)}}\,(c\,(2\,k-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,c\,(2\,k-v)\,z)^{j+1}\right.$$

$$\left(-\frac{(p+2\,c\,(2\,k-v)\,z)^2}{c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(p+2\,c\,(2\,k-v)\,z)^2}{4\,c\,(2\,k-v)}\right)+e^{-\frac{p^2}{4\,c\,(v-2\,k)}}\,(c\,(v-2\,k))^{-n-1}$$

$$\left.\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,c\,(v-2\,k)\,z)^{j+1}\left(-\frac{(p+2\,c\,(v-2\,k)\,z)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(p+2\,c\,(v-2\,k)\,z)^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{p^2}{4\,(c\,(2\,s-v)-b\,(2\,k-m))}}\,(c\,(2\,s-v)-b\,(2\,k-m))^{-n-1}\right.$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (c (2 s - v) - b (2 k - m)) z)^{j+1} \left(-\frac{(p + 2 (c (2 s - v) - b (2 k - m)) z)^2}{c (2 s - v) - b (2 k - m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (c (2 s - v) - b (2 k - m)) z)^2}{4 (c (2 s - v) - b (2 k - m))}\right) + (-1)^{m+v} e^{-\frac{p^2}{4 (c (2 s - v) - b (m - 2 k))}} (c (2 s - v) - b (m - 2 k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (c (2 s - v) - b (m - 2 k)) z)^{j+1} \left(-\frac{(p + 2 (c (2 s - v) - b (m - 2 k)) z)^2}{c (2 s - v) - b (m - 2 k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (c (2 s - v) - b (m - 2 k)) z)^2}{4 (c (2 s - v) - b (m - 2 k))}\right) + e^{-\frac{p^2}{4 (c (v - 2 s) - b (2 k - m))}} (c (v - 2 s) - b (2 k - m))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (c (v - 2 s) - b (2 k - m)) z)^{j+1} \left(-\frac{(p + 2 (c (v - 2 s) - b (2 k - m)) z)^2}{c (v - 2 s) - b (2 k - m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (c (v - 2 s) - b (2 k - m)) z)^2}{4 (c (v - 2 s) - b (2 k - m))}\right) + (-1)^m e^{-\frac{p^2}{4 (c (v - 2 s) - b (m - 2 k))}} (c (v - 2 s) - b (m - 2 k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (c (v - 2 s) - b (m - 2 k)) z)^{j+1} \left(-\frac{(p + 2 (c (v - 2 s) - b (m - 2 k)) z)^2}{c (v - 2 s) - b (m - 2 k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (c (v - 2 s) - b (m - 2 k)) z)^2}{4 (c (v - 2 s) - b (m - 2 k))}\right)\right)\right) /; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.2432.01

$$\int z^n e^{p z} \sinh^m\left(b \sqrt{z}\right) \sinh^v\left(c \sqrt{z}\right) dz =$$

$$(-1)^n 2^{-m-v} i^{m-v} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(n+1, -p z) (1 - m \bmod 2) (1 - v \bmod 2) p^{-n-1} + (-1)^m 2^{-m-2 n-v-1} i^{-v} \binom{v}{\frac{v}{2}}$$

$$(1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{b^2 (2 k - m)^2}{4 p}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b (2 k - m))^{-h-j+2 n} \left(b (2 k - m) + 2 p \sqrt{z}\right)^{h+j} \right.\right.$$

$$\left(-\frac{\left(b (2 k - m) + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b (2 k - m) \left(b (2 k - m) + 2 p \sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2} (h + j + 1), -\frac{\left(b (2 k - m) + 2 p \sqrt{z}\right)^2}{4 p}\right) + 2 \sqrt{-\frac{\left(b (2 k - m) + 2 p \sqrt{z}\right)^2}{p}}$$

$$p\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b(2k-m)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)\Bigg)p^{-2n-2}+(-1)^m\,e^{-\frac{b^2(m-2k)^2}{4p}}$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b(m-2k))^{-h-j+2n}\left(b(m-2k)+2p\sqrt{z}\right)^{h+j}\left(-\frac{\left(b(m-2k)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(b(m-2k)\left(b(m-2k)+2p\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b(m-2k)+2p\sqrt{z}\right)^2}{4p}\right)+2\right.$$

$$\left.\left.\sqrt{-\frac{\left(b(m-2k)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b(m-2k)+2p\sqrt{z}\right)^2}{4p}\right)\right)\right)p^{-2n-2}\Bigg)+$$

$$(-1)^{m+\nu}\,2^{-m-2n-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu\,e^{-\frac{c^2(2k-\nu)^2}{4p}-\frac{i m\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(2k-\nu))^{-h-j+2n}\left(2p\sqrt{z}-c(2k-\nu)\right)^{h+j}\left(-\frac{\left(2p\sqrt{z}-c(2k-\nu)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\right.$$

$$\binom{n}{j}\left(2p\sqrt{-\frac{\left(2p\sqrt{z}-c(2k-\nu)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2p\sqrt{z}-c(2k-\nu)\right)^2}{4p}\right)-c(2k-\nu)\right.$$

$$\left.\left.\left(2p\sqrt{z}-c(2k-\nu)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2p\sqrt{z}-c(2k-\nu)\right)^2}{4p}\right)\right)\right)p^{-2n-2}+e^{-\frac{c^2(\nu-2k)^2}{4p}-\frac{i m\pi}{2}}$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(\nu-2k))^{-h-j+2n}\left(2p\sqrt{z}-c(\nu-2k)\right)^{h+j}\left(-\frac{\left(2p\sqrt{z}-c(\nu-2k)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(2p\sqrt{-\frac{\left(2p\sqrt{z}-c(\nu-2k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2p\sqrt{z}-c(\nu-2k)\right)^2}{4p}\right)-c(\nu-2k)\right.$$

$$\left(2\,p\,\sqrt{z}-c\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\,\sqrt{z}-c\,(v-2\,k)\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)\,p^{-2\,n-2}\Bigg)+(-1)^{m+v}\,2^{-m-2\,n-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{-\frac{(b\,(2\,k-m)-c\,(2\,s-v))^2}{4\,p}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(2\,k-m)-c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,(2\,k-m)-c\,(2\,s-v))\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)\Gamma\!\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)+2\,\sqrt{-\frac{\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,(2\,k-m)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\,p^{-2\,n-2}+$$

$$(-1)^{m+v}\,e^{-\frac{(b\,(m-2\,k)-c\,(2\,s-v))^2}{4\,p}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,(m-2\,k)-c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,(m-2\,k)-c\,(2\,s-v))\left(b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)\Gamma\!\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)+2\,\sqrt{-\frac{\left(b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$p\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b(m-2k)-c(2s-v)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)\Bigg)p^{-2n-2}+$$

$$e^{-\frac{(b(2k-m)-c(v-2s))^2}{4p}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b(2k-m)-c(v-2s))^{-h-j+2n}\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b(2k-m)-c(v-2s))\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)+2\sqrt{-\frac{\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b(2k-m)-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)p^{-2n-2}+(-1)^m\,e^{-\frac{(b(m-2k)-c(v-2s))^2}{4p}}$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b(m-2k)-c(v-2s))^{-h-j+2n}\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b(m-2k)-c(v-2s))$$

$$\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\frac{\left(b(m-2k)-c(v-2s)+2p\sqrt{z}\right)^2}{\ldots}\right)\Bigg)\Bigg)p^{-2n-2}\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z^r} \sinh^m(b z^r) \sinh^\nu(c z^r)$

01.19.21.2433.01

$$\int z^{\alpha-1} e^{p z^r} \sinh^m(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{i^{\nu-m}\, 2^{-m-\nu} z^\alpha (-p z^r)^{-\frac{\alpha}{r}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -p z^r\right) - \frac{2^{-m-\nu} z^\alpha}{r} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{\frac{i\pi\nu}{2}} \Gamma\left(\frac{\alpha}{r}, (-2 b k + b m - p) z^r\right) ((-2 b k + b m - p) z^r)^{-\frac{\alpha}{r}} + e^{\frac{i\pi\nu}{2}} ((2 b k - b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 b k - b m - p) z^r\right)\right) - \frac{i^{-m}\, 2^{-m-\nu} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-2 c k - p + c \nu) z^r\right) ((-2 c k - p + c \nu) z^r)^{-\frac{\alpha}{r}} + ((2 c k - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 c k - p - c \nu) z^r\right)\right) - \frac{(-1)^m 2^{-m-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-2 b k + b m - p - 2 c s + c \nu) z^r\right) ((-2 b k + b m - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+\nu} ((2 b k - b m - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 b k - b m - p - 2 c s + c \nu) z^r\right) + ((-2 b k + b m - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-2 b k + b m - p + 2 c s - c \nu) z^r\right) + (-1)^m ((2 b k - b m - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 b k - b m - p + 2 c s - c \nu) z^r\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{b z^r + e} \sinh^m(a z^r + q) \sinh^\nu(c z^r + g)$

01.19.21.2434.01

$$\int z^{\alpha-1} e^{b z^r+e} \sinh^m(a z^r+q) \sinh^v(c z^r+g) \, dz = -\frac{i^{v-m} 2^{-m-v} e^e z^\alpha (-b z^r)^{-\frac{\alpha}{r}} (1-m \bmod 2)(1-v \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) - \frac{2^{-m-v} z^\alpha}{r} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{e+2 k q-m q+\frac{i \pi v}{2}} \Gamma\left(\frac{\alpha}{r}, (-b-2 a k+a m) z^r\right) ((-b-2 a k+a m) z^r)^{-\frac{\alpha}{r}} + e^{e-2 k q+m q+\frac{i \pi v}{2}} ((-b+2 a k-a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 a k-a m) z^r\right) \right) - \frac{2^{-m-v} i^{-m} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{e+2 g k-g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 c k+c v) z^r\right) ((-b-2 c k+c v) z^r)^{-\frac{\alpha}{r}} + e^{e-2 g k+g v} ((-b+2 c k-c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 c k-c v) z^r\right) \right) - \frac{(-1)^m 2^{-m-v} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{e+2 k q-m q+2 g s-g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 a k+a m-2 c s+c v) z^r\right) ((-b-2 a k+a m-2 c s+c v) z^r)^{-\frac{\alpha}{r}} + (-1)^{m+v} e^{e-2 k q+m q+2 g s-g v} ((-b+2 a k-a m-2 c s+c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 a k-a m-2 c s+c v) z^r\right) + e^{e+2 k q-m q-2 g s+g v} ((-b-2 a k+a m+2 c s-c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-2 a k+a m+2 c s-c v) z^r\right) + (-1)^m e^{e-2 k q+m q-2 g s+g v} ((-b+2 a k-a m+2 c s-c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 a k-a m+2 c s-c v) z^r\right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n e^{b z^r+d z+e} \sinh^m(a z^r+p z+q) \sinh^v(c z^r+f z+g)$

01.19.21.2435.01

$$\int z^n e^{b z^2+d z+e} \sinh^m(a z^2+p z+q) \sinh^v(c z^2+f z+g) \, dz = -i^{v-m} 2^{-m-v-1} b^{-n-1} e^{e-\frac{d^2}{4 b}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2) (1-v \bmod 2) \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d+2 b z)^{j+1} \left(-\frac{(d+2 b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2 b z)^2}{4 b}\right) - i^v 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{(d-(2 k-m) p)^2}{4 (b-a (2 k-m))}+e-(2 k-m) q} \left(\sum_{j=0}^{n} 2^{j-n} ((2 k-m) p-d)^{n-j} (d-(2 k-m) p+2 (b-a (2 k-m)) z)^{j+1} \left(-\frac{(d-(2 k-m) p+2 (b-a (2 k-m)) z)^2}{b-a (2 k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-(2 k-m) p+2 (b-a (2 k-m)) z)^2}{4 (b-a (2 k-m))}\right) \right) (b-a (2 k-m))^{-n-1} + \right.$$

$$(-1)^m e^{-\frac{(d-(m-2k)p)^2}{4(b-a(m-2k))}+e-(m-2k)q} (b-a(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} ((m-2k)p-d)^{n-j}$$

$$(d-(m-2k)p+2(b-a(m-2k))z)^{j+1} \left(-\frac{(d-(m-2k)p+2(b-a(m-2k))z)^2}{b-a(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-(m-2k)p+2(b-a(m-2k))z)^2}{4(b-a(m-2k))}\right)\Bigg) - 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{-\frac{(d+f(2k-v))^2}{4(b+c(2k-v))}+e+g(2k-v)-\frac{i\pi m}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-d-f(2k-v))^{n-j} (d+f(2k-v)+2(b+c(2k-v))z)^{j+1}\right.\right.$$

$$\left(-\frac{(d+f(2k-v)+2(b+c(2k-v))z)^2}{b+c(2k-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(2k-v)+2(b+c(2k-v))z)^2}{4(b+c(2k-v))}\right)\Bigg)$$

$$(b+c(2k-v))^{-n-1} + e^{-\frac{(d+f(v-2k))^2}{4(b+c(v-2k))}+e+g(v-2k)-\frac{i\pi m}{2}} (b+c(v-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-d-f(v-2k))^{n-j} (d+f(v-2k)+2(b+c(v-2k))z)^{j+1}$$

$$\left(-\frac{(d+f(v-2k)+2(b+c(v-2k))z)^2}{b+c(v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f(v-2k)+2(b+c(v-2k))z)^2}{4(b+c(v-2k))}\right)\Bigg) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{-\frac{(d-(2k-m)p+f(2s-v))^2}{4(b-a(2k-m)+c(2s-v))}+e-(2k-m)q+g(2s-v)} \left(\sum_{j=0}^{n} 2^{j-n}\right.\right.$$

$$(-d+(2k-m)p-f(2s-v))^{n-j} (d-(2k-m)p+f(2s-v)+2(b-a(2k-m)+c(2s-v))z)^{j+1}$$

$$\left(-\frac{(d-(2k-m)p+f(2s-v)+2(b-a(2k-m)+c(2s-v))z)^2}{b-a(2k-m)+c(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d-(2k-m)p+f(2s-v)+2(b-a(2k-m)+c(2s-v))z)^2}{4(b-a(2k-m)+c(2s-v))}\right)\Bigg)$$

$$(b-a(2k-m)+c(2s-v))^{-n-1} + (-1)^{m+v} e^{-\frac{(d-(m-2k)p+f(2s-v))^2}{4(b-a(m-2k)+c(2s-v))}+e-(m-2k)q+g(2s-v)}$$

$$(b-a(m-2k)+c(2s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+(m-2k)p-f(2s-v))^{n-j}$$

$$(d-(m-2k)p+f(2s-v)+2(b-a(m-2k)+c(2s-v))z)^{j+1}$$

$$\left(-\frac{(d-(m-2k)p+f(2s-v)+2(b-a(m-2k)+c(2s-v))z)^2}{b-a(m-2k)+c(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d-(m-2k)p+f(2s-v)+2(b-a(m-2k)+c(2s-v))z)^2}{4(b-a(m-2k)+c(2s-v))}\right)+$$

$$e^{-\frac{(d-(2k-m)p+f(v-2s))^2}{4(b-a(2k-m)+c(v-2s))}+e-(2k-m)q+g(v-2s)}(b-a(2k-m)+c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}(-d+(2k-m)p-f(v-2s))^{n-j}(d-(2k-m)p+f(v-2s)+2(b-a(2k-m)+c(v-2s))z)^{j+1}$$

$$\left(-\frac{(d-(2k-m)p+f(v-2s)+2(b-a(2k-m)+c(v-2s))z)^2}{b-a(2k-m)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d-(2k-m)p+f(v-2s)+2(b-a(2k-m)+c(v-2s))z)^2}{4(b-a(2k-m)+c(v-2s))}\right)+$$

$$(-1)^m e^{-\frac{(d-(m-2k)p+f(v-2s))^2}{4(b-a(m-2k)+c(v-2s))}+e-(m-2k)q+g(v-2s)}(b-a(m-2k)+c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}(-d+(m-2k)p-f(v-2s))^{n-j}(d-(m-2k)p+f(v-2s)+2(b-a(m-2k)+c(v-2s))z)^{j+1}$$

$$\left(-\frac{(d-(m-2k)p+f(v-2s)+2(b-a(m-2k)+c(v-2s))z)^2}{b-a(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\right.$$

$$\left.\left.-\frac{(d-(m-2k)p+f(v-2s)+2(b-a(m-2k)+c(v-2s))z)^2}{4(b-a(m-2k)+c(v-2s))}\right)\right) /; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n e^{\sqrt{z}\,b+dz+e}\sinh^m\left(\sqrt{z}\,a+pz+q\right)\sinh^v\left(\sqrt{z}\,c+fz+g\right)dz = i^{v-m}\,2^{-m-2n-v-1}\,d^{-2n-2}\,e^{e-\frac{b^2}{4d}}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}$$

$$(1-m\bmod 2)(1-v\bmod 2)\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2n}\left(b+2d\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$

$$i^v\,2^{-m-2n-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{(b-a(2k-m))^2}{4(d-(2k-m)p)}+e-(2k-m)q}(d-(2k-m)p)^{-2n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-a(2k-m))^{-h-j+2n}\left(b-a(2k-m)+2(d-(2k-m)p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-a(2k-m)+2(d-(2k-m)p)\sqrt{z}\right)^2}{d-(2k-m)p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((b-a(2k-m))\Big(b-a(2k-m)+$$

$$2(d-(2k-m)p)\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-a(2k-m)+2(d-(2k-m)p)\sqrt{z}\right)^2}{4(d-(2k-m)p)}\right)+$$

$$2\sqrt{-\frac{\left(b-a(2k-m)+2(d-(2k-m)p)\sqrt{z}\right)^2}{d-(2k-m)p}}\,(d-(2k-m)p)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(b-a(2k-m)+2(d-(2k-m)p)\sqrt{z}\right)^2}{4(d-(2k-m)p)}\Bigg)\Bigg)\Bigg)+(-1)^m e^{-\frac{(b-a(m-2k))^2}{4(d-(m-2k)p)}+e-(m-2k)q}$$

$$(d-(m-2k)p)^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b-a(m-2k))^{-h-j+2n}\left(b-a(m-2k)+2(d-(m-2k)p)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-a(m-2k)+2(d-(m-2k)p)\sqrt{z}\right)^2}{d-(m-2k)p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg((b-a(m-2k))\Big(b-a(m-2k)+$$

$$2(d-(m-2k)p)\sqrt{z}\Big)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-a(m-2k)+2(d-(m-2k)p)\sqrt{z}\right)^2}{4(d-(m-2k)p)}\right)+$$

$$2\sqrt{-\frac{\left(b-a(m-2k)+2(d-(m-2k)p)\sqrt{z}\right)^2}{d-(m-2k)p}}\,(d-(m-2k)p)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(b-a(m-2k)+2(d-(m-2k)p)\sqrt{z}\right)^2}{4(d-(m-2k)p)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v e^{-\frac{(b+c(2k-v))^2}{4(d+f(2k-v))}+e+g(2k-v)-\frac{i\pi m}{2}}(d+f(2k-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+c(2k-v))^{-h-j+2n}\left(b+c(2k-v)+2(d+f(2k-v))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{d+f\,(2\,k-v)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(2\,k-v))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{d+f\,(2\,k-v)}}$$

$$(d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(2\,k-v))}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{(b+c\,(v-2\,k))^2}{4\,(d+f\,(v-2\,k))}+e+g\,(v-2\,k)-\frac{i\,\pi\,m}{2}}\,(d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^{h+j}\left(-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,k))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{d+f\,(v-2\,k)}}$$

$$(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\,\right)^2}{4\,(d+f\,(v-2\,k))}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{-\frac{(b-a\,(2\,k-m)+c\,(2\,s-v))^2}{4\,(d-(2\,k-m)\,p+f\,(2\,s-v))}+e-(2\,k-m)\,q+g\,(2\,s-v)}$$

$$(d-(2\,k-m)\,p+f\,(2\,s-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-a\,(2\,k-m)+c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(b-a\,(2\,k-m)+c\,(2\,s-v)+2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\,\right)^{h+j}\Big(-\Big(b-a\,(2\,k-m)+c\,(2\,s-v)+$$

$$2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\Big)^2\Big/(d-(2\,k-m)\,p+f\,(2\,s-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Big((b-a\,(2\,k-m)+c\,(2\,s-v))\,\big(b-a\,(2\,k-m)+c\,(2\,s-v)+2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\big)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\big(b-a\,(2\,k-m)+c\,(2\,s-v)+2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(d-(2\,k-m)\,p+f\,(2\,s-v)))\Big)+2\,(d-(2\,k-m)\,p+f\,(2\,s-v))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\big(b-a\,(2\,k-m)+c\,(2\,s-v)+2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(d-(2\,k-m)\,p+f\,(2\,s-v)))\Big)\sqrt{\Big(-\big(b-a\,(2\,k-m)+c\,(2\,s-v)+}$$

$$2\,(d-(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/(d-(2\,k-m)\,p+f\,(2\,s-v))\Big)\Big)+$$

$$(-1)^{m+v}\,e^{-\frac{(b-a\,(m-2\,k)+c\,(2\,s-v))^2}{4\,(d-(m-2\,k)\,p+f\,(2\,s-v))}+e-(m-2\,k)\,q+g\,(2\,s-v)}\,(d-(m-2\,k)\,p+f\,(2\,s-v))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-a\,(m-2\,k)+c\,(2\,s-v))^{-h-j+2\,n}$$

$$\big(b-a\,(m-2\,k)+c\,(2\,s-v)+2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^{h+j}\Big(-\big(b-a\,(m-2\,k)+c\,(2\,s-v)+$$

$$2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/(d-(m-2\,k)\,p+f\,(2\,s-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Big((b-a\,(m-2\,k)+c\,(2\,s-v))\,\big(b-a\,(m-2\,k)+c\,(2\,s-v)+2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\big(b-a\,(m-2\,k)+c\,(2\,s-v)+2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(d-(m-2\,k)\,p+f\,(2\,s-v)))\Big)+2\,(d-(m-2\,k)\,p+f\,(2\,s-v))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\big(b-a\,(m-2\,k)+c\,(2\,s-v)+2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(d-(m-2\,k)\,p+f\,(2\,s-v)))\Big)\sqrt{\Big(-\big(b-a\,(m-2\,k)+c\,(2\,s-v)+}$$

$$2\,(d-(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\big)^2\Big/(d-(m-2\,k)\,p+f\,(2\,s-v))\Big)\Big)+$$

$$e^{-\frac{(b-a\,(2\,k-m)+c\,(v-2\,s))^2}{4\,(d-(2\,k-m)\,p+f\,(v-2\,s))}+e-(2\,k-m)\,q+g\,(v-2\,s)}\,(d-(2\,k-m)\,p+f\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b-a\,(2\,k-m)+c\,(v-2\,s))^{-h-j+2\,n}\,\big(b-a\,(2\,k-m)+c\,(v-2\,s)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))$$

$$\sqrt{z}\big)^{h+j}\Big(-\big(b-a\,(2\,k-m)+c\,(v-2\,s)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$

$$(d-(2\,k-m)\,p+f\,(v-2\,s))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b-a\,(2\,k-m)+c\,(v-2\,s))\,\big(b-a\,(2\,k-m)+c\,(v-2\,s)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\big)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\big(b-a\,(2\,k-m)+c\,(v-2\,s)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(d-(2\,k-m)\,p+f\,(v-2\,s)))\Big)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))$$
$$\Gamma\Big(\frac{1}{2}\,(h+j+2),\,-\Big(b-a\,(2\,k-m)+c\,(v-2\,s)+2\,(d-(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/$$
$$(4\,(d-(2\,k-m)\,p+f\,(v-2\,s)))\Big)\sqrt{\Big(-\Big(b-a\,(2\,k-m)+c\,(v-2\,s)+}$$
$$2\,(d-(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/(d-(2\,k-m)\,p+f\,(v-2\,s))\Big)\Big)+$$
$$(-1)^m\,e^{-\frac{(b-a\,(m-2\,k)+c\,(v-2\,s))^2}{4\,(d-(m-2\,k)\,p+f\,(v-2\,s))}+e-(m-2\,k)\,q+g\,(v-2\,s)}\,(d-(m-2\,k)\,p+f\,(v-2\,s))^{-2\,n-2}$$
$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-a\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}$$
$$\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^{h+j}$$
$$\Big(-\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/$$
$$(d-(m-2\,k)\,p+f\,(v-2\,s))\Big)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\Big((b-a\,(m-2\,k)+c\,(v-2\,s))\,\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)$$
$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/$$
$$(4\,(d-(m-2\,k)\,p+f\,(v-2\,s)))\Big)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\Gamma\Big(\frac{1}{2}\,(h+j+2),$$
$$-\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))\,\sqrt{z}\Big)^2\Big/(4\,(d-(m-2\,k)\,p+$$
$$f\,(v-2\,s)))\Big)\sqrt{\Big(-\Big(b-a\,(m-2\,k)+c\,(v-2\,s)+2\,(d-(m-2\,k)\,p+f\,(v-2\,s))}$$
$$\sqrt{z}\Big)^2\Big/(d-(m-2\,k)\,p+f\,(v-2\,s))\Big)\Big)\Big)\,/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving functions of the direct function, exponential and algebraic functions

Involving powers of the direct function, exponential and algebraic functions

Involving powers of sin, exp and algebraic functions

Involving $(a\,z+b)^{\beta}\,d^z\,\sinh^{v}(c\,z+e)$

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$$\int (b+a\,z)^\beta\, d^z \sinh^\nu(e+c\,z)\,dz = -\frac{1}{a}\, i^{-\nu}\, 2^{-\nu}\, d^{-\frac{b}{a}}\, (b+a\,z)^{\beta+1} \left(\binom{\nu}{\frac{\nu}{2}} E_{-\beta}\!\left(-\frac{(b+a\,z)\log(d)}{a}\right)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{b\,c\,(2\,k-\nu)}{a}+\frac{i\,\pi\,\nu}{2}+e\,(\nu-2\,k)}\, E_{-\beta}\!\left(\frac{(b+a\,z)\,(c\,(2\,k-\nu)-\log(d))}{a}\right) + e^{2\,e\,k-e\,\nu+\frac{b\,c\,(\nu-2\,k)}{a}-\frac{i\,\pi\,\nu}{2}}\, E_{-\beta}\!\left(-\frac{(b+a\,z)\,(c\,(2\,k-\nu)+\log(d))}{a}\right)\right)\right) /;\, \nu \in \mathbb{N}$$

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$$\int (a\,z+b)^\beta\, e^{p\,z} \sinh^\nu(e+c\,z)\,dz = -\frac{1}{a}\, i^{-\nu}\, 2^{-\nu}\, e^{-\frac{b\,p}{a}}\, (b+a\,z)^{\beta+1} \left(\binom{\nu}{\frac{\nu}{2}} E_{-\beta}\!\left(-\frac{p\,(b+a\,z)}{a}\right)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2\,e\,k-e\,\nu+\frac{b\,c\,(\nu-2\,k)}{a}-\frac{i\,\pi\,\nu}{2}} \left(E_{-\beta}\!\left(-\frac{(2\,c\,k+p-c\,\nu)\,(b+a\,z)}{a}\right) + e^{-4\,e\,k+\frac{2\,b\,c\,(2\,k-\nu)}{a}+2\,e\,\nu+i\,\pi\,\nu}\, E_{-\beta}\!\left(-\frac{(p+c\,(\nu-2\,k))\,(b+a\,z)}{a}\right)\right)\right)\right) /;\, \nu \in \mathbb{N}$$

01.19.21.2439.01

$$\int (b+a\,z)^\beta\, d^z \sinh^\nu(c\,z)\,dz = -\frac{1}{a}\, i^{-\nu}\, 2^{-\nu}\, d^{-\frac{b}{a}}\, (b+a\,z)^{\beta+1} \left(\binom{\nu}{\frac{\nu}{2}} E_{-\beta}\!\left(-\frac{(b+a\,z)\log(d)}{a}\right)(1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{b\,c\,(2\,k-\nu)}{a}+\frac{i\,\pi\,\nu}{2}}\, E_{-\beta}\!\left(\frac{(b+a\,z)\,(c\,(2\,k-\nu)-\log(d))}{a}\right) + e^{-\frac{b\,c\,(2\,k-\nu)}{a}-\frac{i\,\pi\,\nu}{2}}\, E_{-\beta}\!\left(-\frac{(b+a\,z)\,(c\,(2\,k-\nu)+\log(d))}{a}\right)\right)\right) /;\, \nu \in \mathbb{N}$$

01.19.21.2440.01

$$\int (a\,z+b)^\beta\, e^{p\,z} \sinh^\nu(c\,z)\,dz = \frac{i^{-\nu}\, 2^{-\nu}\, e^{-\frac{b\,p}{a}}\, (b+a\,z)^\beta}{p} \left(-\frac{p\,(b+a\,z)}{a}\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} \Gamma\!\left(\beta+1,\, -\frac{p\,(b+a\,z)}{a}\right)(1-\nu \bmod 2) - \frac{i^{-\nu}\, 2^{-\nu}\, (b+a\,z)^{\beta+1}}{a} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(i^{-\nu}\, e^{-\frac{b\,(p-c\,(\nu-2\,k))}{a}} \left(-\frac{(p-c\,(\nu-2\,k))\,(b+a\,z)}{a}\right)^{-\beta-1} \Gamma\!\left(\beta+1,\, -\frac{(p-c\,(\nu-2\,k))\,(b+a\,z)}{a}\right) + i^{\nu}\, e^{-\frac{b\,(p+c\,(\nu-2\,k))}{a}} \left(-\frac{(p+c\,(\nu-2\,k))\,(b+a\,z)}{a}\right)^{-\beta-1} \Gamma\!\left(\beta+1,\, -\frac{(p+c\,(\nu-2\,k))\,(b+a\,z)}{a}\right)\right) /;\, \nu \in \mathbb{N}$$

01.19.21.2441.01

$$\int \frac{e^{p z} \sinh^{\nu}(c z)}{\sqrt{a z+b}} \, dz = \frac{i^{-\nu} 2^{-\nu} \sqrt{\pi}}{a} \left(\frac{e^{-\frac{b p}{a}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{\frac{p}{a}} \sqrt{b+a z}\right) (1-\nu \bmod 2)}{\sqrt{\frac{p}{a}}} + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{i^{-\nu} e^{-\frac{b (p-c(\nu-2k))}{a}} \operatorname{erfi}\left(\sqrt{\frac{p-c(\nu-2k)}{a}} \sqrt{b+a z}\right)}{\sqrt{\frac{p-c(\nu-2k)}{a}}} + \frac{i^{\nu} e^{-\frac{b (p+c(\nu-2k))}{a}} \operatorname{erfi}\left(\sqrt{\frac{p+c(\nu-2k)}{a}} \sqrt{b+a z}\right)}{\sqrt{\frac{p+c(\nu-2k)}{a}}} \right) \right) /; \nu \in \mathbb{N}$$

01.19.21.2442.01

$$\int \frac{e^{p z} \sinh^2(c z)}{\sqrt{b+a z}} \, dz = \frac{1}{4a} e^{-\frac{b p}{a}} \sqrt{\pi} \sqrt{b+a z} \left(-\frac{e^{\frac{2 b c}{a}} \operatorname{erfc}\left(\sqrt{\frac{(2c-p)(b+a z)}{a}}\right)}{\sqrt{\frac{(2c-p)(b+a z)}{a}}} + \frac{2 \operatorname{erfc}\left(\sqrt{-\frac{p(b+a z)}{a}}\right)}{\sqrt{-\frac{p(b+a z)}{a}}} - \frac{e^{-\frac{2 b c}{a}} \operatorname{erfc}\left(\sqrt{-\frac{(2c+p)(b+a z)}{a}}\right)}{\sqrt{-\frac{(2c+p)(b+a z)}{a}}} \right)$$

Involving products of the direct function, exponential and algebraic functions

Involving products of sinh, exp and algebraic functions

Involving $(a z+b)^{\beta} d^z \sinh(c z) \sinh(e z)$

01.19.21.2443.01

$$\int (a+b z)^{\beta} d^z \sinh(c z) \sinh(e z) \, dz = \frac{1}{4} d^{-\frac{a}{b}} (a+b z)^{\beta} \left(\frac{1}{b} \left((a+b z) \Gamma\left(\beta+1, -\frac{(a+b z)(c-e+\log(d))}{b}\right) \left(-\frac{(a+b z)(c-e+\log(d))}{b}\right)^{-\beta-1} \left(\cosh\left(\frac{a(c-e)}{b}\right) - \sinh\left(\frac{a(c-e)}{b}\right)\right) \right) + \frac{1}{b} \left((a+b z) \Gamma\left(\beta+1, \frac{(a+b z)(c-e-\log(d))}{b}\right) \left(\frac{(a+b z)(c-e-\log(d))}{b}\right)^{-\beta-1} \left(\cosh\left(\frac{a(c-e)}{b}\right) + \sinh\left(\frac{a(c-e)}{b}\right)\right) \right) + \frac{\Gamma\left(\beta+1, -\frac{(a+b z)(c+e+\log(d))}{b}\right) \left(-\frac{(a+b z)(c+e+\log(d))}{b}\right)^{-\beta} \left(\cosh\left(\frac{a(c+e)}{b}\right) - \sinh\left(\frac{a(c+e)}{b}\right)\right)}{c+e+\log(d)} - \frac{\Gamma\left(\beta+1, \frac{(a+b z)(c+e-\log(d))}{b}\right) \left(\frac{(a+b z)(c+e-\log(d))}{b}\right)^{-\beta} \left(\cosh\left(\frac{a(c+e)}{b}\right) + \sinh\left(\frac{a(c+e)}{b}\right)\right)}{c+e-\log(d)} \right)$$

Involving functions of the direct function and trigonometric functions

Involving powers of the direct function and trigonometric functions

Involving sin

Involving $\sin(c\, z)\sinh^{\nu}(a\, z)$

01.19.21.2444.01

$$\int \sin(c\, z)\sinh^{\nu}(a\, z)\, dz = -\frac{1}{\left(c^2+a^2\,\nu^2\right)2}\, e^{-i\,c\,z}\sinh^{\nu}(a\, z)\left(1-e^{2\,a\,z}\right)^{-\nu} \left(e^{2\,i\,c\,z}\,(c-i\,a\,\nu)\,{}_2F_1\!\left(\frac{i\,c}{2\,a}-\frac{\nu}{2},-\nu;1+\frac{i\,c}{2\,a}-\frac{\nu}{2};e^{2\,a\,z}\right)+(c+i\,a\,\nu)\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;1-\frac{i\,c}{2\,a}-\frac{\nu}{2};e^{2\,a\,z}\right)\right)$$

01.19.21.2445.01

$$\int \sin(c\, z)\sinh^{\nu}(a\, z)\, dz = -\frac{2^{-\nu}\, e^{\frac{i\,\pi\,\nu}{2}}\cos(c\, z)\,(1-\nu \bmod 2)}{c}\binom{\nu}{\frac{\nu}{2}} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(i\,c-2\,a\,k+a\,\nu)\,z}}{c+i\,(2\,a\,k-a\,\nu)}+\frac{e^{i\,\pi\,\nu+(-i\,c+2\,a\,k-a\,\nu)\,z}}{c+i\,(2\,a\,k-a\,\nu)}+\frac{e^{i\,\pi\,\nu+(i\,c+2\,a\,k-a\,\nu)\,z}}{c-i\,(2\,a\,k-a\,\nu)}+\frac{e^{(-i\,c-2\,a\,k+a\,\nu)\,z}}{c-2\,i\,a\,k+i\,a\,\nu}\right)\binom{\nu}{k} /;\ \nu\in\mathbb{N}^+$$

Involving $\sin(c\, z+d)\sinh^{\nu}(a\, z)$

01.19.21.2446.01

$$\int \sin(d+c\, z)\sinh^{\nu}(a\, z)\, dz = -\frac{1}{2}\, e^{i\,d}\left(1-e^{-2\,a\,z}\right)^{-\nu}\left(\frac{e^{-i\,(2\,d+c\,z)}}{c+i\,a\,\nu}\,{}_2F_1\!\left(\frac{i\,(c+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(2+\frac{i\,c}{a}-\nu\right);e^{-2\,a\,z}\right)+\frac{e^{i\,c\,z}}{c-i\,a\,\nu}\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;\frac{1}{2}\left(2-\frac{i\,c}{a}-\nu\right);e^{-2\,a\,z}\right)\right)\sinh^{\nu}(a\, z)$$

01.19.21.2447.01

$$\int \sin(d+c\, z)\sinh^{\nu}(a\, z)\, dz = 2^{-\nu-1}\left(\frac{2\, i^{-\nu}\cos(d+c\, z)\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)}{c}-(-1)^{\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\, e^{i\,d}\left(\frac{e^{a\,z\,\nu+i\,\pi\,\nu-2\,a\,s\,z+i\,(c\,z+\pi)}}{-c-2\,i\,a\,s+i\,a\,\nu}+\frac{e^{2\,a\,s\,z-a\,\nu\,z+i\,(c\,z+\pi)}}{-c+2\,i\,a\,s-i\,a\,\nu}+\frac{e^{-2\,i\,d+i\,\pi\,\nu-i\,c\,z-2\,a\,s\,z+a\,\nu\,z}}{c+a\,i\,(\nu-2\,s)}+\frac{e^{-2\,i\,d+(-i\,c+2\,a\,s-a\,\nu)\,z}}{c+a\,i\,(2\,s-\nu)}\right)\binom{\nu}{s}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sin(c\, z)\sinh^{\nu}(a\, z+b)$

01.19.21.2448.01

$$\int \sin(c z) \sinh^{\nu}(b + a z)\, dz = -\frac{1}{2} \left(1 - e^{-2(b+a z)}\right)^{-\nu} \left(\frac{e^{-i c z}}{c + i a \nu}\, {}_2F_1\left(\frac{i (c + i a \nu)}{2 a}, -\nu; \frac{1}{2}\left(2 + \frac{i c}{a} - \nu\right); e^{-2(b+a z)}\right) + \frac{e^{i c z}}{c - i a \nu}\, {}_2F_1\left(-\frac{i c + a \nu}{2 a}, -\nu; \frac{1}{2}\left(2 - \frac{i c}{a} - \nu\right); e^{-2(b+a z)}\right)\right) \sinh^{\nu}(b + a z)$$

01.19.21.2449.01

$$\int \sin(c z) \sinh^{\nu}(b + a z)\, dz = 2^{-\nu-1} \left(\frac{2 i^{-\nu} \cos(c z) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)}{c} - (-1)^{\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{b(2 s+\nu)} \left(\frac{e^{-4 b s-2 a z s+i \pi \nu+a \nu z+i (c z+\pi)}}{-c - 2 i a s + i a \nu} + \frac{e^{-2 b \nu-a z \nu+2 a s z+i (c z+\pi)}}{-c + 2 i a s - i a \nu} + \frac{e^{-4 b s-2 a z s+i \pi \nu-i c z+a \nu z}}{c + a i (\nu - 2 s)} + \frac{e^{(-i c+2 a s-a \nu) z-2 b \nu}}{c + a i (2 s - \nu)}\right) \binom{\nu}{s}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.2450.01

$$\int \sin(d + c z) \sinh^{\nu}(b + a z)\, dz = -\frac{1}{2} e^{i d} \left(1 - e^{-2(b+a z)}\right)^{-\nu} \left(\frac{e^{-i (2 d+c z)}}{c + i a \nu}\, {}_2F_1\left(\frac{i (c + i a \nu)}{2 a}, -\nu; \frac{1}{2}\left(2 + \frac{i c}{a} - \nu\right); e^{-2(b+a z)}\right) + \frac{e^{i c z}}{c - i a \nu}\, {}_2F_1\left(-\frac{i c + a \nu}{2 a}, -\nu; \frac{1}{2}\left(2 - \frac{i c}{a} - \nu\right); e^{-2(b+a z)}\right)\right) \sinh^{\nu}(b + a z)$$

01.19.21.2451.01

$$\int \sin(d + c z) \sinh^{\nu}(b + a z)\, dz = 2^{-\nu-1} \left(\frac{2 i^{-\nu} \cos(d + c z) \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1)}{c} - (-1)^{\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{i (d-i b (2 s+\nu))} \left(\frac{e^{-4 b s-2 a z s+i \pi \nu+a \nu z+i (c z+\pi)}}{-c - 2 i a s + i a \nu} + \frac{e^{-2 b \nu-a z \nu+2 a s z+i (c z+\pi)}}{-c + 2 i a s - i a \nu} + \frac{e^{-2 i d-4 b s+i \pi \nu-i c z-2 a s z+a \nu z}}{c + a i (\nu - 2 s)} + \frac{e^{-2 i d-2 b \nu+(-i c+2 a s-a \nu) z}}{c + a i (2 s - \nu)}\right) \binom{\nu}{s}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b z^r) \sinh^{\nu}(c z)$

01.19.21.2452.01

$$\int \sin(b z^2)\sinh^\nu(c z)\,dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\, S\left(\frac{b\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right) + i^\nu 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{\sqrt{b}}\left(S\left(\frac{2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\cos\left(\frac{(2 i c k - i c \nu)^2}{4b}+\frac{\pi\nu}{2}\right) - \sin\left(\frac{(2 i c k - i c \nu)^2}{4b}+\frac{\pi\nu}{2}\right) C\left(\frac{2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\right) + \frac{1}{\sqrt{-b}}\left(\sin\left(\frac{\pi\nu}{2}-\frac{(2 i c k - i c \nu)^2}{4b}\right) C\left(\frac{2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) - S\left(\frac{2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\cos\left(\frac{\pi\nu}{2}-\frac{(2 i c k - i c \nu)^2}{4b}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2453.01

$$\int \sin(b\sqrt{z})\sinh^\nu(c z)\,dz = \frac{i^{-\nu} 2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin(b\sqrt{z}) - b\sqrt{z}\cos(b\sqrt{z})\right)}{b^2} + i^\nu 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{(2 i c k - i c \nu)^{3/2}}\left(-b\sqrt{2\pi}\left(\cos\left(\frac{i b^2}{4(2 c k - c\nu)}-\frac{\pi\nu}{2}\right) S\left(\frac{b + 2 c i (2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c (2k-\nu)}}\right) + C\left(\frac{b + 2 c i (2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c (2k-\nu)}}\right)\sin\left(\frac{i b^2}{4(2 c k - c\nu)}-\frac{\pi\nu}{2}\right)\right) - 2\sqrt{2 i c k - i c \nu}\,\cos\left(\sqrt{z}\, b - \frac{\pi\nu}{2} + c i (2k-\nu) z\right)\right) + \frac{1}{(2 i c k - i c \nu)^{3/2}}\left(b\sqrt{2\pi}\left(\sin\left(\frac{\pi\nu}{2}-\frac{i b^2}{4(2 c k - c\nu)}\right) C\left(\frac{2 i c (2k-\nu)\sqrt{z} - b}{\sqrt{2\pi}\sqrt{i c (2k-\nu)}}\right) - S\left(\frac{2 i c (2k-\nu)\sqrt{z} - b}{\sqrt{2\pi}\sqrt{i c (2k-\nu)}}\right)\cos\left(\frac{\pi\nu}{2}-\frac{i b^2}{4(2 c k - c\nu)}\right)\right) + 2\sqrt{2 i c k - i c \nu}\,\cos\left(\sqrt{z}\, b + \frac{\pi\nu}{2} - i c (2k-\nu) z\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b z^r + e)\sinh^\nu(c z)$

01.19.21.2454.01

$$\int \sin\left(b z^2+e\right)\sinh^{\nu}(c z)\,dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(e)\,S\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)-C\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)\sin(e)\right)}{\sqrt{-b}}+$$
$$i^{\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{\sqrt{-b}}\left(\sin\left(-\frac{(2 i c k-i c \nu)^2}{4 b}+e+\frac{\pi\nu}{2}\right)C\left(\frac{2 i c k-i c \nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)-\right.\right.$$
$$S\left(\frac{2 i c k-i c \nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\cos\left(-\frac{(2 i c k-i c \nu)^2}{4 b}+e+\frac{\pi\nu}{2}\right)\right)+\frac{1}{\sqrt{b}}\left(\cos\left(-\frac{(2 i c k-i c \nu)^2}{4 b}+e-\frac{\pi\nu}{2}\right)\right.$$
$$\left.\left.\left.S\left(\frac{2 i c k-i c \nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)+C\left(\frac{2 i c k-i c \nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 i c k-i c \nu)^2}{4 b}+e-\frac{\pi\nu}{2}\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2455.01

$$\int \sin\left(\sqrt{z}\,b+e\right)\sinh^{\nu}(c z)\,dz =$$
$$\frac{i^{-\nu} 2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(\sqrt{z}\,b+e\right)-b\sqrt{z}\cos\left(\sqrt{z}\,b+e\right)\right)}{b^2}+i^{\nu} 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{(2 i c k-i c \nu)^{3/2}}\right.$$
$$\left(-b\sqrt{2\pi}\left(\cos\left(\frac{i b^2}{4(2 c k-c \nu)}+e-\frac{\pi\nu}{2}\right)S\left(\frac{b+2 c i(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)+C\left(\frac{b+2 c i(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)\sin\left(\right.\right.\right.$$
$$\left.\left.\left.\frac{i b^2}{4(2 c k-c \nu)}+e-\frac{\pi\nu}{2}\right)\right)-2\sqrt{2 i c k-i c \nu}\cos\left(\sqrt{z}\,b+e-\frac{\pi\nu}{2}+c i(2k-\nu)z\right)\right)+$$
$$\frac{1}{(2 i c k-i c \nu)^{3/2}}\left(b\sqrt{2\pi}\left(\sin\left(-\frac{i b^2}{4(2 c k-c \nu)}+e+\frac{\pi\nu}{2}\right)C\left(\frac{2 i c(2k-\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)-S\left(\frac{2 i c(2k-\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)\right.\right.$$
$$\left.\left.\left.\cos\left(-\frac{i b^2}{4(2 c k-c \nu)}+e+\frac{\pi\nu}{2}\right)\right)+2\sqrt{2 i c k-i c \nu}\cos\left(\sqrt{z}\,b+e+\frac{\pi\nu}{2}-i c(2k-\nu)z\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b z^r+d z\right)\sinh^{\nu}(c z)$

01.19.21.2456.01

$$\int \sin\left(b z^2 + d z\right) \sinh^\nu(c z)\, dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-\cos\left(\frac{d^2}{4b}\right) S\left(\frac{\sqrt{-b}\,(d+2bz)}{b\sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-b}\,(d+2bz)}{b\sqrt{2\pi}}\right)\left(-\sin\left(\frac{d^2}{4b}\right)\right)\right)}{\sqrt{-b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{b}} \left(S\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{(d + 2 i c k - i c \nu)^2}{4b} + \frac{\pi \nu}{2}\right) - \sin\left(\frac{(d + 2 i c k - i c \nu)^2}{4b} + \frac{\pi \nu}{2}\right) C\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\right) + \frac{1}{\sqrt{-b}} \left(\sin\left(\frac{\pi \nu}{2} - \frac{(-d + 2 i c k - i c \nu)^2}{4b}\right) C\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) - S\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) \cos\left(\frac{\pi \nu}{2} - \frac{(-d + 2 i c k - i c \nu)^2}{4b}\right)\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2457.01

$$\int \sin\left(\sqrt{z}\, b + d z\right) \sinh^\nu(c z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b\sqrt{2\pi} \left(-\cos\left(\frac{b^2}{4d}\right) S\left(\frac{\sqrt{-d}\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-d}\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right)\left(-\sin\left(\frac{b^2}{4d}\right)\right)\right) + 2\sqrt{-d} \cos\left(\sqrt{z}\, b + d z\right)\right)\right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(d + 2 i c k - i c \nu)^{3/2}} \left(-2\sqrt{d + 2 i c k - i c \nu} \cos\left(\sqrt{z}\, b - \frac{\pi \nu}{2} + (d + 2 i c k - i c \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2 (d + 2 i c k - i c \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{d + 2 i c k - i c \nu}}\right) \cos\left(\frac{b^2}{4 (d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) + b\sqrt{2\pi}\, C\left(\frac{b + 2 (d + 2 i c k - i c \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{d + 2 i c k - i c \nu}}\right) \sin\left(\frac{b^2}{4 (d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right)\right) + \left(2\sqrt{-d + 2 i c k - i c \nu} \cos\left(\sqrt{z}\, b + \frac{\pi \nu}{2} - (-d + 2 i c k - i c \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{2 (-d + 2 i c k - i c \nu)\sqrt{z} - b}{\sqrt{2\pi}\sqrt{-d + 2 i c k - i c \nu}}\right) \cos\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) + b\sqrt{2\pi}\, C\left(\frac{2 (-d + 2 i c k - i c \nu)\sqrt{z} - b}{\sqrt{2\pi}\sqrt{-d + 2 i c k - i c \nu}}\right) \sin\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right)\right) \Big/ (-d + 2 i c k - i c \nu)^{3/2}\right) /;\, \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z + e\right) \sinh^\nu(c z)$

01.19.21.2458.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh^{\nu}(c z)\, dz = \frac{1}{\sqrt{-b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) S\left(\frac{\sqrt{-b}\,(d + 2 b z)}{b \sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-b}\,(d + 2 b z)}{b \sqrt{2\pi}}\right) \left(-\sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right)\right) + i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\sin\left(-\frac{(-d + 2 i c k - i c \nu)^2}{4 b} + e + \frac{\pi \nu}{2} \right) C\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\,\sqrt{2\pi}} \right) - S\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\,\sqrt{2\pi}} \right) \cos\left(-\frac{(-d + 2 i c k - i c \nu)^2}{4 b} + e + \frac{\pi \nu}{2} \right) \right) + \frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i c k - i c \nu)^2}{4 b} + e - \frac{\pi \nu}{2} \right) S\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\,\sqrt{2\pi}} \right) + C\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\,\sqrt{2\pi}} \right) \sin\left(-\frac{(d + 2 i c k - i c \nu)^2}{4 b} + e - \frac{\pi \nu}{2} \right) \right) \right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2459.01

$$\int \sin\left(\sqrt{z}\, b + e + d z\right) \sinh^{\nu}(c z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(-\cos\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right) S\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) \left(-\sin\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right)\right)\right) + 2 \sqrt{-d}\, \cos\left(\sqrt{z}\, b + e + d z\right) \right) \right) + i^{\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(d + 2 i c k - i c \nu)^{3/2}} \left(-2 \sqrt{d + 2 i c k - i c \nu}\, \cos\left(\sqrt{z}\, b + e - \frac{\pi \nu}{2} + (d + 2 i c k - i c \nu) z \right) - b \sqrt{2\pi}\, S\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i c k - i c \nu}} \right) \cos\left(-\frac{b^2}{4 (d + 2 i c k - i c \nu)} + e - \frac{\pi \nu}{2} \right) - b \sqrt{2\pi}\, C\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i c k - i c \nu}} \right) \sin\left(-\frac{b^2}{4 (d + 2 i c k - i c \nu)} + e - \frac{\pi \nu}{2} \right) \right) + \left(2 \sqrt{-d + 2 i c k - i c \nu}\, \cos\left(\sqrt{z}\, b + e + \frac{\pi \nu}{2} - (-d + 2 i c k - i c \nu) z \right) - b \sqrt{2\pi}\, S\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i c k - i c \nu}} \right) \cos\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + e + \frac{\pi \nu}{2} \right) + b \sqrt{2\pi}\, C\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i c k - i c \nu}} \right) \sin\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + e + \frac{\pi \nu}{2} \right) \right) \Big/ (-d + 2 i c k - i c \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r\right) \sinh^{\nu}(f z + g)$

01.19.21.2460.01

$$\int \sin\left(b z^2\right) \sinh^\nu(g + f z)\, dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\left(\frac{b\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right)}{\sqrt{-b}} + i^\nu\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\sin\left(-\frac{(2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k - i f \nu - 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - S\left(\frac{2 i f k - i f \nu - 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \cos\left(-\frac{(2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right) S\left(\frac{2 i f k - i f \nu + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) + C\left(\frac{2 i f k - i f \nu + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2461.01

$$\int \sin\left(b \sqrt{z}\right) \sinh^\nu(g + f z)\, dz = \frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(b\sqrt{z}\right) - b\sqrt{z}\, \cos\left(b\sqrt{z}\right)\right)}{b^2} + i^\nu\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(2 i f k - i f \nu)^{3/2}} \left(-2\sqrt{2 i f k - i f \nu}\, \cos\left(\sqrt{z}\, b + 2 i g k - i g \nu - \frac{\pi \nu}{2} + (2 i f k - i f \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2 (2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2 i f k - i f \nu}}\right) \cos\left(-\frac{b^2}{4 (2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) - b\sqrt{2\pi}\, C\left(\frac{b + 2 (2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2 i f k - i f \nu}}\right) \sin\left(-\frac{b^2}{4 (2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(2 i f k - i f \nu)^{3/2}} \left(2\sqrt{2 i f k - i f \nu}\, \cos\left(\sqrt{z}\, b - 2 i g k + i g \nu + \frac{\pi \nu}{2} - (2 i f k - i f \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{2 (2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{2 i f k - i f \nu}}\right) \cos\left(\frac{b^2}{4 (2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) + b\sqrt{2\pi}\, C\left(\frac{2 (2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{2 i f k - i f \nu}}\right) \sin\left(\frac{b^2}{4 (2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + e\right) \sinh^\nu(f z + g)$

01.19.21.2462.01

$$\int \sin\left(b z^2+e\right)\sinh^{\nu}(g+f z)\,dz = \frac{i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(e)\,S\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)-C\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)\sin(e)\right)}{\sqrt{-b}}+$$
$$i^{\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{\sqrt{-b}}\left(\sin\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e-i g(2k-\nu)+\frac{\pi\nu}{2}\right)C\left(\frac{2 i f k-i f \nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)-\right.\right.$$
$$S\left(\frac{2 i f k-i f \nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\cos\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e-i g(2k-\nu)+\frac{\pi\nu}{2}\right)\right)+$$
$$\frac{1}{\sqrt{b}}\left(\cos\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e+g i(2k-\nu)-\frac{\pi\nu}{2}\right)S\left(\frac{2 i f k-i f \nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)+\right.$$
$$\left.\left.\left.C\left(\frac{2 i f k-i f \nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e+g i(2k-\nu)-\frac{\pi\nu}{2}\right)\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2463.01

$$\int \sin\left(\sqrt{z}\,b+e\right)\sinh^{\nu}(g+f z)\,dz = \frac{i^{-\nu}\,2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(\sqrt{z}\,b+e\right)-b\sqrt{z}\cos\left(\sqrt{z}\,b+e\right)\right)}{b^2}+$$
$$i^{\nu}\,2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{(2 i f k-i f \nu)^{3/2}}\left(-2\sqrt{2 i f k-i f \nu}\cos\left(\sqrt{z}\,b+e+2 i g k-i g \nu-\frac{\pi\nu}{2}+(2 i f k-i f \nu) z\right)-\right.\right.$$
$$b\sqrt{2\pi}\,S\left(\frac{b+2(2 i f k-i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k-i f \nu}}\right)\cos\left(-\frac{b^2}{4(2 i f k-i f \nu)}+e+2 i g k-i g \nu-\frac{\pi\nu}{2}\right)-$$
$$\left.b\sqrt{2\pi}\,C\left(\frac{b+2(2 i f k-i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k-i f \nu}}\right)\sin\left(-\frac{b^2}{4(2 i f k-i f \nu)}+e+2 i g k-i g \nu-\frac{\pi\nu}{2}\right)\right)+$$
$$\frac{1}{(2 i f k-i f \nu)^{3/2}}\left(2\sqrt{2 i f k-i f \nu}\cos\left(\sqrt{z}\,b+e-2 i g k+i g \nu+\frac{\pi\nu}{2}-(2 i f k-i f \nu) z\right)-\right.$$
$$b\sqrt{2\pi}\,S\left(\frac{2(2 i f k-i f \nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2 i f k-i f \nu}}\right)\cos\left(\frac{b^2}{4(2 i f k-i f \nu)}+e-2 i g k+i g \nu+\frac{\pi\nu}{2}\right)+$$
$$\left.\left.b\sqrt{2\pi}\,C\left(\frac{2(2 i f k-i f \nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{2 i f k-i f \nu}}\right)\sin\left(\frac{b^2}{4(2 i f k-i f \nu)}+e-2 i g k+i g \nu+\frac{\pi\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b z^r+d z\right)\sinh^{\nu}(f z+g)$

01.19.21.2464.01

$$\int \sin\left(b z^2 + d z\right) \sinh^{\nu}(g + f z)\, dz = \frac{1}{\sqrt{-b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-\cos\left(\frac{d^2}{4 b}\right) S\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right) \left(-\sin\left(\frac{d^2}{4 b}\right)\right)\right)\right) +$$

$$i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\sin\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2} \right) C\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}} \right) - \right.\right.$$

$$\left. S\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}} \right) \cos\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2} \right) \right) +$$

$$\frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2} \right) S\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}} \right) + \right.$$

$$\left.\left.\left. C\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}} \right) \sin\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2} \right) \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2465.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}(g + f\, z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(-\cos\left(\frac{b^2}{4\, d}\right) S\left(\frac{\sqrt{-d}\, \left(b + 2\, d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-d}\, \left(b + 2\, d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) \left(-\sin\left(\frac{b^2}{4\, d}\right)\right)\right) + 2 \sqrt{-d}\, \cos\left(\sqrt{z}\, b + d\, z\right)\right)\right) + i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\left(-2 \sqrt{d + 2\, i\, f\, k - i\, f\, \nu}\, \cos\left(\sqrt{z}\, b + 2\, i\, g\, k - i\, g\, \nu - \frac{\pi\, \nu}{2} + (d + 2\, i\, f\, k - i\, f\, \nu)\, z\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2\, (d + 2\, i\, f\, k - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2\, i\, f\, k - i\, f\, \nu}}\right) \cos\left(-\frac{b^2}{4\, (d + 2\, i\, f\, k - i\, f\, \nu)} + 2\, i\, g\, k - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) - b \sqrt{2\pi}\, C\left(\frac{b + 2\, (d + 2\, i\, f\, k - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2\, i\, f\, k - i\, f\, \nu}}\right) \sin\left(-\frac{b^2}{4\, (d + 2\, i\, f\, k - i\, f\, \nu)} + 2\, i\, g\, k - i\, g\, \nu - \frac{\pi\, \nu}{2}\right)\right) \Big/ (d + 2\, i\, f\, k - i\, f\, \nu)^{3/2} + \left(2 \sqrt{-d + 2\, i\, f\, k - i\, f\, \nu}\, \cos\left(\sqrt{z}\, b - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, k - i\, f\, \nu)\, z\right) - b \sqrt{2\pi}\, S\left(\frac{2\, (-d + 2\, i\, f\, k - i\, f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, k - i\, f\, \nu}}\right) \cos\left(\frac{b^2}{4\, (-d + 2\, i\, f\, k - i\, f\, \nu)} - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) + b \sqrt{2\pi}\, C\left(\frac{2\, (-d + 2\, i\, f\, k - i\, f\, \nu) \sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, k - i\, f\, \nu}}\right) \sin\left(\frac{b^2}{4\, (-d + 2\, i\, f\, k - i\, f\, \nu)} - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2}\right)\right) \Big/ (-d + 2\, i\, f\, k - i\, f\, \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \sinh^{\nu}(f\, z + g)$

01.19.21.2466.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh^{\nu}(g + f z)\, dz = \frac{1}{\sqrt{-b}} \left(i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) S\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right)\left(-\sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right)\right) + i^{\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\sin\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} + e - i g (2 k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) - S\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b}\, \sqrt{2\pi}}\right) \cos\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} + e - i g (2 k - \nu) + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + e + g i (2 k - \nu) - \frac{\pi \nu}{2}\right) S\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) + C\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b}\, \sqrt{2\pi}}\right) \sin\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + e + g i (2 k - \nu) - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2467.01

$$\int \sin\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}(g + f\, z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(-\cos\left(\frac{1}{4}\left(\frac{b^2}{d} - 4e\right)\right) S\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right) + C\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right) \left(-\sin\left(\frac{1}{4}\left(\frac{b^2}{d} - 4e\right)\right)\right)\right) + 2\sqrt{-d}\, \cos\left(\sqrt{z}\, b + e + d\, z\right)\right) + i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\left(-2\sqrt{d + 2 i f k - i f \nu}\, \cos\left(\sqrt{z}\, b + e + 2 i g k - i g \nu - \frac{\pi \nu}{2} + (d + 2 i f k - i f \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d + 2 i f k - i f \nu}}\right) \cos\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) - b\sqrt{2\pi}\, C\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d + 2 i f k - i f \nu}}\right) \sin\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right)\right) \Big/ (d + 2 i f k - i f \nu)^{3/2} + \left(2\sqrt{-d + 2 i f k - i f \nu}\, \cos\left(\sqrt{z}\, b + e - 2 i g k + i g \nu + \frac{\pi \nu}{2} - (-d + 2 i f k - i f \nu) z\right) - b\sqrt{2\pi}\, S\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2 i f k - i f \nu}}\right) \cos\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) + b\sqrt{2\pi}\, C\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\,\sqrt{-d + 2 i f k - i f \nu}}\right) \sin\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right)\right) \Big/ (-d + 2 i f k - i f \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b\, z) \sinh^{\nu}(c\, z^r)$

01.19.21.2468.01

$$\int \sin(b\,z)\sinh^{\nu}(c\,z^2)\,dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(b\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{b} - i^{\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-b}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cos\left(\frac{b^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{b^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-b}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-b}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cos\left(\frac{b^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{b^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-b}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2469.01

$$\int \sin(b\,z)\sinh^{\nu}(c\sqrt{z})\,dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(b\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{b} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-b)^{3/2}}\left(-2\sqrt{-b}\cos\left(\frac{\pi\,\nu}{2}+b\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,b+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)\cos\left(\frac{\pi\,\nu}{2}-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,b}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{-2\sqrt{z}\,b+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,b}\right)\right)+\frac{1}{(-b)^{3/2}}\left(-2\sqrt{-b}\cos\left(\frac{\pi\,\nu}{2}-b\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,b-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,b}+\frac{\pi\,\nu}{2}\right)+\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,C\left(\frac{-2\sqrt{z}\,b-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,b}+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(d\,z+e)\sinh^{\nu}(c\,z^r)$

01.19.21.2470.01

$$\int \sin(e+d\,z)\sinh^{\nu}(c\,z^2)\,dz = -\frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cos(e+d\,z)(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cos\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cos\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2471.01

$$\int \sin(e+d\,z)\sinh^{\nu}(c\sqrt{z})\,dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)(1-\nu \bmod 2)(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\,\cos\left(e-\frac{\pi\,\nu}{2}+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e-\frac{\pi\,\nu}{2}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\,\cos\left(e+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e+\frac{\pi\,\nu}{2}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e+\frac{\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\sin(a\,z^r)\sinh^{\nu}(c\,z^r+g)$

01.19.21.2472.01

$$\int \sin(b z^r) \sinh^\nu(c z^r)\, dz = \frac{i\, 2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Big((-1)^\nu\, \Gamma\!\left(\frac{1}{r}, (-i b - 2 c s + c \nu) z^r\right) ((-i b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^{\nu+1} ((i b - 2 c s + c \nu) z^r)^{-1/r} \Gamma\!\left(\frac{1}{r}, (i b - 2 c s + c \nu) z^r\right) + ((-i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (-i b + 2 c s - c \nu) z^r\right) - ((i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (i b + 2 c s - c \nu) z^r\right)\Big) - \frac{(2 i)^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left((-i b z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, -i b z^r\right) - (i b z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i b z^r\right)\right) (1 - \nu \bmod 2)}{r} \;/;\; \nu \in \mathbb{N}^+$$

01.19.21.2473.01

$$\int \sin\left(b z^2\right) \sinh^\nu\left(c z^2\right) dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, S\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} - i^\nu\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\!\left(\frac{\pi \nu}{2}\right) S\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) + C\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) \sin\!\left(\frac{\pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-b - 2 i c s + i c \nu}\right) + \frac{1}{\sqrt{i c (2 s - \nu) - b}} \left(\cos\!\left(\frac{\pi \nu}{2}\right) S\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) - C\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) \sin\!\left(\frac{\pi \nu}{2}\right)\right)\right) /;\; \nu \in \mathbb{N}^+$$

01.19.21.2474.01

$$\int \sin\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(b \sqrt{z}\right) - b \sqrt{z} \cos\left(b \sqrt{z}\right)\right)}{b^2} + i^{-\nu}\, 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(b + c i (\nu - 2 s))^2} \left(\sin\!\left((b + c i (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right) - (b + c i (\nu - 2 s)) \sqrt{z} \cos\!\left((b + c i (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(i c (\nu - 2 s) - b)^2} \left((i c (\nu - 2 s) - b) \sqrt{z} \cos\!\left(\frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) + \sin\!\left(\frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right)\right)\right) /;\; \nu \in \mathbb{N}^+$$

Involving $\sin\left(a z^r + e\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.2475.01

$$\int \sin(b z^r + e) \sinh^\nu(c z^r)\, dz = \frac{i\, 2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Big((-1)^\nu e^{i e}\, \Gamma\Big(\frac{1}{r}, (-i b - 2 c s + c \nu) z^r\Big) ((-i b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^{\nu+1} e^{-i e} ((i b - 2 c s + c \nu) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b - 2 c s + c \nu) z^r\Big) + e^{i e} ((-i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (-i b + 2 c s - c \nu) z^r\Big) - e^{-i e} ((i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b + 2 c s - c \nu) z^r\Big)\Big) - \frac{1}{r} \Big((2 i)^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \Big(e^{i e} (-i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, -i b z^r\Big) - e^{-i e} (i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, i b z^r\Big)\Big) (1 - \nu \bmod 2) \Big) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2476.01

$$\int \sin(b z^2 + e) \sinh^\nu(c z^2)\, dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos(e)\, S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z \right) + C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z \right) \sin(e) \right)}{\sqrt{b}} - i^\nu\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z \right) \cos\left(e + \frac{\pi \nu}{2}\right) - \sin\left(e + \frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z \right) \right) + \frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z \right) \cos\left(e - \frac{\pi \nu}{2}\right) - \sin\left(e - \frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2477.01

$$\int \sin\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(\sqrt{z}\, b + e\right) - b \sqrt{z} \cos\left(\sqrt{z}\, b + e\right) \right)}{b^2} + i^{-\nu}\, 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(b + c i (\nu - 2 s))^2} \left(\sin\left(e - \frac{\pi \nu}{2} + (b + c i (\nu - 2 s)) \sqrt{z}\right) - (b + c i (\nu - 2 s)) \sqrt{z} \cos\left(e - \frac{\pi \nu}{2} + (b + c i (\nu - 2 s)) \sqrt{z}\right) \right) + \frac{1}{(i c (\nu - 2 s) - b)^2} \left((i c (\nu - 2 s) - b) \sqrt{z} \cos\left(e + \frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) + \sin\left(e + \frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b z^r + d z) \sinh^\nu(c z^r)$

01.19.21.2478.01

$$\int \sin\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2\right) dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) - S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}} - i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2ics+icv}} \left(S\left(\frac{2(-b-2ics+icv)z-d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right) \cos\left(\frac{d^2}{4(-b-2ics+icv)} - \frac{\pi v}{2}\right) - \sin\left(\frac{d^2}{4(-b-2ics+icv)} - \frac{\pi v}{2}\right) C\left(\frac{2(-b-2ics+icv)z-d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right)\right) + \frac{1}{\sqrt{-b+2ics-icv}} \left(S\left(\frac{2(-b+2ics-icv)z-d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right) \cos\left(\frac{d^2}{4(-b+2ics-icv)} + \frac{\pi v}{2}\right) - \sin\left(\frac{d^2}{4(-b+2ics-icv)} + \frac{\pi v}{2}\right) C\left(\frac{2(-b+2ics-icv)z-d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2479.01

$$\int \sin\left(\sqrt{z}\, b + d z\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d} \cos\left(\sqrt{z}\, b + d z\right) - i b \sqrt{2\pi} \left(C\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right) - \cos\left(\frac{b^2}{4d}\right) S\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\right)\right)\right) + i^{\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(-2\sqrt{d} \cos\left(-\frac{\pi v}{2} + d z + (b + 2ick - icv)\sqrt{z}\right) - \sqrt{2\pi}\, (b + 2ick - icv) S\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \cos\left(\frac{(b+2ick-icv)^2}{4d} + \frac{\pi v}{2}\right) - \sqrt{2\pi}\, (-b - 2ick + icv) C\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{(b+2ick-icv)^2}{4d} + \frac{\pi v}{2}\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(\frac{\pi v}{2} + d z - (-b + 2ick - icv)\sqrt{z}\right) + \sqrt{2\pi}\, (-b + 2ick - icv) \cos\left(\frac{\pi v}{2} - \frac{(-b+2ick-icv)^2}{4d}\right) S\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b - 2ick + icv) C\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{\pi v}{2} - \frac{(-b+2ick-icv)^2}{4d}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r + d z + e\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.2480.01

$$\int \sin(b z^2 + d z + e) \sinh^\nu(c z^2) \, dz = -\frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) C\left(\frac{d + 2bz}{\sqrt{b}\sqrt{2\pi}}\right) - S\left(\frac{d + 2bz}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right)\right)\right) - i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2ics + icv}} \left(S\left(\frac{2(-b - 2ics + icv)z - d}{\sqrt{2\pi}\sqrt{-b - 2ics + icv}}\right) \cos\left(\frac{d^2}{4(-b - 2ics + icv)} + e - \frac{\pi\nu}{2}\right) - \sin\left(\frac{d^2}{4(-b - 2ics + icv)} + e - \frac{\pi\nu}{2}\right) C\left(\frac{2(-b - 2ics + icv)z - d}{\sqrt{2\pi}\sqrt{-b - 2ics + icv}}\right)\right) + \frac{1}{\sqrt{-b + 2ics - icv}} \left(S\left(\frac{2(-b + 2ics - icv)z - d}{\sqrt{2\pi}\sqrt{-b + 2ics - icv}}\right) \cos\left(\frac{d^2}{4(-b + 2ics - icv)} + e + \frac{\pi\nu}{2}\right) - \sin\left(\frac{d^2}{4(-b + 2ics - icv)} + e + \frac{\pi\nu}{2}\right) C\left(\frac{2(-b + 2ics - icv)z - d}{\sqrt{2\pi}\sqrt{-b + 2ics - icv}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2481.01

$$\int \sin(\sqrt{z}\, b + e + d z) \sinh^\nu(c \sqrt{z}) \, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d} \cos(\sqrt{z}\, b + e + d z) - i b \sqrt{2\pi} \left(C\left(\frac{ib + 2id\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) - \cos\left(\frac{b^2}{4d} - e\right) S\left(\frac{ib + 2id\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\right)\right)\right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(-2\sqrt{d} \cos\left(e - \frac{\pi\nu}{2} + d z + (b + 2ick - icv)\sqrt{z}\right) - \sqrt{2\pi}\, (b + 2ick - icv)\, S\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \cos\left(-\frac{(b + 2ick - icv)^2}{4d} + e - \frac{\pi\nu}{2}\right) + \sqrt{2\pi}\, (-b - 2ick + icv)\, C\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(-\frac{(b + 2ick - icv)^2}{4d} + e - \frac{\pi\nu}{2}\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(e + \frac{\pi\nu}{2} + d z - (-b + 2ick - icv)\sqrt{z}\right) + \sqrt{2\pi}\, (-b + 2ick - icv) \cos\left(-\frac{(-b + 2ick - icv)^2}{4d} + e + \frac{\pi\nu}{2}\right) S\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b - 2ick + icv)\, C\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2ick - icv)^2}{4d} + e + \frac{\pi\nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sin(d z) \sinh^\nu(c z^r + g)$

01.19.21.2482.01

$$\int \sin(d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cos(d\,z)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cos\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cos\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)-\sin\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right)\ /;\ \nu\in\mathbb{N}^+$$

01.19.21.2483.01

$$\int \sin(d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(d\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\cos\left(2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\cos\left(-2\,g\,i\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)\right)\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving $\sin(d\,z+e)\sinh^{\nu}\left(c\,z^r+g\right)$

01.19.21.2484.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\cos(e+d\,z)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\cos\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right) - \sin\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\right) + \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\cos\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right) - \sin\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2485.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\,\cos\left(e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right) - \sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right) - \sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,C\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)\right) + \frac{1}{(-d)^{3/2}}\left(-2\sqrt{-d}\,\cos\left(e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right) - \sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right) - \sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\sin\left(a\,z^r\right)\sinh^{\nu}\left(c\,z^r+g\right)$

01.19.21.2486.01

$$\int \sin(b z^r) \sinh^v(c z^r + g) \, dz = \frac{i\, 2^{-v-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{2 g s - g v}\, \Gamma\Big(\frac{1}{r}, (-i b - 2 c s + c v) z^r\Big) ((-i b - 2 c s + c v) z^r)^{-1/r} + (-1)^{v+1} e^{2 g s - g v} ((i b - 2 c s + c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b - 2 c s + c v) z^r\Big) + e^{g v - 2 g s} ((-i b + 2 c s - c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (-i b + 2 c s - c v) z^r\Big) - e^{g v - 2 g s} ((i b + 2 c s - c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b + 2 c s - c v) z^r\Big)\Big) - \frac{(2 i)^{-v-1} z \binom{v}{\frac{v}{2}} \Big((-i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, -i b z^r\Big) - (i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, i b z^r\Big)\Big) (1 - v \bmod 2)}{r} \;/;\; v \in \mathbb{N}^+$$

01.19.21.2487.01

$$\int \sin(b z^2) \sinh^v(c z^2 + g) \, dz = \frac{i^{-v}\, 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, S\Big(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\Big)}{\sqrt{b}} - i^v\, 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(\frac{1}{\sqrt{i c (2 s - v) - b}} \Big(\cosh\Big(2 g s - g v + \frac{i \pi v}{2}\Big) S\Big(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c v}\, z\Big) + i\, C\Big(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c v}\, z\Big) \sinh\Big(2 g s - g v + \frac{i \pi v}{2}\Big)\Big) + \frac{1}{\sqrt{-b - 2 i c s + i c v}} \Big(\cosh\Big(2 g s - g v + \frac{i \pi v}{2}\Big) S\Big(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c v}\, z\Big) - i\, C\Big(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c v}\, z\Big) \sinh\Big(2 g s - g v + \frac{i \pi v}{2}\Big)\Big)\Bigg) \;/;\; v \in \mathbb{N}^+$$

01.19.21.2488.01

$$\int \sin\big(b \sqrt{z}\big) \sinh^v\big(\sqrt{z}\, c + g\big) \, dz = \frac{i^{-v}\, 2^{1-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \big(\sin\big(b \sqrt{z}\big) - b \sqrt{z} \cos\big(b \sqrt{z}\big)\big)}{b^2} + i^{-v}\, 2^{1-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(\frac{1}{(b + c i (v - 2 s))^2} \Big(\sin\Big(-\frac{\pi v}{2} + g i (v - 2 s) + (b + c i (v - 2 s)) \sqrt{z}\Big) - (b + c i (v - 2 s)) \sqrt{z} \cos\Big(-\frac{\pi v}{2} + g i (v - 2 s) + (b + c i (v - 2 s)) \sqrt{z}\Big)\Big) + \frac{1}{(i c (v - 2 s) - b)^2} \Big((i c (v - 2 s) - b) \sqrt{z} \cos\Big(\frac{\pi v}{2} - i g (v - 2 s) - (i c (v - 2 s) - b) \sqrt{z}\Big) + \sin\Big(\frac{\pi v}{2} - i g (v - 2 s) - (i c (v - 2 s) - b) \sqrt{z}\Big)\Big)\Bigg) \;/;\; v \in \mathbb{N}^+$$

Involving $\sin(a z^r + e)\sinh^v(c z^r + g)$

01.19.21.2489.01

$$\int \sin(b z^r + e)\sinh^v(c z^r + g)\, dz = \frac{i\, 2^{-v-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{i e + 2 g s - g v}\, \Gamma\Big(\frac{1}{r}, (-i b - 2 c s + c v) z^r\Big) ((-i b - 2 c s + c v) z^r)^{-1/r} + (-1)^{v+1} e^{-i e + 2 g s - g v} ((i b - 2 c s + c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b - 2 c s + c v) z^r\Big) + e^{i e - 2 g s + g v} ((-i b + 2 c s - c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (-i b + 2 c s - c v) z^r\Big) - e^{-i e - 2 g s + g v} ((i b + 2 c s - c v) z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, (i b + 2 c s - c v) z^r\Big)\Big) - \frac{1}{r}\left((2 i)^{-v-1} z \binom{v}{\frac{v}{2}} \Big(e^{i e} (-i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, -i b z^r\Big) - e^{-i e} (i b z^r)^{-1/r}\, \Gamma\Big(\frac{1}{r}, i b z^r\Big)\Big)(1 - v \bmod 2)\right) /;\ v \in \mathbb{N}^+$$

01.19.21.2490.01

$$\int \sin(b z^2 + e)\sinh^v(c z^2 + g)\, dz = \frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\cos(e)\, S\left(\sqrt{b} \sqrt{\tfrac{2}{\pi}}\, z\right) + C\left(\sqrt{b} \sqrt{\tfrac{2}{\pi}}\, z\right) \sin(e)\right)}{\sqrt{b}} - i^v 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c v}} \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c v}\; z\right) \cos\left(e + g i (2 s - v) - \frac{\pi v}{2}\right) - \sin\left(e + g i (2 s - v) - \frac{\pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c v}\; z\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c v}} \left(S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c v}\; z\right) \cos\left(e - i g (2 s - v) + \frac{\pi v}{2}\right) - \sin\left(e - i g (2 s - v) + \frac{\pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c v}\; z\right)\right)\right) /;\ v \in \mathbb{N}^+$$

01.19.21.2491.01

$$\int \sin(\sqrt{z}\, b + e)\sinh^v(\sqrt{z}\, c + g)\, dz = \frac{i^{-v} 2^{1-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sin(\sqrt{z}\, b + e) - b \sqrt{z} \cos(\sqrt{z}\, b + e)\right)}{b^2} + i^{-v} 2^{1-v} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{(b + c i (v - 2 s))^2} \left(\sin\left(e - \frac{\pi v}{2} + g i (v - 2 s) + (b + c i (v - 2 s)) \sqrt{z}\right) - (b + c i (v - 2 s)) \sqrt{z} \cos\left(e - \frac{\pi v}{2} + g i (v - 2 s) + (b + c i (v - 2 s)) \sqrt{z}\right)\right) + \frac{1}{(i c (v - 2 s) - b)^2} \left((i c (v - 2 s) - b) \sqrt{z} \cos\left(e + \frac{\pi v}{2} - i g (v - 2 s) - (i c (v - 2 s) - b) \sqrt{z}\right) + \sin\left(e + \frac{\pi v}{2} - i g (v - 2 s) - (i c (v - 2 s) - b) \sqrt{z}\right)\right)\right) /;\ v \in \mathbb{N}^+$$

Involving $\sin(b z^r + d z) \sinh^\nu(c z^r + g)$

01.19.21.2492.01

$$\int \sin(b z^2 + d z) \sinh^\nu(c z^2 + g)\, dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) - S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}} - i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}} \right) \cos\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + g i (2s - \nu) - \frac{\pi \nu}{2} \right) - \sin\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + g i (2s - \nu) - \frac{\pi \nu}{2} \right) C\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}} \right) \right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}} \right) \cos\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} - i g (2s - \nu) + \frac{\pi \nu}{2} \right) - \sin\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} - i g (2s - \nu) + \frac{\pi \nu}{2} \right) C\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2493.01

$$\int \sin(\sqrt{z}\, b + d z) \sinh^\nu(\sqrt{z}\, c + g)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d} \cos(\sqrt{z}\, b + d z) - i b \sqrt{2\pi} \left(C\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}} \right) \sin\left(\frac{b^2}{4d}\right) - \cos\left(\frac{b^2}{4d}\right) S\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}} \right) \right) \right) \right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(-2\sqrt{d} \cos\left(2 i g k - i g \nu - \frac{\pi \nu}{2} + d z + (b + 2 i c k - i c \nu)\sqrt{z} \right) - \sqrt{2\pi}\, (b + 2 i c k - i c \nu)\, S\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d}\sqrt{2\pi}} \right) \cos\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + 2 i g k - i g \nu - \frac{\pi \nu}{2} \right) + \sqrt{2\pi}\, (-b - 2 i c k + i c \nu)\, C\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d}\sqrt{2\pi}} \right) \sin\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + 2 i g k - i g \nu - \frac{\pi \nu}{2} \right) \right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(-2 g i k + i g \nu + \frac{\pi \nu}{2} + d z - (-b + 2 i c k - i c \nu)\sqrt{z} \right) + \sqrt{2\pi}\, (-b + 2 i c k - i c \nu) \cos\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} - 2 i g k + i g \nu + \frac{\pi \nu}{2} \right) S\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}} \right) + \sqrt{2\pi}\, (b - 2 i c k + i c \nu)\, C\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}} \right) \sin\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} - 2 i g k + i g \nu + \frac{\pi \nu}{2} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(b z^r + d z + e) \sinh^\nu(c z^r + g)$

01.19.21.2494.01

$$\int \sin(b z^2 + d z + e) \sinh^{\nu}(c z^2 + g) \, dz = -\frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) - S\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right)\right)\right) - i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right) \cos\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) - \sin\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right) \cos\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) - \sin\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2495.01

$$\int \sin(\sqrt{z}\, b + e + d z) \sinh^{\nu}(\sqrt{z}\, c + g) \, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{-d} \cos(\sqrt{z}\, b + e + d z) - i b \sqrt{2\pi} \left(C\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) - \cos\left(\frac{b^2}{4d} - e\right) S\left(\frac{i b + 2 i d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\right)\right)\right) + i^{\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(-2\sqrt{d} \cos\left(e + 2 i g k - i g \nu - \frac{\pi \nu}{2} + d z + (b + 2 i c k - i c \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (b + 2 i c k - i c \nu) S\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \cos\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) + \sqrt{2\pi}\, (-b - 2 i c k + i c \nu) C\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(-d)^{3/2}} \left(2\sqrt{-d} \cos\left(e - 2 i g k + i g \nu + \frac{\pi \nu}{2} + d z - (-b + 2 i c k - i c \nu)\sqrt{z}\right) + \sqrt{2\pi}\, (-b + 2 i c k - i c \nu) \cos\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) S\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b - 2 i c k + i c \nu) C\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sin(d\, z) \sinh^{\nu}(c\, z^{r} + f\, z)$

01.19.21.2496.01

$$\int \sin(d\, z) \sinh^{\nu}(c\, z^2 + f\, z)\, dz = \frac{(2\, i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \cos(d\, z)\, (\nu \bmod 2 - 1)}{d} - i^{-\nu}\, 2^{-\nu - \frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{i\, c\, \nu - 2\, i\, c\, s}} \left(\cos\left(\frac{(-d - 2\, i\, f\, s + i\, f\, \nu)^2}{4\, (i\, c\, \nu - 2\, i\, c\, s)} - \frac{\pi\, \nu}{2} \right) S\left(\frac{-d - 2\, i\, f\, s + i\, f\, \nu + 2\, (i\, c\, \nu - 2\, i\, c\, s)\, z}{\sqrt{2\pi}\, \sqrt{i\, c\, \nu - 2\, i\, c\, s}} \right) - C\left(\frac{-d - 2\, i\, f\, s + i\, f\, \nu + 2\, (i\, c\, \nu - 2\, i\, c\, s)\, z}{\sqrt{2\pi}\, \sqrt{i\, c\, \nu - 2\, i\, c\, s}} \right) \sin\left(\frac{(-d - 2\, i\, f\, s + i\, f\, \nu)^2}{4\, (i\, c\, \nu - 2\, i\, c\, s)} - \frac{\pi\, \nu}{2} \right) \right) + \frac{1}{\sqrt{2\, i\, c\, s - i\, c\, \nu}} \left(\cos\left(\frac{(-d + 2\, i\, f\, s - i\, f\, \nu)^2}{4\, (2\, i\, c\, s - i\, c\, \nu)} + \frac{\pi\, \nu}{2} \right) S\left(\frac{-d + 2\, i\, f\, s - i\, f\, \nu + 2\, (2\, i\, c\, s - i\, c\, \nu)\, z}{\sqrt{2\pi}\, \sqrt{2\, i\, c\, s - i\, c\, \nu}} \right) - C\left(\frac{-d + 2\, i\, f\, s - i\, f\, \nu + 2\, (2\, i\, c\, s - i\, c\, \nu)\, z}{\sqrt{2\pi}\, \sqrt{2\, i\, c\, s - i\, c\, \nu}} \right) \sin\left(\frac{(-d + 2\, i\, f\, s - i\, f\, \nu)^2}{4\, (2\, i\, c\, s - i\, c\, \nu)} + \frac{\pi\, \nu}{2} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2497.01

$$\int \sin(d\, z) \sinh^{\nu}(\sqrt{z}\, c + f\, z)\, dz = -\frac{\binom{\nu}{\frac{\nu}{2}} \cos(d\, z)\, (1 - \nu \bmod 2)\, (2\, i)^{-\nu}}{d} - i^{\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (2\, i\, c\, s - i\, c\, \nu) \left(\cos\left(\frac{(i\, c\, \nu - 2\, i\, c\, s)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2} \right) S\left(\frac{-2\, c\, i\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}} \right) - C\left(\frac{-2\, c\, i\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}} \right) \sin\left(\frac{(i\, c\, \nu - 2\, i\, c\, s)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2} \right) \right) - 2 \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}\, \cos\left(\frac{\pi\, \nu}{2} + (-d - 2\, i\, f\, s + i\, f\, \nu)\, z + (i\, c\, \nu - 2\, i\, c\, s) \sqrt{z} \right) \right) \Big/ (-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(-2 \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}\, \cos\left(\frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - (2\, i\, c\, s - i\, c\, \nu) \sqrt{z} \right) - \sqrt{2\pi}\, (2\, i\, c\, s - i\, c\, \nu) \cos\left(\frac{(2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2} \right) S\left(\frac{2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}} \right) - \sqrt{2\pi}\, (i\, c\, \nu - 2\, i\, c\, s)\, C\left(\frac{2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}} \right) \sin\left(\frac{(2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2} \right) \right) \Big/ (-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin(d\,z+e)\sinh^{\nu}\left(c\,z^{r}+f\,z\right)$

01.19.21.2498.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(c\,z^{2}+f\,z\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(\nu \bmod 2-1)}{d} - i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^{2}}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^{2}}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^{2}}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^{2}}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^{+}$$

01.19.21.2499.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\left(\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^{2}}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e-\frac{\pi\,\nu}{2}\right)S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)-C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^{2}}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e-\frac{\pi\,\nu}{2}\right)\right)-2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\,\cos\left(e-(-d-2\,i\,f\,s+i\,f\,\nu)\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)\Big/(-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(-2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\,\cos\left(e+\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^{2}}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e+\frac{\pi\,\nu}{2}\right)S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^{2}}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e+\frac{\pi\,\nu}{2}\right)\right)\Big/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;\nu\in\mathbb{N}^{+}$$

Involving $\sin(b z^r) \sinh^v(c z^r + f z)$

01.19.21.2500.01

$$\int \sin(b z^2) \sinh^v(c z^2 + f z)\, dz = \frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} - i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c v}} \left(\cos\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} - \frac{\pi v}{2} \right) S\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}} \right) - C\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}} \right) \sin\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} - \frac{\pi v}{2} \right) \right) + \frac{1}{\sqrt{-b + 2 i c s - i c v}} \left(\cos\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + \frac{\pi v}{2} \right) S\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}} \right) - C\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}} \right) \sin\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + \frac{\pi v}{2} \right) \right) \right) /; v \in \mathbb{N}^+$$

01.19.21.2501.01

$$\int \sin(b \sqrt{z}) \sinh^v(\sqrt{z}\, c + f z)\, dz = \frac{i^{-v} 2^{1-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sin(b\sqrt{z}) - b\sqrt{z} \cos(b\sqrt{z}) \right)}{b^2} - i^v 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{(i f v - 2 i f s)^{3/2}} \left(\sqrt{2\pi}\, (b + 2 i c s - i c v) \left(\cos\left(\frac{(-b - 2 i c s + i c v)^2}{4(i f v - 2 i f s)} - \frac{\pi v}{2} \right) S\left(\frac{-b - 2 i c s + i c v + 2(i f v - 2 i f s)\sqrt{z}}{\sqrt{2\pi} \sqrt{i f v - 2 i f s}} \right) - C\left(\frac{-b - 2 i c s + i c v + 2(i f v - 2 i f s)\sqrt{z}}{\sqrt{2\pi} \sqrt{i f v - 2 i f s}} \right) \sin\left(\frac{(-b - 2 i c s + i c v)^2}{4(i f v - 2 i f s)} - \frac{\pi v}{2} \right) \right) - 2\sqrt{i f v - 2 i f s} \cos\left(\frac{\pi v}{2} + (i f v - 2 i f s) z + (-b - 2 i c s + i c v)\sqrt{z} \right) \right) + \frac{1}{(2 i f s - i f v)^{3/2}} \left(-2\sqrt{2 i f s - i f v} \cos\left(\frac{\pi v}{2} - (2 i f s - i f v) z - (-b + 2 i c s - i c v)\sqrt{z} \right) - \sqrt{2\pi}\, (-b + 2 i c s - i c v) \cos\left(\frac{(-b + 2 i c s - i c v)^2}{4(2 i f s - i f v)} + \frac{\pi v}{2} \right) S\left(\frac{-b + 2 i c s - i c v + 2(2 i f s - i f v)\sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s - i f v}} \right) - \sqrt{2\pi}\, (b - 2 i c s + i c v)\, C\left(\frac{-b + 2 i c s - i c v + 2(2 i f s - i f v)\sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s - i f v}} \right) \sin\left(\frac{(-b + 2 i c s - i c v)^2}{4(2 i f s - i f v)} + \frac{\pi v}{2} \right) \right) \right) /; v \in \mathbb{N}^+$$

Involving $\sin(b z^r + e) \sinh^v(c z^r + f z)$

01.19.21.2502.01

$$\int \sin(b z^2 + e) \sinh^v(c z^2 + f z)\, dz = \frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\cos(e) S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) + C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right)}{\sqrt{b}} - i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c v}} \left(\cos\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} + e - \frac{\pi v}{2}\right) S\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}}\right) - C\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}}\right) \sin\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} + e - \frac{\pi v}{2}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c v}} \left(\cos\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + e + \frac{\pi v}{2}\right) S\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}}\right) - C\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}}\right) \sin\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + e + \frac{\pi v}{2}\right)\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.2503.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \sinh^{\nu}\left(\sqrt{z}\, c+f z\right) dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\sin\left(\sqrt{z}\, b+e\right)-b \sqrt{z} \cos\left(\sqrt{z}\, b+e\right)\right)}{b^2} - i^{\nu} 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu-2 i f s)^{3/2}} \left(\sqrt{2\pi}\, (b+2 i c s-i c \nu) \left(\cos\left(\frac{(-b-2 i c s+i c \nu)^2}{4 (i f \nu-2 i f s)}+e-\frac{\pi \nu}{2}\right) S\left(\frac{-b-2 i c s+i c \nu+2 (i f \nu-2 i f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i f \nu-2 i f s}}\right) - C\left(\frac{-b-2 i c s+i c \nu+2 (i f \nu-2 i f s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i f \nu-2 i f s}}\right) \sin\left(\frac{(-b-2 i c s+i c \nu)^2}{4 (i f \nu-2 i f s)}+e-\frac{\pi \nu}{2}\right)\right) - 2 \sqrt{i f \nu-2 i f s} \cos\left(e-(i f \nu-2 i f s) z-(-b-2 i c s+i c \nu) \sqrt{z}-\frac{\pi \nu}{2}\right)\right) + \frac{1}{(2 i f s-i f \nu)^{3/2}} \left(-2 \sqrt{2 i f s-i f \nu} \cos\left(e+\frac{\pi \nu}{2}-(2 i f s-i f \nu) z-(-b+2 i c s-i c \nu) \sqrt{z}\right) - \sqrt{2\pi}\, (-b+2 i c s-i c \nu) \cos\left(\frac{(-b+2 i c s-i c \nu)^2}{4 (2 i f s-i f \nu)}+e+\frac{\pi \nu}{2}\right) S\left(\frac{-b+2 i c s-i c \nu+2 (2 i f s-i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s-i f \nu}}\right) - \sqrt{2\pi}\, (b-2 i c s+i c \nu) C\left(\frac{-b+2 i c s-i c \nu+2 (2 i f s-i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f s-i f \nu}}\right) \sin\left(\frac{(-b+2 i c s-i c \nu)^2}{4 (2 i f s-i f \nu)}+e+\frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\sin\left(b z^r+d z\right) \sinh^{\nu}\left(c z^r+f z\right)$

01.19.21.2504.01

$$\int \sin(b z^2 + d z) \sinh^\nu(c z^2 + f z)\, dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(S\left(\frac{d+2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{d^2}{4 b}\right) - \sin\left(\frac{d^2}{4 b}\right) C\left(\frac{d+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\right)}{\sqrt{b}} - i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{-b-2 i c s+i c \nu}} \left(S\left(\frac{-d-2 i f s+i f \nu+2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi}\sqrt{-b-2 i c s+i c \nu}}\right) \cos\left(\frac{(-d-2 i f s+i f \nu)^2}{4(-b-2 i c s+i c \nu)} - \frac{\pi \nu}{2}\right) - \right.\right.$$

$$\left.\sin\left(\frac{(-d-2 i f s+i f \nu)^2}{4(-b-2 i c s+i c \nu)} - \frac{\pi \nu}{2}\right) C\left(\frac{-d-2 i f s+i f \nu+2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi}\sqrt{-b-2 i c s+i c \nu}}\right)\right) +$$

$$\frac{1}{\sqrt{-b+2 i c s-i c \nu}} \left(S\left(\frac{-d+2 i f s-i f \nu+2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{-b+2 i c s-i c \nu}}\right) \cos\left(\frac{(-d+2 i f s-i f \nu)^2}{4(-b+2 i c s-i c \nu)} + \frac{\pi \nu}{2}\right) - \right.$$

$$\left.\left.\sin\left(\frac{(-d+2 i f s-i f \nu)^2}{4(-b+2 i c s-i c \nu)} + \frac{\pi \nu}{2}\right) C\left(\frac{-d+2 i f s-i f \nu+2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{-b+2 i c s-i c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2505.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = -\frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{d}\, \cos\left(\sqrt{z}\, b + d\, z\right) + b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d}\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right)\right)\right) - i^{\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b + 2\, i\, c\, s - i\, c\, \nu) \left(S\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cos\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2}\right) - \sin\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2}\right) C\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right)\right) - 2\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}\, \cos\left(\frac{\pi\, \nu}{2} + (-d - 2\, i\, f\, s + i\, f\, \nu)\, z + (-b - 2\, i\, c\, s + i\, c\, \nu)\sqrt{z}\right)\right) \Big/ (-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(-2\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}\, \cos\left(\frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - (-b + 2\, i\, c\, s - i\, c\, \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, s - i\, c\, \nu)\, S\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cos\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2}\right) - \sqrt{2\pi}\, (b - 2\, i\, c\, s + i\, c\, \nu)\, C\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sin\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2}\right)\right) \Big/ (-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \sinh^{\nu}\left(c\, z^r + f\, z\right)$

01.19.21.2506.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z\right) dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) - \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right)\right)\right) - i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right) \cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right) C\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right) \cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2507.01

$$\int \sin\left(\sqrt{z}\, b+e+d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c+f\, z\right) dz = -\frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(2\sqrt{d}\, \cos\left(\sqrt{z}\, b+e+d\, z\right)+b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d}-e\right) S\left(\frac{b+2\, d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right)-b\sqrt{2\pi}\, C\left(\frac{b+2\, d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}-e\right)\right)\right)-$$

$$i^{\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b+2\, i\, c\, s-i\, c\, \nu) \left(S\left(\frac{-b-2\, i\, c\, s+i\, c\, \nu+2\, (-d-2\, i\, f\, s+i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2\, i\, f\, s+i\, f\, \nu}}\right) \cos\left(\frac{(-b-2\, i\, c\, s+i\, c\, \nu)^2}{4\, (-d-2\, i\, f\, s+i\, f\, \nu)}+e-\frac{\pi\, \nu}{2}\right)-\sin\left(\frac{(-b-2\, i\, c\, s+i\, c\, \nu)^2}{4\, (-d-2\, i\, f\, s+i\, f\, \nu)}+e-\frac{\pi\, \nu}{2}\right) C\left(\frac{-b-2\, i\, c\, s+i\, c\, \nu+2\, (-d-2\, i\, f\, s+i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2\, i\, f\, s+i\, f\, \nu}}\right)\right)-2\sqrt{-d-2\, i\, f\, s+i\, f\, \nu}\, \cos\left(e-\frac{\pi\, \nu}{2}-(-d-2\, i\, f\, s+i\, f\, \nu)\, z-(-b-2\, i\, c\, s+i\, c\, \nu)\sqrt{z}\right)\right)\Big/ (-d-2\, i\, f\, s+i\, f\, \nu)^{3/2}+$$

$$\left(-2\sqrt{-d+2\, i\, f\, s-i\, f\, \nu}\, \cos\left(e+\frac{\pi\, \nu}{2}-(-d+2\, i\, f\, s-i\, f\, \nu)\, z-(-b+2\, i\, c\, s-i\, c\, \nu)\sqrt{z}\right)-\sqrt{2\pi}\, (-b+2\, i\, c\, s-i\, c\, \nu)\, S\left(\frac{-b+2\, i\, c\, s-i\, c\, \nu+2\, (-d+2\, i\, f\, s-i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2\, i\, f\, s-i\, f\, \nu}}\right) \cos\left(\frac{(-b+2\, i\, c\, s-i\, c\, \nu)^2}{4\, (-d+2\, i\, f\, s-i\, f\, \nu)}+e+\frac{\pi\, \nu}{2}\right)-\sqrt{2\pi}\, (b-2\, i\, c\, s+i\, c\, \nu)\, C\left(\frac{-b+2\, i\, c\, s-i\, c\, \nu+2\, (-d+2\, i\, f\, s-i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2\, i\, f\, s-i\, f\, \nu}}\right) \sin\left(\frac{(-b+2\, i\, c\, s-i\, c\, \nu)^2}{4\, (-d+2\, i\, f\, s-i\, f\, \nu)}+e+\frac{\pi\, \nu}{2}\right)\right)\Big/ (-d+2\, i\, f\, s-i\, f\, \nu)^{3/2}\right) /;\, \nu \in \mathbb{N}^+$$

Involving $\sin(d\, z) \sinh^{\nu}\left(c\, z^r+f\, z+g\right)$

01.19.21.2508.01

$$\int \sin(d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(d\,z)\,(\nu \bmod 2-1)}{d} - i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.\right.$$
$$\left.C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-\right.$$
$$\left.\left.C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2509.01

$$\int \sin(d\, z) \sinh^{v}\left(\sqrt{z}\; c + g + f\, z\right) dz = -\frac{\binom{v}{\frac{v}{2}} \cos(d\, z)\, (1 - v \bmod 2)\, (2\, i)^{-v}}{d} - i^{v}\, 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s} \binom{v}{s} \Bigg(\Bigg(\sqrt{2\pi}\, (2\, i\, c\, s - i\, c\, v) \Bigg(\cos\left(\frac{(i\, c\, v - 2\, i\, c\, s)^{2}}{4\, (-d - 2\, i\, f\, s + i\, f\, v)} + 2\, i\, g\, s - i\, g\, v - \frac{\pi\, v}{2} \right) S\left(\frac{-2\, c\, i\, s + i\, c\, v + 2\, (-d - 2\, i\, f\, s + i\, f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, v}} \right) - C\left(\frac{-2\, c\, i\, s + i\, c\, v + 2\, (-d - 2\, i\, f\, s + i\, f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, v}} \right) \sin\left(\frac{(i\, c\, v - 2\, i\, c\, s)^{2}}{4\, (-d - 2\, i\, f\, s + i\, f\, v)} + 2\, i\, g\, s - i\, g\, v - \frac{\pi\, v}{2} \right) \Bigg) - 2 \sqrt{-d - 2\, i\, f\, s + i\, f\, v}\, \cos\left(2\, i\, g\, s - i\, g\, v - (-d - 2\, i\, f\, s + i\, f\, v)\, z - (i\, c\, v - 2\, i\, c\, s) \sqrt{z} - \frac{\pi\, v}{2} \right) \Bigg) \Big/ (-d - 2\, i\, f\, s + i\, f\, v)^{3/2} + \Bigg(-2 \sqrt{-d + 2\, i\, f\, s - i\, f\, v}\, \cos\left(-2\, g\, i\, s + i\, g\, v + \frac{\pi\, v}{2} - (-d + 2\, i\, f\, s - i\, f\, v)\, z - (2\, i\, c\, s - i\, c\, v) \sqrt{z} \right) - \sqrt{2\pi}\, (2\, i\, c\, s - i\, c\, v) \cos\left(\frac{(2\, i\, c\, s - i\, c\, v)^{2}}{4\, (-d + 2\, i\, f\, s - i\, f\, v)} - 2\, i\, g\, s + i\, g\, v + \frac{\pi\, v}{2} \right) S\left(\frac{2\, i\, c\, s - i\, c\, v + 2\, (-d + 2\, i\, f\, s - i\, f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, v}} \right) - \sqrt{2\pi}\, (i\, c\, v - 2\, i\, c\, s)\, C\left(\frac{2\, i\, c\, s - i\, c\, v + 2\, (-d + 2\, i\, f\, s - i\, f\, v) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, v}} \right) \sin\left(\frac{(2\, i\, c\, s - i\, c\, v)^{2}}{4\, (-d + 2\, i\, f\, s - i\, f\, v)} - 2\, i\, g\, s + i\, g\, v + \frac{\pi\, v}{2} \right) \Bigg) \Big/ (-d + 2\, i\, f\, s - i\, f\, v)^{3/2} \Bigg) /;\; v \in \mathbb{N}^{+}$$

Involving $\sin(d\, z + e) \sinh^{v}\left(c\, z^{r} + f\, z + g\right)$

01.19.21.2510.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(\nu \bmod 2-1)}{d} - i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.\right.$$

$$\left.C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-\right.$$

$$\left.\left.C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2511.01

$$\int \sin(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g+f\,z\right)dz = -\frac{\binom{\nu}{\frac{\nu}{2}}\cos(e+d\,z)\,(1-\nu \bmod 2)\,(2\,i)^{-\nu}}{d} - i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\Bigg(\Bigg(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\Bigg(\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)-C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)\Bigg)-2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\cos\left(e+2\,i\,g\,s-i\,g\,\nu-(-d-2\,i\,f\,s+i\,f\,\nu)\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\Bigg)\Bigg/(-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\Bigg(-2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\cos\left(e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)\Bigg)\Bigg/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin(b\,z^r)\sinh^{\nu}(c\,z^r+f\,z+g)$

01.19.21.2512.01

$$\int \sin(b z^2)\sinh^{\nu}(c z^2 + f z + g)\,dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\, S\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} - i^{-\nu} 2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2 i c s+i c \nu}}\left(\cos\left(\frac{(i f \nu - 2 i f s)^2}{4(-b-2 i c s+i c \nu)} + g i (2s-\nu) - \frac{\pi \nu}{2}\right) S\left(\frac{-2 f i s + i f \nu + 2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi}\sqrt{-b-2 i c s+i c \nu}}\right) - C\left(\frac{-2 f i s + i f \nu + 2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi}\sqrt{-b-2 i c s+i c \nu}}\right) \sin\left(\frac{(i f \nu - 2 i f s)^2}{4(-b-2 i c s+i c \nu)} + g i (2s-\nu) - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b+2 i c s-i c \nu}} \left(\cos\left(\frac{(2 i f s - i f \nu)^2}{4(-b+2 i c s-i c \nu)} - i g (2s-\nu) + \frac{\pi \nu}{2}\right) S\left(\frac{2 i f s - i f \nu + 2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{-b+2 i c s-i c \nu}}\right) - C\left(\frac{2 i f s - i f \nu + 2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{-b+2 i c s-i c \nu}}\right) \sin\left(\frac{(2 i f s - i f \nu)^2}{4(-b+2 i c s-i c \nu)} - i g (2s-\nu) + \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2513.01

$$\int \sin\left(b\sqrt{z}\right)\sinh^{\nu}\left(\sqrt{z}\; c+g+f\,z\right)dz = \frac{i^{-\nu}\,2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sin\left(b\sqrt{z}\right)-b\sqrt{z}\,\cos\left(b\sqrt{z}\right)\right)}{b^2} -$$
$$i^{\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(i\,f\,\nu-2\,i\,f\,s)^{3/2}}\left(\sqrt{2\pi}\,(b+2\,i\,c\,s-i\,c\,\nu)\right.\right.$$
$$\left(\cos\left(\frac{(-b-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(i\,f\,\nu-2\,i\,f\,s)}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)S\left(\frac{-b-2\,i\,c\,s+i\,c\,\nu+2\,(i\,f\,\nu-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)-\right.$$
$$\left.C\left(\frac{-b-2\,i\,c\,s+i\,c\,\nu+2\,(i\,f\,\nu-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)\sin\left(\frac{(-b-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(i\,f\,\nu-2\,i\,f\,s)}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)\right)-$$
$$\left.2\sqrt{i\,f\,\nu-2\,i\,f\,s}\,\cos\left(2\,i\,g\,s-i\,g\,\nu-(i\,f\,\nu-2\,i\,f\,s)\,z-(-b-2\,i\,c\,s+i\,c\,\nu)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{1}{(2\,i\,f\,s-i\,f\,\nu)^{3/2}}\left(-2\sqrt{2\,i\,f\,s-i\,f\,\nu}\,\cos\left(-2\,g\,i\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}-(2\,i\,f\,s-i\,f\,\nu)\,z-(-b+2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)-\right.$$
$$\sqrt{2\pi}\,(-b+2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(-b+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,i\,f\,s-i\,f\,\nu)}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)$$
$$S\left(\frac{-b+2\,i\,c\,s-i\,c\,\nu+2\,(2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\pi}\,(b-2\,i\,c\,s+i\,c\,\nu)$$
$$\left.\left.C\left(\frac{-b+2\,i\,c\,s-i\,c\,\nu+2\,(2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(-b+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,i\,f\,s-i\,f\,\nu)}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\sin\left(b\,z^r+e\right)\sinh^{\nu}\left(c\,z^r+f\,z+g\right)$

01.19.21.2514.01

$$\int \sin\left(b z^2 + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos(e) S\left(\sqrt{b} \sqrt{\frac{2}{\pi}} z\right) + C\left(\sqrt{b} \sqrt{\frac{2}{\pi}} z\right) \sin(e)\right)}{\sqrt{b}} -$$

$$i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{(i f \nu - 2 i f s)^2}{4 (-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2} \right) \right.\right.$$

$$S\left(\frac{-2 f i s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 i c s + i c \nu}} \right) - C\left(\frac{-2 f i s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 i c s + i c \nu}} \right)$$

$$\left.\sin\left(\frac{(i f \nu - 2 i f s)^2}{4 (-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2} \right) \right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}}$$

$$\left(\cos\left(\frac{(2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) S\left(\frac{2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 i c s - i c \nu}} \right) - \right.$$

$$\left.\left.\left. C\left(\frac{2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 i c s - i c \nu}} \right) \sin\left(\frac{(2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2515.01

$$\int \sin\left(\sqrt{z}\, b+e\right) \sinh^{v}\left(\sqrt{z}\, c+g+f\, z\right) dz = \frac{i^{-v}\, 2^{1-v} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \left(\sin\left(\sqrt{z}\, b+e\right)-b\sqrt{z}\, \cos\left(\sqrt{z}\, b+e\right)\right)}{b^2} -$$

$$i^{v}\, 2^{-v-1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(\frac{1}{(i\, f\, v-2\, i\, f\, s)^{3/2}} \Bigg(\sqrt{2\pi}\, (b+2\, i\, c\, s-i\, c\, v)$$

$$\Bigg(\cos\left(\frac{(-b-2\, i\, c\, s+i\, c\, v)^2}{4\, (i\, f\, v-2\, i\, f\, s)} + e + 2\, i\, g\, s - i\, g\, v - \frac{\pi\, v}{2} \right) S\left(\frac{-b-2\, i\, c\, s+i\, c\, v+2\, (i\, f\, v-2\, i\, f\, s)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, f\, v-2\, i\, f\, s}} \right) -$$

$$C\left(\frac{-b-2\, i\, c\, s+i\, c\, v+2\, (i\, f\, v-2\, i\, f\, s)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, f\, v-2\, i\, f\, s}} \right) \sin\left(\frac{(-b-2\, i\, c\, s+i\, c\, v)^2}{4\, (i\, f\, v-2\, i\, f\, s)} + e + 2\, i\, g\, s - i\, g\, v - \frac{\pi\, v}{2} \right) \Bigg) -$$

$$2\sqrt{i\, f\, v-2\, i\, f\, s}\, \cos\left(e + 2\, i\, g\, s - i\, g\, v - (i\, f\, v-2\, i\, f\, s)\, z - (-b-2\, i\, c\, s+i\, c\, v)\sqrt{z} - \frac{\pi\, v}{2} \right) \Bigg) +$$

$$\frac{1}{(2\, i\, f\, s-i\, f\, v)^{3/2}} \Bigg(-2\sqrt{2\, i\, f\, s-i\, f\, v}\, \cos\left(e - 2\, i\, g\, s + i\, g\, v + \frac{\pi\, v}{2} - (2\, i\, f\, s-i\, f\, v)\, z - (-b+2\, i\, c\, s-i\, c\, v)\sqrt{z} \right) -$$

$$\sqrt{2\pi}\, (-b+2\, i\, c\, s-i\, c\, v) \cos\left(\frac{(-b+2\, i\, c\, s-i\, c\, v)^2}{4\, (2\, i\, f\, s-i\, f\, v)} + e - 2\, i\, g\, s + i\, g\, v + \frac{\pi\, v}{2} \right)$$

$$S\left(\frac{-b+2\, i\, c\, s-i\, c\, v+2\, (2\, i\, f\, s-i\, f\, v)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, i\, f\, s-i\, f\, v}} \right) -$$

$$\sqrt{2\pi}\, (b-2\, i\, c\, s+i\, c\, v)\, C\left(\frac{-b+2\, i\, c\, s-i\, c\, v+2\, (2\, i\, f\, s-i\, f\, v)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, i\, f\, s-i\, f\, v}} \right)$$

$$\sin\left(\frac{(-b+2\, i\, c\, s-i\, c\, v)^2}{4\, (2\, i\, f\, s-i\, f\, v)} + e - 2\, i\, g\, s + i\, g\, v + \frac{\pi\, v}{2} \right) \Bigg) \Bigg) \;/;\; v \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z\right) \sinh^{v}\left(c\, z^r + f\, z + g\right)$

01.19.21.2516.01

$$\int \sin\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{d^2}{4b}\right) - \sin\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)\right)}{\sqrt{b}} - i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right) \cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + g i (2s - \nu) - \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + g i (2s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right) \cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} - i g (2s - \nu) + \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} - i g (2s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2517.01

$$\int \sin\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = -\frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{d}\, \cos\left(\sqrt{z}\, b + d\, z\right) + b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d}\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\; C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right)\right)\right) - i^{\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b + 2\, i\, c\, s - i\, c\, \nu) \left(S\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\,(-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cos\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\,(-d - 2\, i\, f\, s + i\, f\, \nu)} + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) - \sin\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\,(-d - 2\, i\, f\, s + i\, f\, \nu)} + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) C\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\,(-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right)\right) - 2\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}\, \cos\left(2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2} - (-d - 2\, i\, f\, s + i\, f\, \nu)\, z - (-b - 2\, i\, c\, s + i\, c\, \nu)\sqrt{z}\right)\right) \Big/ (-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(-2\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}\, \cos\left(-2\, g\, i\, s + i\, g\, \nu + \frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - (-b + 2\, i\, c\, s - i\, c\, \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, s - i\, c\, \nu)\, S\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\,(-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cos\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\,(-d + 2\, i\, f\, s - i\, f\, \nu)} - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) - \sqrt{2\pi}\, (b - 2\, i\, c\, s + i\, c\, \nu)\, C\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\,(-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sin\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\,(-d + 2\, i\, f\, s - i\, f\, \nu)} - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right)\right) \Big/ (-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\sin\left(b\, z^r + d\, z + e\right) \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.2518.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) - \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right)\right)\right) - i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(S\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right) \cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(S\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right) \cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) - \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2519.01

$$\int \sin\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = -\frac{i^{\nu} 2^{-\nu-2} \sqrt{\pi}}{\sqrt{b}} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt[4]{-1}\, e^{i e - \frac{i d^2}{4 b}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(d + 2 b z)}{2\sqrt{b}}\right) + (-1)^{3/4} e^{\frac{i d^2}{4 b} - i e} \operatorname{erfi}\left(\frac{(-1)^{3/4}(d + 2 b z)}{2\sqrt{b}}\right)\right) (1 - \nu \bmod 2) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{i\, e^{\frac{(-i d + f(\nu - 2k))^2}{4 i b - 4 c (\nu - 2 k)} - i e + g(\nu - 2k)} \operatorname{erfi}\left(\frac{-i d - 2 f k + f \nu - 2 i b z - 4 c k z + 2 c \nu z}{2\sqrt{-i b - 2 c k + c \nu}}\right)}{\sqrt{-i b + c(\nu - 2k)}} + \frac{(-1)^{\nu} e^{-\frac{(i d + 2 f k - f \nu)^2}{4(i b + 2 c k - c \nu)} + i e + 2 g k - g \nu} \operatorname{erfi}\left(\frac{-d + 2 i f k - i f \nu - 2 b z + 4 i c k z - 2 i c \nu z}{2\sqrt{-i b - 2 c k + c \nu}}\right)}{\sqrt{-i b - 2 c k + c \nu}} + \frac{1}{\sqrt{i b - 2 c k + c \nu}} \left((-1)^{\nu} e^{-\frac{(-i d + 2 f k - f \nu)^2}{4(-i b + 2 c k - c \nu)} - i e + 2 g k - g \nu} \operatorname{erfi}\left(\frac{-d - 2 i f k + i f \nu - 2 b z - 4 i c k z + 2 i c \nu z}{2\sqrt{i b - 2 c k + c \nu}}\right)\right) + \frac{i\, e^{\frac{(i d + f(\nu - 2k))^2}{-4 i b - 4 c (\nu - 2 k)} + i e - 2 g k + g \nu} \operatorname{erfi}\left(\frac{-i d + 2 f k - f \nu - 2 i b z + 4 c k z - 2 c \nu z}{2\sqrt{i b - 2 c k + c \nu}}\right)}{\sqrt{i b + c(\nu - 2k)}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2520.01

$$\int \sin\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = -\frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(2\sqrt{d} \cos\left(\sqrt{z}\, b + e + d\, z\right) + b\sqrt{2\pi} \cos\left(\frac{b^2}{4\,d} - e\right) S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,d} - e\right) \right) \right) - i^{\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2}} \left(\sqrt{2\pi}\, (b + 2\, i\, c\, s - i\, c\, \nu) \left(S\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \cos\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) - \sin\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) C\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \right) - 2\sqrt{-d - 2\, i\, f\, s + i\, f\, \nu} \cos\left(e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2} - (-d - 2\, i\, f\, s + i\, f\, \nu)\, z - (-b - 2\, i\, c\, s + i\, c\, \nu)\sqrt{z}\right) \right) + \frac{1}{(-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2}} \left(-2\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu} \cos\left(e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - (-b + 2\, i\, c\, s - i\, c\, \nu)\sqrt{z}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, s - i\, c\, \nu)\, S\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \cos\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) - \sqrt{2\pi}\, (b - 2\, i\, c\, s + i\, c\, \nu)\, C\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sin\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2521.01

$$\int \sin\left(\sqrt{z}\, b + d\, z + e\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z + g\right) dz = i^{\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(-\frac{4\cos\left(\sqrt{z}\, b + e + d\, z\right)}{d} + \frac{b\, e^{\frac{i b^2}{4 d} - i e}\, i\, \sqrt{\pi}\, \operatorname{erf}\left(\frac{b + 2 d \sqrt{z}}{2\sqrt{-i d}}\right)}{(-i\, d)^{3/2}} - \frac{i\, b\, e^{i e - \frac{i b^2}{4 d}}\, \sqrt{\pi}\, \operatorname{erf}\left(\frac{b + 2 d \sqrt{z}}{2\sqrt{i d}}\right)}{(i\, d)^{3/2}} \right) (1 - \nu \bmod 2) + 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(i\sqrt{\pi} \left(\frac{1}{(-i\, d + 2\, f\, k - f\, \nu)^{3/2}} \left((-1)^{\nu}\, e^{\frac{(b + i (2 c k - c \nu))^2}{4(-i d + 2 f k - f \nu)} - i e + 2 g k - g \nu} (-i\, b + 2\, c\, k - c\, \nu)\, \operatorname{erfi}\left(\frac{i\, b - 2\, c\, k + c\, \nu + 2\, i\, d \sqrt{z} - 4\, f\, k \sqrt{z} + 2\, f\, \nu \sqrt{z}}{2\sqrt{-i\, d + 2\, f\, k - f\, \nu}} \right) \right) + \frac{1}{(i\, d + 2\, f\, k - f\, \nu)^{3/2}} \left((-1)^{\nu}\, e^{-\frac{(i b + 2 c k - c \nu)^2}{4(i d + 2 f k - f \nu)} + i e + 2 g k - g \nu} (i\, b + 2\, c\, k - c\, \nu)\, \operatorname{erfi}\left(\frac{i\, b + 2\, c\, k - c\, \nu + 2\, i\, d \sqrt{z} + 4\, f\, k \sqrt{z} - 2\, f\, \nu \sqrt{z}}{2\sqrt{i\, d + 2\, f\, k - f\, \nu}} \right) \right) + \frac{1}{(-i\, d + f\, (\nu - 2\, k))^{3/2}} \left(e^{\frac{(b + c i (\nu - 2 k))^2}{4(-i d + f(\nu - 2 k))} - i e + g(\nu - 2 k)} (-i\, b + c\, (\nu - 2\, k))\, \operatorname{erfi}\left(\frac{i\, b + 2\, c\, k - c\, \nu + 2\, i\, d \sqrt{z} + 4\, f\, k \sqrt{z} - 2\, f\, \nu \sqrt{z}}{2\sqrt{-i\, d + f\, (\nu - 2\, k)}} \right) \right) - \frac{1}{(i\, d + f\, (\nu - 2\, k))^{3/2}} \left(e^{\frac{(b - i c (\nu - 2 k))^2}{4(i d + f(\nu - 2 k))} + i e - 2 g k + g \nu} (-i\, b + 2\, c\, k - c\, \nu)\, \operatorname{erfi}\left(\frac{i\, b - 2\, c\, k + c\, \nu + 2\, i\, d \sqrt{z} - 4\, f\, k \sqrt{z} + 2\, f\, \nu \sqrt{z}}{2\sqrt{i\, d + f\, (\nu - 2\, k)}} \right) \right) \right) + \frac{2\, e^{\sqrt{z}\, (i b - 2 c k + c \nu) + \frac{1}{2}(2 i e - 4 g k + 2 g \nu) + (i d - 2 f k + f \nu) z}}{-d - 2\, i\, f\, k + i\, f\, \nu} + \frac{2\, (-1)^{\nu}\, e^{\sqrt{z}\, (-i b + 2 c k - c \nu) + \frac{1}{2}(-2 i e + 4 g k - 2 g \nu) + (-i d + 2 f k - f \nu) z}}{-d - 2\, i\, f\, k + i\, f\, \nu} + \frac{2\, e^{\sqrt{z}\, (-i b - 2 c k + c \nu) + \frac{1}{2}(-2 i e - 4 g k + 2 g \nu) + (-i d - 2 f k + f \nu) z}}{-d + 2\, i\, f\, k - i\, f\, \nu} + \frac{2\, (-1)^{\nu}\, e^{\sqrt{z}\, (i b + 2 c k - c \nu) + \frac{1}{2}(2 i e + 4 g k - 2 g \nu) + (i d + 2 f k - f \nu) z}}{-d + 2\, i\, f\, k - i\, f\, \nu} \right) /;\ \nu \in \mathbb{N}^{+}$$

Involving powers of sin

Involving $\sin^{\mu}(c\, z)\, \sinh^{\nu}(a\, z)$

01.19.21.2522.01

$$\int \sin^{\mu}(c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{1}{c\,\mu}\,i\,2^{-\nu}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}\sin^{\mu}(c\,z)\left(i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2\,i\,c\,z}\right)(1-\nu\bmod 2)+(-1)^{\nu}\,c\,\mu\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\left(e^{i\,(-i\,a\,z\,\nu+\pi\,\nu+2\,i\,a\,k\,z)}\,{}_2F_1\!\left(-\frac{-2\,a\,i\,k+i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(2\,k-\nu)}{c}-\mu+2\right);e^{2\,i\,c\,z}\right)\right)\Big/(-2\,a\,i\,k+i\,a\,\nu+c\,\mu)+\frac{e^{-a\,(\nu-2\,k)\,z}}{2\,i\,a\,k-i\,a\,\nu+c\,\mu}\,{}_2F_1\!\left(-\frac{2\,i\,a\,k-i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(\nu-2\,k)}{c}-\mu+2\right);e^{2\,i\,c\,z}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2523.01

$$\int \sin^{m}(c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{1}{a\,\nu}\,2^{-m}\left(1-e^{-2\,a\,z}\right)^{-\nu}\sinh^{\nu}(a\,z)\left(-\binom{m}{\frac{m}{2}}\,{}_2F_1\!\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};e^{-2\,a\,z}\right)(m\bmod 2-1)+i^{1-m}\,a\,\nu\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{e^{i\,c\,(m-2\,k)\,z}}{2\,c\,k-c\,m+i\,a\,\nu}\,{}_2F_1\!\left(\frac{i\,(2\,c\,k-c\,m+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(m-2\,k)}{a}-\nu+2\right);e^{-2\,a\,z}\right)-\frac{1}{2\,c\,k-c\,m-i\,a\,\nu}\left(e^{i\,(-c\,z\,m+\pi\,m+2\,c\,k\,z)}\,{}_2F_1\!\left(\frac{i\,(c\,(m-2\,k)+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(2\,k-m)}{a}-\nu+2\right);e^{-2\,a\,z}\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+$$

01.19.21.2524.01

$$\int \sin^{m}(c\,z)\sinh^{\nu}(a\,z)\,dz = 2^{-m-\nu}\left((-1)^m\,i^{-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m\bmod 2-1)(\nu\bmod 2-1)-\frac{1}{c}\,i^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(\nu\bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\,e^{-i\,c\,(m-2\,k)\,z}\left(-(-1)^m+e^{2\,i\,c\,(m-2\,k)\,z}\right)\binom{m}{k}}{2\,k-m}-\frac{(-1)^{m+\nu}}{a}\binom{m}{\frac{m}{2}}(m\bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^s\,e^{a\,(\nu-2\,s)\,z}\left(-(-1)^{\nu}+e^{-2\,a\,(\nu-2\,s)\,z}\right)\binom{\nu}{s}}{2\,s-\nu}+i^{m+1}\,(-1)^{\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\left(\frac{e^{a\,z\,\nu+i\,\pi\,\nu-2\,i\,c\,k\,z-2\,a\,s\,z+i\,m\,(c\,z+\pi)}}{2\,c\,k-c\,m-2\,i\,a\,s+i\,a\,\nu}+\frac{e^{-2\,c\,i\,k\,z+2\,a\,s\,z-a\,\nu\,z+i\,m\,(c\,z+\pi)}}{2\,c\,k-c\,m+2\,i\,a\,s-i\,a\,\nu}+\frac{e^{a\,z\,\nu+i\,\pi\,\nu+2\,i\,c\,k\,z-i\,c\,m\,z-2\,a\,s\,z}}{c\,(m-2\,k)+a\,i\,(\nu-2\,s)}+\frac{e^{(2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z}}{c\,(m-2\,k)+a\,i\,(2\,s-\nu)}\right)\binom{\nu}{s}\right)\,/;\,m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

Involving $\sin^{\mu}(c\,z+d)\sinh^{\nu}(a\,z)$

01.19.21.2525.01

$$\int \sin^{\mu}(d+c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{1}{c\,\mu}\,i\,2^{-\nu}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}\sin^{\mu}(d+c\,z)\left(i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2\,i\,(d+c\,z)}\right)(1-\nu \bmod 2)+(-1)^{\nu}\,c\,\mu \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\left(e^{i\,(-i\,a\,z\,\nu+\pi\,\nu+2\,i\,a\,k\,z)}\,{}_2F_1\left(-\frac{-2\,a\,i\,k+i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(2\,k-\nu)}{c}-\mu+2\right);e^{2\,i\,(d+c\,z)}\right)\right)\Big/(-2\,a\,i\,k+i\,a\,\nu+c\,\mu)+\left(e^{-a\,(\nu-2\,k)\,z}\,{}_2F_1\left(-\frac{2\,i\,a\,k-i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(\nu-2\,k)}{c}-\mu+2\right);e^{2\,i\,(d+c\,z)}\right)\right)\Big/(2\,i\,a\,k-i\,a\,\nu+c\,\mu)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2526.01

$$\int \sin^{m}(d+c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{1}{a\,\nu}\,2^{-m}\left(1-e^{-2\,a\,z}\right)^{-\nu}\sinh^{\nu}(a\,z)\left(-\binom{m}{\frac{m}{2}}\,{}_2F_1\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};e^{-2\,a\,z}\right)(m \bmod 2-1)+i^{1-m}\,a\,\nu\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{i\,d\,(m-2\,k)}\binom{m}{k}\left(\frac{e^{i\,c\,(m-2\,k)\,z}}{2\,c\,k-c\,m+i\,a\,\nu}\,{}_2F_1\left(\frac{i\,(2\,c\,k-c\,m+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(m-2\,k)}{a}-\nu+2\right);e^{-2\,a\,z}\right)-\frac{1}{2\,c\,k-c\,m-i\,a\,\nu}\left(e^{i\,(4\,d\,k+2\,c\,z\,k-2\,d\,m-c\,m\,z+m\,\pi)}\,{}_2F_1\left(\frac{i\,(c\,(m-2\,k)+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(2\,k-m)}{a}-\nu+2\right);e^{-2\,a\,z}\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+$$

01.19.21.2527.01

$$\int \sin^m(d+c\,z)\sinh^\nu(a\,z)\,dz = 2^{-m-\nu}\Bigg((-1)^m\,i^{-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1) - \frac{1}{c}\,i^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\,e^{-i(d(2k+m)+c(m-2k)z)}\left(-(-1)^m\,e^{4idk}+e^{2i(dm+c(m-2k)z)}\right)\binom{m}{k}}{2k-m} - \frac{(-1)^{m+\nu}}{a}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^s\,e^{a(\nu-2s)z}\left(-(-1)^\nu+e^{-2a(\nu-2s)z}\right)\binom{\nu}{s}}{2s-\nu} + i^{m+1}(-1)^\nu\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\,e^{i d(2k+m)}\left(\frac{e^{-4dik-2iczk+i\pi\nu-2asz+a\nu z+im(cz+\pi)}}{2ck-cm-2ias+ia\nu}+\frac{e^{-4dik-2iczk+2asz-a\nu z+im(cz+\pi)}}{2ck-cm+2ias-ia\nu}+\frac{e^{-2dim-iczm+i\pi\nu+2ickz-2asz+a\nu z}}{c(m-2k)+a\,i(\nu-2s)}+\frac{e^{(2ick-icm+2as-a\nu)z-2idm}}{c(m-2k)+a\,i(2s-\nu)}\right)\binom{\nu}{s}\Bigg)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^\mu(c\,z)\sinh^\nu(a\,z+b)$

01.19.21.2528.01

$$\int \sin^\mu(c\,z)\sinh^\nu(b+a\,z)\,dz = \frac{1}{c\,\mu}\,i\,2^{-\nu}\left(1-e^{2icz}\right)^{-\mu}\sin^\mu(c\,z)\Bigg(i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2icz}\right)(1-\nu \bmod 2)+(-1)^\nu\,c\,\mu\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{-b(\nu-2k)}\binom{\nu}{k}\Bigg(\Bigg(e^{i(4ibk+2iazk-2ib\nu+\pi\nu-ia\nu z)}\,{}_2F_1\!\left(-\frac{-2aik+ia\nu+c\mu}{2c},-\mu;\frac{1}{2}\left(\frac{a\,i(2k-\nu)}{c}-\mu+2\right);e^{2icz}\right)\Bigg)\Big/(-2aik+ia\nu+c\mu)+\frac{e^{-a(\nu-2k)z}}{2iak-ia\nu+c\mu}\,{}_2F_1\!\left(-\frac{2iak-ia\nu+c\mu}{2c},-\mu;\frac{1}{2}\left(\frac{a\,i(\nu-2k)}{c}-\mu+2\right);e^{2icz}\right)\Bigg)\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2529.01

$$\int \sin^m(c z) \sinh^\nu(b + a z) \, dz = \frac{1}{a \nu} 2^{-m} \left(1 - e^{-2(b+a z)}\right)^{-\nu} \sinh^\nu(b + a z) \left(-\binom{m}{\frac{m}{2}} {}_2F_1\left(-\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}; e^{-2(b+a z)}\right) (m \bmod 2 - 1) + i^{1-m} a \nu \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\left(e^{i c (m-2k) z} {}_2F_1\left(\frac{i (2 c k - c m + i a \nu)}{2 a}, -\nu; \frac{1}{2}\left(-\frac{i c (m - 2k)}{a} - \nu + 2\right); e^{-2(b+a z)}\right)\right) \Big/ (2 c k - c m + i a \nu) - \frac{1}{2 c k - c m - i a \nu} \left(e^{i(-c z m + \pi m + 2 c k z)} {}_2F_1\left(\frac{i (c (m - 2k) + i a \nu)}{2 a}, -\nu; \frac{1}{2}\left(-\frac{i c (2k - m)}{a} - \nu + 2\right); e^{-2(b+a z)}\right)\right)\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.2530.01

$$\int \sin^m(c z) \sinh^\nu(b + a z) \, dz = 2^{-m-\nu} \left((-1)^m i^{-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1) - \frac{1}{c} i^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k e^{-i c (m-2k) z} \left(-(-1)^m + e^{2 i c (m-2k) z}\right) \binom{m}{k}}{2k - m} - \frac{1}{a} (-1)^{m+\nu} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^s e^{-i (b i (2 s + \nu) + a i (\nu - 2 s) z)} \left(-(-1)^\nu e^{-4 b s} + e^{2 i (i b \nu + a i (\nu - 2 s) z)}\right) \binom{\nu}{s}}{2 s - \nu} + i^{m+1} (-1)^\nu \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{b (2 s + \nu)} \left(\frac{e^{-4 b s - 2 a z s + i \pi \nu - 2 i c k z + a \nu z + i m (c z + \pi)}}{2 c k - c m - 2 i a s + i a \nu} + \frac{e^{-2 b \nu - a z \nu - 2 i c k z + 2 a s z + i m (c z + \pi)}}{2 c k - c m + 2 i a s - i a \nu} + \frac{e^{-4 b s - 2 a z s + i \pi \nu + 2 i c k z - i c m z + a \nu z}}{c (m - 2k) + a i (\nu - 2 s)} + \frac{e^{(2 i c k - i c m + 2 a s - a \nu) z - 2 b \nu}}{c (m - 2k) + a i (2 s - \nu)}\right) \binom{\nu}{s}\right) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $\sin^\mu(c z + d) \sinh^\nu(a z + b)$

01.19.21.2531.01

$$\int \sin^{\mu}(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = \frac{1}{c\,\mu}\,i\,2^{-\nu}\left(1-e^{2\,i\,(d+c\,z)}\right)^{-\mu}\sin^{\mu}(d+c\,z)\left(i^{-\nu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\!\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};e^{2\,i\,(d+c\,z)}\right)(1-\nu \bmod 2)+(-1)^{\nu}\,c\,\mu\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{-b\,(\nu-2\,k)}\binom{\nu}{k}\left(\left(e^{i\,(4\,i\,b\,k+2\,i\,a\,z\,k-2\,i\,b\,\nu+\pi\,\nu-i\,a\,\nu\,z)}\,{}_2F_1\!\left(-\frac{-2\,a\,i\,k+i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(2\,k-\nu)}{c}-\mu+2\right);e^{2\,i\,(d+c\,z)}\right)\right)\Big/(-2\,a\,i\,k+i\,a\,\nu+c\,\mu)+\left(e^{-a\,(\nu-2\,k)\,z}\,{}_2F_1\!\left(-\frac{2\,i\,a\,k-i\,a\,\nu+c\,\mu}{2\,c},-\mu;\frac{1}{2}\left(\frac{a\,i\,(\nu-2\,k)}{c}-\mu+2\right);e^{2\,i\,(d+c\,z)}\right)\right)\Big/(2\,i\,a\,k-i\,a\,\nu+c\,\mu)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2532.01

$$\int \sin^{m}(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = \frac{1}{a\,\nu}\,2^{-m}\left(1-e^{-2\,(b+a\,z)}\right)^{-\nu}\sinh^{\nu}(b+a\,z)\left(-\binom{m}{\frac{m}{2}}\,{}_2F_1\!\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};e^{-2\,(b+a\,z)}\right)(m \bmod 2-1)+i^{1-m}\,a\,\nu\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{i\,d\,(m-2\,k)}\binom{m}{k}\left(\left(e^{i\,c\,(m-2\,k)\,z}\,{}_2F_1\!\left(\frac{i\,(2\,c\,k-c\,m+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(m-2\,k)}{a}-\nu+2\right);e^{-2\,(b+a\,z)}\right)\right)\Big/(2\,c\,k-c\,m+i\,a\,\nu)-\frac{1}{2\,c\,k-c\,m-i\,a\,\nu}\left(e^{i\,(4\,d\,k+2\,c\,z\,k-2\,d\,m-c\,m\,z+m\,\pi)}\,{}_2F_1\!\left(\frac{i\,(c\,(m-2\,k)+i\,a\,\nu)}{2\,a},-\nu;\frac{1}{2}\left(-\frac{i\,c\,(2\,k-m)}{a}-\nu+2\right);e^{-2\,(b+a\,z)}\right)\right)\right)\right)\,/;\,m\in\mathbb{N}^+$$

01.19.21.2533.01

$$\int \sin^m(c\,z+d)\sinh^\nu(a\,z+b)\,dz = 2^{-m-\nu}\left((-1)^m i^{-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1) - \frac{1}{c} i^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{(-1)^k e^{-i(d(2k+m)+c(m-2k)z)}\left(-(-1)^m e^{4idk}+e^{2i(dm+c(m-2k)z)}\right)\binom{m}{k}}{2k-m} - \frac{1}{a}(-1)^{m+\nu}\binom{m}{\frac{m}{2}}(m \bmod 2-1) \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{(-1)^s e^{-i(bi(2s+\nu)+ai(\nu-2s)z)}\left(-(-1)^\nu e^{-4bs}+e^{2i(ib\nu+ai(\nu-2s)z)}\right)\binom{\nu}{s}}{2s-\nu} + i^{m+1}(-1)^\nu \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{i(d(2k+m)-ib(2s+\nu))}\left(\frac{e^{-4dik-2iczk-4bs+i\pi\nu-2asz+a\nu z+im(cz+\pi)}}{2ck-cm-2ias+ia\nu} + \frac{e^{-4dik-2iczk-2b\nu+2asz-a\nu z+im(cz+\pi)}}{2ck-cm+2ias-ia\nu} + \frac{e^{-2dim-iczm-4bs+i\pi\nu+2ickz-2asz+a\nu z}}{c(m-2k)+ai(\nu-2s)} + \frac{e^{-2dim-2b\nu+(2ick-icm+2as-a\nu)z}}{c(m-2k)+ai(2s-\nu)}\right)\binom{\nu}{s}\right) /;\; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\sinh^\nu(c\,z)$

01.19.21.2534.01

$$\int \sin^m(b\,z^2)\sinh^\nu(c\,z)\,dz = i^{-\nu}(-1)^m 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{-b(m-2k)}}\binom{m}{k}\left(S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b(m-2k)}}\right)\sin\left(\frac{m\pi}{2}\right)-\cos\left(\frac{m\pi}{2}\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b(m-2k)}}\right)\right) + \frac{i^\nu(-1)^m 2^{-m-\nu+1}}{c}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\sinh\left(2ckz+\frac{1}{2}i\nu(2icz+\pi)\right)}{2k-\nu} + i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{\sqrt{2bs-bm}}\left(\cos\left(\frac{(2ick-ic\nu)^2}{4(2bs-bm)}+\frac{1}{2}\pi(\nu-m)\right)C\left(\frac{2ick-ic\nu+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) + S\left(\frac{2ick-ic\nu+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)\sin\left(\frac{(2ick-ic\nu)^2}{4(2bs-bm)}+\frac{1}{2}\pi(\nu-m)\right)\right) + \frac{1}{\sqrt{bm-2bs}}\left(\cos\left(\frac{(2ick-ic\nu)^2}{4(bm-2bs)}+\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2ick-ic\nu+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) + S\left(\frac{2ick-ic\nu+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)\sin\left(\frac{(2ick-ic\nu)^2}{4(bm-2bs)}+\frac{1}{2}\pi(m+\nu)\right)\right)\right) /;\; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

01.19.21.2535.01

$$\int \sin^m\left(\sqrt{z}\, b\right) \sinh^v(c\, z)\, dz = (-1)^m\, i^{-v}\, 2^{-m-v}\, z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\, (1 - v \bmod 2) + \frac{1}{b^2} \left(i^{-v}\, 2^{-m-v+2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left((-1)^k \binom{m}{k} \left(\cos\left(b\sqrt{z}\, (2k-m) + \frac{m\pi}{2} \right) + b\,(2k-m)\sqrt{z}\, \sin\left(b\sqrt{z}\, (2k-m) + \frac{m\pi}{2} \right) \right) \right) \right) - \frac{(-1)^m\, i^{v+1}\, 2^{-m-v+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{(-1)^k \binom{v}{k} \sin\left(\frac{\pi v}{2} + c\, i\,(v-2k)\, z\right)}{v-2k} + i^v\, 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(2\, i\, c\, k - i\, c\, v)^{3/2}} \left(b\sqrt{2\pi}\, (m-2s) \left(\cos\left(\frac{i\,(b\,m - 2\,b\,s)^2}{4\,(2\,c\,k - c\,v)} + \frac{1}{2}\pi\,(m-v) \right) C\left(\frac{2\, i\, c\,(2k-v)\sqrt{z} - b\,(m-2s)}{\sqrt{2\pi}\, \sqrt{i\, c\,(2k-v)}} \right) - S\left(\frac{2\, i\, c\,(2k-v)\sqrt{z} - b\,(m-2s)}{\sqrt{2\pi}\, \sqrt{i\, c\,(2k-v)}} \right) \sin\left(\frac{i\,(b\,m - 2\,b\,s)^2}{4\,(2\,c\,k - c\,v)} + \frac{1}{2}\pi\,(m-v) \right) \right) + 2\sqrt{2\, i\, c\, k - i\, c\, v}\, \sin\left(\sqrt{z}\, (2\,b\,s - b\,m) + \frac{1}{2}\pi\,(m-v) + c\, i\,(2k-v)\, z \right) \right) + \frac{1}{(2\, i\, c\, k - i\, c\, v)^{3/2}} \left(2\sqrt{2\, i\, c\, k - i\, c\, v}\, \sin\left(\sqrt{z}\, (b\,m - 2\,b\,s) - \frac{1}{2}\pi\,(m+v) + c\, i\,(2k-v)\, z \right) - b\sqrt{2\pi}\, (m-2s) \left(\cos\left(\frac{i\,(b\,m - 2\,b\,s)^2}{4\,(2\,c\,k - c\,v)} - \frac{1}{2}\pi\,(m+v) \right) C\left(\frac{b\,(m-2s) + 2\,c\, i\,(2k-v)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, c\,(2k-v)}} \right) - S\left(\frac{b\,(m-2s) + 2\,c\, i\,(2k-v)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, c\,(2k-v)}} \right) \sin\left(\frac{i\,(b\,m - 2\,b\,s)^2}{4\,(2\,c\,k - c\,v)} - \frac{1}{2}\pi\,(m+v) \right) \right) \right) \right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + e\right) \sinh^v(c\, z)$

01.19.21.2536.01

$$\int \sin^m\left(b z^2 + e\right) \sinh^\nu(c z)\, dz ==$$

$$i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}}$$
$$\left((-1)^k \binom{m}{k} \left(\cos\left(e(m-2k) - \frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) \sin\left(e(m-2k) - \frac{m\pi}{2}\right)\right)\right) +$$
$$\frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2 c k z + \frac{1}{2} i \nu (2 i c z + \pi)\right)}{2k - \nu} +$$
$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s}$$
$$\left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2ick - ic\nu)^2}{4(2bs - bm)} + e(2s - m) - \frac{1}{2}\pi(\nu - m)\right) C\left(\frac{2ick - ic\nu + 2(2bs - bm)z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) -\right.\right.$$
$$\left. S\left(\frac{2ick - ic\nu + 2(2bs - bm)z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) \sin\left(-\frac{(2ick - ic\nu)^2}{4(2bs - bm)} + e(2s - m) - \frac{1}{2}\pi(\nu - m)\right)\right) +$$
$$\frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2ick - ic\nu)^2}{4(bm - 2bs)} + e(2s - m) + \frac{1}{2}\pi(m + \nu)\right) C\left(\frac{2ick - ic\nu + 2(bm - 2bs)z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) +\right.$$
$$\left.\left. S\left(\frac{2ick - ic\nu + 2(bm - 2bs)z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) \sin\left(\frac{(2ick - ic\nu)^2}{4(bm - 2bs)} + e(2s - m) + \frac{1}{2}\pi(m + \nu)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2537.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right)\sinh^\nu(c\,z)\,dz = (-1)^m\, i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(i^{-\nu}\, 2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\,\sin\left(2ek-em+b(2k-m)\sqrt{z}+\frac{m\pi}{2}\right)\right)\right)\right) - \frac{(-1)^m\, i^{\nu+1}\, 2^{-m-\nu+1}}{c}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\sin\left(\frac{\pi\nu}{2}+c\,i\,(\nu-2k)\,z\right)}{\nu-2k} + i^\nu\, 2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{(2ick-icv)^{3/2}}\left(2\sqrt{2ick-icv}\,\sin\left(em-2es-\frac{1}{2}\pi(m+\nu)+c\,i\,(2k-\nu)\,z+(bm-2bs)\sqrt{z}\right)-b\sqrt{2\pi}\,(m-2s)\left(\cos\left(\frac{i\,(bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{b(m-2s)+2c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)-S\left(\frac{b(m-2s)+2c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)\sin\left(\frac{i\,(bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{1}{2}\pi(m+\nu)\right)\right)\right)+\frac{1}{(2ick-icv)^{3/2}}\left(b\sqrt{2\pi}\,(m-2s)\left(\cos\left(-\frac{i\,(bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{1}{2}\pi(m-\nu)\right)C\left(\frac{2\,i\,c\,(2k-\nu)\sqrt{z}-b(m-2s)}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)+S\left(\frac{2\,i\,c\,(2k-\nu)\sqrt{z}-b(m-2s)}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)\sin\left(-\frac{i\,(bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{1}{2}\pi(m-\nu)\right)\right)-2\sqrt{2ick-icv}\,\sin\left(em-2es-\frac{1}{2}\pi(m-\nu)-i\,c\,(2k-\nu)\,z-(2bs-bm)\sqrt{z}\right)\right)\right) /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+d\,z\right)\sinh^\nu(c\,z)$

01.19.21.2538.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 2 m \pi\right)\right)\right.\right.$$
$$\left.\left.C\left(\frac{\sqrt{b(2k-m)}\,(d + 2 b z)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d + 2 b z)}{b\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 2 m \pi\right)\right)\right)\right) +$$
$$\frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2 c k z + \frac{1}{2} i \nu (2 i c z + \pi)\right)}{2k - \nu} +$$
$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}}\right.$$
$$\left(\cos\left(\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4(2 b s - b m)} + \frac{1}{2}\pi(\nu - m)\right) C\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2(2 b s - b m) z}{\sqrt{2\pi}\,\sqrt{2 b s - b m}}\right) +\right.$$
$$\left. S\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2(2 b s - b m) z}{\sqrt{2\pi}\,\sqrt{2 b s - b m}}\right) \sin\left(\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4(2 b s - b m)} + \frac{1}{2}\pi(\nu - m)\right)\right) +$$
$$\frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4(b m - 2 b s)} + \frac{1}{2}\pi(m + \nu)\right)\right.$$
$$C\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2(b m - 2 b s) z}{\sqrt{2\pi}\,\sqrt{b m - 2 b s}}\right) + S\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2(b m - 2 b s) z}{\sqrt{2\pi}\,\sqrt{b m - 2 b s}}\right)$$
$$\left.\left.\sin\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4(b m - 2 b s)} + \frac{1}{2}\pi(m + \nu)\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2539.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^v(c\, z)\, dz = i^{-v} (-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + i^{-v} 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)b^2}{d} + 2m\pi\right)\right) C\left(\frac{\sqrt{d(2k-m)}\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{d(2k-m)}\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)b^2}{d} + 2m\pi\right)\right)\right) - 2\sqrt{-d(m-2k)} \sin\left(-\frac{\pi m}{2} + d(m-2k)z + b(m-2k)\sqrt{z}\right)\right)\right) - \frac{i^{v+1}(-1)^m 2^{-m-v+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{(-1)^k \binom{v}{k} \sin\left(\frac{\pi v}{2} + c\, i\,(v-2k)z\right)}{v-2k} + i^v 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\left(\sqrt{2\pi}\,(b\,m - 2b\,s) \cos\left(\frac{(2b\,s - b\,m)^2}{4(2i\,c\,k - d\,m + 2d\,s - i\,c\,v)} - \frac{1}{2}\pi(m-v)\right) C\left(\frac{-b\,m + 2b\,s + 2(2i\,c\,k - d\,m + 2d\,s - i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2i\,c\,k - d\,m + 2d\,s - i\,c\,v}}\right) - \sqrt{2\pi}\,(2b\,s - b\,m) S\left(\frac{-b\,m + 2b\,s + 2(2i\,c\,k - d\,m + 2d\,s - i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2i\,c\,k - d\,m + 2d\,s - i\,c\,v}}\right) \sin\left(\frac{(2b\,s - b\,m)^2}{4(2i\,c\,k - d\,m + 2d\,s - i\,c\,v)} - \frac{1}{2}\pi(m-v)\right) + 2\sqrt{2i\,c\,k - d\,m + 2d\,s - i\,c\,v} \sin\left(\sqrt{z}\,(2b\,s - b\,m) + \frac{1}{2}\pi(m-v) + (2i\,c\,k - d\,m + 2d\,s - i\,c\,v)z\right)\right) \Big/ (2i\,c\,k - d\,m + 2d\,s - i\,c\,v)^{3/2} + \left(\sqrt{2\pi}\,(2b\,s - b\,m) \cos\left(\frac{(b\,m - 2b\,s)^2}{4(2i\,c\,k + d\,m - 2d\,s - i\,c\,v)} + \frac{1}{2}\pi(m+v)\right) C\left(\frac{b\,m - 2b\,s + 2(2i\,c\,k + d\,m - 2d\,s - i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2i\,c\,k + d\,m - 2d\,s - i\,c\,v}}\right) - \sqrt{2\pi}\,(b\,m - 2b\,s) S\left(\frac{b\,m - 2b\,s + 2(2i\,c\,k + d\,m - 2d\,s - i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2i\,c\,k + d\,m - 2d\,s - i\,c\,v}}\right) \sin\left(\frac{(b\,m - 2b\,s)^2}{4(2i\,c\,k + d\,m - 2d\,s - i\,c\,v)} + \frac{1}{2}\pi(m+v)\right) - 2\sqrt{2i\,c\,k + d\,m - 2d\,s - i\,c\,v} \sin\left(-\sqrt{z}\,(b\,m - 2b\,s) + \frac{1}{2}\pi(m+v) - (2i\,c\,k + d\,m - 2d\,s - i\,c\,v)z\right)\right) \Big/ (2i\,c\,k + d\,m - 2d\,s - i\,c\,v)^{3/2}\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e) \sinh^\nu(c z)$

01.19.21.2540.01

$$\int \sin^m(b z^2 + d z + e) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{1}{4} \left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m + 2 m \pi \right) \right) C\left(\frac{\sqrt{b(2k-m)}\, (d + 2 b z)}{b \sqrt{2\pi}} \right) - S\left(\frac{\sqrt{b(2k-m)}\, (d + 2 b z)}{b \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m + 2 m \pi \right) \right) \right) \right) + \frac{i^\nu (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2 c k z + \frac{1}{2} i \nu (2 i c z + \pi)\right)}{2k - \nu}}{c} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4(2 b s - b m)} + e(2s - m) - \frac{1}{2} \pi (\nu - m) \right) C\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2(2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) - S\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2(2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \sin\left(-\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4(2 b s - b m)} + e(2s - m) - \frac{1}{2} \pi (\nu - m) \right) \right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4(b m - 2 b s)} + e(2s - m) + \frac{1}{2} \pi (m + \nu) \right) C\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2(b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) + S\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2(b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4(b m - 2 b s)} + e(2s - m) + \frac{1}{2} \pi (m + \nu) \right) \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2541.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(c z)\, dz = (-1)^m i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b(m-2k) \sqrt{2\pi} \left(\cos\left(\frac{1}{4} \left(\frac{(m-2k) b^2}{d} + 8 e k - 4 e m + 2 m \pi \right) \right) C\left(\frac{\sqrt{d(2k-m)}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}} \right) - S\left(\frac{\sqrt{d(2k-m)}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{(m-2k) b^2}{d} + 8 e k - 4 e m + 2 m \pi \right) \right) \right) - \right.\right.$$

$$2\sqrt{-d\,(m-2\,k)}\,\sin\!\left(-\frac{\pi\,m}{2}+e\,(m-2\,k)+d\,(m-2\,k)\,z+b\,(m-2\,k)\sqrt{z}\right)\Bigg)\Bigg)-$$

$$\frac{(-1)^m\,i^{v+1}\,2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sin\left(\frac{\pi v}{2}+c\,i\,(v-2\,k)\,z\right)}{v-2\,k}}{c}+i^v\,2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(2\,b\,s-b\,m)\cos\!\left(-\frac{(b\,m-2\,b\,s)^2}{4\,(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)}+e\,m-2\,e\,s-\frac{1}{2}\,\pi\,(m+v)\right)$$
$$C\!\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v}}\right)+\sqrt{2\pi}\,(b\,m-2\,b\,s)$$
$$S\!\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v}}\right)\sin\!\Bigg(-\frac{(b\,m-2\,b\,s)^2}{4\,(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)}+$$
$$e\,m-2\,e\,s-\frac{1}{2}\,\pi\,(m+v)\Bigg)+2\sqrt{2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v}\,\sin\!\Bigg(e\,m-2\,e\,s-\frac{1}{2}\,\pi\,(m+v)+$$
$$(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)\,z+(b\,m-2\,b\,s)\sqrt{z}\Bigg)\Bigg)\Big/(2\,i\,c\,k+d\,m-2\,d\,s-i\,c\,v)^{3/2}+$$
$$\Bigg(\sqrt{2\pi}\,(b\,m-2\,b\,s)\cos\!\left(\frac{(2\,b\,s-b\,m)^2}{4\,(2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v)}+e\,m-2\,e\,s-\frac{1}{2}\,\pi\,(m-v)\right)$$
$$C\!\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v}}\right)-\sqrt{2\pi}\,(2\,b\,s-b\,m)$$
$$S\!\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v}}\right)\sin\!\Bigg(\frac{(2\,b\,s-b\,m)^2}{4\,(2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v)}+e\,m-2\,e\,s-$$
$$\frac{1}{2}\,\pi\,(m-v)\Bigg)-2\sqrt{2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v}\,\sin\!\Bigg(e\,m-2\,e\,s-\frac{1}{2}\,\pi\,(m-v)-(2\,i\,c\,k-d\,m+$$
$$2\,d\,s-i\,c\,v)\,z-(2\,b\,s-b\,m)\sqrt{z}\Bigg)\Bigg)\Big/(2\,i\,c\,k-d\,m+2\,d\,s-i\,c\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\!\left(b\,z^r\right)\sinh^v(f\,z+g)$

01.19.21.2542.01

$$\int \sin^m(b z^2) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$

$$i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^k \binom{m}{k} \left(S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}} \right) \sin\left(\frac{m\pi}{2}\right) - \cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}} \right) \right)}{\sqrt{-b(m-2k)}} +$$

$$\frac{i^\nu (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2 f k z + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu}}{f} +$$

$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s}$$

$$\left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs - bm)} + g i (2k - \nu) - \frac{1}{2}\pi(\nu - m) \right) C\left(\frac{2 i f k - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\sqrt{2bs - bm}} \right) - \right.\right.$$

$$\left. S\left(\frac{2 i f k - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\sqrt{2bs - bm}} \right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs - bm)} + g i (2k - \nu) - \frac{1}{2}\pi(\nu - m) \right) \right) +$$

$$\frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2 i f k - i f \nu)^2}{4(bm - 2bs)} - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu) \right) C\left(\frac{2 i f k - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\sqrt{bm - 2bs}} \right) + \right.$$

$$S\left(\frac{2 i f k - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\sqrt{bm - 2bs}} \right)$$

$$\left.\left. \sin\left(\frac{(2 i f k - i f \nu)^2}{4(bm - 2bs)} - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu) \right) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2543.01

$$\int \sin^m\left(b\sqrt{z}\right)\sinh^\nu(g+fz)\,dz = i^{-\nu}(-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(i^{-\nu} 2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)\right)\right) - \frac{1}{f}\left(i^{\nu+1}(-1)^m 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\sin\left(\frac{\pi\nu}{2}+g\,i(\nu-2k)+f\,i(\nu-2k)z\right)}{\nu-2k}\right) + i^\nu 2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{(2ifk-if\nu)^{3/2}}\left(\sqrt{2\pi}\,(bm-2bs)\cosh\left(\frac{i(2bs-bm)^2}{4(2ifk-if\nu)}+2gk-\frac{1}{2}i\pi(m-\nu)-g\nu\right)C\left(\frac{-bm+2bs+2(2ifk-if\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ifk-if\nu}}\right)+i\sqrt{2\pi}\,(2bs-bm)\,S\left(\frac{-bm+2bs+2(2ifk-if\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ifk-if\nu}}\right)\sinh\left(\frac{i(2bs-bm)^2}{4(2ifk-if\nu)}+2gk-\frac{1}{2}i\pi(m-\nu)-g\nu\right)+2i\sqrt{2ifk-if\nu}\,\sinh\left(2gk-\frac{1}{2}i\pi(m-\nu)-g\nu-i(2ifk-if\nu)z-i(2bs-bm)\sqrt{z}\right)\right)+\frac{1}{(2ifk-if\nu)^{3/2}}\left(\sqrt{2\pi}\,(2bs-bm)\cosh\left(\frac{i(bm-2bs)^2}{4(2ifk-if\nu)}+2gk-g\nu+\frac{1}{2}i\pi(m+\nu)\right)C\left(\frac{bm-2bs+2(2ifk-if\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ifk-if\nu}}\right)+i\sqrt{2\pi}\,(bm-2bs)\,S\left(\frac{bm-2bs+2(2ifk-if\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ifk-if\nu}}\right)\sinh\left(\frac{i(bm-2bs)^2}{4(2ifk-if\nu)}+2gk-g\nu+\frac{1}{2}i\pi(m+\nu)\right)+2i\sqrt{2ifk-if\nu}\,\sinh\left(2gk-g\nu+\frac{1}{2}i\pi(m+\nu)-i(2ifk-if\nu)z-i(bm-2bs)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r + e\right)\sinh^\nu(f z + g)$

01.19.21.2544.01

$$\int \sin^m\left(b z^2+e\right) \sinh^\nu(g+f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(e(m-2k)-\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) \sin\left(e(m-2k)-\frac{m\pi}{2}\right)\right)\right) + \frac{1}{f}\left(i^\nu (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu)+2 f k z+\frac{1}{2} i \nu (2 i f z+\pi)\right)}{2k-\nu}\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2bs-bm}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs-bm)} + e(2s-m) + g i (2k-\nu) - \frac{1}{2}\pi(\nu-m)\right) C\left(\frac{2 i f k - i f \nu + 2(2bs-bm) z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) - S\left(\frac{2 i f k - i f \nu + 2(2bs-bm) z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs-bm)} + e(2s-m) + g i (2k-\nu) - \frac{1}{2}\pi(\nu-m)\right)\right) + \frac{1}{\sqrt{bm-2bs}} \left(\cos\left(\frac{(2 i f k - i f \nu)^2}{4(bm-2bs)} + e(2s-m) - i g (2k-\nu) + \frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2 i f k - i f \nu + 2(bm-2bs) z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) + S\left(\frac{2 i f k - i f \nu + 2(bm-2bs) z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) \sin\left(\frac{(2 i f k - i f \nu)^2}{4(bm-2bs)} + e(2s-m) - i g (2k-\nu) + \frac{1}{2}\pi(m+\nu)\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2545.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \sinh^\nu(f z+g)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(i^{-\nu} 2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left((-1)^k \binom{m}{k} \left(\cos\left(2 e k - e m + b(2k-m)\sqrt{z} + \frac{m\pi}{2}\right) + b(2k-m)\sqrt{z} \sin\left(2 e k - e m + b(2k-m)\sqrt{z} + \frac{m\pi}{2}\right)\right)\right)\right) - \frac{1}{f}\left(i^{\nu+1} (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi\nu}{2} + g\, i(\nu-2k) + f\, i(\nu-2k) z\right)}{\nu-2k}\right) + i^\nu 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(2 i f k - i f \nu)^{3/2}} \left(\sqrt{2\pi}\, (b m - 2 b s) \cosh\left(\frac{i(2 b s - b m)^2}{4(2 i f k - i f \nu)} + 2 g k + i e m - 2 i e s - \frac{1}{2} i\pi(m-\nu) - g\nu\right) C\left(\frac{-b m + 2 b s + 2(2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k - i f \nu}}\right) + i\sqrt{2\pi}\, (2 b s - b m) S\left(\frac{-b m + 2 b s + 2(2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k - i f \nu}}\right) \sinh\left(\frac{i(2 b s - b m)^2}{4(2 i f k - i f \nu)} + 2 g k + i e m - 2 i e s - \frac{1}{2} i\pi(m-\nu) - g\nu\right) + 2 i \sqrt{2 i f k - i f \nu} \sinh\left(2 g k + i e m - 2 i e s - \frac{1}{2} i\pi(m-\nu) - g\nu - i(2 i f k - i f \nu) z - i(2 b s - b m)\sqrt{z}\right)\right) + \frac{1}{(2 i f k - i f \nu)^{3/2}} \left(\sqrt{2\pi}\, (2 b s - b m) \cosh\left(\frac{i(b m - 2 b s)^2}{4(2 i f k - i f \nu)} + 2 g k - i e m + 2 i e s - g\nu + \frac{1}{2} i\pi(m+\nu)\right) C\left(\frac{b m - 2 b s + 2(2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k - i f \nu}}\right) + i\sqrt{2\pi}\, (b m - 2 b s) S\left(\frac{b m - 2 b s + 2(2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f k - i f \nu}}\right) \sinh\left(\frac{i(b m - 2 b s)^2}{4(2 i f k - i f \nu)} + 2 g k - i e m + 2 i e s - g\nu + \frac{1}{2} i\pi(m+\nu)\right) + 2 i \sqrt{2 i f k - i f \nu} \sinh\left(2 g k - i e m + 2 i e s - g\nu + \frac{1}{2} i\pi(m+\nu) - i(2 i f k - i f \nu) z - i(b m - 2 b s)\sqrt{z}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh^\nu(f z+g)$

01.19.21.2546.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 2 m \pi\right)\right) C\left(\frac{\sqrt{b(2k-m)}\,(d + 2 b z)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d + 2 b z)}{b\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 2 m \pi\right)\right)\right)\right) + \frac{1}{f}\left(i^\nu (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2 f k z + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu}\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2 b s - b m)} + g i (2k - \nu) - \frac{1}{2}\pi(\nu - m)\right) C\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2 b s - b m) z}{\sqrt{2\pi}\,\sqrt{2 b s - b m}}\right) - S\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2 b s - b m) z}{\sqrt{2\pi}\,\sqrt{2 b s - b m}}\right) \sin\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2 b s - b m)} + g i (2k - \nu) - \frac{1}{2}\pi(\nu - m)\right)\right) + \frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(b m - 2 b s)} - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu)\right) C\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(b m - 2 b s) z}{\sqrt{2\pi}\,\sqrt{b m - 2 b s}}\right) + S\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(b m - 2 b s) z}{\sqrt{2\pi}\,\sqrt{b m - 2 b s}}\right) \sin\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(b m - 2 b s)} - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu)\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2547.01

$$\int \sin^m\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b (m - 2k) \sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k) b^2}{d} + 2 m \pi\right)\right) C\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2 d \sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k) b^2}{d} + 2 m \pi\right)\right)\right) - 2\sqrt{-d(m-2k)}\, \sin\left(-\frac{\pi m}{2} + d(m-2k) z + b(m-2k)\sqrt{z}\right)\right)\right) -$$

$$\frac{1}{f}\left(i^{v+1}(-1)^m 2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sin\left(\frac{\pi v}{2}+g\,i\,(v-2k)+f\,i\,(v-2k)\,z\right)}{v-2k}\right)+$$

$$i^v\,2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\left(\left(\sqrt{2\pi}\,(b\,m-2\,b\,s)\cosh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)}+2\,g\,k-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v\right)\right.\right.\right.$$

$$C\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}}\right)+$$

$$i\sqrt{2\pi}\,(2\,b\,s-b\,m)\,S\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}}\right)$$

$$\sinh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)}+2\,g\,k-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v\right)+2\,i\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}$$

$$\left.\left.\sinh\left(2\,g\,k-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v-i\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\,z-i\,(2\,b\,s-b\,m)\sqrt{z}\right)\right)\right/$$

$$(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)^{3/2}+\left(\sqrt{2\pi}\,(2\,b\,s-b\,m)\cosh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,g\,k-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)\right)C\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}}\right)+$$

$$i\sqrt{2\pi}\,(b\,m-2\,b\,s)\,S\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}}\right)$$

$$\sinh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)}+2\,g\,k-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)\right)+$$

$$2\,i\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}\,\sinh\left(2\,g\,k-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)-i\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\,z-\right.$$

$$\left.\left.\left.i\,(b\,m-2\,b\,s)\sqrt{z}\right)\right)\right/(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+d\,z+e\right)\sinh^v(f\,z+g)$

01.19.21.2548.01

$$\int \sin^m\left(b z^2 + d z + e\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left((-1)^k \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em + 2m\pi\right)\right) C\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em + 2m\pi\right)\right)\right)\right) + \frac{1}{f}\left(i^\nu (-1)^m 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2fkz + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu} \right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g\, i (2k - \nu) - \frac{1}{2}\pi(\nu - m)\right) C\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\,\sqrt{2bs - bm}}\right) - S\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\,\sqrt{2bs - bm}}\right) \sin\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g\, i (2k - \nu) - \frac{1}{2}\pi(\nu - m)\right)\right) + \frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu)\right) C\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\,\sqrt{bm - 2bs}}\right) + S\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\,\sqrt{bm - 2bs}}\right) \sin\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g (2k - \nu) + \frac{1}{2}\pi(m + \nu)\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2549.01

$$\int \sin^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k) b^2}{d} + 8ek - 4em + 2m\pi\right)\right) C\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - \right.\right.\right.$$

$$S\left(\frac{\sqrt{d(2k-m)}\left(b+2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right)\sin\left(\frac{1}{4}\left(\frac{(m-2k)b^2}{d}+8ek-4em+2m\pi\right)\right)\Bigg)-$$

$$2\sqrt{-d(m-2k)}\,\sin\left(-\frac{\pi m}{2}+e(m-2k)+d(m-2k)z+b(m-2k)\sqrt{z}\right)\Bigg)\Bigg)-$$

$$\frac{1}{f}\left(i^{v+1}(-1)^m 2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sin\left(\frac{\pi v}{2}+g\,i(v-2k)+f\,i(v-2k)z\right)}{v-2k}\right)+$$

$$i^v 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(\Bigg(\Bigg(\sqrt{2\pi}\,(b m-2bs)\cosh\left(\frac{i(2bs-bm)^2}{4(2ifk-dm+2ds-ifv)}+2gk+iem-2ies-\right.$$

$$\left.\frac{1}{2}i\pi(m-v)-gv\right)C\left(\frac{-bm+2bs+2(2ifk-dm+2ds-ifv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ifk-dm+2ds-ifv}}\right)+i\sqrt{2\pi}\,(2bs-bm)$$

$$S\left(\frac{-bm+2bs+2(2ifk-dm+2ds-ifv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ifk-dm+2ds-ifv}}\right)\sinh\left(\frac{i(2bs-bm)^2}{4(2ifk-dm+2ds-ifv)}+\right.$$

$$\left.2gk+iem-2ies-\frac{1}{2}i\pi(m-v)-gv\right)+2i\sqrt{2ifk-dm+2ds-ifv}\,\sinh\Bigg(2gk+$$

$$iem-2ies-\frac{1}{2}i\pi(m-v)-gv-i(2ifk-dm+2ds-ifv)z-i(2bs-bm)\sqrt{z}\Bigg)\Bigg)\Bigg/$$

$$(2ifk-dm+2ds-ifv)^{3/2}+\Bigg(\sqrt{2\pi}\,(2bs-bm)\cosh\left(\frac{i(bm-2bs)^2}{4(2ifk+dm-2ds-ifv)}+\right.$$

$$\left.2gk-iem+2ies-gv+\frac{1}{2}i\pi(m+v)\right)C\left(\frac{bm-2bs+2(2ifk+dm-2ds-ifv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ifk+dm-2ds-ifv}}\right)+$$

$$i\sqrt{2\pi}\,(bm-2bs)S\left(\frac{bm-2bs+2(2ifk+dm-2ds-ifv)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ifk+dm-2ds-ifv}}\right)$$

$$\sinh\left(\frac{i(bm-2bs)^2}{4(2ifk+dm-2ds-ifv)}+2gk-iem+2ies-gv+\frac{1}{2}i\pi(m+v)\right)+$$

$$2i\sqrt{2ifk+dm-2ds-ifv}\,\sinh\Bigg(2gk-iem+2ies-gv+\frac{1}{2}i\pi(m+v)-i(2ifk+dm-$$

$$2ds-ifv)z-i(bm-2bs)\sqrt{z}\Bigg)\Bigg)\Bigg/(2ifk+dm-2ds-ifv)^{3/2}\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z)\sinh^\nu(c\,z^r)$

01.19.21.2550.01

$$\int \sin^m(b\,z)\sinh^\nu(c\,z^2)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{\nu+1}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}$$
$$(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(\nu-2\,k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{i^{-\nu}\,2^{-m-\nu+1}}{b}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi\,m}{2}+b\,(m-2\,k)\,z\right)}{m-2\,k}+i^{\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(2\,b\,k-b\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+\frac{1}{2}\pi\,(m-\nu)\right)C\left(\frac{2\,b\,k-b\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+\right.\right.$$
$$\left.S\left(\frac{2\,b\,k-b\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(2\,b\,k-b\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+\frac{1}{2}\pi\,(m-\nu)\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(2\,b\,k-b\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{1}{2}\pi\,(m+\nu)\right)C\left(\frac{2\,b\,k-b\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+\right.$$
$$\left.\left.S\left(\frac{2\,b\,k-b\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(2\,b\,k-b\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{1}{2}\pi\,(m+\nu)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2551.01

$$\int \sin^m(b\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\right.$$
$$\left.\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}+c\,i\,(\nu-2k)\sqrt{z}\right)+c\,i\,(\nu-2k)\sqrt{z}\,\sin\left(\frac{\pi\nu}{2}+c\,i\,(\nu-2k)\sqrt{z}\right)\right)\right)\right)+$$
$$\frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+b\,(m-2k)\,z\right)}{m-2k}}{b}+$$
$$i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,b\,k-b\,m)^{3/2}}\right.$$
$$\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{1}{2}\pi(\nu-m)-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,b\,k-b\,m)}\right)C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)+\right.$$
$$\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{1}{2}\pi(\nu-m)-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,b\,k-b\,m)}\right)+$$
$$\left.2\sqrt{2\,b\,k-b\,m}\,\sin\left(\frac{1}{2}\pi(\nu-m)+(2\,b\,k-b\,m)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,b\,k-b\,m)^{3/2}}$$
$$\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,b\,k-b\,m)}+\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)-\right.$$
$$\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,b\,k-b\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,b\,k-b\,m}\,\sqrt{2\pi}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,b\,k-b\,m)}+\frac{1}{2}\pi(m+\nu)\right)-$$
$$\left.\left.2\sqrt{2\,b\,k-b\,m}\,\sin\left(\frac{1}{2}\pi(m+\nu)-(2\,b\,k-b\,m)\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh^\nu\left(c\,z^r\right)$

01.19.21.2552.01

$$\int \sin^m(e+d\,z)\sinh^\nu(c\,z^2)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{\nu+1}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}$$

$$(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(\nu-2\,k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2\,k)\,z}{\sqrt{i\,c\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}\right)\right)+$$

$$\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(e\,(2\,k-m)+2\,d\,k\,z-\frac{1}{2}\,m\,(2\,d\,z+\pi)\right)}{2\,k-m}+$$

$$i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m-\nu)\right)C\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-\right.\right.$$

$$\left.S\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m-\nu)\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m+\nu)\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-\right.$$

$$S\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)$$

$$\left.\left.\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m+\nu)\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2553.01

$$\int \sin^m(e+d\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{m-2k}}{d} - \frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)}{(\nu-2k)^2}\right) + i^{-\nu}\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(2ics-ic\nu)\cos\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}+2ek-em+\frac{1}{2}\pi(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(ic\nu-2ics)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}+2ek-em+\frac{1}{2}\pi(\nu-m)\right)+2\sqrt{2dk-dm}\,\sin\left(2ek-em+\frac{1}{2}\pi(\nu-m)+(2dk-dm)\,z+(ic\nu-2ics)\sqrt{z}\right)\right)+\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(ic\nu-2ics)\cos\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2ek-em-\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2ics-ic\nu)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2ek-em-\frac{1}{2}\pi(m+\nu)\right)+2\sqrt{2dk-dm}\,\sin\left(2ek-em-\frac{1}{2}\pi(m+\nu)+(2dk-dm)\,z+(2ics-ic\nu)\sqrt{z}\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m(a\,z^r)\sinh^\nu(c\,z^r)$

01.19.21.2554.01

$$\int \sin^m(b z^r) \sinh^\nu(c z^r)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - \frac{i^{-m-\nu} 2^{-m-\nu} z}{r} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{1}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-1/r} + ((2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m) z^r\right)\right) - \frac{(-1)^{m+\nu} 2^{-m-\nu} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{1}{r}, (c\nu - 2ck) z^r\right) ((c\nu - 2ck) z^r)^{-1/r} + (-1)^\nu ((2ck - c\nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2ck - c\nu) z^r\right)\right) - \frac{i^{-m} 2^{-m-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c \nu) z^r\right) ((-2 b i k + i b m - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu ((2 i b k - i b m - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - 2 c s + c \nu) z^r\right) + (-1)^m ((-2 b i k + i b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c \nu) z^r\right) + ((2 i b k - i b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m + 2 c s - c \nu) z^r\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2555.01

$$\int \sin^m(b z^2) \sinh^\nu(c z^2)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^{k+m} \binom{m}{k}}{\sqrt{b(m-2k)}} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right)\right) + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k}}{\sqrt{i c (\nu - 2k)}} \left(\cos\left(\frac{\pi\nu}{2}\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\, (\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\, (\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2}\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{1}{2}\pi(m-\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\; z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\; z\right) \sin\left(\frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(\frac{1}{2}\pi(m+\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\; z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\; z\right) \sin\left(\frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2556.01

$$\int \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\left(z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1) - \frac{1}{b^2}\left(4\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^k\binom{m}{k}\right.\right.\right.$$
$$\left.\left.\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)\right)\right)+\frac{1}{c^2}\left(4\binom{m}{\frac{m}{2}}(m \bmod 2-1)\right.$$
$$\left.\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)+c\,i\,(2k-\nu)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)\right)\right)\right)+$$
$$4\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(\frac{1}{2}\pi(m+\nu)+(2bk-bm+2ics-ic\nu)\sqrt{z}\right)+(2bk-bm+2ics-ic\nu)\right.\right.$$
$$\left.\sqrt{z}\,\sin\left(\frac{1}{2}\pi(m+\nu)+(2bk-bm+2ics-ic\nu)\sqrt{z}\right)\right)\Big/(-2bk+bm-2ics+ic\nu)^2+$$
$$\left(\cos\left(\frac{1}{2}\pi(m-\nu)+(b(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)+(b(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\,\sin\left(\frac{1}{2}\pi(m-\nu)+\right.\right.$$
$$\left.\left.\left.(b(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)\right)\Big/(b(2k-m)+c\,i\,(\nu-2s))^2\right)\Bigg)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m\left(a\,z^r+e\right)\sinh^\nu\left(c\,z^r\right)$

01.19.21.2557.01

$$\int \sin^m(b z^r + e) \sinh^v(c z^r)\, dz = i^{-v} (-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) -$$

$$\frac{i^{-m-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg((-1)^m e^{2 i e k - i e m} \Gamma\left(\frac{1}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-1/r} +$$

$$e^{i e m - 2 i e k} ((2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m) z^r\right)\Bigg) - \frac{(-1)^{m+v} 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \Bigg(\Gamma\left(\frac{1}{r}, (c v - 2 c k) z^r\right) ((c v - 2 c k) z^r)^{-1/r} + (-1)^v ((2 c k - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - c v) z^r\right)\Bigg) -$$

$$\frac{i^{-m} 2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^{m+v} e^{2 i e k - i e m} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c v) z^r\right) ((-2 b i k + i b m - 2 c s + c v) z^r)^{-1/r} +$$

$$(-1)^v e^{i e m - 2 i e k} ((2 i b k - i b m - 2 c s + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - 2 c s + c v) z^r\right) +$$

$$(-1)^m e^{2 i e k - i e m} ((-2 b i k + i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c v) z^r\right) +$$

$$e^{i e m - 2 i e k} ((2 i b k - i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m + 2 c s - c v) z^r\right)\Bigg) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2558.01

$$\int \sin^m\left(b z^2+e\right) \sinh^\nu\left(c z^2\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{\pi m}{2}+e(m-2k)\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{\pi m}{2}+e(m-2k)\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \left(i \cos\left(\frac{\pi \nu}{2}\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + i\, S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi \nu}{2}\right)\right)}{\sqrt{i c(\nu-2k)}} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(e(2k-m)-\frac{1}{2}\pi(m-\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2ics+ic\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2ics+ic\nu}\, z\right) \sin\left(e(2k-m)-\frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(e(2k-m)-\frac{1}{2}\pi(m+\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2ics-ic\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2ics-ic\nu}\, z\right) \sin\left(e(2k-m)-\frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2559.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+ \frac{1}{b^2}\left(i^{-\nu}\,2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\left((-1)^k\binom{m}{k}\left(\cos\left(-b\sqrt{z}\,(2k-m)+e\,(m-2k)-\frac{m\pi}{2}\right)- b\,(2k-m)\sqrt{z}\,\sin\left(-b\sqrt{z}\,(2k-m)+e\,(m-2k)-\frac{m\pi}{2}\right)\right)\right)\right)-\frac{1}{c^2}\left(i^{-\nu}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(2k-\nu)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)+c\,i\,(2k-\nu)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)\right)\right)\right)+ i^{-\nu}\,2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(e\,(m-2k)-\frac{1}{2}\pi\,(m-\nu)-(b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)- (b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\,\sin\left(e\,(m-2k)-\frac{1}{2}\pi\,(m-\nu)-(b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)\right)\Big/ (b\,(2k-m)+c\,i\,(\nu-2s))^2+\left(\cos\left(e\,(m-2k)-\frac{1}{2}\pi\,(m+\nu)-(b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\right)- (b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\,\sin\left(e\,(m-2k)-\frac{1}{2}\pi\,(m+\nu)-(b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\right)\right)\Big/ (b\,(2k-m)-i\,c\,(\nu-2s))^2\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r+d\,z\right)\sinh^\nu\left(c\,z^r\right)$

01.19.21.2560.01

$$\int \sin^m(b z^2 + d z)\sinh^\nu(c z^2)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}$$

$$(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^{k+m}\binom{m}{k}\left(\cos\left(\frac{1}{4}\left(\frac{d^2(m-2k)}{b} - 2m\pi\right)\right)C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + \right.\right.$$

$$\left.\left.S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{1}{4}\left(\frac{d^2(m-2k)}{b} - 2m\pi\right)\right)\right)\right) - i^{1-\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^{k+\nu}}{\sqrt{i c(\nu-2k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}\right)\right) + i^\nu$$

$$2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + \frac{1}{2}\pi(m-\nu)\right)C\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) + \right.\right.$$

$$\left.S\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)\sin\left(\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + \frac{1}{2}\pi(m-\nu)\right)\right)\Big/$$

$$\left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + \frac{1}{2}\pi(m+\nu)\right)C\left(\right.\right.$$

$$\left.\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) + S\left(\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)\sin\left(\right.$$

$$\left.\left.\left.\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + \frac{1}{2}\pi(m+\nu)\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right)\ /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2561.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(c \sqrt{z}\right) dz = (-1)^m\, i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2) - \frac{1}{c^2} \left((-1)^m\, i^\nu\, 2^{-m-\nu+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} - i\, c\, (2 k - \nu) \sqrt{z}\right) - i\, c\, (2 k - \nu) \sqrt{z} \sin\left(\frac{\pi \nu}{2} - i\, c\, (2 k - \nu) \sqrt{z}\right)\right)}{(\nu - 2 k)^2} \right) +$$

$$i^{-\nu}\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d\, (m - 2 k))^{3/2}} \left((-1)^k \binom{m}{k} \left(b\, (m - 2 k) \sqrt{2 \pi} \left(\cos\left(\frac{1}{4} \left(\frac{(m - 2 k)\, b^2}{d} + 2\, m\, \pi\right)\right) C\left(\frac{\sqrt{d\, (2 k - m)} \left(b + 2\, d \sqrt{z}\right)}{d \sqrt{2 \pi}}\right) - S\left(\frac{\sqrt{d\, (2 k - m)} \left(b + 2\, d \sqrt{z}\right)}{d \sqrt{2 \pi}}\right) \sin\left(\frac{1}{4} \left(\frac{(m - 2 k)\, b^2}{d} + 2\, m\, \pi\right)\right)\right) + 2 \sqrt{-d\, (m - 2 k)} \sin\left(\frac{\pi\, m}{2} - d\, (m - 2 k)\, z - b\, (m - 2 k) \sqrt{z}\right) \right) \right) + i^\nu\, 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s$$

$$\binom{m}{s} \left(\frac{1}{(2\, d\, s - d\, m)^{3/2}} \left(\sqrt{2 \pi}\, (-2\, c\, i\, k + b\, m - 2\, b\, s + i\, c\, \nu) \cos\left(\frac{1}{2} \pi\, (m - \nu) - \frac{(2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu)^2}{4\, (2\, d\, s - d\, m)}\right) C\left(\frac{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu + 2\, (2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2\, d\, s - d\, m}}\right) + \sqrt{2 \pi}\, (2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu) S\left(\frac{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu + 2\, (2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2 \pi} \sqrt{2\, d\, s - d\, m}}\right) \sin\left(\frac{1}{2} \pi\, (m - \nu) - \frac{(2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu)^2}{4\, (2\, d\, s - d\, m)}\right) + 2 \sqrt{2\, d\, s - d\, m} \sin\left(\frac{1}{2} \pi\, (m - \nu) + (2\, d\, s - d\, m)\, z + (2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu) \sqrt{z}\right)\right) + \frac{1}{(d\, m - 2\, d\, s)^{3/2}} \left(\sqrt{2 \pi}\, (-2\, c\, i\, k - b\, m + 2\, b\, s + i\, c\, \nu) \cos\left(\frac{(2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu)^2}{4\, (d\, m - 2\, d\, s)} + \frac{1}{2} \pi\, (m + \nu)\right) C\left(\frac{2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu + 2\, (d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d\, m - 2\, d\, s}}\right) - \sqrt{2 \pi}\, (2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu)\, S\left(\frac{2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu + 2\, (d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2 \pi} \sqrt{d\, m - 2\, d\, s}}\right) \sin\left(\frac{(2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu)^2}{4\, (d\, m - 2\, d\, s)} + \frac{1}{2} \pi\, (m + \nu)\right) - 2 \sqrt{d\, m - 2\, d\, s} \sin\left(\frac{1}{2} \pi\, (m + \nu) - (d\, m - 2\, d\, s)\, z - (2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu) \sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\sinh^\nu(c z^r)$

01.19.21.2562.01

$$\int \sin^m(b z^2 + d z + e)\sinh^\nu(c z^2)\,dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^{k+m}\binom{m}{k}\left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em - 2m\pi\right)\right)C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + \right.\right.$$
$$\left.\left. S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em - 2m\pi\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}$$
$$(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^{k+\nu}}{\sqrt{i c(\nu-2k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}\right)\right) +$$
$$i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu)\right)\right.\right.\right.$$
$$C\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) - S\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)$$
$$\left.\left.\sin\left(-\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu)\right)\right)\right/$$
$$\left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m+\nu)\right)\right.$$
$$C\left(\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) - S\left(\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)$$
$$\left.\left.\sin\left(-\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m+\nu)\right)\right)\right/$$
$$\left.\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2563.01

$$\int \sin^m\left(\sqrt{z}\,b + e + d z\right)\sinh^\nu\left(c\sqrt{z}\right)dz =$$
$$i^{-\nu}(-1)^m 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(-d(m-2k))^{3/2}}$$
$$\left((-1)^k\binom{m}{k}\left(-i b(m-2k)\sqrt{2\pi}\left(\cos\left(\frac{(m-2k)b^2}{4d} - e(m-2k) + \frac{m\pi}{2}\right)C\left(\frac{(2k-m)\left(i b + 2 i d\sqrt{z}\right)}{\sqrt{-d(m-2k)}\sqrt{2\pi}}\right) + \right.\right.\right.$$

$$S\left(\frac{(2k-m)\left(i\,b+2\,i\,d\sqrt{z}\right)}{\sqrt{-d\,(m-2k)}\,\sqrt{2\pi}}\right)\sin\left(\frac{(m-2k)\,b^2}{4d}-e\,(m-2k)+\frac{m\,\pi}{2}\right)\Bigg)-2\sqrt{-d\,(m-2k)}$$

$$\sin\left(-\frac{\pi\,m}{2}+e\,(m-2k)+d\,(m-2k)\,z+b\,(m-2k)\sqrt{z}\right)\Bigg)\Bigg)-\frac{1}{c^2}\Bigg(i^{\nu}\,(-1)^m\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)}{(\nu-2k)^2}\Bigg)+i^{\nu}\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k$$

$$\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(\frac{1}{(2ds-dm)^{3/2}}\Bigg(\sqrt{2\pi}\,(-2\,c\,i\,k+b\,m-2\,b\,s+i\,c\,\nu)\cosh\Bigg(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu)^2}{4\,(2ds-dm)}+$$

$$i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-\nu)\Bigg)C\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu+2\,(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ds-dm}}\right)+$$

$$i\sqrt{2\pi}\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu+2\,(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ds-dm}}\right)$$

$$\sinh\left(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu)^2}{4\,(2ds-dm)}+i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-\nu)\right)+2\,i\sqrt{2ds-dm}$$

$$\sinh\left(i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-\nu)-i\,(2ds-dm)\,z-i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu)\sqrt{z}\right)\Bigg)+$$

$$\frac{1}{(dm-2ds)^{3/2}}\Bigg(\sqrt{2\pi}\,(-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,\nu)\cosh\Bigg(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu)^2}{4\,(dm-2ds)}-$$

$$i\,e\,m+2\,i\,e\,s+\frac{1}{2}\,i\,\pi\,(m+\nu)\Bigg)C\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu+2\,(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{dm-2ds}}\right)+$$

$$i\sqrt{2\pi}\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu+2\,(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{dm-2ds}}\right)$$

$$\sinh\left(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu)^2}{4\,(dm-2ds)}-i\,e\,m+2\,i\,e\,s+\frac{1}{2}\,i\,\pi\,(m+\nu)\right)+2\,i\sqrt{dm-2ds}\,\sinh\Bigg(-i\,e\,m+$$

$$2\,i\,e\,s+\frac{1}{2}\,i\,\pi\,(m+\nu)-i\,(dm-2ds)\,z-i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,\nu)\sqrt{z}\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\sinh^{\nu}(c\,z^r+g)$

01.19.21.2564.01

$$\int \sin^m(d\,z)\sinh^v\left(c\,z^2+g\right)dz = i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+i^{v+1}\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(v-2\,k)}}\binom{v}{k}\left(\cos\left(\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,k)\,z}{\sqrt{i\,c\,(v-2\,k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(v-2\,k)\,z}{\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)+$$

$$\frac{i^{-v}\,2^{-m-v+1}}{d}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(2\,d\,k\,z-\frac{1}{2}\,m\,(2\,d\,z+\pi)\right)}{2\,k-m}+$$

$$i^v\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}$$

$$\left(\frac{1}{\sqrt{i\,c\,v-2\,i\,c\,s}}\left(\cos\left(\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+\frac{1}{2}\,\pi\,(m-v)+g\,i\,(2\,s-v)\right)C\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)+\right.\right.$$

$$\left.S\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)\sin\left(\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+\frac{1}{2}\,\pi\,(m-v)+g\,i\,(2\,s-v)\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,v}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)-\right.$$

$$S\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)$$

$$\left.\left.\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)\right)\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2565.01

$$\int \sin^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+\frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(m-2k)\,z\right)}{m-2k}}{d} - \frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2k-\nu)\sqrt{z}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2k-\nu)\sqrt{z}\right)\right)\right)\right)+ i^{-\nu}\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(-2\,g\,i\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)+(2\,d\,k-d\,m)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)\right)+2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)+(2\,d\,k-d\,m)\,z+(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.2566.01

$$\int \sin^m(d z+e)\sinh^\nu\left(c z^2+g\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{(-1)^k}{\sqrt{i c(\nu-2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2}+g i(\nu-2k)\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2}+g i(\nu-2k)\right)\right) +$$

$$\frac{i^{-\nu} 2^{-m-\nu+1}}{d} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{(-1)^{k+m} \binom{m}{k} \sin\left(e(2k-m)+2 d k z-\frac{1}{2} m(2 d z+\pi)\right)}{2k-m} +$$

$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{i c \nu - 2 i c s}}\right.$$

$$\left(\cos\left(-\frac{(2 d k-d m)^2}{4(i c \nu-2 i c s)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)-i g(2s-\nu)\right) C\left(\frac{2 d k-d m+2(i c \nu-2 i c s) z}{\sqrt{2\pi}\sqrt{i c \nu-2 i c s}}\right) -\right.$$

$$\left.S\left(\frac{2 d k-d m+2(i c \nu-2 i c s) z}{\sqrt{2\pi}\sqrt{i c \nu-2 i c s}}\right) \sin\left(-\frac{(2 d k-d m)^2}{4(i c \nu-2 i c s)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)-i g(2s-\nu)\right)\right) +$$

$$\frac{1}{\sqrt{2 i c s-i c \nu}} \left(\cos\left(-\frac{(2 d k-d m)^2}{4(2 i c s-i c \nu)}+e(2k-m)+g i(2s-\nu)-\frac{1}{2}\pi(m+\nu)\right)\right.$$

$$C\left(\frac{2 d k-d m+2(2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{2 i c s-i c \nu}}\right) - S\left(\frac{2 d k-d m+2(2 i c s-i c \nu) z}{\sqrt{2\pi}\sqrt{2 i c s-i c \nu}}\right)$$

$$\left.\left.\sin\left(-\frac{(2 d k-d m)^2}{4(2 i c s-i c \nu)}+e(2k-m)+g i(2s-\nu)-\frac{1}{2}\pi(m+\nu)\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2567.01

$$\int \sin^m(d\,z+e)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{m-2k} - \frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2k-\nu)\sqrt{z}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(2\,g\,k-g\,\nu+\frac{i\,\pi\,\nu}{2}+c\,(2k-\nu)\sqrt{z}\right)\right)\right)\right) + i^{-\nu}\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\;(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right)C\left(\frac{2\sqrt{z}\;(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+\sqrt{2\pi}\;(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{2\sqrt{z}\;(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right)+2\sqrt{2\,d\,k-d\,m}\;\sin\left(2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)+(2\,d\,k-d\,m)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}\left(\sqrt{2\pi}\;(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)\right)C\left(\frac{2\sqrt{z}\;(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)+\sqrt{2\pi}\;(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\sqrt{z}\;(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\;\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)\right)+2\sqrt{2\,d\,k-d\,m}\;\sin\left(2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)+(2\,d\,k-d\,m)\,z+(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\sin^m\left(a\,z^r\right)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.2568.01

$$\int \sin^m(b z^r) \sinh^v(c z^r + g)\, dz = i^{-v} (-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) - \frac{i^{-m-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{1}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-1/r} + ((2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m) z^r\right)\right) - \frac{(-1)^{m+v} 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{2 g k - g v} \Gamma\left(\frac{1}{r}, (c v - 2 c k) z^r\right) ((c v - 2 c k) z^r)^{-1/r} + (-1)^v e^{g v - 2 g k} ((2 c k - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - c v) z^r\right)\right) - \frac{i^{-m} 2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{2 g s - g v} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c v) z^r\right) ((-2 b i k + i b m - 2 c s + c v) z^r)^{-1/r} + (-1)^v e^{2 g s - g v} ((2 i b k - i b m - 2 c s + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - 2 c s + c v) z^r\right) + (-1)^m e^{g v - 2 g s} ((-2 b i k + i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c v) z^r\right) + e^{g v - 2 g s} ((2 i b k - i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m + 2 c s - c v) z^r\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2569.01

$$\int \sin^m(b z^2) \sinh^\nu(c z^2 + g)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^{k+m} \binom{m}{k}}{\sqrt{b(m-2k)}} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right) \right) + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k}}{\sqrt{i c(\nu-2k)}} \left(\cos\left(\frac{\pi\nu}{2} + g\, i(\nu-2k)\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2} + g\, i(\nu-2k)\right) \right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\left(\cos\left(\frac{1}{2}\pi(m-\nu) + g\, i(2s-\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\, z\right) \sin\left(\frac{1}{2}\pi(m-\nu) + g\, i(2s-\nu)\right) \right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(i g(2s-\nu) - \frac{1}{2}\pi(m+\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\, z\right) \sin\left(i g(2s-\nu) - \frac{1}{2}\pi(m+\nu)\right) \right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2570.01

$$\int \sin^m\left(b\sqrt{z}\right)\sinh^v\left(\sqrt{z}\,c+g\right)dz = i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)+\frac{1}{b^2}\left(i^{-v}\,2^{-m-v+2}\binom{v}{\frac{v}{2}}\right.$$

$$\left.(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^k\binom{m}{k}\left(\cos\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)+b\,(2k-m)\sqrt{z}\,\sin\left(b\sqrt{z}\,(2k-m)+\frac{m\pi}{2}\right)\right)}{(2k-m)^2}\right)-$$

$$\frac{1}{c^2}\left(i^{-v}\,2^{-m-v+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(2k-v)^2}\left((-1)^k\binom{v}{k}\right.\right.$$

$$\left.\left.\left(\cos\left(c\,i\sqrt{z}\,(2k-v)+\frac{\pi v}{2}-i\,g\,(v-2k)\right)+c\,i\,(2k-v)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-v)+\frac{\pi v}{2}-i\,g\,(v-2k)\right)\right)\right)\right)+$$

$$i^{-v}\,2^{-m-v+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\cos\left(\frac{1}{2}\pi\,(m-v)+g\,i\,(v-2s)+(b\,(2k-m)+c\,i\,(v-2s))\sqrt{z}\right)+\right.\right.$$

$$\left.\left.(b\,(2k-m)+c\,i\,(v-2s))\sqrt{z}\,\sin\left(\frac{1}{2}\pi\,(m-v)+g\,i\,(v-2s)+(b\,(2k-m)+c\,i\,(v-2s))\sqrt{z}\right)\right)\right/$$

$$(b\,(2k-m)+c\,i\,(v-2s))^2+\left(\cos\left(-\frac{1}{2}\pi\,(m+v)+g\,i\,(v-2s)-(b\,(2k-m)-i\,c\,(v-2s))\sqrt{z}\right)-\right.$$

$$\left.(b\,(2k-m)-i\,c\,(v-2s))\sqrt{z}\,\sin\left(-\frac{1}{2}\pi\,(m+v)+g\,i\,(v-2s)-(b\,(2k-m)-i\,c\,(v-2s))\sqrt{z}\right)\right)\Big/$$

$$\left.(b\,(2k-m)-i\,c\,(v-2s))^2\right)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(a\,z^r+e\right)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2571.01

$$\int \sin^m(b z^r + e) \sinh^v(c z^r + g)\, dz = i^{-v} (-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2) (1 - v \bmod 2) -$$
$$\frac{i^{-m-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Big((-1)^m e^{2 i e k - i e m} \Gamma\Big(\frac{1}{r}, (i b m - 2 i b k) z^r\Big) ((i b m - 2 i b k) z^r)^{-1/r} +$$
$$e^{i e m - 2 i e k} ((2 i b k - i b m) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (2 i b k - i b m) z^r\Big)\Big) - \frac{(-1)^{m+v} 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k}$$
$$\Big(e^{2 g k - g v} \Gamma\Big(\frac{1}{r}, (c v - 2 c k) z^r\Big) ((c v - 2 c k) z^r)^{-1/r} + (-1)^v e^{g v - 2 g k} ((2 c k - c v) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (2 c k - c v) z^r\Big)\Big) -$$
$$\frac{i^{-m} 2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^{m+v} e^{2 i e k - i e m + 2 g s - g v} \Gamma\Big(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c v) z^r\Big)$$
$$((-2 b i k + i b m - 2 c s + c v) z^r)^{-1/r} + (-1)^v e^{-2 e i k + i e m + 2 g s - g v}$$
$$((2 i b k - i b m - 2 c s + c v) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (2 i b k - i b m - 2 c s + c v) z^r\Big) + (-1)^m e^{2 i e k - i e m - 2 g s + g v}$$
$$((-2 b i k + i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c v) z^r\Big) + e^{-2 e i k + i e m - 2 g s + g v}$$
$$((2 i b k - i b m + 2 c s - c v) z^r)^{-1/r} \Gamma\Big(\frac{1}{r}, (2 i b k - i b m + 2 c s - c v) z^r\Big)\Big) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.2572.01

$$\int \sin^m(b z^2 + e) \sinh^\nu(c z^2 + g) \, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{\pi m}{2} + e(m-2k)\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{\pi m}{2} + e(m-2k)\right) \right) \right) + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} + g i(\nu-2k)\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi \nu}{2} + g i(\nu-2k)\right) \right) \right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g(2s-\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\; z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm - 2ics + ic\nu}\; z\right) \sin\left(e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g(2s-\nu)\right) \right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(e(2k-m) + g i(2s-\nu) - \frac{1}{2}\pi(m+\nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\; z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk - bm + 2ics - ic\nu}\; z\right) \sin\left(e(2k-m) + g i(2s-\nu) - \frac{1}{2}\pi(m+\nu)\right) \right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2573.01

$$\int \sin^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\Bigg(i^{-\nu} 2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor} \frac{1}{(2k-m)^2} \Big((-1)^k \binom{m}{k} \Big(\cos\Big(-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\Big) - b(2k-m)\sqrt{z}\, \sin\Big(-b\sqrt{z}\,(2k-m)+e(m-2k)-\frac{m\pi}{2}\Big)\Big)\Big)\Bigg) - \frac{1}{c^2}\Bigg(i^{-\nu} 2^{-m-\nu+2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor} \frac{1}{(2k-\nu)^2} \Big((-1)^k \binom{\nu}{k} \Big(\cos\Big(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\, g(\nu-2k)\Big) + c\, i(2k-\nu)\sqrt{z}\, \sin\Big(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\, g(\nu-2k)\Big)\Big)\Big)\Bigg) + i^{-\nu} 2^{-m-\nu+2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\Bigg(\Big(\cos\Big(e(m-2k)-\frac{1}{2}\pi(m-\nu)-i\, g(\nu-2s)-(b(2k-m)+c\, i(\nu-2s))\sqrt{z}\Big) - (b(2k-m)+c\, i(\nu-2s))\sqrt{z}\, \sin\Big(e(m-2k)-\frac{1}{2}\pi(m-\nu)-i\, g(\nu-2s)-(b(2k-m)+c\, i(\nu-2s))\sqrt{z}\Big)\Big)\Big/ (b(2k-m)+c\, i(\nu-2s))^2 + \Big(\cos\Big(e(m-2k)-\frac{1}{2}\pi(m+\nu)+g\, i(\nu-2s)-(b(2k-m)-i\, c(\nu-2s))\sqrt{z}\Big) - (b(2k-m)-i\, c(\nu-2s))\sqrt{z}\, \sin\Big(e(m-2k)-\frac{1}{2}\pi(m+\nu)+g\, i(\nu-2s)-(b(2k-m)-i\, c(\nu-2s))\sqrt{z}\Big)\Big)\Big/ (b(2k-m)-i\, c(\nu-2s))^2\Bigg)\Bigg) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\sin^m\left(b z^r + d z\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.2574.01

$$\int \sin^m(b z^2 + d z) \sinh^\nu(c z^2 + g)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4} \left(\frac{d^2 (m-2k)}{b} - 2 m \pi \right) \right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{d^2(m-2k)}{b} - 2 m \pi \right) \right) \right) \right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (2k-\nu) z}{\sqrt{i c (\nu-2k)}} \right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (2k-\nu) z}{\sqrt{i c(\nu-2k)}} \right) \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) \right) \right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{(2dk-dm)^2}{4(2bk - bm - 2ics + ic\nu)} + \frac{1}{2} \pi (m-\nu) + g i (2s-\nu) \right) C\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}} \right) + S\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}} \right) \sin\left(\frac{(2dk-dm)^2}{4(2bk - bm - 2ics + ic\nu)} + \frac{1}{2} \pi (m-\nu) + g i (2s-\nu) \right) \right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu} \right) + \left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk - bm + 2ics - ic\nu)} + g i (2s-\nu) - \frac{1}{2} \pi (m+\nu) \right) C\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}} \right) \sin\left(-\frac{(2dk-dm)^2}{4(2bk - bm + 2ics - ic\nu)} + g i (2s-\nu) - \frac{1}{2} \pi (m+\nu) \right) \right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2575.01

$$\int \sin^m(\sqrt{z}\, b + d z) \sinh^\nu(\sqrt{z}\, c + g)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left((-1)^k \binom{m}{k} \left(-i b (m-2k) \sqrt{2\pi} \left(\cos\left(\frac{(m-2k) b^2}{4d} + \frac{m\pi}{2} \right) C\left(\frac{(2k-m)\left(i b + 2 i d \sqrt{z}\right)}{\sqrt{-d(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{(2k-m)\left(i b + 2 i d \sqrt{z}\right)}{\sqrt{-d(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{(m-2k) b^2}{4d} + \frac{m\pi}{2} \right) \right) - 2 \sqrt{-d(m-2k)} \sin\left(-\frac{\pi m}{2} + d(m-2k) z + b(m-2k) \sqrt{z} \right) \right) \right) -$$

$$\frac{1}{c^2}\left(i^v (-1)^m 2^{-m-v+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \frac{1}{(v-2k)^2} \left((-1)^k \binom{v}{k} \left(\cosh\left(2gk - gv + \frac{i\pi v}{2} + c(2k-v)\sqrt{z}\right) - \right.\right.\right.$$

$$\left.\left.\left. c(2k-v)\sqrt{z}\,\sinh\left(2gk - gv + \frac{i\pi v}{2} + c(2k-v)\sqrt{z}\right)\right)\right)\right) + i^v 2^{-m-v} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \left(\frac{1}{(2ds-dm)^{3/2}} \left(\sqrt{2\pi}\,(-2cik + bm - 2bs + icv) \cosh\left(\frac{i(2ick - bm + 2bs - icv)^2}{4(2ds-dm)} + \right.\right.\right.$$

$$\left. 2gk - \frac{1}{2} i\pi(m-v) - gv\right) C\left(\frac{2ick - bm + 2bs - icv + 2(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ds-dm}}\right) +$$

$$i\sqrt{2\pi}\,(2ick - bm + 2bs - icv)\, S\left(\frac{2ick - bm + 2bs - icv + 2(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2ds-dm}}\right)$$

$$\sinh\left(\frac{i(2ick - bm + 2bs - icv)^2}{4(2ds-dm)} + 2gk - \frac{1}{2} i\pi(m-v) - gv\right) + 2i\sqrt{2ds-dm}$$

$$\left.\left.\sinh\left(2gk - \frac{1}{2} i\pi(m-v) - gv - i(2ds-dm)z - i(2ick - bm + 2bs - icv)\sqrt{z}\right)\right)\right) +$$

$$\frac{1}{(dm-2ds)^{3/2}} \left(\sqrt{2\pi}\,(-2cik - bm + 2bs + icv) \cosh\left(\frac{i(2ick + bm - 2bs - icv)^2}{4(dm-2ds)} + \right.\right.$$

$$\left. 2gk - gv + \frac{1}{2} i\pi(m+v)\right) C\left(\frac{2ick + bm - 2bs - icv + 2(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{dm-2ds}}\right) +$$

$$i\sqrt{2\pi}\,(2ick + bm - 2bs - icv)\, S\left(\frac{2ick + bm - 2bs - icv + 2(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{dm-2ds}}\right)$$

$$\sinh\left(\frac{i(2ick + bm - 2bs - icv)^2}{4(dm-2ds)} + 2gk - gv + \frac{1}{2} i\pi(m+v)\right) + 2i\sqrt{dm-2ds}\,\sinh\left(2gk - \right.$$

$$\left.\left.\left. gv + \frac{1}{2} i\pi(m+v) - i(dm-2ds)z - i(2ick + bm - 2bs - icv)\sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\sin^m(b z^r + d z + e)\sinh^v(c z^r + g)$

01.19.21.2576.01

$$\int \sin^m(b z^2 + d z + e) \sinh^\nu(c z^2 + g)\, dz = i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2) - i^{-\nu}\, 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4} \left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m - 2 m \pi \right) \right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m - 2 m \pi \right) \right) \right) \right) - i^{1-\nu}\, 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (2k-\nu) z}{\sqrt{i c(\nu-2k)}} \right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (2k-\nu) z}{\sqrt{i c(\nu-2k)}} \right) \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k) \right) \right) \right) + i^{\nu}\, 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g (2s-\nu) \right) C\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g (2s-\nu) \right) \right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu} \right) + \left(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) + g i (2s-\nu) - \frac{1}{2}\pi(m+\nu) \right) C\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}} \right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}} \right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) + g i (2s-\nu) - \frac{1}{2}\pi(m+\nu) \right) \right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2577.01

$$\int \sin^m(\sqrt{z}\, b + e + d z) \sinh^\nu(\sqrt{z}\, c + g)\, dz = i^{-\nu} (-1)^m\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2) + i^{-\nu}\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(-d\,(m-2\,k))^{3/2}} \left((-1)^k \binom{m}{k} \left(-i\,b\,(m-2\,k)\,\sqrt{2\,\pi} \left(\cos\left(\frac{(m-2\,k)\,b^2}{4\,d} - e\,(m-2\,k) + \frac{m\,\pi}{2}\right) C\left(\frac{(2\,k-m)\left(i\,b+2\,i\,d\,\sqrt{z}\right)}{\sqrt{-d\,(m-2\,k)}\,\sqrt{2\,\pi}}\right) + S\left(\frac{(2\,k-m)\left(i\,b+2\,i\,d\,\sqrt{z}\right)}{\sqrt{-d\,(m-2\,k)}\,\sqrt{2\,\pi}}\right) \sin\left(\frac{(m-2\,k)\,b^2}{4\,d} - e\,(m-2\,k) + \frac{m\,\pi}{2}\right)\right) - 2\,\sqrt{-d\,(m-2\,k)}\,\sin\left(-\frac{\pi\,m}{2} + e\,(m-2\,k) + d\,(m-2\,k)\,z + b\,(m-2\,k)\,\sqrt{z}\right)\right)\right) -$$

$$\frac{1}{c^2}\left(i^v\,(-1)^m\,2^{-m-v+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(v-2\,k)^2}\left((-1)^k\binom{v}{k}\left(\cosh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}+c\,(2\,k-v)\,\sqrt{z}\right) - c\,(2\,k-v)\,\sqrt{z}\,\sinh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}+c\,(2\,k-v)\,\sqrt{z}\right)\right)\right)\right) + i^v\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(\frac{1}{(2\,d\,s-d\,m)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,c\,i\,k+b\,m-2\,b\,s+i\,c\,v)\cosh\left(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)^2}{4\,(2\,d\,s-d\,m)} + 2\,g\,k+i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v\right) C\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v+2\,(2\,d\,s-d\,m)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,s-d\,m}}\right) + i\,\sqrt{2\,\pi}\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v+2\,(2\,d\,s-d\,m)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,s-d\,m}}\right)\sinh\left(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)^2}{4\,(2\,d\,s-d\,m)} + 2\,g\,k+i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v\right) + 2\,i\,\sqrt{2\,d\,s-d\,m}\,\sinh\left(2\,g\,k+i\,e\,m-2\,i\,e\,s-\frac{1}{2}\,i\,\pi\,(m-v)-g\,v-i\,(2\,d\,s-d\,m)\,z-i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)\,\sqrt{z}\right)\right) +$$

$$\frac{1}{(d\,m-2\,d\,s)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v)\cosh\left(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)^2}{4\,(d\,m-2\,d\,s)} + 2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)\right) C\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v+2\,(d\,m-2\,d\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{d\,m-2\,d\,s}}\right) + i\,\sqrt{2\,\pi}\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v+2\,(d\,m-2\,d\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{d\,m-2\,d\,s}}\right) \sinh\left(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)^2}{4\,(d\,m-2\,d\,s)} + 2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)\right) + 2\,i\,\sqrt{d\,m-2\,d\,s}\,\sinh\left(2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{1}{2}\,i\,\pi\,(m+v)-i\,(d\,m-2\,d\,s)\,z - i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)\,\sqrt{z}\right)\right)\right) /;\ m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\sinh^\nu(c\,z^r+f\,z)$

01.19.21.2578.01

$$\int \sin^m(d\,z)\sinh^\nu(c\,z^2+f\,z)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2) - 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}-\frac{i\,f^2(\nu-2k)}{4c}\right)C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{i\,f^2(\nu-2k)}{4c}\right)\right)\right)+$$

$$\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(2\,d\,k\,z-\frac{1}{2}m(2\,d\,z+\pi)\right)}{2k-m}+$$

$$i^{\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+\frac{1}{2}\pi(m-\nu)\right)C\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+S\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+\frac{1}{2}\pi(m-\nu)\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+S\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{1}{2}\pi(m+\nu)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2579.01

$$\int \sin^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2)+\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}$$
$$(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(m-2\,k)\,z\right)}{m-2\,k}+i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}$$
$$\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f\,(\nu-2\,k)}\;\sin\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\sqrt{z}\right)-c\sqrt{2\,\pi}\;(\nu-2\,k)\left(\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right.\right.\right.$$
$$\left.\left.\left.C\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\;\sqrt{i\,f\,(\nu-2\,k)}}\right)+S\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\;\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right)\right)\right)+$$
$$i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(\sqrt{2\,\pi}\;(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{1}{2}\,\pi\,(\nu-m)-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}\right)\right.\right.\right.$$
$$C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)+$$
$$\sqrt{2\,\pi}\;(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)$$
$$\sin\left(\frac{1}{2}\,\pi\,(\nu-m)-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}\right)+2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}$$
$$\left.\left.\sin\left(\frac{1}{2}\,\pi\,(\nu-m)+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)\right/$$
$$(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(\sqrt{2\,\pi}\;(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+\frac{1}{2}\,\pi\,(m+\nu)\right)\right.$$
$$C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\,\pi}\;(2\,i\,c\,s-i\,c\,\nu)$$
$$S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+\right.$$
$$\left.\frac{1}{2}\,\pi\,(m+\nu)\right)+2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}\;\sin\left(-\frac{1}{2}\,\pi\,(m+\nu)+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\,z+\right.$$
$$\left.\left.\left.(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\sinh^\nu(c\,z^r+f\,z)$

01.19.21.2580.01

$$\int \sin^m(e+d\,z)\sinh^\nu(c\,z^2+f\,z)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)-2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}\Bigg((-1)^k\binom{\nu}{k}\Bigg(\cos\left(\frac{\pi\nu}{2}-\frac{i\,f^2(\nu-2k)}{4c}\right)C\left(\frac{(2k-\nu)(f+2\,c\,z)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2\,c\,z)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{i\,f^2(\nu-2k)}{4c}\right)\Bigg)\Bigg)+\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(e\,(2k-m)+2\,d\,k\,z-\frac{1}{2}m\,(2\,d\,z+\pi)\right)}{2k-m}+i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\Bigg(\cos\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-\frac{1}{2}\pi\,(m-\nu)\right)C\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-\frac{1}{2}\pi\,(m-\nu)\right)\Bigg)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\Bigg(\cos\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)-\frac{1}{2}\pi\,(m+\nu)\right)C\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)-\frac{1}{2}\pi\,(m+\nu)\right)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2581.01

$$\int \sin^m(e+d\,z)\sinh^\nu(\sqrt{z}\,c+f\,z)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)+\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{m-2k}+i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2k))^{3/2}}\Bigg((-1)^k\binom{\nu}{k}\Bigg(2\sqrt{i\,f\,(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+f\,i\,(\nu-2k)\,z+c\,i\,(\nu-2k)\sqrt{z}\right)-c\sqrt{2\pi}\,(\nu-2k)\Bigg(\cos\left(\frac{\pi\nu}{2}-\frac{i\,c^2(\nu-2k)}{4f}\right)C\Bigg($$

$$\left.\left.\left.\left.\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)+S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i\,c^2\,(v-2k)}{4f}\right)\right)\right)\right)+$$

$$i^v\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\cos\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}+\right.\right.\right.\right.$$

$$\left.2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)\right)C\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)$$

$$\sin\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}+2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)\right)+2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}$$

$$\left.\left.\sin\left(2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\,z+(i\,c\,v-2\,i\,c\,s)\sqrt{z}\right)\right)\right/$$

$$(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^{3/2}+\left(\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,e\,k-e\,m-\frac{1}{2}\pi\,(m+v)\right)C\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,e\,k-e\,m-\frac{1}{2}\pi\,(m+v)\right)+$$

$$2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,e\,k-e\,m-\frac{1}{2}\pi\,(m+v)+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\,z+\right.$$

$$\left.\left.\left.(2\,i\,c\,s-i\,c\,v)\sqrt{z}\right)\right)\right/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right)\text{/; } m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m\left(b\,z^r\right)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2582.01

$$\int \sin^m(b z^2) \sinh^\nu(c z^2 + f z)\, dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^{k+m}}{\sqrt{b(m-2k)}} \binom{m}{k} \left(\cos\left(\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{m\pi}{2}\right)\right) - i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2} - \frac{i f^2(\nu-2k)}{4c}\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2} - \frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{(i f \nu - 2 i f s)^2}{4(2bk - bm - 2ics + ic\nu)} + \frac{1}{2}\pi(m-\nu)\right) C\left(\frac{-2 f i s + i f \nu + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + ic\nu}}\right) + S\left(\frac{-2 f i s + i f \nu + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(\frac{(i f \nu - 2 i f s)^2}{4(2bk - bm - 2ics + ic\nu)} + \frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(\frac{(2 i f s - i f \nu)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2 i f s - i f \nu + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - ic\nu}}\right) + S\left(\frac{2 i f s - i f \nu + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - ic\nu}}\right) \sin\left(\frac{(2 i f s - i f \nu)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2583.01

$$\int \sin^m(b\sqrt{z}) \sinh^\nu(\sqrt{z}\, c + f z)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + \frac{1}{b^2} \left(i^{-\nu} \left(2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(b(2k-m)\sqrt{z} - \frac{m\pi}{2}\right) + b(2k-m)\sqrt{z} \sin\left(b(2k-m)\sqrt{z} - \frac{m\pi}{2}\right)\right)\right)\right)\right) + i^\nu 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i f(\nu-2k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(2\sqrt{i f(\nu-2k)} \sin\left(\frac{\pi\nu}{2} + f i(\nu-2k) z + c i(\nu-2k)\sqrt{z}\right) - \right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\left(\cos\left(\frac{\pi v}{2}-\frac{i c^2 (v-2k)}{4 f}\right) C\left(\frac{(2k-v)\left(c+2 f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f (v-2k)}}\right)+\right.$$

$$\left.\left.\left. S\left(\frac{(2k-v)\left(c+2 f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f (v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i c^2 (v-2k)}{4 f}\right)\right)\right)\right)+$$

$$i^v\, 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i f v-2 i f s)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2ics-icv)\cos\left(\right.\right.\right.$$

$$\left.\frac{1}{2}\pi(v-m)-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2 i f s)}\right) C\left(\frac{2bk-bm-2ics+icv+2(i f v-2 i f s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2ics+icv)\, S\left(\frac{2bk-bm-2ics+icv+2(i f v-2 i f s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2 i f s}}\right)$$

$$\sin\left(\frac{1}{2}\pi(v-m)-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2 i f s)}\right)+$$

$$\left.2\sqrt{i f v-2 i f s}\,\sin\left(\frac{1}{2}\pi(v-m)+(i f v-2 i f s) z+(2bk-bm-2ics+icv)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2 i f s-i f v)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2ics+icv)\cos\left(\frac{(2bk-bm+2ics-icv)^2}{4(2 i f s-i f v)}+\frac{1}{2}\pi(m+v)\right)\right.$$

$$C\left(\frac{2bk-bm+2ics-icv+2(2 i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)-$$

$$\sqrt{2\pi}\,(2bk-bm+2ics-icv)\, S\left(\frac{2bk-bm+2ics-icv+2(2 i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f s-i f v}}\right)$$

$$\sin\left(\frac{(2bk-bm+2ics-icv)^2}{4(2 i f s-i f v)}+\frac{1}{2}\pi(m+v)\right)+2\sqrt{2 i f s-i f v}$$

$$\left.\left.\sin\left(-\frac{1}{2}\pi(m+v)+(2 i f s-i f v) z+(2bk-bm+2ics-icv)\sqrt{z}\right)\right)\right) /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m\left(b z^r+e\right)\sinh^v\left(c z^r+f z\right)$

01.19.21.2584.01

$$\int \sin^m(b z^2 + e) \sinh^\nu(c z^2 + f z) \, dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{\pi m}{2} + e(m-2k)\right) C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}} z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}} z}{\sqrt{b(m-2k)}}\right) \sin\left(\frac{\pi m}{2} + e(m-2k)\right)\right)\right) - i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^k \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} - \frac{i f^2 (\nu-2k)}{4c}\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi} \sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi} \sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(-\frac{(i f \nu - 2 i f s)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu)\right) C\left(\frac{-2 f i s + i f \nu + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) - S\left(\frac{-2 f i s + i f \nu + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(-\frac{(i f \nu - 2 i f s)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(-\frac{(2 i f s - i f \nu)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2 i f s - i f \nu + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) - S\left(\frac{2 i f s - i f \nu + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) \sin\left(-\frac{(2 i f s - i f \nu)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) - \frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2585.01

$$\int \sin^m(\sqrt{z}\, b + e) \sinh^\nu(\sqrt{z}\, c + f z) \, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + \frac{1}{b^2} \left(i^{-\nu} \left(2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(2ek - em + b(2k-m)\sqrt{z} - \frac{m\pi}{2}\right) + b(2k-m)\sqrt{z} \sin\left(2ek - em + b(2k-m)\sqrt{z} - \frac{m\pi}{2}\right)\right)\right)\right) + \right.$$

$$i^{v}\,2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i\,f\,(v-2\,k))^{3/2}}\left((-1)^{k}\binom{v}{k}\left(2\sqrt{i\,f\,(v-2\,k)}\,\sin\left(\frac{\pi\,v}{2}+f\,i\,(v-2\,k)\,z+c\,i\,(v-2\,k)\,\sqrt{z}\right)-\right.\right.$$

$$c\sqrt{2\pi}\,(v-2\,k)\left(\cos\left(\frac{\pi\,v}{2}-\frac{i\,c^{2}\,(v-2\,k)}{4\,f}\right)C\left(\frac{(2\,k-v)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2\,k)}}\right)+\right.$$

$$\left.\left.\left.\left.S\left(\frac{(2\,k-v)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2\,k)}}\right)\sin\left(\frac{\pi\,v}{2}-\frac{i\,c^{2}\,(v-2\,k)}{4\,f}\right)\right)\right)\right)+i^{v}\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s}\binom{v}{s}\left(\frac{1}{(i\,f\,v-2\,i\,f\,s)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m+2\,i\,c\,s-i\,c\,v)\cos\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)^{2}}{4\,(i\,f\,v-2\,i\,f\,s)}+\right.\right.\right.$$

$$\left.2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)\right)C\left(\frac{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v+2\,(i\,f\,v-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)+$$

$$\sqrt{2\pi}\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\,S\left(\frac{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v+2\,(i\,f\,v-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)^{2}}{4\,(i\,f\,v-2\,i\,f\,s)}+2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)\right)+$$

$$\left.2\sqrt{i\,f\,v-2\,i\,f\,s}\,\sin\left(2\,e\,k-e\,m+\frac{1}{2}\pi\,(v-m)+(i\,f\,v-2\,i\,f\,s)\,z+(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2\,i\,f\,s-i\,f\,v)^{3/2}}\left(\sqrt{2\pi}\,(-2\,b\,k+b\,m-2\,i\,c\,s+i\,c\,v)\cos\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^{2}}{4\,(2\,i\,f\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,e\,k-e\,m-\frac{1}{2}\pi\,(m+v)\right)C\left(\frac{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v+2\,(2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v+2\,(2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^{2}}{4\,(2\,i\,f\,s-i\,f\,v)}+2\,e\,k-e\,m-\frac{1}{2}\pi\,(m+v)\right)+2\sqrt{2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,e\,k-\right.$$

$$\left.\left.\left.e\,m-\frac{1}{2}\pi\,(m+v)+(2\,i\,f\,s-i\,f\,v)\,z+(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^{+}\land v\in\mathbb{N}^{+}$$

Involving $\sin^{m}(b\,z^{r}+d\,z)\sinh^{v}(c\,z^{r}+f\,z)$

01.19.21.2586.01

$$\int \sin^m\left(b z^2+d z\right) \sinh^\nu\left(c z^2+f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{d^2(m-2k)}{b}-2m\pi\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2(m-2k)}{b}-2m\pi\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\cos\left(\frac{(2dk-dm-2ifs+ifv)^2}{4(2bk-bm-2ics+icv)}+\frac{1}{2}\pi(m-\nu)\right) C\left(\frac{2dk-dm-2ifs+ifv+2(2bk-bm-2ics+icv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+icv}}\right) + S\left(\frac{2dk-dm-2ifs+ifv+2(2bk-bm-2ics+icv)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+icv}}\right) \sin\left(\frac{(2dk-dm-2ifs+ifv)^2}{4(2bk-bm-2ics+icv)}+\frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm-2ics+icv}\right) + \left(\cos\left(\frac{(2dk-dm+2ifs-ifv)^2}{4(2bk-bm+2ics-icv)}+\frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2dk-dm+2ifs-ifv+2(2bk-bm+2ics-icv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-icv}}\right) + S\left(\frac{2dk-dm+2ifs-ifv+2(2bk-bm+2ics-icv)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-icv}}\right) \sin\left(\frac{(2dk-dm+2ifs-ifv)^2}{4(2bk-bm+2ics-icv)}+\frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm+2ics-icv}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2587.01

$$\int \sin^m\left(\sqrt{z}\, b+d z\right) \sinh^\nu\left(\sqrt{z}\, c+f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(d(m-2k))^{3/2}} \left((-1)^{k+m} \binom{m}{k} \left(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{b^2(m-2k)}{4d}-\frac{m\pi}{2}\right) C\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) - b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k)+2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{b^2(m-2k)}{4d}-\frac{m\pi}{2}\right) + 2\sqrt{d(m-2k)}\, \sin\left(\frac{\pi m}{2}+d(m-2k)z+b(m-2k)\sqrt{z}\right)\right)\right) +$$

$$i^{\nu}\, 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i\, f\, (\nu - 2\, k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c\, \sqrt{2\, \pi}\, (2\, k - \nu) \left(\cos\left(\frac{\pi\, \nu}{2} - \frac{i\, c^2\, (\nu - 2\, k)}{4\, f} \right) C\left(\frac{(2\, k - \nu) \left(c + 2\, f\, \sqrt{z} \right)}{\sqrt{2\, \pi}\, \sqrt{i\, f\, (\nu - 2\, k)}} \right) + S\left(\frac{(2\, k - \nu) \left(c + 2\, f\, \sqrt{z} \right)}{\sqrt{2\, \pi}\, \sqrt{i\, f\, (\nu - 2\, k)}} \right) \sin\left(\frac{\pi\, \nu}{2} - \frac{i\, c^2\, (\nu - 2\, k)}{4\, f} \right) \right) + 2\, \sqrt{i\, f\, (\nu - 2\, k)}\, \sin\left(\frac{\pi\, \nu}{2} + f\, i\, (\nu - 2\, k)\, z + c\, i\, (\nu - 2\, k)\, \sqrt{z} \right) \right) \right) + i^{-\nu}\, 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\sqrt{2\, \pi}\, (-2\, b\, k + b\, m + 2\, i\, c\, s - i\, c\, \nu) \cos\left(\frac{1}{2}\, \pi\, (\nu - m) - \frac{(2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)} \right) C\left(\left(2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu + 2\, (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)\, \sqrt{z} \right) \Big/ \left(\sqrt{2\, \pi}\, \sqrt{2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu} \right) \right) + \sqrt{2\, \pi}\, (2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu)\, S\left(\left(2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu + 2\, (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)\, \sqrt{z} \right) \Big/ \left(\sqrt{2\, \pi}\, \sqrt{2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu} \right) \right) \sin\left(\frac{1}{2}\, \pi\, (\nu - m) - \frac{(2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)} \right) + 2\, \sqrt{2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu}\, \sin\left(\frac{1}{2}\, \pi\, (\nu - m) + (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)\, z + (2\, b\, k - b\, m - 2\, i\, c\, s + i\, c\, \nu)\, \sqrt{z} \right) \right) \Big/ (2\, d\, k - d\, m - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(\sqrt{2\, \pi}\, (-2\, b\, k + b\, m - 2\, i\, c\, s + i\, c\, \nu) \cos\left(\frac{(2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)} + \frac{1}{2}\, \pi\, (m + \nu) \right) C\left(\left(2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu + 2\, (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)\, \sqrt{z} \right) \Big/ \left(\sqrt{2\, \pi}\, \sqrt{2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu} \right) \right) - \sqrt{2\, \pi}\, (2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu)\, S\left(\left(2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu + 2\, (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)\, \sqrt{z} \right) \Big/ \left(\sqrt{2\, \pi}\, \sqrt{2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu} \right) \right) \sin\left(\frac{(2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)} + \frac{1}{2}\, \pi\, (m + \nu) \right) + 2\, \sqrt{2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu}\, \sin\left(-\frac{1}{2}\, \pi\, (m + \nu) + (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)\, z + (2\, b\, k - b\, m + 2\, i\, c\, s - i\, c\, \nu)\, \sqrt{z} \right) \right) \Big/ (2\, d\, k - d\, m + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \right) /;\, m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $\sin^m\left(b\, z^r + d\, z + e\right) \sinh^\nu\left(c\, z^r + f\, z\right)$

01.19.21.2588.01

$$\int \sin^m\left(b z^2+d z+e\right) \sinh^\nu\left(c z^2+f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b}+8ek-4em-2m\pi\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b}+8ek-4em-2m\pi\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk-dm-2ifs+if\nu)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)\right) C\left(\frac{2dk-dm-2ifs+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) - S\left(\frac{2dk-dm-2ifs+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) \sin\left(-\frac{(2dk-dm-2ifs+if\nu)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(-\frac{(2dk-dm+2ifs-if\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2dk-dm+2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) - S\left(\frac{2dk-dm+2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) \sin\left(-\frac{(2dk-dm+2ifs-if\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2589.01

$$\int \sin^m\left(\sqrt{z}\, b+e+d z\right) \sinh^\nu\left(\sqrt{z}\, c+f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(m-2k))^{3/2}}$$

$$\left((-1)^{k+m}\binom{m}{k}\left(-b\,(m-2\,k)\,\sqrt{2\,\pi}\,\cos\left(\frac{(m-2\,k)\,b^2}{4\,d}-e\,(m-2\,k)-\frac{m\,\pi}{2}\right)C\left(\frac{b\,(m-2\,k)+2\,d\,\sqrt{z}\,(m-2\,k)}{\sqrt{d\,(m-2\,k)}\,\sqrt{2\,\pi}}\right)-\right.\right.$$

$$b\,(m-2\,k)\,\sqrt{2\,\pi}\,S\left(\frac{b\,(m-2\,k)+2\,d\,\sqrt{z}\,(m-2\,k)}{\sqrt{d\,(m-2\,k)}\,\sqrt{2\,\pi}}\right)\sin\left(\frac{(m-2\,k)\,b^2}{4\,d}-e\,(m-2\,k)-\frac{m\,\pi}{2}\right)+$$

$$\left.\left.2\,\sqrt{d\,(m-2\,k)}\,\sin\left(\frac{\pi\,m}{2}+e\,(m-2\,k)+d\,(m-2\,k)\,z+b\,(m-2\,k)\,\sqrt{z}\right)\right)\right)+$$

$$i^{\nu}\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(c\,\sqrt{2\,\pi}\,(2\,k-\nu)\right.\right.$$

$$\left(\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)C\left(\frac{(2\,k-\nu)\left(c+2\,f\,\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)+S\left(\frac{(2\,k-\nu)\left(c+2\,f\,\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right)+$$

$$\left.\left.2\,\sqrt{i\,f\,(\nu-2\,k)}\,\sin\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\,\sqrt{z}\right)\right)\right)+$$

$$i^{-\nu}\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\left(\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m+2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+\right.\right.\right.\right.$$

$$\left.2\,e\,k-e\,m+\frac{1}{2}\,\pi\,(\nu-m)\right)C\left(\left(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,\sqrt{z}\right)\Big/\right.$$

$$\left.\left(\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}\right)\right)+\sqrt{2\,\pi}\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,\nu)\,S\left(\left(2\,b\,k-b\,m-\right.\right.$$

$$\left.\left.2\,i\,c\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,\sqrt{z}\right)\Big/\left(\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}\right)\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+2\,e\,k-e\,m+\frac{1}{2}\,\pi\,(\nu-m)\right)+$$

$$2\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}\,\sin\left(2\,e\,k-e\,m+\frac{1}{2}\,\pi\,(\nu-m)+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,z+\right.$$

$$\left.\left.(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,\nu)\,\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+$$

$$\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m-2\,i\,c\,s+i\,c\,\nu)\cos\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+2\,e\,k-e\,m-\frac{1}{2}\,\pi\,(m+\nu)\right)\right.$$

$$C\left(\left(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\,\sqrt{z}\right)\Big/\right.$$

$$\left.\left(\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}\right)\right)+\sqrt{2\,\pi}\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,\nu)\,S\left(\left(2\,b\,k-b\,m+\right.\right.$$

$$\left.\left.2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\,\sqrt{z}\right)\Big/\left(\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}\right)\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,e\,k-e\,m-\frac{1}{2}\,\pi\,(m+v)\right)+$$
$$2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,e\,k-e\,m-\frac{1}{2}\,\pi\,(m+v)+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\,z+\right.$$
$$\left.\left.\left.(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.2590.01

$$\int\sin^m(d\,z)\sinh^v\left(c\,z^2+f\,z+g\right)dz=i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)-$$
$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,i^{v+1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right.\right.$$
$$\left.\left.\left.C\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)+S\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)\right)+$$
$$\frac{i^{-v}\left(2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(2\,d\,k\,z-\frac{1}{2}\,m\,(2\,d\,z+\pi)\right)}{2\,k-m}\right)}{d}+i^v\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,v-2\,i\,c\,s}}\left(\cos\left(\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+\frac{1}{2}\,\pi\,(m-v)+g\,i\,(2\,s-v)\right)C\left(\right.\right.\right.$$
$$\left.\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)+S\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)$$
$$\left.\sin\left(\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+\frac{1}{2}\,\pi\,(m-v)+g\,i\,(2\,s-v)\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,v}}\left(\cos\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)C\left(\right.\right.$$
$$\left.\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)$$
$$\left.\left.\left.\sin\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2591.01

$$\int \sin^m(d\,z)\sinh^v\left(\sqrt{z}\,c+g+f\,z\right)dz = i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+$$

$$\frac{i^{-v}\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+d\,(m-2k)\,z\right)}{m-2k}}{d}+i^{v}\,2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i\,f\,(v-2k))^{3/2}}\left((-1)^k\binom{v}{k}\left(2\sqrt{i\,f\,(v-2k)}\,\sin\left(\frac{\pi v}{2}+g\,i\,(v-2k)+f\,i\,(v-2k)\,z+c\,i\,(v-2k)\sqrt{z}\right)-\right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\left(\cos\left(-\frac{i\,(v-2k)\,c^2}{4f}+\frac{\pi v}{2}+g\,i\,(v-2k)\right)C\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)+\right.$$

$$\left.\left.\left.\left.S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\,f\,(v-2k)}}\right)\sin\left(-\frac{i\,(v-2k)\,c^2}{4f}+\frac{\pi v}{2}+g\,i\,(v-2k)\right)\right)\right)\right)\right)+$$

$$i^{v}\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\cos\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}-\right.\right.\right.\right.$$

$$\left.2\,i\,g\,s+i\,g\,v+\frac{1}{2}\pi\,(v-m)\right)C\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)$$

$$\sin\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}-2\,i\,g\,s+i\,g\,v+\frac{1}{2}\pi\,(v-m)\right)+2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}$$

$$\left.\sin\left(-2\,g\,i\,s+i\,g\,v+\frac{1}{2}\pi\,(v-m)+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\,z+(i\,c\,v-2\,i\,c\,s)\sqrt{z}\right)\right)\Big/$$

$$(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^{3/2}+\left(\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,i\,g\,s-i\,g\,v-\frac{1}{2}\pi\,(m+v)\right)C\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)+ 2\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\Big(2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\,z+ (2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\Big)\Bigg)\Bigg/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(d\,z+e)\,\sinh^v(c\,z^r+f\,z+g)$

01.19.21.2592.01

$$\int\sin^m(e+d\,z)\,\sinh^v(c\,z^2+f\,z+g)\,dz = i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)-$$

$$2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,i^{v+1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right.\right.$$

$$\left.\left. C\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)+S\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)\right)+$$

$$\frac{i^{-v}\,2^{-m-v+1}}{d}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(e\,(2\,k-m)+2\,d\,k\,z-\frac{1}{2}\,m\,(2\,d\,z+\pi)\right)}{2\,k-m}+$$

$$i^v\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{\sqrt{i\,c\,v-2\,i\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m-v)-i\,g\,(2\,s-v)\right)C\left(\right.\right.\right.$$

$$\left.\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v+2\,(i\,c\,v-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,v-2\,i\,c\,s}}\right)$$

$$\left.\sin\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^2}{4\,(i\,c\,v-2\,i\,c\,s)}+e\,(2\,k-m)-\frac{1}{2}\,\pi\,(m-v)-i\,g\,(2\,s-v)\right)\right)+$$

$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,v}}\left(\cos\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+e\,(2\,k-m)+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)C\left(\right.\right.$$

$$\left.\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v+2\,(2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,v}}\right)$$

$$\left.\left.\left.\sin\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,i\,c\,s-i\,c\,v)}+e\,(2\,k-m)+g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)\right)\right)\right)/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int \sin^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\,c+g+f\,z\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}\binom{m}{k}\sin\left(\frac{\pi m}{2}+e\,(m-2k)+d\,(m-2k)\,z\right)}{m-2k} + i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f\,(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+g\,i\,(\nu-2k)+f\,i\,(\nu-2k)\,z+c\,i\,(\nu-2k)\sqrt{z}\right) - c\sqrt{2\pi}\,(\nu-2k)\left(\cos\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)C\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right)\sin\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)\right)\right)\right) + i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right)C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right) + \sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)\right) + 2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}\,\sin\left(2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi\,(\nu-m)+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2} + \left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi\,(m+\nu)\right)C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right) + \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)\right.$$

$$\sin\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)+ 2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)+(2\,d\,k-d\,m+ 2\,i\,f\,s-i\,f\,v)\,z+(2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\right)\Bigg)\Bigg/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\Bigg)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r)\sinh^v(c\,z^r+f\,z+g)$

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$$\int\sin^m(b\,z^2)\sinh^v(c\,z^2+f\,z+g)\,dz = 2^{-m-v}\,i^{-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)+i^{-v}\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}} (1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{(-1)^{k+m}}{\sqrt{b\,(m-2\,k)}}\binom{m}{k}\left(\cos\left(\frac{m\,\pi}{2}\right)C\left(\frac{b\,(m-2\,k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2\,k)}}\right)-S\left(\frac{b\,(m-2\,k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2\,k)}}\right)\sin\left(\frac{m\,\pi}{2}\right)\right)- i^{v+1}\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(v-2\,k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right) C\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)+S\left(\frac{(2\,k-v)\,(f+2\,c\,z)}{\sqrt{2\,\pi}\,\sqrt{i\,c\,(v-2\,k)}}\right)\sin\left(-\frac{i\,(v-2\,k)\,f^2}{4\,c}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\right)\right)+ i^v\,2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\cos\left(\frac{(i\,f\,v-2\,i\,f\,s)^2}{4\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)}+\frac{1}{2}\,\pi\,(m-v)+g\,i\,(2\,s-v)\right) C\left(\frac{-2\,f\,i\,s+i\,f\,v+2\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v}}\right)+ S\left(\frac{-2\,f\,i\,s+i\,f\,v+2\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v}}\right)\sin\left(\frac{(i\,f\,v-2\,i\,f\,s)^2}{4\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)}+\frac{1}{2}\,\pi\,(m-v)+ g\,i\,(2\,s-v)\right)\right)\Bigg/\left(\sqrt{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v}\right)+\left(\cos\left(-\frac{(2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)}+ g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)C\left(\frac{2\,i\,f\,s-i\,f\,v+2\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v}}\right)- S\left(\frac{2\,i\,f\,s-i\,f\,v+2\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v}}\right)\sin\left(-\frac{(2\,i\,f\,s-i\,f\,v)^2}{4\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)}+ g\,i\,(2\,s-v)-\frac{1}{2}\,\pi\,(m+v)\right)\right)\Bigg/\left(\sqrt{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v}\right)\right)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int \sin^m(b\sqrt{z})\sinh^\nu(\sqrt{z}\,c+g+f\,z)\,dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)+\frac{1}{b^2}\left(i^{-\nu}\left(2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^{k+m}\binom{m}{k}\left(\cos\left(b(2k-m)\sqrt{z}-\frac{m\pi}{2}\right)+b(2k-m)\sqrt{z}\sin\left(b(2k-m)\sqrt{z}-\frac{m\pi}{2}\right)\right)\right)\right)\right)+$$

$$i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f(\nu-2k)}\sin\left(\frac{\pi\nu}{2}+g\,i(\nu-2k)+f\,i(\nu-2k)z+c\,i(\nu-2k)\sqrt{z}\right)-c\sqrt{2\pi}(\nu-2k)\left(\cos\left(-\frac{i(\nu-2k)c^2}{4f}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)C\left(\frac{(2k-\nu)(c+2f\sqrt{z})}{\sqrt{2\pi}\sqrt{i\,f(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(c+2f\sqrt{z})}{\sqrt{2\pi}\sqrt{i\,f(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)c^2}{4f}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)\right)\right)\right)+i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(i\,f\,\nu-2\,i\,f\,s)^{3/2}}\left(\sqrt{2\pi}(-2bk+bm+2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(2bk-bm-2\,i\,c\,s+i\,c\,\nu)^2}{4(i\,f\,\nu-2\,i\,f\,s)}-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi(\nu-m)\right)C\left(\frac{2bk-bm-2\,i\,c\,s+i\,c\,\nu+2(i\,f\,\nu-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)+\sqrt{2\pi}(2bk-bm-2\,i\,c\,s+i\,c\,\nu)S\left(\frac{2bk-bm-2\,i\,c\,s+i\,c\,\nu+2(i\,f\,\nu-2\,i\,f\,s)\sqrt{z}}{\sqrt{2\pi}\sqrt{i\,f\,\nu-2\,i\,f\,s}}\right)\sin\left(-\frac{(2bk-bm-2\,i\,c\,s+i\,c\,\nu)^2}{4(i\,f\,\nu-2\,i\,f\,s)}-2\,i\,g\,s+i\,g\,\nu+\frac{1}{2}\pi(\nu-m)\right)+2\sqrt{i\,f\,\nu-2\,i\,f\,s}\sin\left(-2\,g\,i\,s+i\,g\,\nu+\frac{1}{2}\pi(\nu-m)+(i\,f\,\nu-2\,i\,f\,s)z+(2bk-bm-2\,i\,c\,s+i\,c\,\nu)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2\,i\,f\,s-i\,f\,\nu)^{3/2}}\left(\sqrt{2\pi}(-2bk+bm-2\,i\,c\,s+i\,c\,\nu)\cos\left(-\frac{(2bk-bm+2\,i\,c\,s-i\,c\,\nu)^2}{4(2\,i\,f\,s-i\,f\,\nu)}+2\,i\,g\,s-i\,g\,\nu-\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2bk-bm+2\,i\,c\,s-i\,c\,\nu+2(2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,f\,s-i\,f\,\nu}}\right)+\right.$$

$$\sqrt{2\pi}\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v+2\,(2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,i\,f\,s-i\,f\,v)}+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)+2\,\sqrt{2\,i\,f\,s-i\,f\,v}\,\sin\Bigl(2\,i\,g\,s-$$

$$i\,g\,v-\frac{1}{2}\,\pi\,(m+v)+(2\,i\,f\,s-i\,f\,v)\,z+(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\sqrt{z}\Bigr)\Bigr)\Bigr)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r+e)\,\sinh^v(c\,z^r+f\,z+g)$

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$$\int \sin^m(b z^2+e)\sinh^\nu(c z^2+f z+g)\,dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{\sqrt{b(m-2k)}}\left((-1)^{k+m}\binom{m}{k}\left(\cos\left(\frac{\pi m}{2}+e(m-2k)\right)C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin\left(\frac{\pi m}{2}+e(m-2k)\right)\right)\right) - i^{\nu+1} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(-\frac{(i f\nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)-i g(2s-\nu)\right)C\left(\frac{-2fis+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)-S\left(\frac{-2fis+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)\sin\left(-\frac{(if\nu-2ifs)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-\frac{1}{2}\pi(m-\nu)-i g(2s-\nu)\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+ic\nu}\right)+\left(\cos\left(-\frac{(2ifs-if\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)+g\,i(2s-\nu)-\frac{1}{2}\pi(m+\nu)\right)C\left(\frac{2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)-S\left(\frac{2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)\sin\left(-\frac{(2ifs-if\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)+g\,i(2s-\nu)-\frac{1}{2}\pi(m+\nu)\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

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$$\int \sin^m(\sqrt{z}\,b+e)\sinh^\nu(\sqrt{z}\,c+g+f z)\,dz = i^{-\nu} 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(i^{-\nu}\left(2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left((-1)^{k+m}\binom{m}{k}\left(\cos\left(2ek-em+b(2k-m)\sqrt{z}-\frac{m\pi}{2}\right)+\right.\right.\right.\right.$$

$$b\,(2\,k-m)\,\sqrt{z}\,\sin\left(2\,e\,k-e\,m+b\,(2\,k-m)\,\sqrt{z}-\frac{m\,\pi}{2}\right)\Bigg)\Bigg)\Bigg)\Bigg)+i^{v}\,2^{-m-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i\,f\,(v-2\,k))^{3/2}}\left((-1)^{k}\binom{v}{k}\left(2\,\sqrt{i\,f\,(v-2\,k)}\,\sin\left(\frac{\pi\,v}{2}+g\,i\,(v-2\,k)+f\,i\,(v-2\,k)\,z+c\,i\,(v-2\,k)\,\sqrt{z}\right)-\right.\right.$$

$$c\,\sqrt{2\,\pi}\,(v-2\,k)\left(\cos\left(-\frac{i\,(v-2\,k)\,c^{2}}{4\,f}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)C\left(\frac{(2\,k-v)\left(c+2\,f\,\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(v-2\,k)}}\right)+\right.$$

$$S\left(\frac{(2\,k-v)\left(c+2\,f\,\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(v-2\,k)}}\right)\sin\left(-\frac{i\,(v-2\,k)\,c^{2}}{4\,f}+\frac{\pi\,v}{2}+g\,i\,(v-2\,k)\right)\Bigg)\Bigg)\Bigg)\Bigg)+i^{v}\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+m}\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s}\binom{v}{s}\left(\frac{1}{(i\,f\,v-2\,i\,f\,s)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m+2\,i\,c\,s-i\,c\,v)\cos\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)^{2}}{4\,(i\,f\,v-2\,i\,f\,s)}+\right.\right.\right.$$

$$\left.2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,v+\frac{1}{2}\,\pi\,(v-m)\right)C\left(\frac{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v+2\,(i\,f\,v-2\,i\,f\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)+$$

$$\sqrt{2\,\pi}\,(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\,S\left(\frac{2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v+2\,(i\,f\,v-2\,i\,f\,s)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{i\,f\,v-2\,i\,f\,s}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)^{2}}{4\,(i\,f\,v-2\,i\,f\,s)}+2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,v+\frac{1}{2}\,\pi\,(v-m)\right)+2\,\sqrt{i\,f\,v-2\,i\,f\,s}$$

$$\left.\sin\left(2\,e\,k-e\,m-2\,i\,g\,s+i\,g\,v+\frac{1}{2}\,\pi\,(v-m)+(i\,f\,v-2\,i\,f\,s)\,z+(2\,b\,k-b\,m-2\,i\,c\,s+i\,c\,v)\,\sqrt{z}\right)\right)+$$

$$\frac{1}{(2\,i\,f\,s-i\,f\,v)^{3/2}}\left(\sqrt{2\,\pi}\,(-2\,b\,k+b\,m-2\,i\,c\,s+i\,c\,v)\cos\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^{2}}{4\,(2\,i\,f\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)C\left(\frac{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v+2\,(2\,i\,f\,s-i\,f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\,\pi}\,(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v+2\,(2\,i\,f\,s-i\,f\,v)\,\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^{2}}{4\,(2\,i\,f\,s-i\,f\,v)}+2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)+$$

$$2\,\sqrt{2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,e\,k-e\,m+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)+(2\,i\,f\,s-i\,f\,v)\,z+\right.$$

$$\left.(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\right)\Bigg)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^{+}\land v\in\mathbb{N}^{+}$$

Involving $\sin^m\left(b z^r + d z\right) \sinh^v\left(c z^r + f z + g\right)$

01.19.21.2598.01

$$\int \sin^m\left(b z^2 + d z\right) \sinh^v\left(c z^2 + f z + g\right) dz = i^{-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) - i^{-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4} \left(\frac{d^2 (m-2k)}{b} - 2 m \pi \right) \right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{d^2(m-2k)}{b} - 2 m \pi \right) \right) \right) \right) - i^{1-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (v-2k)}} \left((-1)^{k+v} \binom{v}{k} \left(\cos\left(-\frac{i (v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k) \right) C\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi} \sqrt{i c (v-2k)}} \right) + S\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi} \sqrt{i c (v-2k)}} \right) \sin\left(-\frac{i (v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k) \right) \right) \right) + i^{-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\left(\cos\left(\frac{(2dk - dm - 2 i f s + i f v)^2}{4(2bk - bm - 2 i c s + i c v)} + \frac{1}{2} \pi (m-v) + g i (2s - v) \right) C\left(\frac{2dk - dm - 2 i f s + i f v + 2(2bk - bm - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2 i c s + i c v}} \right) + S\left(\frac{2dk - dm - 2 i f s + i f v + 2(2bk - bm - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2 i c s + i c v}} \right) \sin\left(\frac{(2dk - dm - 2 i f s + i f v)^2}{4(2bk - bm - 2 i c s + i c v)} + \frac{1}{2} \pi (m-v) + g i (2s - v) \right) \right) \Big/ \left(\sqrt{2bk - bm - 2 i c s + i c v} \right) + \left(\cos\left(-\frac{(2dk - dm + 2 i f s - i f v)^2}{4(2bk - bm + 2 i c s - i c v)} + g i (2s - v) - \frac{1}{2} \pi (m+v) \right) C\left(\frac{2dk - dm + 2 i f s - i f v + 2(2bk - bm + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2 i c s - i c v}} \right) - S\left(\frac{2dk - dm + 2 i f s - i f v + 2(2bk - bm + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2 i c s - i c v}} \right) \sin\left(-\frac{(2dk - dm + 2 i f s - i f v)^2}{4(2bk - bm + 2 i c s - i c v)} + g i (2s - v) - \frac{1}{2} \pi (m+v) \right) \right) \Big/ \left(\sqrt{2bk - bm + 2 i c s - i c v} \right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2599.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g + f\, z\right) dz = i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2) + i^{-\nu}\, 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d\,(m-2k))^{3/2}} \left((-1)^{k+m} \binom{m}{k} \left(-b\,(m-2k)\sqrt{2\pi}\, \cos\left(\frac{b^2\,(m-2k)}{4d} - \frac{m\pi}{2}\right) C\left(\frac{b\,(m-2k) + 2\,d\sqrt{z}\,(m-2k)}{\sqrt{d\,(m-2k)}\,\sqrt{2\pi}}\right) - \right.\right.$$

$$b\,(m-2k)\sqrt{2\pi}\, S\left(\frac{b\,(m-2k) + 2\,d\sqrt{z}\,(m-2k)}{\sqrt{d\,(m-2k)}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2\,(m-2k)}{4d} - \frac{m\pi}{2}\right) +$$

$$\left.\left. 2\sqrt{d\,(m-2k)}\, \sin\left(\frac{\pi m}{2} + d\,(m-2k)\,z + b\,(m-2k)\sqrt{z}\right)\right)\right) + i^{\nu}\, 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i\, f\,(\nu-2k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c\sqrt{2\pi}\,(2k-\nu) \left(\cos\left(-\frac{i\,(\nu-2k)\,c^2}{4f} + \frac{\pi\nu}{2} + g\, i\,(\nu-2k)\right) C\left(\frac{(2k-\nu)\left(c + 2\,f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(\nu-2k)}}\right) + \right.\right.\right.$$

$$\left. S\left(\frac{(2k-\nu)\left(c + 2\,f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(\nu-2k)}}\right) \sin\left(-\frac{i\,(\nu-2k)\,c^2}{4f} + \frac{\pi\nu}{2} + g\, i\,(\nu-2k)\right)\right) +$$

$$\left.\left. 2\sqrt{i\, f\,(\nu-2k)}\, \sin\left(\frac{\pi\nu}{2} + g\, i\,(\nu-2k) + f\, i\,(\nu-2k)\,z + c\, i\,(\nu-2k)\sqrt{z}\right)\right)\right) +$$

$$i^{-\nu}\, 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (-2\,b\,k + b\,m + 2\,i\,c\,s - i\,c\,\nu)\, \cos\left(-\frac{(2\,b\,k - b\,m - 2\,i\,c\,s + i\,c\,\nu)^2}{4\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)} - \right.\right.\right.\right.$$

$$\left. 2\,i\,g\,s + i\,g\,\nu + \frac{1}{2}\pi\,(\nu - m)\right) C\left(\left(2\,b\,k - b\,m - 2\,i\,c\,s + i\,c\,\nu + 2\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)\sqrt{z}\right) \Big/\right.$$

$$\left.\left(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu}\right)\right) + \sqrt{2\pi}\,(2\,b\,k - b\,m - 2\,i\,c\,s + i\,c\,\nu)\, S\left(\left(2\,b\,k - b\,m - \right.\right.$$

$$\left.\left. 2\,i\,c\,s + i\,c\,\nu + 2\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)\sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu}\right)\right)$$

$$\left. \sin\left(-\frac{(2\,b\,k - b\,m - 2\,i\,c\,s + i\,c\,\nu)^2}{4\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)} - 2\,i\,g\,s + i\,g\,\nu + \frac{1}{2}\pi\,(\nu - m)\right) + \right.$$

$$2\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu}\, \sin\left(-2\,g\,i\,s + i\,g\,\nu + \frac{1}{2}\pi\,(\nu - m) + (2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)\,z + \right.$$

$$\left.\left.\left. (2\,b\,k - b\,m - 2\,i\,c\,s + i\,c\,\nu)\sqrt{z}\right)\right) \Big/ (2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,\nu)^{3/2} +$$

$$\left(\sqrt{2\pi}\, (-2\,b\,k + b\,m - 2\,i\,c\,s + i\,c\,\nu)\, \cos\left(-\frac{(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,\nu)^2}{4\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,\nu)} + 2\,i\,g\,s - i\,g\,\nu - \frac{1}{2}\pi\,(m + \nu)\right)\right.$$

$$C\left(\left(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,\nu + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,\nu)\sqrt{z}\right) \Big/\right.$$

$$\left.\left(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,\nu}\right)\right) + \sqrt{2\pi}\,(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,\nu)\, S\left(\left(2\,b\,k - b\,m + \right.\right.$$

$$\left.\left. 2\,i\,c\,s - i\,c\,\nu + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,\nu)\sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,\nu}\right)\right)$$

$$\sin\left(-\frac{(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)\right)+$$
$$2\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,i\,g\,s-i\,g\,v-\frac{1}{2}\,\pi\,(m+v)+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\,z+\right.$$
$$\left.\left.\left.(2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v)\,\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\sin^m(b\,z^r+d\,z+e)\,\sinh^v(c\,z^r+f\,z+g)$

01.19.21.2600.01

$$\int \sin^m(b z^2 + d z + e) \sinh^\nu(c z^2 + f z + g) \, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \frac{1}{\sqrt{b(m-2k)}} \left((-1)^{k+m} \binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m - 2 m \pi\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k) d^2}{b} + 8 e k - 4 e m - 2 m \pi\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(-\frac{i(\nu-2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k)\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi} \sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi} \sqrt{i c(\nu-2k)}}\right) \sin\left(-\frac{i(\nu-2k) f^2}{4c} + \frac{\pi \nu}{2} + g i (\nu - 2k)\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk - dm - 2 i f s + i f \nu)^2}{4(2bk - bm - 2 i c s + i c \nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g (2s-\nu)\right) C\left(\frac{2dk - dm - 2 i f s + i f \nu + 2(2bk - bm - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2 i c s + i c \nu}}\right) - S\left(\frac{2dk - dm - 2 i f s + i f \nu + 2(2bk - bm - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2 i c s + i c \nu}}\right) \sin\left(-\frac{(2dk - dm - 2 i f s + i f \nu)^2}{4(2bk - bm - 2 i c s + i c \nu)} + e(2k-m) - \frac{1}{2}\pi(m-\nu) - i g (2s-\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm - 2 i c s + i c \nu}\right) + \left(\cos\left(-\frac{(2dk - dm + 2 i f s - i f \nu)^2}{4(2bk - bm + 2 i c s - i c \nu)} + e(2k-m) + g i (2s-\nu) - \frac{1}{2}\pi(m+\nu)\right) C\left(\frac{2dk - dm + 2 i f s - i f \nu + 2(2bk - bm + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2 i c s - i c \nu}}\right) - S\left(\frac{2dk - dm + 2 i f s - i f \nu + 2(2bk - bm + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2 i c s - i c \nu}}\right) \sin\left(-\frac{(2dk - dm + 2 i f s - i f \nu)^2}{4(2bk - bm + 2 i c s - i c \nu)} + e(2k-m) + g i (2s-\nu) - \frac{1}{2}\pi(m+\nu)\right)\right) \Big/ \left(\sqrt{2bk - bm + 2 i c s - i c \nu}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2601.01

$$\int \sin^m(b z^2 + d z + e) \sinh^\nu(c z^2 + f z + g) \, dz = i^\nu 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + \frac{1}{b} \left(i^{\nu+1} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \right.$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m-2s} \Bigg((-1)^s \binom{m}{s} \Bigg(e^{-\frac{i \left(4 i b \left(\frac{i m \pi}{2} - i e (m-2s)\right)(m-2s) - d^2 (m-2s)^2\right)}{4 b (m-2s)}} \sqrt{-i b (m-2s)}\, \operatorname{erfi}\left(\frac{-i d (m-2s) - 2 i b z (m-2s)}{2 \sqrt{-i b (m-2s)}} \right) -$$

$$e^{\frac{i \left(-d^2 (m-2s)^2 - 4 b i \left(i e (m-2s) - \frac{i m \pi}{2}\right)(m-2s)\right)}{4 b (m-2s)}} \sqrt{i b (m-2s)}\, \operatorname{erfi}\left(\frac{d i (m-2s) + 2 b i z (m-2s)}{2 \sqrt{i b (m-2s)}} \right) \Bigg) \Bigg) \Bigg) \Bigg) -$$

$$\frac{1}{c} \Bigg(i^{\nu} 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\nu - 2k} \Bigg((-1)^k \binom{\nu}{k} \Bigg(e^{\frac{f^2 (\nu-2k)^2 + 4 c \left(\frac{i \pi \nu}{2} - g (\nu-2k)\right)(\nu-2k)}{4 c (\nu-2k)}}$$

$$\sqrt{-c (\nu-2k)}\, \operatorname{erfi}\left(\frac{-f (\nu-2k) - 2 c z (\nu-2k)}{2 \sqrt{-c (\nu-2k)}} \right) -$$

$$e^{-\frac{f^2 (\nu-2k)^2 - 4 c (\nu-2k) \left(g (\nu-2k) - \frac{i \pi \nu}{2}\right)}{4 c (\nu-2k)}} \sqrt{c (\nu-2k)}\, \operatorname{erfi}\left(\frac{f (\nu-2k) + 2 c z (\nu-2k)}{2 \sqrt{c (\nu-2k)}} \right) \Bigg) \Bigg) \Bigg) + i^{\nu} 2^{-m-\nu-1} \sqrt{\pi}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \Bigg(\Bigg(\Bigg(e^{-\frac{(d i (m-2s) + f (2k-\nu))^2 - 4 (b i (m-2s) + c (2k-\nu)) \left(e i (m-2s) + g (2k-\nu) + \frac{1}{2} i \pi (\nu - m)\right)}{4 (b i (m-2s) + c (2k-\nu))}} \sqrt{b i (m-2s) + c (2k-\nu)}$$

$$(-i b (m-2s) - c (2k-\nu))\, \operatorname{erfi}\left(\frac{d i (m-2s) + f (2k-\nu) + 2 (b i (m-2s) + c (2k-\nu)) z}{2 \sqrt{b i (m-2s) + c (2k-\nu)}} \right) +$$

$$e^{-\frac{(-i d (m-2s) - f (2k-\nu))^2 - 4 (-i b (m-2s) - c (2k-\nu)) \left(-i e (m-2s) - g (2k-\nu) - \frac{1}{2} i \pi (\nu - m)\right)}{4 (-i b (m-2s) - c (2k-\nu))}} (b i (m-2s) + c (2k-\nu))$$

$$\sqrt{-i b (m-2s) - c (2k-\nu)}\, \operatorname{erfi}\left(\frac{-i d (m-2s) - f (2k-\nu) - 2 (b i (m-2s) + c (2k-\nu)) z}{2 \sqrt{-i b (m-2s) - c (2k-\nu)}} \right) \Bigg) \Big/$$

$$((-i b (m-2s) - c (2k-\nu)) (b i (m-2s) + c (2k-\nu))) +$$

$$\Bigg(e^{-\frac{(d i (m-2s) + f (\nu-2k))^2 - 4 (b i (m-2s) + c (\nu-2k)) \left(e i (m-2s) + g (\nu-2k) - \frac{1}{2} i \pi (m + \nu)\right)}{4 (b i (m-2s) + c (\nu-2k))}} \sqrt{b i (m-2s) + c (\nu-2k)}$$

$$(-i b (m-2s) - c (\nu-2k))\, \operatorname{erfi}\left(\frac{d i (m-2s) + f (\nu-2k) + 2 (b i (m-2s) + c (\nu-2k)) z}{2 \sqrt{b i (m-2s) + c (\nu-2k)}} \right) +$$

$$e^{-\frac{(-i d (m-2s) - f (\nu-2k))^2 - 4 (-i b (m-2s) - c (\nu-2k)) \left(-i e (m-2s) - g (\nu-2k) + \frac{1}{2} i \pi (m + \nu)\right)}{4 (-i b (m-2s) - c (\nu-2k))}} (b i (m-2s) + c (\nu-2k))$$

$$\sqrt{-i b (m-2s) - c (\nu-2k)}\, \operatorname{erfi}\left(\frac{-i d (m-2s) - f (\nu-2k) - 2 (b i (m-2s) + c (\nu-2k)) z}{2 \sqrt{-i b (m-2s) - c (\nu-2k)}} \right) \Bigg) \Big/$$

$$((-i b (m-2s) - c (\nu-2k)) (b i (m-2s) + c (\nu-2k))) \Bigg) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2602.01

$$\int \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^v\left(\sqrt{z}\, c + f\, z + g\right) dz = i^{-v}\, 2^{-m-v}\, z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + i^{-v}\, 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d\,(m - 2k))^{3/2}} \left((-1)^{k+m} \binom{m}{k} \left(-b\,(m - 2k) \sqrt{2\pi} \cos\left(\frac{(m - 2k)\, b^2}{4d} - e\,(m - 2k) - \frac{m\pi}{2}\right) C\left(\frac{b\,(m - 2k) + 2d\sqrt{z}\,(m - 2k)}{\sqrt{d\,(m - 2k)}\,\sqrt{2\pi}}\right) - b\,(m - 2k)\sqrt{2\pi}\, S\left(\frac{b\,(m - 2k) + 2d\sqrt{z}\,(m - 2k)}{\sqrt{d\,(m - 2k)}\,\sqrt{2\pi}}\right) \sin\left(\frac{(m - 2k)\, b^2}{4d} - e\,(m - 2k) - \frac{m\pi}{2}\right) + 2\sqrt{d\,(m - 2k)} \sin\left(\frac{\pi m}{2} + e\,(m - 2k) + d\,(m - 2k)\, z + b\,(m - 2k)\sqrt{z}\right)\right)\right) + i^{v}\, 2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(i\, f\,(v - 2k))^{3/2}} \left((-1)^k \binom{v}{k} \left(c\sqrt{2\pi}\,(2k - v) \left(\cos\left(-\frac{i\,(v - 2k)\, c^2}{4f} + \frac{\pi v}{2} + g\, i\,(v - 2k)\right) C\left(\frac{(2k - v)\left(c + 2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(v - 2k)}}\right) + S\left(\frac{(2k - v)\left(c + 2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(v - 2k)}}\right) \sin\left(-\frac{i\,(v - 2k)\, c^2}{4f} + \frac{\pi v}{2} + g\, i\,(v - 2k)\right)\right) + 2\sqrt{i\, f\,(v - 2k)} \sin\left(\frac{\pi v}{2} + g\, i\,(v - 2k) + f\, i\,(v - 2k)\, z + c\, i\,(v - 2k)\sqrt{z}\right)\right)\right) + i^{-v}\, 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+m} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\left(\left(\sqrt{2\pi}\,(-2bk + bm + 2icS - icv) \cos\left(-\frac{(2bk - bm - 2ics + icv)^2}{4(2dk - dm - 2ifs + ifv)} + 2ek - em - 2igs + igv + \frac{1}{2}\pi(v - m)\right) C\left(\left(2bk - bm - 2ics + icv + 2(2dk - dm - 2ifs + ifv)\sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\,\sqrt{2dk - dm - 2ifs + ifv}\right)\right) + \sqrt{2\pi}\,(2bk - bm - 2ics + icv)\, S\left(\left(2bk - bm - 2ics + icv + 2(2dk - dm - 2ifs + ifv)\sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\,\sqrt{2dk - dm - 2ifs + ifv}\right)\right) \sin\left(-\frac{(2bk - bm - 2ics + icv)^2}{4(2dk - dm - 2ifs + ifv)} + 2ek - em - 2igs + igv + \frac{1}{2}\pi(v - m)\right) + 2\sqrt{2dk - dm - 2ifs + ifv} \sin\left(2ek - em - 2igs + igv + \frac{1}{2}\pi(v - m) + (2dk - dm - 2ifs + ifv)\, z + (2bk - bm - 2ics + icv)\sqrt{z}\right)\right) \Big/ (2dk - dm - 2ifs + ifv)^{3/2} + \left(\sqrt{2\pi}\,(-2bk + bm - 2ics + icv) \cos\left(-\frac{(2bk - bm + 2ics - icv)^2}{4(2dk - dm + 2ifs - ifv)} + 2ek - em + 2igs - igv - \frac{1}{2}\pi(m + v)\right) C\left(\left(2bk - bm + \right.\right.\right.\right.$$

$$2\,i\,c\,s - i\,c\,v + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\Big)\Big/\Big(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}\Big)\Big) +$$

$$\sqrt{2\pi}\,(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,v)\,S\Big(\big(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,v + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\,\sqrt{z}\big)\Big/$$

$$\Big(\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}\Big)\Big)\sin\!\Big(-\frac{(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,v)^2}{4\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)} +$$

$$2\,e\,k - e\,m + 2\,i\,g\,s - i\,g\,v - \frac{1}{2}\,\pi\,(m+v)\Big) + 2\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}$$

$$\sin\!\Big(2\,e\,k - e\,m + 2\,i\,g\,s - i\,g\,v - \frac{1}{2}\,\pi\,(m+v) + (2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\,z +$$

$$(2\,b\,k - b\,m + 2\,i\,c\,s - i\,c\,v)\,\sqrt{z}\Big)\Big)\Big/(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)^{3/2}\Big)\;/;\; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.2603.01

$$\int \sin^m\!\big(\sqrt{z}\,b + e + d\,z\big)\sinh^v\!\big(\sqrt{z}\,c + g + f\,z\big)\,dz =$$

$$i^v\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)\,(1 - v \bmod 2) + i^{m+v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\,e^{-i\,e\,(m-2s)}\binom{m}{s}\Bigg(\frac{2\,i\,e^{-i\left(\pi\,m + d\,(m-2s)\,z + b\,(m-2s)\sqrt{z}\right)}\left(e^{i\,m\,\pi} - e^{2\,i\,(m-2s)\left(\sqrt{z}\,b + e + d\,z\right)}\right)}{d\,(m-2s)} - \frac{1}{d\,\sqrt{d^2\,(m-2s)^2}}$$

$$\Bigg(b\,e^{-\frac{1}{4}\,i\left(\frac{(m-2s)\,b^2}{d} + 4\,m\,\pi\right)}\sqrt{\pi}\,\Bigg(e^{\frac{1}{2}\,i\left(\frac{(m-2s)\,b^2}{d} + 2\,m\,\pi\right)}\sqrt{i\,d\,(m-2s)}\;\mathrm{erfi}\!\left(\frac{\sqrt{-i\,d\,(m-2s)}\,\left(b + 2\,d\,\sqrt{z}\right)}{2\,d}\right) +$$

$$e^{2\,i\,e\,(m-2s)}\sqrt{-i\,d\,(m-2s)}\;\mathrm{erfi}\!\left(\frac{\sqrt{i\,d\,(m-2s)}\,\left(b + 2\,d\,\sqrt{z}\right)}{2\,d}\right)\Bigg)\Bigg)\Bigg) +$$

$$(-1)^v\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\,e^{-g\,(v-2k)}\binom{v}{k}\Bigg(\frac{2\,e^{(2k-v)\left(c + f\sqrt{z}\right)\sqrt{z} - i\,\pi\,v}\left(-e^{i\,\pi\,v} + e^{2\,(v-2k)\left(\sqrt{z}\,c + g + f\,z\right)}\right)}{f\,(v-2k)} +$$

$$\frac{1}{f\,\sqrt{-f^2\,(v-2k)^2}}\Bigg(c\,e^{-\frac{(v-2k)\,c^2}{4f} - i\,\pi\,v}\sqrt{\pi}\,\Bigg(e^{2\,g\,(v-2k)}\sqrt{f\,(2k-v)}\;\mathrm{erfi}\!\left(\frac{(2k-v)\left(c + 2\,f\,\sqrt{z}\right)}{2\,\sqrt{f\,(v-2k)}}\right) -$$

$$e^{\frac{(v-2k)\,c^2}{2f} + i\,\pi\,v}\sqrt{f\,(v-2k)}\;\mathrm{erfi}\!\left(\frac{\sqrt{f\,(2k-v)}\,\left(c + 2\,f\,\sqrt{z}\right)}{2\,f}\right)\Bigg)\Bigg)\Bigg) + i^v\,2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}$$

$$\Bigg(e^{-i\,e\,(m-2s) - g\,(2k-v) - \frac{1}{2}\,i\,\pi\,(v-m)}\Bigg(\Bigg(2\,e^{\sqrt{z}\,(b\,i\,(m-2s) + c\,(2k-v)) + 2\left(e\,i\,(m-2s) + g\,(2k-v) + \frac{1}{2}\,i\,\pi\,(v-m)\right) + (d\,i\,(m-2s) + f\,(2k-v))\,z}\Bigg)\Big/$$

$$(d\,i\,(m-2s)+f\,(2k-v)) - \Bigg(e^{2\left(e\,i\,(m-2s)+g\,(2k-v)+\frac{1}{2}\,i\,\pi\,(v-m)\right)-\frac{(b\,i\,(m-2s)+c\,(2k-v))^2}{4\,(d\,i\,(m-2s)+f\,(2k-v))}}\sqrt{\pi}$$

$$(b\,i\,(m-2s)+c\,(2k-v))\,\mathrm{erfi}\left(\frac{b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}}{2\sqrt{d\,i\,(m-2s)+f\,(2k-v)}}\right)\Bigg)\Big/$$

$$(d\,i\,(m-2s)+f\,(2k-v))^{3/2}+\frac{2\,e^{\sqrt{z}\,(-i\,b\,(m-2s)-c\,(2k-v))+(-i\,d\,(m-2s)-f\,(2k-v))\,z}}{-i\,d\,(m-2s)-f\,(2k-v)} - \Bigg(e^{-\frac{(-i\,b\,(m-2s)-c\,(2k-v))^2}{4\,(-i\,d\,(m-2s)-f\,(2k-v))}}\sqrt{\pi}$$

$$(b\,i\,(m-2s)+c\,(2k-v))\,\mathrm{erfi}\left(\frac{b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}}{2\sqrt{-i\,d\,(m-2s)-f\,(2k-v)}}\right)\Bigg)\Big/$$

$$(-i\,d\,(m-2s)-f\,(2k-v))^{3/2}\Bigg)+e^{-i\,e\,(m-2s)-g\,(v-2k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\Bigg(\left(2\,e^{\sqrt{z}\,(b\,i\,(m-2s)+c\,(v-2k))+2\left(e\,i\,(m-2s)+g\,(v-2k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)+(d\,i\,(m-2s)+f\,(v-2k))\,z}\right)\Big/(d\,i\,(m-2s)+f\,(v-2k)) -$$

$$\Bigg(e^{2\left(e\,i\,(m-2s)+g\,(v-2k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)-\frac{(b\,i\,(m-2s)+c\,(v-2k))^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}}\sqrt{\pi}\,(b\,i\,(m-2s)+c\,(v-2k))\,\mathrm{erfi}\Bigg($$

$$\frac{b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}}{2\sqrt{d\,i\,(m-2s)+f\,(v-2k)}}\Bigg)\Bigg)\Big/(d\,i\,(m-2s)+f\,(v-2k))^{3/2}+$$

$$\frac{2\,e^{\sqrt{z}\,(-i\,b\,(m-2s)-c\,(v-2k))+(-i\,d\,(m-2s)-f\,(v-2k))\,z}}{-i\,d\,(m-2s)-f\,(v-2k)} - \Bigg(e^{-\frac{(-i\,b\,(m-2s)-c\,(v-2k))^2}{4\,(-i\,d\,(m-2s)-f\,(v-2k))}}\sqrt{\pi}\,(b\,i\,(m-2s)+c\,(v-2k))$$

$$\mathrm{erfi}\left(\frac{b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}}{2\sqrt{-i\,d\,(m-2s)-f\,(v-2k)}}\right)\Bigg)\Big/$$

$$(-i\,d\,(m-2s)-f\,(v-2k))^{3/2}\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving cos

Involving $\cos(c\,z)\,\sinh^{v}(a\,z)$

01.19.21.2604.01

$$\int \cos(c\,z)\sinh^{\nu}(a\,z)\,dz = -\frac{1}{2\left(c^2+a^2\nu^2\right)}\,e^{-i\,c\,z}\left(1-e^{2\,a\,z}\right)^{-\nu}\sinh^{\nu}(a\,z)\left(e^{2\,i\,c\,z}\,(i\,c+a\,\nu)\,{}_2F_1\!\left(\frac{i\,(c+i\,a\,\nu)}{2\,a},-\nu;\frac{i\,c-a\,(\nu-2)}{2\,a};e^{2\,a\,z}\right)+(-i\,c+a\,\nu)\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;1-\frac{i\,c}{2\,a}-\frac{\nu}{2};e^{2\,a\,z}\right)\right)$$

01.19.21.2605.01

$$\int \cos(c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{2^{-\nu}\,e^{\frac{i\,\pi\,\nu}{2}}\sin(c\,z)\,(1-\nu \bmod 2)}{c}\binom{\nu}{\frac{\nu}{2}} - 2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{i\,\pi\,\nu-(i\,c-2\,a\,k+a\,\nu)\,z}}{i\,c-2\,a\,k+a\,\nu}+\frac{e^{(i\,c-2\,a\,k+a\,\nu)\,z}}{-i\,c+2\,a\,k-a\,\nu}+\frac{e^{(-i\,c-2\,a\,k+a\,\nu)\,z}}{i\,c+2\,a\,k-a\,\nu}+\frac{e^{i\,\pi\,\nu-(-i\,c-2\,a\,k+a\,\nu)\,z}}{-i\,c-2\,a\,k+a\,\nu}\right)\binom{\nu}{k}\,/;\,\nu\in\mathbb{N}^+$$

Involving $\cos(c\,z+d)\sinh^{\nu}(a\,z)$

01.19.21.2606.01

$$\int \cos(d+c\,z)\sinh^{\nu}(a\,z)\,dz = -\frac{1}{2}\,e^{-i\,d}\left(1-e^{2\,a\,z}\right)^{-\nu}\left(\frac{i\,e^{i\,(2\,d+c\,z)}\,{}_2F_1\!\left(\frac{i\,(c+i\,a\,\nu)}{2\,a},-\nu;\frac{i\,c-a\,(\nu-2)}{2\,a};e^{2\,a\,z}\right)}{c+i\,a\,\nu}+\frac{e^{-i\,c\,z}\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;-\frac{i\,c+a\,(\nu-2)}{2\,a};e^{2\,a\,z}\right)}{i\,c+a\,\nu}\right)\sinh^{\nu}(a\,z)$$

01.19.21.2607.01

$$\int \cos(d+c\,z)\sinh^{\nu}(a\,z)\,dz = -2^{-\nu-1}\left(\frac{2\,e^{\frac{i\,\pi\,\nu}{2}}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(d+c\,z)}{c}+\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{-i\,d}\left(\frac{e^{2\,i\,d+i\,\pi\,\nu+(i\,c+a\,(2\,k-\nu))\,z}}{-i\,c+a\,(\nu-2\,k)}-\frac{e^{2\,i\,d+(i\,c+a\,(\nu-2\,k))\,z}}{i\,c+a\,(\nu-2\,k)}+\frac{e^{-a\,z\,\nu+i\,\pi\,\nu-i\,c\,z+2\,a\,k\,z}}{i\,c+a\,(\nu-2\,k)}+\frac{e^{(-i\,c+a\,(\nu-2\,k))\,z}}{i\,c+a\,(2\,k-\nu)}\right)\binom{\nu}{k}\right)/;\,\nu\in\mathbb{N}^+$$

Involving $\cos(c\,z)\sinh^{\nu}(a\,z+b)$

01.19.21.2608.01

$$\int \cos(c\,z)\sinh^{\nu}(b+a\,z)\,dz = -\frac{1}{2}\left(1-e^{2\,(b+a\,z)}\right)^{-\nu}\left(\frac{e^{i\,c\,z}\,i\,{}_2F_1\!\left(\frac{i\,(c+i\,a\,\nu)}{2\,a},-\nu;\frac{i\,c-a\,(\nu-2)}{2\,a};e^{2\,(b+a\,z)}\right)}{c+i\,a\,\nu}+\frac{e^{-i\,c\,z}\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;-\frac{i\,c+a\,(\nu-2)}{2\,a};e^{2\,(b+a\,z)}\right)}{i\,c+a\,\nu}\right)\sinh^{\nu}(b+a\,z)$$

01.19.21.2609.01

$$\int \cos(c\,z)\sinh^{\nu}(b+a\,z)\,dz = -2^{-\nu-1}\left(\frac{2\,e^{\frac{i\pi\nu}{2}}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(c\,z)}{c}+\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{-b(2k+\nu)}\left(\frac{e^{4bk+i\pi\nu+(i c+a(2k-\nu))z}}{-i\,c+a(\nu-2k)}-\frac{e^{2b\nu+(i c+a(\nu-2k))z}}{i\,c+a(\nu-2k)}+\frac{e^{4bk+2azk+i\pi\nu-icz-a\nu z}}{i\,c+a(\nu-2k)}+\frac{e^{2b\nu+(-ic+a(\nu-2k))z}}{i\,c+a(2k-\nu)}\right)\binom{\nu}{k}\right)/;\, m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

Involving $\cos(c\,z+d)\sinh^{\nu}(a\,z+b)$

01.19.21.2610.01

$$\int \cos(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = -\frac{1}{2}\,e^{-i\,d}\left(1-e^{2(b+a\,z)}\right)^{-\nu}\sinh^{\nu}(b+a\,z)\left(\frac{i\,e^{i(2d+cz)}}{c+i\,a\,\nu}\,{}_2F_1\!\left(\frac{i\,(c+i\,a\,\nu)}{2\,a},-\nu;\frac{i\,c-a(\nu-2)}{2\,a};e^{2(b+a\,z)}\right)+\frac{e^{-i\,c\,z}}{i\,c+a\,\nu}\,{}_2F_1\!\left(-\frac{i\,c+a\,\nu}{2\,a},-\nu;-\frac{i\,c+a(\nu-2)}{2\,a};e^{2(b+a\,z)}\right)\right)$$

01.19.21.2611.01

$$\int \cos(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = -2^{-\nu-1}\left(\frac{2\,e^{\frac{i\pi\nu}{2}}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(d+c\,z)}{c}+\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{-i\,d-b(2k+\nu)}\left(\frac{e^{2id+4bk+i\pi\nu+(ic+a(2k-\nu))z}}{-i\,c+a(\nu-2k)}-\frac{e^{2id+2b\nu+(ic+a(\nu-2k))z}}{i\,c+a(\nu-2k)}+\frac{e^{4bk+2azk+i\pi\nu-icz-a\nu z}}{i\,c+a(\nu-2k)}+\frac{e^{2b\nu+(-ic+a(\nu-2k))z}}{i\,c+a(2k-\nu)}\right)\binom{\nu}{k}\right)/;\, m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

Involving $\cos^m\left(b\,z^r\right)\sinh^{\nu}(c\,z)$

01.19.21.2612.01

$$\int \cos(b z^2) \sinh^\nu(c z)\, dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi}}{\sqrt{-b}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, C\!\left(\frac{b \sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right) + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{b}} \left(\cos\!\left(\frac{(2 i c k - i c \nu)^2}{4 b} + \frac{\pi \nu}{2}\right) C\!\left(\frac{2 i c k - i c \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) + S\!\left(\frac{2 i c k - i c \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\!\left(\frac{(2 i c k - i c \nu)^2}{4 b} + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b}} \left(\cos\!\left(\frac{\pi \nu}{2} - \frac{(2 i c k - i c \nu)^2}{4 b}\right) C\!\left(\frac{2 i c k - i c \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) + S\!\left(\frac{2 i c k - i c \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\!\left(\frac{\pi \nu}{2} - \frac{(2 i c k - i c \nu)^2}{4 b}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2613.01

$$\int \cos\!\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\!\left(b \sqrt{z}\right) + b \sqrt{z} \sin\!\left(b \sqrt{z}\right)\right)}{b^2} + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(2 i c k - i c \nu)^{3/2}} \left(2 \sqrt{2 i c k - i c \nu} \sin\!\left(\sqrt{z}\, b + c\, i (2 k - \nu) z - \frac{\pi \nu}{2}\right) - b \sqrt{2 \pi} \left(\cos\!\left(\frac{i b^2}{4 (2 c k - c \nu)} - \frac{\pi \nu}{2}\right) C\!\left(\frac{b + 2 c\, i (2 k - \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i c (2 k - \nu)}}\right) - S\!\left(\frac{b + 2 c\, i (2 k - \nu) \sqrt{z}}{\sqrt{2 \pi} \sqrt{i c (2 k - \nu)}}\right) \sin\!\left(\frac{i b^2}{4 (2 c k - c \nu)} - \frac{\pi \nu}{2}\right)\right)\right) + \frac{1}{(2 i c k - i c \nu)^{3/2}} \left(b \sqrt{2 \pi} \left(\cos\!\left(\frac{\pi \nu}{2} - \frac{i b^2}{4 (2 c k - c \nu)}\right) C\!\left(\frac{2 i c (2 k - \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{i c (2 k - \nu)}}\right) + S\!\left(\frac{2 i c (2 k - \nu) \sqrt{z} - b}{\sqrt{2 \pi} \sqrt{i c (2 k - \nu)}}\right) \sin\!\left(\frac{\pi \nu}{2} - \frac{i b^2}{4 (2 c k - c \nu)}\right)\right) - 2 \sqrt{2 i c k - i c \nu} \sin\!\left(\sqrt{z}\, b + \frac{\pi \nu}{2} - i c (2 k - \nu) z\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + e) \sinh^\nu(c z)$

01.19.21.2614.01

$$\int \cos\left(b z^2+e\right)\sinh^{\nu}(c z)\,dz = -\frac{i^{-\nu}2^{-\nu-\frac{1}{2}}\sqrt{\pi}}{\sqrt{-b}}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos(e)\,C\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)+S\left(\frac{b\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b}}\right)\sin(e)\right)+ i^{\nu}2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{\sqrt{-b}}\left(\cos\left(-\frac{(2 i c k-i c \nu)^2}{4 b}+e+\frac{\pi\nu}{2}\right)C\left(\frac{2 i c k-i c\nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)+ S\left(\frac{2 i c k-i c\nu-2 b z}{\sqrt{-b}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 i c k-i c\nu)^2}{4 b}+e+\frac{\pi\nu}{2}\right)\right)+\frac{1}{\sqrt{b}}\left(\cos\left(-\frac{(2 i c k-i c\nu)^2}{4 b}+e-\frac{\pi\nu}{2}\right) C\left(\frac{2 i c k-i c\nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)-S\left(\frac{2 i c k-i c\nu+2 b z}{\sqrt{b}\sqrt{2\pi}}\right)\sin\left(-\frac{(2 i c k-i c\nu)^2}{4 b}+e-\frac{\pi\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2615.01

$$\int \cos\left(\sqrt{z}\,b+e\right)\sinh^{\nu}(c z)\,dz = \frac{i^{-\nu}2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\cos\left(\sqrt{z}\,b+e\right)+b\sqrt{z}\,\sin\left(\sqrt{z}\,b+e\right)\right)}{b^2}+ i^{\nu}2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{1}{(2 i c k-i c\nu)^{3/2}}\left(2\sqrt{2 i c k-i c\nu}\,\sin\left(\sqrt{z}\,b+e+c\,i\,(2k-\nu)z-\frac{\pi\nu}{2}\right)- b\sqrt{2\pi}\left(\cos\left(\frac{i b^2}{4(2 c k-c\nu)}+e-\frac{\pi\nu}{2}\right)C\left(\frac{b+2 c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)- S\left(\frac{b+2 c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)\sin\left(\frac{i b^2}{4(2 c k-c\nu)}+e-\frac{\pi\nu}{2}\right)\right)\right)+\frac{1}{(2 i c k-i c\nu)^{3/2}} \left(b\sqrt{2\pi}\left(\cos\left(-\frac{i b^2}{4(2 c k-c\nu)}+e+\frac{\pi\nu}{2}\right)C\left(\frac{2 i c(2k-\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)+S\left(\frac{2 i c(2k-\nu)\sqrt{z}-b}{\sqrt{2\pi}\sqrt{i c(2k-\nu)}}\right)\sin\left(-\frac{i b^2}{4(2 c k-c\nu)}+e+\frac{\pi\nu}{2}\right)\right)-2\sqrt{2 i c k-i c\nu}\,\sin\left(\sqrt{z}\,b+e+\frac{\pi\nu}{2}-i c(2k-\nu)z\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos\left(b z^r+d z\right)\sinh^{\nu}(c z)$

01.19.21.2616.01

$$\int \cos\left(b z^2 + d z\right) \sinh^{\nu}(c z)\, dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{\sqrt{-b}\, (d+2 b z)}{b \sqrt{2 \pi}}\right) - S\left(\frac{\sqrt{-b}\, (d+2 b z)}{b \sqrt{2 \pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{-b}} + i^{\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{b}} \left(\cos\left(\frac{(d + 2 i c k - i c \nu)^2}{4 b} + \frac{\pi \nu}{2}\right) C\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) + S\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(\frac{(d + 2 i c k - i c \nu)^2}{4 b} + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b}} \left(\cos\left(\frac{\pi \nu}{2} - \frac{(-d + 2 i c k - i c \nu)^2}{4 b}\right) C\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) + S\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{(-d + 2 i c k - i c \nu)^2}{4 b}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2617.01

$$\int \cos\left(\sqrt{z}\, b + d z\right) \sinh^{\nu}(c z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2 \pi} \left(\cos\left(\frac{b^2}{4 d}\right) C\left(\frac{\sqrt{-d}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2 \pi}}\right) - S\left(\frac{\sqrt{-d}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2 \pi}}\right) \sin\left(\frac{b^2}{4 d}\right)\right) - 2 \sqrt{-d}\, \sin\left(\sqrt{z}\, b + d z\right)\right)\right) + i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(d + 2 i c k - i c \nu)^{3/2}} \left(-b \sqrt{2 \pi}\, \cos\left(\frac{b^2}{4 (d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) C\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2 \pi}\, \sqrt{d + 2 i c k - i c \nu}}\right) - b \sqrt{2 \pi}\, S\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2 \pi}\, \sqrt{d + 2 i c k - i c \nu}}\right) \sin\left(\frac{b^2}{4 (d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) + 2 \sqrt{d + 2 i c k - i c \nu}\, \sin\left(\sqrt{z}\, b + (d + 2 i c k - i c \nu) z - \frac{\pi \nu}{2}\right)\right) + \left(b \sqrt{2 \pi}\, \cos\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) C\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2 \pi}\, \sqrt{-d + 2 i c k - i c \nu}}\right) + b \sqrt{2 \pi}\, S\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2 \pi}\, \sqrt{-d + 2 i c k - i c \nu}}\right) \sin\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + \frac{\pi \nu}{2}\right) - 2 \sqrt{-d + 2 i c k - i c \nu}\, \sin\left(\sqrt{z}\, b + \frac{\pi \nu}{2} - (-d + 2 i c k - i c \nu) z\right)\right) \Big/ (-d + 2 i c k - i c \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + d z + e\right) \sinh^{\nu}(c z)$

01.19.21.2618.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^{\nu}(c z)\, dz = \frac{1}{\sqrt{-b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) C\left(\frac{\sqrt{-b}\,(d + 2 b z)}{b \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{-b}\,(d + 2 b z)}{b \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right) + i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\cos\left(-\frac{(-d + 2 i c k - i c \nu)^2}{4 b} + e + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) + S\left(\frac{-d + 2 i c k - i c \nu - 2 b z}{\sqrt{-b}\sqrt{2\pi}}\right) \sin\left(-\frac{(-d + 2 i c k - i c \nu)^2}{4 b} + e + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i c k - i c \nu)^2}{4 b} + e - \frac{\pi \nu}{2}\right) C\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) - S\left(\frac{d + 2 i c k - i c \nu + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(-\frac{(d + 2 i c k - i c \nu)^2}{4 b} + e - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2619.01

$$\int \cos\left(\sqrt{z}\, b + e + d z\right) \sinh^{\nu}(c z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right) C\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{-d}\,\left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right)\right) - 2 \sqrt{-d}\, \sin\left(\sqrt{z}\, b + e + d z\right)\right)\right) + i^{\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(d + 2 i c k - i c \nu)^{3/2}} \left(-b \sqrt{2\pi}\, \cos\left(-\frac{b^2}{4 (d + 2 i c k - i c \nu)} + e - \frac{\pi \nu}{2}\right) C\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2\pi}\sqrt{d + 2 i c k - i c \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{b + 2 (d + 2 i c k - i c \nu) \sqrt{z}}{\sqrt{2\pi}\sqrt{d + 2 i c k - i c \nu}}\right) \sin\left(-\frac{b^2}{4 (d + 2 i c k - i c \nu)} + e - \frac{\pi \nu}{2}\right) + 2 \sqrt{d + 2 i c k - i c \nu}\, \sin\left(\sqrt{z}\, b + e + (d + 2 i c k - i c \nu) z - \frac{\pi \nu}{2}\right)\right) + \left(b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + e + \frac{\pi \nu}{2}\right) C\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2\pi}\sqrt{-d + 2 i c k - i c \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (-d + 2 i c k - i c \nu) \sqrt{z} - b}{\sqrt{2\pi}\sqrt{-d + 2 i c k - i c \nu}}\right) \sin\left(\frac{b^2}{4 (-d + 2 i c k - i c \nu)} + e + \frac{\pi \nu}{2}\right) - 2 \sqrt{-d + 2 i c k - i c \nu}\, \sin\left(\sqrt{z}\, b + e + \frac{\pi \nu}{2} - (-d + 2 i c k - i c \nu) z\right)\right) \Big/ (-d + 2 i c k - i c \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r\right) \sinh^{\nu}(f z + g)$

01.19.21.2620.01

$$\int \cos(b z^2) \sinh^\nu(g + f z)\, dz = -\frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, C\left(\frac{b\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right)}{\sqrt{-b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) + S\left(\frac{2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) - S\left(\frac{2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2621.01

$$\int \cos\left(b \sqrt{z}\right) \sinh^\nu(g + f z)\, dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(b\sqrt{z}\right) + b \sqrt{z} \sin\left(b \sqrt{z}\right)\right)}{b^2} + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{(2 i f k - i f \nu)^{3/2}} \left(-b \sqrt{2\pi} \cos\left(-\frac{b^2}{4 (2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) C\left(\frac{b + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{b + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}}\right) \sin\left(-\frac{b^2}{4 (2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) + 2 \sqrt{2 i f k - i f \nu} \sin\left(\sqrt{z}\, b + 2 i g k - i g \nu + (2 i f k - i f \nu) z - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(2 i f k - i f \nu)^{3/2}} \left(b \sqrt{2\pi} \cos\left(\frac{b^2}{4 (2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) C\left(\frac{2 (2 i f k - i f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2 (2 i f k - i f \nu) \sqrt{z} - b}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}}\right) \sin\left(\frac{b^2}{4 (2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) - 2 \sqrt{2 i f k - i f \nu} \sin\left(\sqrt{z}\, b - 2 i g k + i g \nu + \frac{\pi \nu}{2} - (2 i f k - i f \nu) z\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + e) \sinh^\nu(f z + g)$

01.19.21.2622.01

$$\int \cos\left(b z^2+e\right) \sinh^{\nu}(g+f z)\, dz = -\frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos(e)\, C\left(\frac{b\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right)+S\left(\frac{b\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b}}\right)\sin(e)\right)}{\sqrt{-b}}+$$
$$i^{\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}}\left(\cos\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e-i g (2k-\nu)+\frac{\pi \nu}{2}\right) C\left(\frac{2 i f k-i f \nu-2 b z}{\sqrt{-b}\,\sqrt{2\pi}}\right)+\right.\right.$$
$$\left. S\left(\frac{2 i f k-i f \nu-2 b z}{\sqrt{-b}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e-i g (2k-\nu)+\frac{\pi \nu}{2}\right)\right)+$$
$$\frac{1}{\sqrt{b}}\left(\cos\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e+g i (2k-\nu)-\frac{\pi \nu}{2}\right) C\left(\frac{2 i f k-i f \nu+2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right)-\right.$$
$$\left.\left.S\left(\frac{2 i f k-i f \nu+2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(2 i f k-i f \nu)^2}{4 b}+e+g i (2k-\nu)-\frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2623.01

$$\int \cos\left(\sqrt{z}\, b+e\right) \sinh^{\nu}(g+f z)\, dz =$$
$$\frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos\left(\sqrt{z}\, b+e\right)+b\sqrt{z}\, \sin\left(\sqrt{z}\, b+e\right)\right)}{b^2}+i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k}$$
$$\left(\frac{1}{(2 i f k-i f \nu)^{3/2}}\left(-b\sqrt{2\pi}\, \cos\left(-\frac{b^2}{4(2 i f k-i f \nu)}+e+2 i g k-i g \nu-\frac{\pi \nu}{2}\right) C\left(\frac{b+2(2 i f k-i f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f k-i f \nu}}\right)+\right.\right.$$
$$b\sqrt{2\pi}\, S\left(\frac{b+2(2 i f k-i f \nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2 i f k-i f \nu}}\right) \sin\left(-\frac{b^2}{4(2 i f k-i f \nu)}+e+2 i g k-i g \nu-\frac{\pi \nu}{2}\right)+$$
$$\left. 2\sqrt{2 i f k-i f \nu}\, \sin\left(\sqrt{z}\, b+e+2 i g k-i g \nu+(2 i f k-i f \nu) z-\frac{\pi \nu}{2}\right)\right)+$$
$$\frac{1}{(2 i f k-i f \nu)^{3/2}}\left(b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(2 i f k-i f \nu)}+e-2 i g k+i g \nu+\frac{\pi \nu}{2}\right) C\left(\frac{2(2 i f k-i f \nu)\sqrt{z}-b}{\sqrt{2\pi}\,\sqrt{2 i f k-i f \nu}}\right)+\right.$$
$$b\sqrt{2\pi}\, S\left(\frac{2(2 i f k-i f \nu)\sqrt{z}-b}{\sqrt{2\pi}\,\sqrt{2 i f k-i f \nu}}\right) \sin\left(\frac{b^2}{4(2 i f k-i f \nu)}+e-2 i g k+i g \nu+\frac{\pi \nu}{2}\right)-$$
$$\left.\left. 2\sqrt{2 i f k-i f \nu}\, \sin\left(\sqrt{z}\, b+e-2 i g k+i g \nu+\frac{\pi \nu}{2}-(2 i f k-i f \nu) z\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + d z\right) \sinh^\nu(f z + g)$

01.19.21.2624.01

$$\int \cos\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{-b}} +$$

$$i^\nu\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\cos\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) +\right.\right.$$

$$\left. S\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2\pi}}\right) \sin\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} - i g (2 k - \nu) + \frac{\pi \nu}{2}\right)\right) +$$

$$\frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) -\right.$$

$$\left.\left.\left. S\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + g i (2 k - \nu) - \frac{\pi \nu}{2}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2625.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}(g + f\, z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b\sqrt{2\pi} \left(\cos\left(\frac{b^2}{4d}\right) C\left(\frac{\sqrt{-d}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{-d}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right)\right) - 2\sqrt{-d}\, \sin\left(\sqrt{z}\, b + d\, z\right)\right)\right) +$$

$$i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\left(\left(-b\sqrt{2\pi}\, \cos\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) C\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i f k - i f \nu}}\right) + \right.\right.\right.$$

$$b\sqrt{2\pi}\, S\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i f k - i f \nu}}\right) \sin\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) +$$

$$\left. 2\sqrt{d + 2 i f k - i f \nu}\, \sin\left(\sqrt{z}\, b + 2 i g k - i g \nu + (d + 2 i f k - i f \nu) z - \frac{\pi \nu}{2}\right)\right) \Big/ (d + 2 i f k - i f \nu)^{3/2} +$$

$$\left(b\sqrt{2\pi}\, \cos\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) C\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i f k - i f \nu}}\right) + \right.$$

$$b\sqrt{2\pi}\, S\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i f k - i f \nu}}\right)$$

$$\sin\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) - 2\sqrt{-d + 2 i f k - i f \nu}$$

$$\left.\left. \sin\left(\sqrt{z}\, b - 2 i g k + i g \nu + \frac{\pi \nu}{2} - (-d + 2 i f k - i f \nu) z\right)\right) \Big/ (-d + 2 i f k - i f \nu)^{3/2}\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \sinh^{\nu}(f\, z + g)$

01.19.21.2626.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^{\nu}(g + f z)\, dz = \frac{1}{\sqrt{-b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) C\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2 \pi}}\right) - S\left(\frac{\sqrt{-b}\, (d + 2 b z)}{b \sqrt{2 \pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right) +$$

$$i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{-b}} \left(\cos\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} + e - i g (2 k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) + \right.\right.$$

$$\left. S\left(\frac{-d + 2 i f k - i f \nu - 2 b z}{\sqrt{-b} \sqrt{2 \pi}}\right) \sin\left(-\frac{(-d + 2 i f k - i f \nu)^2}{4 b} + e - i g (2 k - \nu) + \frac{\pi \nu}{2}\right)\right) +$$

$$\frac{1}{\sqrt{b}} \left(\cos\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + e + g i (2 k - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) - \right.$$

$$\left.\left. S\left(\frac{d + 2 i f k - i f \nu + 2 b z}{\sqrt{b} \sqrt{2 \pi}}\right) \sin\left(-\frac{(d + 2 i f k - i f \nu)^2}{4 b} + e + g i (2 k - \nu) - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2627.01

$$\int \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}(g + f\, z)\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right) C\left(\frac{\sqrt{-d}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) - S\left(\frac{\sqrt{-d}\, \left(b + 2 d \sqrt{z}\right)}{d \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{b^2}{d} - 4 e\right)\right)\right) - 2 \sqrt{-d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right) + i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\left(-b \sqrt{2\pi}\, \cos\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) C\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i f k - i f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{b + 2(d + 2 i f k - i f \nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{d + 2 i f k - i f \nu}}\right) \sin\left(-\frac{b^2}{4(d + 2 i f k - i f \nu)} + e + 2 i g k - i g \nu - \frac{\pi \nu}{2}\right) + 2 \sqrt{d + 2 i f k - i f \nu}\, \sin\left(\sqrt{z}\, b + e + 2 i g k - i g \nu + (d + 2 i f k - i f \nu) z - \frac{\pi \nu}{2}\right)\right) \Big/ (d + 2 i f k - i f \nu)^{3/2} + \left(b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) C\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i f k - i f \nu}}\right) + b \sqrt{2\pi}\, S\left(\frac{2(-d + 2 i f k - i f \nu)\sqrt{z} - b}{\sqrt{2\pi}\, \sqrt{-d + 2 i f k - i f \nu}}\right) \sin\left(\frac{b^2}{4(-d + 2 i f k - i f \nu)} + e - 2 i g k + i g \nu + \frac{\pi \nu}{2}\right) - 2 \sqrt{-d + 2 i f k - i f \nu}\, \sin\left(\sqrt{z}\, b + e - 2 i g k + i g \nu + \frac{\pi \nu}{2} - (-d + 2 i f k - i f \nu) z\right)\right) \Big/ (-d + 2 i f k - i f \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b\, z) \sinh^{\nu}(c\, z^r)$

01.19.21.2628.01

$$\int \cos(b\,z)\sinh^{\nu}(c\,z^2)\,dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(b\,z)\,(2\,i)^{-\nu}}{b} + 2^{-\nu-\frac{1}{2}}\,i^{\nu}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{b^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-b}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+ S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-b}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{b^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{b^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right) C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-b}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-b}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{b^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2629.01

$$\int \cos(b\,z)\sinh^{\nu}(c\sqrt{z})\,dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(b\,z)\,(2\,i)^{-\nu}}{b} + 2^{-\nu-1}\,i^{\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-b)^{3/2}}\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{\pi\,\nu}{2}-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,b}\right)C\left(\frac{-2\sqrt{z}\,b+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)- \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,b+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,b}\right)- 2\sqrt{-b}\,\sin\left(\frac{\pi\,\nu}{2}+b\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)+\frac{1}{(-b)^{3/2}}\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,b}+\frac{\pi\,\nu}{2}\right) C\left(\frac{-2\sqrt{z}\,b-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,b-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-b}\,\sqrt{2\pi}}\right) \sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,b}+\frac{\pi\,\nu}{2}\right)+2\sqrt{-b}\,\sin\left(\frac{\pi\,\nu}{2}-b\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\sinh^{\nu}(c\,z^r)$

01.19.21.2630.01

$$\int \cos(e+d\,z)\sinh^{\nu}(c\,z^2)\,dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)(2\,i)^{-\nu}}{d} + 2^{-\nu-\frac{1}{2}}\,i^{\nu}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{d^2}{4(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)C\left(\frac{2(i\,c\,\nu-2\,i\,c\,s)z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+ S\left(\frac{2(i\,c\,\nu-2\,i\,c\,s)z-d}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{d^2}{4(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)\right)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{d^2}{4(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)C\left(\frac{2(2\,i\,c\,s-i\,c\,\nu)z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+ S\left(\frac{2(2\,i\,c\,s-i\,c\,\nu)z-d}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{d^2}{4(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2631.01

$$\int \cos(e+d\,z)\sinh^{\nu}(c\sqrt{z})\,dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)(2\,i)^{-\nu}}{d} + 2^{-\nu-1}\,i^{\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)- \sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e-\frac{\pi\,\nu}{2}\right)- 2\sqrt{-d}\,\sin\left(e+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)+ \frac{1}{(-d)^{3/2}}\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e+\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)- \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e+\frac{\pi\,\nu}{2}\right)- 2\sqrt{-d}\,\sin\left(e+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(a\,z^r)\sinh^{\nu}(c\,z^r)$

01.19.21.2632.01

$$\int \cos(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{i^{-\nu} 2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{1}{r}, -i b z^r\right) (-i b z^r)^{-1/r} + (i b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i b z^r\right)\right) (1 - \nu \bmod 2)}{r} - \frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-i b - 2 c s + c \nu) z^r\right) ((-i b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu ((i b - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - 2 c s + c \nu) z^r\right) + ((-i b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-i b + 2 c s - c \nu) z^r\right) + ((i b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b + 2 c s - c \nu) z^r\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2633.01

$$\int \cos(b z^2) \sinh^\nu(c z^2)\, dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) \sin\left(\frac{\pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-b + 2 i c s - i c \nu}\right) + \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) \sin\left(\frac{\pi \nu}{2}\right)\right) \Big/ \left(\sqrt{-b - 2 i c s + i c \nu}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2634.01

$$\int \cos\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(b \sqrt{z}\right) + b \sqrt{z} \sin\left(b \sqrt{z}\right)\right)}{b^2} + i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(-b - i c (\nu - 2 s))^2} \left(\cos\left((b + c i (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right) - (-b - i c (\nu - 2 s)) \sqrt{z} \sin\left((b + c i (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(i c (\nu - 2 s) - b)^2} \left(\cos\left(\frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) - (i c (\nu - 2 s) - b) \sqrt{z} \sin\left(\frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(a z^r + e) \sinh^\nu(c z^r)$

01.19.21.2635.01

$$\int \cos(b z^r + e) \sinh^\nu(c z^r) \, dz = -\frac{1}{r} \left(i^{-\nu} 2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(\frac{1}{r}, -i b z^r\right) (-i b z^r)^{-1/r} + e^{-i e} (i b z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i b z^r\right) \right) (1 - \nu \bmod 2) \right) - \frac{1}{r} \left(2^{-\nu-1} z \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{i e} \Gamma\left(\frac{1}{r}, (-i b - 2 c s + c \nu) z^r\right) ((-i b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu e^{-i e} ((i b - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - 2 c s + c \nu) z^r\right) + e^{i e} ((-i b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-i b + 2 c s - c \nu) z^r\right) + e^{-i e} ((i b + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b + 2 c s - c \nu) z^r\right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2636.01

$$\int \cos(b z^2 + e) \sinh^\nu(c z^2) \, dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos(e) C\left(\sqrt{b} \sqrt{\frac{2}{\pi}} z\right) - S\left(\sqrt{b} \sqrt{\frac{2}{\pi}} z\right) \sin(e) \right)}{\sqrt{b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(e + \frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu} \, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu} \, z\right) \sin\left(e + \frac{\pi \nu}{2}\right) \right) + \frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(e - \frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu} \, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu} \, z\right) \sin\left(e - \frac{\pi \nu}{2}\right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2637.01

$$\int \cos\left(\sqrt{z} \, b + e\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\sqrt{z} \, b + e\right) + b \sqrt{z} \sin\left(\sqrt{z} \, b + e\right) \right)}{b^2} + i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i c (\nu - 2 s) - b)^2} \left(\cos\left(e + \frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) - (i c (\nu - 2 s) - b) \sqrt{z} \sin\left(e + \frac{\pi \nu}{2} - (i c (\nu - 2 s) - b) \sqrt{z}\right) \right) + \frac{1}{(-b - i c (\nu - 2 s))^2} \left(\cos\left(e - (-b - i c (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right) - (-b - i c (\nu - 2 s)) \sqrt{z} \sin\left(e - (-b - i c (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z) \sinh^\nu(c z^r)$

01.19.21.2638.01

$$\int \cos\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}} + i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2ics + icv}} \left(\cos\left(\frac{d^2}{4(-b-2ics+icv)} - \frac{\pi\nu}{2}\right) C\left(\frac{2(-b-2ics+icv)z - d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right) + S\left(\frac{2(-b-2ics+icv)z - d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right) \sin\left(\frac{d^2}{4(-b-2ics+icv)} - \frac{\pi\nu}{2}\right)\right) + \frac{1}{\sqrt{-b+2ics-icv}} \left(\cos\left(\frac{d^2}{4(-b+2ics-icv)} + \frac{\pi\nu}{2}\right) C\left(\frac{2(-b+2ics-icv)z - d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right) + S\left(\frac{2(-b+2ics-icv)z - d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right) \sin\left(\frac{d^2}{4(-b+2ics-icv)} + \frac{\pi\nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2639.01

$$\int \cos\left(\sqrt{z}\, b + d z\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(S\left(\frac{b + 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right) - \cos\left(\frac{b^2}{4d}\right) C\left(\frac{b + 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\right) - 2\sqrt{-d} \sin\left(\sqrt{z}\, b + d z\right)\right)\right) + i^{\nu} 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(\sqrt{2\pi} (-b - 2ick + icv) \cos\left(\frac{(b + 2ick - icv)^2}{4d} + \frac{\pi\nu}{2}\right) C\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) - \sqrt{2\pi} (b + 2ick - icv) S\left(\frac{b + 2ick - icv + 2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(\frac{(b + 2ick - icv)^2}{4d} + \frac{\pi\nu}{2}\right) + 2\sqrt{d} \sin\left(-\frac{\pi\nu}{2} + d z + (b + 2ick - icv)\sqrt{z}\right)\right) + \frac{1}{(-d)^{3/2}} \left(\sqrt{2\pi} (b - 2ick + icv) \cos\left(\frac{\pi\nu}{2} - \frac{(-b + 2ick - icv)^2}{4d}\right) C\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi} (-b + 2ick - icv) S\left(\frac{-b + 2ick - icv - 2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{\pi\nu}{2} - \frac{(-b + 2ick - icv)^2}{4d}\right) - 2\sqrt{-d} \sin\left(\frac{\pi\nu}{2} + d z - (-b + 2ick - icv)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + d z + e\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.2640.01

$$\int \cos(b z^2 + d z + e) \sinh^\nu(c z^2)\, dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4e\right)\right)\right)\right) + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right) C\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right) + S\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right) \sin\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right) C\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right) + S\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right) \sin\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2641.01

$$\int \cos(\sqrt{z}\, b + e + d z) \sinh^\nu(c \sqrt{z})\, dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d} - e\right) - \cos\left(\frac{b^2}{4d} - e\right) C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right)\right) - 2\sqrt{-d} \sin(\sqrt{z}\, b + e + d z)\right)\right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(\sqrt{2\pi} (-b - 2 i c k + i c \nu) \cos\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + e - \frac{\pi \nu}{2}\right) C\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) + \sqrt{2\pi} (b + 2 i c k - i c \nu) S\left(\frac{b + 2 i c k - i c \nu + 2 d \sqrt{z}}{\sqrt{d} \sqrt{2\pi}}\right) \sin\left(-\frac{(b + 2 i c k - i c \nu)^2}{4d} + e - \frac{\pi \nu}{2}\right) + 2\sqrt{d} \sin\left(e + d z + (b + 2 i c k - i c \nu)\sqrt{z} - \frac{\pi \nu}{2}\right)\right) + \frac{1}{(-d)^{3/2}} \left(\sqrt{2\pi} (b - 2 i c k + i c \nu) \cos\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} + e + \frac{\pi \nu}{2}\right) C\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) - \sqrt{2\pi} (-b + 2 i c k - i c \nu) S\left(\frac{-b + 2 i c k - i c \nu - 2 d \sqrt{z}}{\sqrt{-d} \sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2 i c k - i c \nu)^2}{4d} + e + \frac{\pi \nu}{2}\right) - 2\sqrt{-d} \sin\left(e + \frac{\pi \nu}{2} + d z - (-b + 2 i c k - i c \nu)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(d z) \sinh^\nu(c z^r + g)$

01.19.21.2642.01

$$\int \cos(d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)\,(2\,i)^{-\nu}}{d} + 2^{-\nu-\frac{1}{2}}\,i^{\nu}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2643.01

$$\int \cos(d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g\right)dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)\,(2\,i)^{-\nu}}{d} + 2^{-\nu-1}\,i^{\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(\sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\;d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)-\sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\;d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)-2\sqrt{-d}\,\sin\left(2\,i\,g\,s-i\,g\,\nu+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{(-d)^{3/2}}\left(\sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\;d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)-\sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\;d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\,\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)-2\sqrt{-d}\,\sin\left(-2\,g\,i\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\sinh^{\nu}\left(c\,z^r+g\right)$

01.19.21.2644.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(c\,z^2+g\right)dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)\,(2\,i)^{-\nu}}{d} + 2^{-\nu-\frac{1}{2}}\,i^{\nu}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+S\left(\frac{2\,(i\,c\,\nu-2\,i\,c\,s)\,z-d}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{d^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+S\left(\frac{2\,(2\,i\,c\,s-i\,c\,\nu)\,z-d}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{d^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2645.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+g\right)dz = \frac{\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)\,(2\,i)^{-\nu}}{d} + 2^{-\nu-1}\,i^{\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(-d)^{3/2}}\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\sqrt{z}\,d-2\,i\,c\,s+i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,d}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)-2\sqrt{-d}\,\sin\left(e+2\,i\,g\,s-i\,g\,\nu+d\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)+\frac{1}{(-d)^{3/2}}\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{-2\sqrt{z}\,d+2\,i\,c\,s-i\,c\,\nu}{\sqrt{-d}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,d}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)-2\sqrt{-d}\,\sin\left(e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}+d\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(a\,z^r)\sinh^{\nu}(c\,z^r+g)$

01.19.21.2646.01

$$\int \cos(b\, z^r) \sinh^\nu(c\, z^r + g)\, dz = -\frac{i^{-\nu}\, 2^{-\nu-1}\, z \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{1}{r}, -i\, b\, z^r\right) (-i\, b\, z^r)^{-1/r} + (i\, b\, z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, i\, b\, z^r\right)\right) (1 - \nu \bmod 2)}{r} - \frac{2^{-\nu-1}\, z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu\, e^{2\,g\,s - g\,\nu}\, \Gamma\left(\frac{1}{r}, (-i\, b - 2\, c\, s + c\, \nu)\, z^r\right) ((-i\, b - 2\, c\, s + c\, \nu)\, z^r)^{-1/r} + (-1)^\nu\, e^{2\,g\,s - g\,\nu}\, ((i\, b - 2\, c\, s + c\, \nu)\, z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i\, b - 2\, c\, s + c\, \nu)\, z^r\right) + e^{g\,\nu - 2\,g\,s}\, ((-i\, b + 2\, c\, s - c\, \nu)\, z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-i\, b + 2\, c\, s - c\, \nu)\, z^r\right) + e^{g\,\nu - 2\,g\,s}\, ((i\, b + 2\, c\, s - c\, \nu)\, z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i\, b + 2\, c\, s - c\, \nu)\, z^r\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.19.21.2647.01

$$\int \cos(b\, z^2) \sinh^\nu(c\, z^2 + g)\, dz = \frac{i^{-\nu}\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} + i^\nu\, 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b + 2\, i\, c\, s - i\, c\, \nu}} \left(\cos\left(\frac{\pi\, \nu}{2} - i\, g\, (2\, s - \nu)\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2\, i\, c\, s - i\, c\, \nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2\, i\, c\, s - i\, c\, \nu}\, z\right) \sin\left(\frac{\pi\, \nu}{2} - i\, g\, (2\, s - \nu)\right)\right) + \frac{1}{\sqrt{-b - 2\, i\, c\, s + i\, c\, \nu}} \left(\cos\left(i\, g\, (2\, s - \nu) - \frac{\pi\, \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2\, i\, c\, s + i\, c\, \nu}\, z\right) + S\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2\, i\, c\, s + i\, c\, \nu}\, z\right) \sin\left(i\, g\, (2\, s - \nu) - \frac{\pi\, \nu}{2}\right)\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.19.21.2648.01

$$\int \cos\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(b \sqrt{z}\right) + b \sqrt{z}\, \sin\left(b \sqrt{z}\right)\right)}{b^2} + i^{-\nu}\, 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i\, c\, (\nu - 2\, s) - b)^2} \left(\cos\left(\frac{\pi\, \nu}{2} - i\, g\, (\nu - 2\, s) - (i\, c\, (\nu - 2\, s) - b) \sqrt{z}\right) - (i\, c\, (\nu - 2\, s) - b) \sqrt{z}\, \sin\left(\frac{\pi\, \nu}{2} - i\, g\, (\nu - 2\, s) - (i\, c\, (\nu - 2\, s) - b) \sqrt{z}\right)\right) + \frac{1}{(-b - i\, c\, (\nu - 2\, s))^2} \left(\cos\left(-\frac{\pi\, \nu}{2} + g\, i\, (\nu - 2\, s) - (-b - i\, c\, (\nu - 2\, s)) \sqrt{z}\right) - (-b - i\, c\, (\nu - 2\, s)) \sqrt{z}\, \sin\left(-\frac{\pi\, \nu}{2} + g\, i\, (\nu - 2\, s) - (-b - i\, c\, (\nu - 2\, s)) \sqrt{z}\right)\right)\right) /;\, \nu \in \mathbb{N}^+$$

Involving $\cos(a\, z^r + e) \sinh^\nu(c\, z^r + g)$

01.19.21.2649.01

$$\int \cos(b z^r + e) \sinh^\nu(c z^r + g)\, dz = -\frac{1}{r}\left(i^{-\nu} 2^{-\nu-1} z \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\!\left(\frac{1}{r}, -i b z^r\right) (-i b z^r)^{-1/r} + e^{-i e} (i b z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, i b z^r\right)\right) (1 - \nu \bmod 2)\right) - \frac{2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{i e + 2 g s - g \nu}\, \Gamma\!\left(\frac{1}{r}, (-i b - 2 c s + c \nu) z^r\right) ((-i b - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu e^{-i e + 2 g s - g \nu} ((i b - 2 c s + c \nu) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (i b - 2 c s + c \nu) z^r\right) + e^{i e - 2 g s + g \nu} ((-i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (-i b + 2 c s - c \nu) z^r\right) + e^{-i e - 2 g s + g \nu} ((i b + 2 c s - c \nu) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (i b + 2 c s - c \nu) z^r\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2650.01

$$\int \cos(b z^2 + e) \sinh^\nu(c z^2 + g)\, dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos(e)\, C\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right)}{\sqrt{b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\!\left(e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) C\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) + S\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b + 2 i c s - i c \nu}\, z\right) \sin\!\left(e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\!\left(e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) C\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) + S\!\left(\sqrt{\frac{2}{\pi}} \sqrt{-b - 2 i c s + i c \nu}\, z\right) \sin\!\left(e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2651.01

$$\int \cos\!\left(\sqrt{z}\, b + e\right) \sinh^\nu\!\left(\sqrt{z}\, c + g\right) dz = \frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\!\left(\sqrt{z}\, b + e\right) + b \sqrt{z} \sin\!\left(\sqrt{z}\, b + e\right)\right)}{b^2} + i^{-\nu} 2^{1-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i c (\nu - 2 s) - b)^2} \left(\cos\!\left(e + \frac{\pi \nu}{2} - i g (\nu - 2 s) - (i c (\nu - 2 s) - b) \sqrt{z}\right) - (i c (\nu - 2 s) - b) \sqrt{z} \sin\!\left(e + \frac{\pi \nu}{2} - i g (\nu - 2 s) - (i c (\nu - 2 s) - b) \sqrt{z}\right)\right) + \frac{1}{(-b - i c (\nu - 2 s))^2} \left(\cos\!\left(e + g i (\nu - 2 s) - (-b - i c (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right) - (-b - i c (\nu - 2 s)) \sqrt{z} \sin\!\left(e + g i (\nu - 2 s) - (-b - i c (\nu - 2 s)) \sqrt{z} - \frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z) \sinh^\nu(c z^r + g)$

01.19.21.2652.01

$$\int \cos\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + g\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4b}\right) C\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d+2bz}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4b}\right)\right)}{\sqrt{b}} + i^\nu 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2ics+icv}} \left(\cos\left(\frac{d^2}{4(-b-2ics+icv)} + g i (2s-\nu) - \frac{\pi\nu}{2}\right) C\left(\frac{2(-b-2ics+icv)z-d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right) + S\left(\frac{2(-b-2ics+icv)z-d}{\sqrt{2\pi}\sqrt{-b-2ics+icv}}\right) \sin\left(\frac{d^2}{4(-b-2ics+icv)} + g i (2s-\nu) - \frac{\pi\nu}{2}\right)\right) + \frac{1}{\sqrt{-b+2ics-icv}} \left(\cos\left(\frac{d^2}{4(-b+2ics-icv)} - i g (2s-\nu) + \frac{\pi\nu}{2}\right) C\left(\frac{2(-b+2ics-icv)z-d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right) + S\left(\frac{2(-b+2ics-icv)z-d}{\sqrt{2\pi}\sqrt{-b+2ics-icv}}\right) \sin\left(\frac{d^2}{4(-b+2ics-icv)} - i g (2s-\nu) + \frac{\pi\nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2653.01

$$\int \cos\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b \sqrt{2\pi} \left(S\left(\frac{b+2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4d}\right) - \cos\left(\frac{b^2}{4d}\right) C\left(\frac{b+2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right)\right) - 2\sqrt{-d}\, \sin\left(\sqrt{z}\, b + d z\right)\right)\right) + i^\nu 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(\sqrt{2\pi}\, (-b-2ick+icv) \cos\left(-\frac{(b+2ick-icv)^2}{4d} + 2igk - igv - \frac{\pi\nu}{2}\right) C\left(\frac{b+2ick-icv+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b+2ick-icv) S\left(\frac{b+2ick-icv+2d\sqrt{z}}{\sqrt{d}\sqrt{2\pi}}\right) \sin\left(-\frac{(b+2ick-icv)^2}{4d} + 2igk - igv - \frac{\pi\nu}{2}\right) + 2\sqrt{d}\, \sin\left(2igk - igv + dz + (b+2ick-icv)\sqrt{z} - \frac{\pi\nu}{2}\right)\right) + \frac{1}{(-d)^{3/2}} \left(\sqrt{2\pi}\, (b-2ick+icv) \cos\left(-\frac{(-b+2ick-icv)^2}{4d} - 2igk + igv + \frac{\pi\nu}{2}\right) C\left(\frac{-b+2ick-icv-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b+2ick-icv) S\left(\frac{-b+2ick-icv-2d\sqrt{z}}{\sqrt{-d}\sqrt{2\pi}}\right) \sin\left(-\frac{(-b+2ick-icv)^2}{4d} - 2igk + igv + \frac{\pi\nu}{2}\right) - 2\sqrt{-d}\, \sin\left(-2gik + igv + \frac{\pi\nu}{2} + dz - (-b+2ick-icv)\sqrt{z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $\cos\left(b z^r + d z + e\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.2654.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + g\right) dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right) +$$

$$i^{\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right) + S\left(\frac{2(-b - 2 i c s + i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b - 2 i c s + i c \nu}}\right) \sin\left(\frac{d^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right) + S\left(\frac{2(-b + 2 i c s - i c \nu) z - d}{\sqrt{2\pi}\sqrt{-b + 2 i c s - i c \nu}}\right) \sin\left(\frac{d^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2655.01

$$\int \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g\right) dz = \frac{1}{(-d)^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(b\sqrt{2\pi} \left(S\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right) - \cos\left(\frac{b^2}{4\, d} - e\right) C\left(\frac{b + 2\, d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right)\right) - 2\sqrt{-d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) +$$

$$i^{\nu}\, 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{d^{3/2}} \left(\sqrt{2\pi}\, (-b - 2\, i\, c\, k + i\, c\, \nu) \cos\left(-\frac{(b + 2\, i\, c\, k - i\, c\, \nu)^2}{4\, d} + e + 2\, i\, g\, k - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) \right.\right.$$

$$C\left(\frac{b + 2\, i\, c\, k - i\, c\, \nu + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) + \sqrt{2\pi}\, (b + 2\, i\, c\, k - i\, c\, \nu)$$

$$S\left(\frac{b + 2\, i\, c\, k - i\, c\, \nu + 2\, d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(b + 2\, i\, c\, k - i\, c\, \nu)^2}{4\, d} + e + 2\, i\, g\, k - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) +$$

$$\left.2\sqrt{d}\, \sin\left(e + 2\, i\, g\, k - i\, g\, \nu + d\, z + (b + 2\, i\, c\, k - i\, c\, \nu)\sqrt{z} - \frac{\pi\, \nu}{2}\right)\right) +$$

$$\frac{1}{(-d)^{3/2}} \left(\sqrt{2\pi}\, (b - 2\, i\, c\, k + i\, c\, \nu) \cos\left(-\frac{(-b + 2\, i\, c\, k - i\, c\, \nu)^2}{4\, d} + e - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) \right.$$

$$C\left(\frac{-b + 2\, i\, c\, k - i\, c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, k - i\, c\, \nu)$$

$$S\left(\frac{-b + 2\, i\, c\, k - i\, c\, \nu - 2\, d\sqrt{z}}{\sqrt{-d}\,\sqrt{2\pi}}\right) \sin\left(-\frac{(-b + 2\, i\, c\, k - i\, c\, \nu)^2}{4\, d} + e - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) -$$

$$\left.\left.2\sqrt{-d}\, \sin\left(e - 2\, i\, g\, k + i\, g\, \nu + \frac{\pi\, \nu}{2} + d\, z - (-b + 2\, i\, c\, k - i\, c\, \nu)\sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(d\, z) \sinh^{\nu}\left(c\, z^r + f\, z\right)$

01.19.21.2656.01

$$\int \cos(d\,z)\sinh^\nu(c\,z^2+f\,z)\,dz = -\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(d\,z)}{d} + i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\Bigg(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\Bigg(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+ S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-\frac{\pi\,\nu}{2}\right)\Bigg)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\Bigg(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+ S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)\Bigg)\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2657.01

$$\int \cos(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + i^{-\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\Bigg(\Bigg(\Bigg(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)- \sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}-\frac{\pi\,\nu}{2}\right)- 2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\,\sin\left(-\frac{\pi\,\nu}{2}-(-d-2\,i\,f\,s+i\,f\,\nu)\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\Bigg)\Big/(-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+ \Bigg(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)- \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right) \sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+\frac{\pi\,\nu}{2}\right)-2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\, \sin\left(\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\Bigg)\Big/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\sinh^\nu(c\,z^r+f\,z)$

01.19.21.2658.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(c\,z^2+f\,z\right)dz = -\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(e+d\,z)}{d} + i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+ S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e-\frac{\pi\,\nu}{2}\right)\right)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+ S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e+\frac{\pi\,\nu}{2}\right)\right)\right) /;\ \nu\in\mathbb{N}^+$$

01.19.21.2659.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+f\,z\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + i^{-\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s} \left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)- \sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right) \sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e-\frac{\pi\,\nu}{2}\right)-2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\, \sin\left(e-(-d-2\,i\,f\,s+i\,f\,\nu)\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\right)\Big/(-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+ \left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)- \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right) \sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e+\frac{\pi\,\nu}{2}\right)-2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\, \sin\left(e+\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)\,z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\Big/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right) /;\ \nu\in\mathbb{N}^+$$

Involving $\cos(b z^r)\sinh^\nu(c z^r + f z)$

01.19.21.2660.01

$$\int \cos(b z^2)\sinh^\nu(c z^2 + f z)\,dz = \frac{i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,C\left(\sqrt{b}\sqrt{\frac{2}{\pi}}\,z\right)}{\sqrt{b}} + i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{\sqrt{-b-2\,i\,c\,s+i\,c\,\nu}}\left(\cos\left(\frac{(i\,f\,\nu-2\,i\,f\,s)^2}{4\,(-b-2\,i\,c\,s+i\,c\,\nu)}-\frac{\pi\,\nu}{2}\right)C\left(\frac{-2\,f\,i\,s+i\,f\,\nu+2\,(-b-2\,i\,c\,s+i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{-b-2\,i\,c\,s+i\,c\,\nu}}\right)+\right.\right.$$
$$\left.S\left(\frac{-2\,f\,i\,s+i\,f\,\nu+2\,(-b-2\,i\,c\,s+i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{-b-2\,i\,c\,s+i\,c\,\nu}}\right)\sin\left(\frac{(i\,f\,\nu-2\,i\,f\,s)^2}{4\,(-b-2\,i\,c\,s+i\,c\,\nu)}-\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{1}{\sqrt{-b+2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(2\,i\,f\,s-i\,f\,\nu)^2}{4\,(-b+2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,i\,f\,s-i\,f\,\nu+2\,(-b+2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{-b+2\,i\,c\,s-i\,c\,\nu}}\right)+\right.$$
$$\left.\left.S\left(\frac{2\,i\,f\,s-i\,f\,\nu+2\,(-b+2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{-b+2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(2\,i\,f\,s-i\,f\,\nu)^2}{4\,(-b+2\,i\,c\,s-i\,c\,\nu)}+\frac{\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2661.01

$$\int \cos(b\sqrt{z})\sinh^\nu(\sqrt{z}\,c + f z)\,dz = -\frac{i^{-\nu}\,2^{1-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2 - 1)\left(\cos(b\sqrt{z})+b\sqrt{z}\,\sin(b\sqrt{z})\right)}{b^2}+$$
$$i^{-\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\left(\frac{1}{(2\,i\,f\,s-i\,f\,\nu)^{3/2}}\left(\sqrt{2\,\pi}\,(i\,b+2\,c\,s-c\,\nu)\cos\left(\frac{1}{4}\left(2\,\pi\,\nu-\frac{i\,(b-2\,i\,c\,s+i\,c\,\nu)^2}{2\,f\,s-f\,\nu}\right)\right)\right.\right.$$
$$C\left(\frac{i\,b+(2\,s-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(2\,s-\nu)}}\right)-\sqrt{2\,\pi}\,(i\,b+2\,c\,s-c\,\nu)\,S\left(\frac{i\,b+(2\,s-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(2\,s-\nu)}}\right)$$
$$\left.\sin\left(\frac{1}{4}\left(2\,\pi\,\nu-\frac{i\,(b-2\,i\,c\,s+i\,c\,\nu)^2}{2\,f\,s-f\,\nu}\right)\right)-2\sqrt{i\,f\,(2\,s-\nu)}\,\sin\left(\frac{\pi\,\nu}{2}+\left(b-i\,(2\,s-\nu)\left(c+f\sqrt{z}\right)\right)\sqrt{z}\right)\right)+$$
$$\frac{1}{(i\,f\,\nu-2\,i\,f\,s)^{3/2}}\left(\sqrt{2\,\pi}\,(i\,b+c\,(\nu-2\,s))\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,(b+2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,f\,s-f\,\nu)}\right)C\left(\frac{i\,b-(2\,s-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{-i\,f\,(2\,s-\nu)}}\right)+\right.$$
$$\sqrt{2\,\pi}\,(-i\,b+2\,c\,s-c\,\nu)\,S\left(\frac{i\,b-(2\,s-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{-i\,f\,(2\,s-\nu)}}\right)\sin\left(\frac{1}{4}\left(\frac{i\,(b+2\,i\,c\,s-i\,c\,\nu)^2}{2\,f\,s-f\,\nu}-2\,\pi\,\nu\right)\right)+$$
$$\left.\left.2\sqrt{-i\,f\,(2\,s-\nu)}\,\sin\left(\frac{\pi\,\nu}{2}-i\left(-i\,b+(2\,s-\nu)\left(c+f\sqrt{z}\right)\right)\sqrt{z}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $\cos(b z^r + e)\sinh^\nu(c z^r + f z)$

01.19.21.2662.01

$$\int \cos\left(b z^2+e\right) \sinh^{\nu}\left(c z^2+f z\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\cos(e)\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) - S\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right)}{\sqrt{b}} + i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b-2 i c s+i c \nu}} \left(\cos\left(\frac{(i f \nu-2 i f s)^2}{4(-b-2 i c s+i c \nu)}+e-\frac{\pi \nu}{2}\right) C\left(\frac{-2 f i s+i f \nu+2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi} \sqrt{-b-2 i c s+i c \nu}}\right) + S\left(\frac{-2 f i s+i f \nu+2(-b-2 i c s+i c \nu) z}{\sqrt{2\pi} \sqrt{-b-2 i c s+i c \nu}}\right) \sin\left(\frac{(i f \nu-2 i f s)^2}{4(-b-2 i c s+i c \nu)}+e-\frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b+2 i c s-i c \nu}} \left(\cos\left(\frac{(2 i f s-i f \nu)^2}{4(-b+2 i c s-i c \nu)}+e+\frac{\pi \nu}{2}\right) C\left(\frac{2 i f s-i f \nu+2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi} \sqrt{-b+2 i c s-i c \nu}}\right) + S\left(\frac{2 i f s-i f \nu+2(-b+2 i c s-i c \nu) z}{\sqrt{2\pi} \sqrt{-b+2 i c s-i c \nu}}\right) \sin\left(\frac{(2 i f s-i f \nu)^2}{4(-b+2 i c s-i c \nu)}+e+\frac{\pi \nu}{2}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.2663.01

$$\int \cos\left(\sqrt{z}\, b+e\right) \sinh^{\nu}\left(\sqrt{z}\, c+f z\right) dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2-1) \left(\cos\left(\sqrt{z}\, b+e\right)+b \sqrt{z} \sin\left(\sqrt{z}\, b+e\right)\right)}{b^2} + i^{\nu} 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{(i f \nu-2 i f s)^{3/2}} \left(\sqrt{2\pi}\, (i b-2 c s+c \nu) \cos\left(\frac{i(b+2 i c s-i c \nu)^2}{4(2 f s-f \nu)}+e-\frac{\pi \nu}{2}\right) C\left(\frac{i b-(2 s-\nu)\left(c+2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{-i f(2 s-\nu)}}\right) - \sqrt{2\pi}\, (i b+c(\nu-2 s))\, S\left(\frac{i b-(2 s-\nu)\left(c+2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{-i f(2 s-\nu)}}\right) \sin\left(\frac{i(b+2 i c s-i c \nu)^2}{4(2 f s-f \nu)}+e-\frac{\pi \nu}{2}\right) - 2 \sqrt{-i f(2 s-\nu)} \sin\left(e+\left(b+i(2 s-\nu)\left(c+f \sqrt{z}\right)\right) \sqrt{z}-\frac{\pi \nu}{2}\right)\right) + \frac{1}{(2 i f s-i f \nu)^{3/2}} \left(\sqrt{2\pi}\, (i b+2 c s-c \nu) \cos\left(-\frac{i(b-2 i c s+i c \nu)^2}{4(2 f s-f \nu)}+e+\frac{\pi \nu}{2}\right) C\left(\frac{i b+(2 s-\nu)\left(c+2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{i f(2 s-\nu)}}\right) - \sqrt{2\pi}\, (i b+2 c s-c \nu)\, S\left(\frac{i b+(2 s-\nu)\left(c+2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{i f(2 s-\nu)}}\right) \sin\left(-\frac{i(b-2 i c s+i c \nu)^2}{4(2 f s-f \nu)}+e+\frac{\pi \nu}{2}\right) - 2 \sqrt{2 i f s-i f \nu} \sin\left(e+\frac{\pi \nu}{2}+\left(b-i(2 s-\nu)\left(c+f \sqrt{z}\right)\right) \sqrt{z}\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + d z) \sinh^v(c z^r + f z)$

01.19.21.2664.01

$$\int \cos(b z^2 + d z) \sinh^v(c z^2 + f z) \, dz == \frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + S\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{b}} + i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s}$$

$$\left(\frac{1}{\sqrt{-b - 2 i c s + i c v}} \left(\cos\left(\frac{(-d - 2 i f s + i f v)^2}{4 (-b - 2 i c s + i c v)} - \frac{\pi v}{2}\right) C\left(\frac{-d - 2 i f s + i f v + 2 (-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}}\right) + \right.\right.$$

$$\left. S\left(\frac{-d - 2 i f s + i f v + 2 (-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}}\right) \sin\left(\frac{(-d - 2 i f s + i f v)^2}{4 (-b - 2 i c s + i c v)} - \frac{\pi v}{2}\right)\right) +$$

$$\frac{1}{\sqrt{-b + 2 i c s - i c v}} \left(\cos\left(\frac{(-d + 2 i f s - i f v)^2}{4 (-b + 2 i c s - i c v)} + \frac{\pi v}{2}\right) C\left(\frac{-d + 2 i f s - i f v + 2 (-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}}\right) + \right.$$

$$\left.\left. S\left(\frac{-d + 2 i f s - i f v + 2 (-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}}\right) \sin\left(\frac{(-d + 2 i f s - i f v)^2}{4 (-b + 2 i c s - i c v)} + \frac{\pi v}{2}\right)\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.2665.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4\, d}\right) C\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d}\right) + 2 \sqrt{d} \sin\left(\sqrt{z}\, b + d\, z\right) \right) \right) + i^{-\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\sqrt{2\pi}\, (b + 2\, i\, c\, s - i\, c\, \nu) \cos\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2}\right) C\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) - \sqrt{2\pi}\, (-b - 2\, i\, c\, s + i\, c\, \nu)\, S\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \sin\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} - \frac{\pi\, \nu}{2}\right) + 2 \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu} \sin\left(\frac{\pi\, \nu}{2} + (-d - 2\, i\, f\, s + i\, f\, \nu)\, z + (-b - 2\, i\, c\, s + i\, c\, \nu) \sqrt{z}\right) \right) \Big/ (-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(\sqrt{2\pi}\, (b - 2\, i\, c\, s + i\, c\, \nu) \cos\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2}\right) C\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, s - i\, c\, \nu)\, S\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sin\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + \frac{\pi\, \nu}{2}\right) - 2 \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu} \sin\left(\frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - (-b + 2\, i\, c\, s - i\, c\, \nu) \sqrt{z}\right) \right) \Big/ (-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z + e\right) \sinh^{\nu}\left(c\, z^r + f\, z\right)$

01.19.21.2666.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^\nu\left(c z^2 + f z\right) dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right) +$$

$$i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s}$$

$$\left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4 (-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right) C\left(\frac{-d - 2 i f s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right) + S\left(\frac{-d - 2 i f s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}}\right) \sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4 (-b - 2 i c s + i c \nu)} + e - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right) + S\left(\frac{-d + 2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}}\right) \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} + e + \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2667.01

$$\int \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + f\, z\right) dz = \frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4\,d} - e\right) C\left(\frac{b + 2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) - b\sqrt{2\pi}\, S\left(\frac{b + 2\,d\sqrt{z}}{\sqrt{d}\,\sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\,d} - e\right) + 2\sqrt{d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) +$$

$$i^{-\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b + 2\,i\,c\,s - i\,c\,\nu) \cos\left(\frac{(-b - 2\,i\,c\,s + i\,c\,\nu)^2}{4\,(-d - 2\,i\,f\,s + i\,f\,\nu)} + e - \frac{\pi\,\nu}{2}\right) \right.\right.\right.$$

$$C\left(\frac{-b - 2\,i\,c\,s + i\,c\,\nu + 2\,(-d - 2\,i\,f\,s + i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\,i\,f\,s + i\,f\,\nu}}\right) - \sqrt{2\pi}\, (-b - 2\,i\,c\,s + i\,c\,\nu)$$

$$S\left(\frac{-b - 2\,i\,c\,s + i\,c\,\nu + 2\,(-d - 2\,i\,f\,s + i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d - 2\,i\,f\,s + i\,f\,\nu}}\right) \sin\left(\frac{(-b - 2\,i\,c\,s + i\,c\,\nu)^2}{4\,(-d - 2\,i\,f\,s + i\,f\,\nu)} + e - \frac{\pi\,\nu}{2}\right) -$$

$$\left. 2\sqrt{-d - 2\,i\,f\,s + i\,f\,\nu}\, \sin\left(e - (-d - 2\,i\,f\,s + i\,f\,\nu)\, z - (-b - 2\,i\,c\,s + i\,c\,\nu)\sqrt{z} - \frac{\pi\,\nu}{2}\right)\right) \Big/$$

$$(-d - 2\,i\,f\,s + i\,f\,\nu)^{3/2} + \left(\sqrt{2\pi}\, (b - 2\,i\,c\,s + i\,c\,\nu) \cos\left(\frac{(-b + 2\,i\,c\,s - i\,c\,\nu)^2}{4\,(-d + 2\,i\,f\,s - i\,f\,\nu)} + e + \frac{\pi\,\nu}{2}\right) \right.$$

$$C\left(\frac{-b + 2\,i\,c\,s - i\,c\,\nu + 2\,(-d + 2\,i\,f\,s - i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\,i\,f\,s - i\,f\,\nu}}\right) -$$

$$\sqrt{2\pi}\, (-b + 2\,i\,c\,s - i\,c\,\nu)\, S\left(\frac{-b + 2\,i\,c\,s - i\,c\,\nu + 2\,(-d + 2\,i\,f\,s - i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d + 2\,i\,f\,s - i\,f\,\nu}}\right)$$

$$\sin\left(\frac{(-b + 2\,i\,c\,s - i\,c\,\nu)^2}{4\,(-d + 2\,i\,f\,s - i\,f\,\nu)} + e + \frac{\pi\,\nu}{2}\right) - 2\sqrt{-d + 2\,i\,f\,s - i\,f\,\nu}$$

$$\left.\left. \sin\left(e + \frac{\pi\,\nu}{2} - (-d + 2\,i\,f\,s - i\,f\,\nu)\, z - (-b + 2\,i\,c\,s - i\,c\,\nu)\sqrt{z}\right)\right) \Big/ (-d + 2\,i\,f\,s - i\,f\,\nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(d\, z) \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.2668.01

$$\int \cos(d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = -\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(d\,z)}{d} + i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+\right.\right.$$
$$S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\,\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\Bigg)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+\right.$$
$$\left.\left.S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\,\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\,/;\,\nu\in\mathbb{N}^+$$

01.19.21.2669.01

$$\int \cos(d\,z)\sinh^{\nu}\left(\sqrt{z}\;c+g+f\,z\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(d\,z)}{d} + i^{-\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4(-d-2\,i\,f\,s+i\,f\,\nu)}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right) C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\, S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4(-d-2\,i\,f\,s+i\,f\,\nu)}+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)- 2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\,\sin\left(2\,i\,g\,s-i\,g\,\nu-(-d-2\,i\,f\,s+i\,f\,\nu)z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\Bigg)\Big/ (-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\Bigg(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4(-d+2\,i\,f\,s-i\,f\,\nu)}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right) C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)- \sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right) \sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4(-d+2\,i\,f\,s-i\,f\,\nu)}-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)-2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\,\sin\left(-2\,g\,i\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)z-(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\Bigg)\Big/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(d\,z+e)\sinh^{\nu}\left(c\,z^r+f\,z+g\right)$

01.19.21.2670.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(c\,z^2+f\,z+g\right)dz = -\frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sin(e+d\,z)}{d} + i^{-\nu}\,2^{-\nu-\frac{1}{2}}\sqrt{\pi}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}$$
$$\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)+\right.\right.$$
$$\left.S\left(\frac{-d-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(\frac{(-d-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e+g\,i\,(2\,s-\nu)-\frac{\pi\,\nu}{2}\right)\right)+$$
$$\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)+\right.$$
$$\left.\left.S\left(\frac{-d+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(\frac{(-d+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e-i\,g\,(2\,s-\nu)+\frac{\pi\,\nu}{2}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2671.01

$$\int \cos(e+d\,z)\sinh^{\nu}\left(\sqrt{z}\,c+g+f\,z\right)dz = \frac{(2\,i)^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sin(e+d\,z)}{d} + i^{-\nu}\,2^{-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s+\nu}\binom{\nu}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)$$
$$C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)-\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)$$
$$S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(-d-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(-d-2\,i\,f\,s+i\,f\,\nu)}+e+2\,i\,g\,s-i\,g\,\nu-\frac{\pi\,\nu}{2}\right)-$$
$$2\sqrt{-d-2\,i\,f\,s+i\,f\,\nu}\,\sin\left(e+2\,i\,g\,s-i\,g\,\nu-(-d-2\,i\,f\,s+i\,f\,\nu)\,z-(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}-\frac{\pi\,\nu}{2}\right)\Bigg)\Big/$$
$$(-d-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\Bigg(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)$$
$$C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)$$
$$S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(-d+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(-d+2\,i\,f\,s-i\,f\,\nu)}+e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}\right)-$$
$$2\sqrt{-d+2\,i\,f\,s-i\,f\,\nu}\,\sin\Bigg(e-2\,i\,g\,s+i\,g\,\nu+\frac{\pi\,\nu}{2}-(-d+2\,i\,f\,s-i\,f\,\nu)\,z-$$
$$(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\Bigg)\Bigg)\Big/(-d+2\,i\,f\,s-i\,f\,\nu)^{3/2}\Bigg)\;/;\;\nu\in\mathbb{N}^+$$

Involving $\cos(b\,z^r)\sinh^{\nu}(c\,z^r+f\,z+g)$

01.19.21.2672.01

$$\int \cos\left(b z^2\right) \sinh^\nu\left(c z^2 + f z + g\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, C\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right)}{\sqrt{b}} + i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{(i f \nu - 2 i f s)^2}{4 (-b - 2 i c s + i c \nu)} + g i (2 s - \nu) - \frac{\pi \nu}{2} \right) C\left(\frac{-2 f i s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 i c s + i c \nu}} \right) + S\left(\frac{-2 f i s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2 \pi} \sqrt{-b - 2 i c s + i c \nu}} \right) \sin\left(\frac{(i f \nu - 2 i f s)^2}{4 (-b - 2 i c s + i c \nu)} + g i (2 s - \nu) - \frac{\pi \nu}{2} \right) \right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(\frac{(2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) C\left(\frac{2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 i c s - i c \nu}} \right) + S\left(\frac{2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2 \pi} \sqrt{-b + 2 i c s - i c \nu}} \right) \sin\left(\frac{(2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2673.01

$$\int \cos\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + g + f z\right) dz = -\frac{i^{-\nu} 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\cos\left(b \sqrt{z}\right) + b \sqrt{z} \sin\left(b \sqrt{z}\right) \right)}{b^2} + i^{-\nu} 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{(i f \nu - 2 i f s)^{3/2}} \left(\sqrt{2 \pi} (i b - 2 c s + c \nu) \cos\left(\frac{i (b + 2 i c s - i c \nu)^2}{4 (2 f s - f \nu)} + 2 i g s - i g \nu - \frac{\pi \nu}{2} \right) C\left(\frac{i b - (2 s - \nu) \left(c + 2 f \sqrt{z}\right)}{\sqrt{2 \pi} \sqrt{-i f (2 s - \nu)}} \right) - \sqrt{2 \pi} (i b + c (\nu - 2 s)) S\left(\frac{i b - (2 s - \nu) \left(c + 2 f \sqrt{z}\right)}{\sqrt{2 \pi} \sqrt{-i f (2 s - \nu)}} \right) \sin\left(\frac{i (b + 2 i c s - i c \nu)^2}{4 (2 f s - f \nu)} + 2 i g s - i g \nu - \frac{\pi \nu}{2} \right) - 2 \sqrt{i f \nu - 2 i f s} \sin\left(2 i g s - i g \nu + f i (2 s - \nu) z + (b + c i (2 s - \nu)) \sqrt{z} - \frac{\pi \nu}{2} \right) \right) + \frac{1}{(2 i f s - i f \nu)^{3/2}} \left(\sqrt{2 \pi} (i b + 2 c s - c \nu) \cos\left(-\frac{i (b - 2 i c s + i c \nu)^2}{4 (2 f s - f \nu)} - 2 i g s + i g \nu + \frac{\pi \nu}{2} \right) C\left(\frac{i b + (2 s - \nu) \left(c + 2 f \sqrt{z}\right)}{\sqrt{2 \pi} \sqrt{i f (2 s - \nu)}} \right) - \sqrt{2 \pi} (i b + 2 c s - c \nu) S\left(\frac{i b + (2 s - \nu) \left(c + 2 f \sqrt{z}\right)}{\sqrt{2 \pi} \sqrt{i f (2 s - \nu)}} \right) \sin\left(-\frac{i (b - 2 i c s + i c \nu)^2}{4 (2 f s - f \nu)} - 2 i g s + i g \nu + \frac{\pi \nu}{2} \right) - 2 \sqrt{2 i f s - i f \nu} \sin\left(-2 g i s + i g \nu + \frac{\pi \nu}{2} - i f (2 s - \nu) z + (b - 2 i c s + i c \nu) \sqrt{z} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $\cos(b z^r + e) \sinh^v(c z^r + f z + g)$

01.19.21.2674.01

$$\int \cos(b z^2 + e) \sinh^v(c z^2 + f z + g)\, dz == \frac{i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\cos(e)\, C\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) - S\!\left(\sqrt{b} \sqrt{\frac{2}{\pi}}\, z\right) \sin(e)\right)}{\sqrt{b}} + i^{-v} 2^{-v-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c v}} \left(\cos\!\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} + e + g i (2 s - v) - \frac{\pi v}{2} \right) C\!\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}} \right) + S\!\left(\frac{-2 f i s + i f v + 2(-b - 2 i c s + i c v) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c v}} \right) \sin\!\left(\frac{(i f v - 2 i f s)^2}{4(-b - 2 i c s + i c v)} + e + g i (2 s - v) - \frac{\pi v}{2} \right) \right) + \frac{1}{\sqrt{-b + 2 i c s - i c v}} \left(\cos\!\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + e - i g (2 s - v) + \frac{\pi v}{2} \right) C\!\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}} \right) + S\!\left(\frac{2 i f s - i f v + 2(-b + 2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c v}} \right) \sin\!\left(\frac{(2 i f s - i f v)^2}{4(-b + 2 i c s - i c v)} + e - i g (2 s - v) + \frac{\pi v}{2} \right) \right) \right) /;\ v \in \mathbb{N}^+$$

01.19.21.2675.01

$$\int \cos\left(\sqrt{z}\, b + e\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = -\frac{i^{-\nu}\, 2^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\cos\left(\sqrt{z}\, b + e\right) + b\sqrt{z}\, \sin\left(\sqrt{z}\, b + e\right)\right)}{b^2} + i^{-\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{(i\, f\, \nu - 2\, i\, f\, s)^{3/2}} \left(\sqrt{2\pi}\, (i\, b - 2\, c\, s + c\, \nu) \cos\left(\frac{i\, (b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (2\, f\, s - f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) C\left(\frac{i\, b - (2\, s - \nu)\left(c + 2\, f\sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{-i\, f\, (2\, s - \nu)}}\right) - \sqrt{2\pi}\, (i\, b + c\, (\nu - 2\, s))\, S\left(\frac{i\, b - (2\, s - \nu)\left(c + 2\, f\sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{-i\, f\, (2\, s - \nu)}}\right) \sin\left(\frac{i\, (b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (2\, f\, s - f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) - 2\sqrt{i\, f\, \nu - 2\, i\, f\, s}\, \sin\left(e + 2\, i\, g\, s - i\, g\, \nu + f\, i\, (2\, s - \nu)\, z + (b + c\, i\, (2\, s - \nu))\sqrt{z} - \frac{\pi\, \nu}{2}\right)\right) + \frac{1}{(2\, i\, f\, s - i\, f\, \nu)^{3/2}} \left(\sqrt{2\pi}\, (i\, b + 2\, c\, s - c\, \nu) \cos\left(-\frac{i\, (b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (2\, f\, s - f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) C\left(\frac{i\, b + (2\, s - \nu)\left(c + 2\, f\sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{i\, f\, (2\, s - \nu)}}\right) - \sqrt{2\pi}\, (i\, b + 2\, c\, s - c\, \nu)\, S\left(\frac{i\, b + (2\, s - \nu)\left(c + 2\, f\sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{i\, f\, (2\, s - \nu)}}\right) \sin\left(-\frac{i\, (b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (2\, f\, s - f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) - 2\sqrt{2\, i\, f\, s - i\, f\, \nu}\, \sin\left(e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2} - i\, f\, (2\, s - \nu)\, z + (b - 2\, i\, c\, s + i\, c\, \nu)\sqrt{z}\right)\right)\right) /;\, \nu \in \mathbb{N}^+$$

Involving $\cos\left(b\, z^r + d\, z\right) \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.2676.01

$$\int \cos\left(b z^2 + d z\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{d^2}{4 b}\right) C\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2\pi}}\right) + S\left(\frac{d+2 b z}{\sqrt{b} \sqrt{2\pi}}\right) \sin\left(\frac{d^2}{4 b}\right)\right)}{\sqrt{b}} +$$

$$i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4 (-b - 2 i c s + i c \nu)} + g i (2 s - \nu) - \frac{\pi \nu}{2} \right) \right.\right.$$

$$C\left(\frac{-d - 2 i f s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}} \right) + S\left(\frac{-d - 2 i f s + i f \nu + 2 (-b - 2 i c s + i c \nu) z}{\sqrt{2\pi} \sqrt{-b - 2 i c s + i c \nu}} \right)$$

$$\left.\sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4 (-b - 2 i c s + i c \nu)} + g i (2 s - \nu) - \frac{\pi \nu}{2} \right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}}$$

$$\left(\cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) C\left(\frac{-d + 2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}} \right) + \right.$$

$$\left.\left.\left. S\left(\frac{-d + 2 i f s - i f \nu + 2 (-b + 2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{-b + 2 i c s - i c \nu}} \right) \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4 (-b + 2 i c s - i c \nu)} - i g (2 s - \nu) + \frac{\pi \nu}{2} \right) \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.2677.01

$$\int \cos\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi} \cos\left(\frac{b^2}{4 d}\right) C\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2 d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4 d}\right) + 2 \sqrt{d}\, \sin\left(\sqrt{z}\, b + d\, z\right)\right)\right) +$$

$$i^{-\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b + 2 i c s - i c \nu) \cos\left(\frac{(-b - 2 i c s + i c \nu)^2}{4 (-d - 2 i f s + i f \nu)} + 2 i g s - i g \nu - \frac{\pi \nu}{2}\right) C\left(\frac{-b - 2 i c s + i c \nu + 2 (-d - 2 i f s + i f \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2 i f s + i f \nu}}\right) - \sqrt{2\pi}\, (-b - 2 i c s + i c \nu) S\left(\frac{-b - 2 i c s + i c \nu + 2 (-d - 2 i f s + i f \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2 i f s + i f \nu}}\right) \sin\left(\frac{(-b - 2 i c s + i c \nu)^2}{4 (-d - 2 i f s + i f \nu)} + 2 i g s - i g \nu - \frac{\pi \nu}{2}\right) - 2 \sqrt{-d - 2 i f s + i f \nu}\, \sin\left(2 i g s - i g \nu - (-d - 2 i f s + i f \nu) z - (-b - 2 i c s + i c \nu) \sqrt{z} - \frac{\pi \nu}{2}\right)\right) \Big/ (-d - 2 i f s + i f \nu)^{3/2} + \left(\sqrt{2\pi}\, (b - 2 i c s + i c \nu) \cos\left(\frac{(-b + 2 i c s - i c \nu)^2}{4 (-d + 2 i f s - i f \nu)} - 2 i g s + i g \nu + \frac{\pi \nu}{2}\right) C\left(\frac{-b + 2 i c s - i c \nu + 2 (-d + 2 i f s - i f \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2 i f s - i f \nu}}\right) - \sqrt{2\pi}\, (-b + 2 i c s - i c \nu) S\left(\frac{-b + 2 i c s - i c \nu + 2 (-d + 2 i f s - i f \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2 i f s - i f \nu}}\right) \sin\left(\frac{(-b + 2 i c s - i c \nu)^2}{4 (-d + 2 i f s - i f \nu)} - 2 i g s + i g \nu + \frac{\pi \nu}{2}\right) - 2 \sqrt{-d + 2 i f s - i f \nu}\, \sin\left(-2 g i s + i g \nu + \frac{\pi \nu}{2} - (-d + 2 i f s - i f \nu) z - (-b + 2 i c s - i c \nu) \sqrt{z}\right)\right) \Big/ (-d + 2 i f s - i f \nu)^{3/2} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $\cos(b\, z^r + d\, z + e) \sinh^{\nu}(c\, z^r + f\, z + g)$

01.19.21.2678.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{1}{\sqrt{b}} \left(i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\cos\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right) C\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) + S\left(\frac{d + 2 b z}{\sqrt{b}\,\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{d^2}{b} - 4 e\right)\right)\right)\right) + i^{-\nu} 2^{-\nu-\frac{1}{2}} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\frac{1}{\sqrt{-b - 2 i c s + i c \nu}} \left(\cos\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\,\sqrt{-b - 2 i c s + i c \nu}}\right) + S\left(\frac{-d - 2 i f s + i f \nu + 2(-b - 2 i c s + i c \nu) z}{\sqrt{2\pi}\,\sqrt{-b - 2 i c s + i c \nu}}\right) \sin\left(\frac{(-d - 2 i f s + i f \nu)^2}{4(-b - 2 i c s + i c \nu)} + e + g i (2 s - \nu) - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{-b + 2 i c s - i c \nu}} \left(\cos\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\,\sqrt{-b + 2 i c s - i c \nu}}\right) + S\left(\frac{-d + 2 i f s - i f \nu + 2(-b + 2 i c s - i c \nu) z}{\sqrt{2\pi}\,\sqrt{-b + 2 i c s - i c \nu}}\right) \sin\left(\frac{(-d + 2 i f s - i f \nu)^2}{4(-b + 2 i c s - i c \nu)} + e - i g (2 s - \nu) + \frac{\pi \nu}{2}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2679.01

$$\int \cos\left(b z^2 + d z + e\right) \sinh^{\nu}\left(c z^2 + f z + g\right) dz = \frac{1}{b} \left(i^{\nu+1} 2^{-\nu-2} e^{\frac{i\left(-d^2 - 4 b e\right)}{4 b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(-i \sqrt{-i b}\, e^{\frac{i d^2}{2 b}} \operatorname{erf}\left(\frac{\sqrt{-i b}\,(i d + 2 i b z)}{2 b}\right) - \sqrt{i b}\, e^{2 i e} \operatorname{erfi}\left(\frac{i d + 2 i b z}{2\sqrt{i b}}\right)\right) (1 - \nu \bmod 2)\right) + i^{\nu} 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{-i b - 2 c k + c \nu} \left(e^{-\frac{(i d + 2 f k - f \nu)^2}{4 i b + 8 c k - 4 c \nu} + i e - 2 g \nu + g(\nu - 2 k) - \frac{i \pi \nu}{2}} \left(e^{2\left(\frac{(i d + 2 f k - f \nu)^2}{4 i b + 8 c k - 4 c \nu} - i e + g \nu\right)} \sqrt{-i b - 2 c k + c \nu}\, \operatorname{erfi}\left(\frac{-i d - 2 i b z - 2 k (f + 2 c z) + \nu (f + 2 c z)}{2\sqrt{-i b - 2 c k + c \nu}}\right) - e^{4 g k + i \pi \nu} \sqrt{i b + 2 c k - c \nu}\, \operatorname{erfi}\left(\frac{i d + 2 i b z + 2 k (f + 2 c z) - \nu (f + 2 c z)}{2\sqrt{i b + 2 c k - c \nu}}\right)\right)\right) - \frac{1}{i b + c(\nu - 2 k)} \left(e^{-\frac{(i d - 2 f k + f \nu)^2}{-4 i b + 8 c k - 4 c \nu} - i e + g(2 k - \nu) + \frac{i \pi \nu}{2}} \sqrt{-i b + 2 c k - c \nu}\, \operatorname{erfi}\left(\frac{-i d - 2 i b z + 2 k (f + 2 c z) - \nu (f + 2 c z)}{2\sqrt{-i b + 2 c k - c \nu}}\right)\right) + \frac{e^{\frac{(i d - 2 f k + f \nu)^2}{-4 i b + 8 c k - 4 c \nu} + i e + g(\nu - 2 k) - \frac{i \pi \nu}{2}} \operatorname{erfi}\left(\frac{i d + 2 i b z - 2 k (f + 2 c z) + \nu (f + 2 c z)}{2\sqrt{i b + c(\nu - 2 k)}}\right)}{\sqrt{i b + c(\nu - 2 k)}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2680.01

$$\int \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^{\nu}\left(\sqrt{z}\, c + g + f\, z\right) dz = \frac{1}{d^{3/2}} \left(i^{-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(-b \sqrt{2\pi}\, \cos\left(\frac{b^2}{4\, d} - e\right) C\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) - b \sqrt{2\pi}\, S\left(\frac{b + 2\, d \sqrt{z}}{\sqrt{d}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2}{4\, d} - e\right) + 2 \sqrt{d}\, \sin\left(\sqrt{z}\, b + e + d\, z\right)\right)\right) +$$

$$i^{-\nu}\, 2^{-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (b + 2\, i\, c\, s - i\, c\, \nu) \cos\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) \right.\right.\right.$$

$$C\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) - \sqrt{2\pi}\, (-b - 2\, i\, c\, s + i\, c\, \nu)$$

$$S\left(\frac{-b - 2\, i\, c\, s + i\, c\, \nu + 2\, (-d - 2\, i\, f\, s + i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}}\right) \sin\left(\frac{(-b - 2\, i\, c\, s + i\, c\, \nu)^2}{4\, (-d - 2\, i\, f\, s + i\, f\, \nu)} + e + 2\, i\, g\, s - i\, g\, \nu - \frac{\pi\, \nu}{2}\right) -$$

$$\left.\left. 2 \sqrt{-d - 2\, i\, f\, s + i\, f\, \nu}\, \sin\left(e + 2\, i\, g\, s - i\, g\, \nu - (-d - 2\, i\, f\, s + i\, f\, \nu)\, z - (-b - 2\, i\, c\, s + i\, c\, \nu) \sqrt{z} - \frac{\pi\, \nu}{2}\right)\right) \right/$$

$$(-d - 2\, i\, f\, s + i\, f\, \nu)^{3/2} + \left(\sqrt{2\pi}\, (b - 2\, i\, c\, s + i\, c\, \nu) \cos\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) \right.$$

$$C\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) - \sqrt{2\pi}\, (-b + 2\, i\, c\, s - i\, c\, \nu)$$

$$S\left(\frac{-b + 2\, i\, c\, s - i\, c\, \nu + 2\, (-d + 2\, i\, f\, s - i\, f\, \nu) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}}\right) \sin\left(\frac{(-b + 2\, i\, c\, s - i\, c\, \nu)^2}{4\, (-d + 2\, i\, f\, s - i\, f\, \nu)} + e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2}\right) -$$

$$2 \sqrt{-d + 2\, i\, f\, s - i\, f\, \nu}\, \sin\left(e - 2\, i\, g\, s + i\, g\, \nu + \frac{\pi\, \nu}{2} - (-d + 2\, i\, f\, s - i\, f\, \nu)\, z - \right.$$

$$\left.\left.\left. (-b + 2\, i\, c\, s - i\, c\, \nu) \sqrt{z}\right)\right) \right/ (-d + 2\, i\, f\, s - i\, f\, \nu)^{3/2} \Bigg) \;/;\; \nu \in \mathbb{N}^+$$

01.19.21.2681.01

$$\int \cos\left(\sqrt{z}\, b+e+d\, z\right)\sinh^{\nu}\left(\sqrt{z}\, c+g+f\, z\right) dz = i^{\nu+1}\, 2^{-\nu-2}\, e^{-i e}\binom{\nu}{\frac{\nu}{2}}\left(\frac{b\, e^{\frac{i b^2}{4 d}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{\sqrt{-i d}\left(b+2 d\sqrt{z}\right)}{2 d}\right)}{(-i d)^{3/2}} + \frac{1}{d^2}\left(b\sqrt{i d}\; e^{-\frac{i\left(b^2-8 d e\right)}{4 d}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{\sqrt{i d}\left(b+2 d\sqrt{z}\right)}{2 d}\right)-2 d\, e^{-i\left(b+d\sqrt{z}\right)\sqrt{z}}\left(-1+e^{2 i\left(\sqrt{z}\, b+e+d z\right)}\right)\right)\right)(1-\nu \bmod 2) +$$

$$i^{\nu}\, 2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-i e-g(2k-\nu)-\frac{i\pi\nu}{2}}\left(\frac{2\, e^{2\left(i e+g(2k-\nu)+\frac{i\pi\nu}{2}\right)+(i d+f(2k-\nu))z+(i b+c(2k-\nu))\sqrt{z}}}{i d+f(2k-\nu)} - \right.\right.$$

$$\left(e^{2\left(i e+g(2k-\nu)+\frac{i\pi\nu}{2}\right)-\frac{(i b+c(2k-\nu))^2}{4(i d+f(2k-\nu))}}\sqrt{\pi}\,(i b+c(2k-\nu))\operatorname{erfi}\left(\frac{i b+c(2k-\nu)+2(i d+f(2k-\nu))\sqrt{z}}{2\sqrt{i d+f(2k-\nu)}}\right)\right)\Big/$$

$$(i d+f(2k-\nu))^{3/2}+\frac{2\, e^{\sqrt{z}\,(-i b-c(2k-\nu))+(-i d+f(\nu-2k))z}}{-i d+f(\nu-2k)} -$$

$$\left.\frac{e^{-\frac{(-i b-c(2k-\nu))^2}{4(-i d+f(\nu-2k))}}\sqrt{\pi}\,(i b+c(2k-\nu))\operatorname{erfi}\left(\frac{i b+c(2k-\nu)+2(i d+f(2k-\nu))\sqrt{z}}{2\sqrt{-i d+f(\nu-2k)}}\right)}{(-i d+f(\nu-2k))^{3/2}}\right)+e^{-i e+\frac{i\pi\nu}{2}-g(\nu-2k)}$$

$$\left(\frac{2\, e^{\sqrt{z}\,(-i b-c(\nu-2k))+(-i d+f(2k-\nu))z}}{-i d+f(2k-\nu)}-\frac{e^{-\frac{(-i b-c(\nu-2k))^2}{4(-i d+f(2k-\nu))}}\sqrt{\pi}\,(i b+c(\nu-2k))\operatorname{erfi}\left(\frac{i b+c(\nu-2k)+2(i d+f(\nu-2k))\sqrt{z}}{2\sqrt{-i d+f(2k-\nu)}}\right)}{(-i d+f(2k-\nu))^{3/2}}+\right.$$

$$\frac{2\, e^{\sqrt{z}\,(i b+c(\nu-2k))+2\left(i e-\frac{i\pi\nu}{2}+g(\nu-2k)\right)+(i d+f(\nu-2k))z}}{i d+f(\nu-2k)}-\left(e^{2\left(i e-\frac{i\pi\nu}{2}+g(\nu-2k)\right)-\frac{(i b+c(\nu-2k))^2}{4(i d+f(\nu-2k))}}\sqrt{\pi}\,(i b+c(\nu-2k))\right.$$

$$\left.\left.\left.\operatorname{erfi}\left(\frac{i b+c(\nu-2k)+2(i d+f(\nu-2k))\sqrt{z}}{2\sqrt{i d+f(\nu-2k)}}\right)\right)\Big/(i d+f(\nu-2k))^{3/2}\right)\right) /;\ \nu\in\mathbb{N}^+$$

Involving powers of cos

Involving $\cos^{\mu}(c\, z)\sinh^{\nu}(a\, z)$

01.19.21.2682.01

$$\int \cos^{\mu}(c z) \sinh^{\nu}(a z) \, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(c z) \left(-\frac{i \left(1 + e^{2 i c z}\right)^{-\mu} (\nu \bmod 2 - 1)}{c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{\mu}{2}, -\mu; 1 - \frac{\mu}{2}; -e^{2 i c z}\right) + i^{-\nu} \left(1 + e^{-2 i c z}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-a z \nu + i \pi \nu + 2 a k z}}{2 a k - a \nu + i c \mu} {}_2F_1\left(\frac{i (2 a k - a \nu + i c \mu)}{2 c}, -\mu; \frac{i (2 a k - a \nu + c i (\mu - 2))}{2 c}; -e^{-2 i c z}\right) + \frac{e^{a (\nu - 2 k) z}}{a (\nu - 2 k) + i c \mu} {}_2F_1\left(\frac{i (a (\nu - 2 k) + i c \mu)}{2 c}, -\mu; \frac{i (a (\nu - 2 k) + c i (\mu - 2))}{2 c}; -e^{-2 i c z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2683.01

$$\int \cos^{m}(c z) \sinh^{\nu}(a z) \, dz = 2^{-m} \left(1 - e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) \left(\frac{(m \bmod 2 - 1)}{a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(-\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}; e^{2 a z}\right) - \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i c (m - 2 s) z} \binom{m}{s} \left(\frac{i e^{2 i c (m - 2 s) z}}{c (m - 2 s) + i a \nu} {}_2F_1\left(\frac{i (c (m - 2 s) + i a \nu)}{2 a}, -\nu; \frac{i c (m - 2 s) - a (\nu - 2)}{2 a}; e^{2 a z}\right) + \frac{1}{c i (m - 2 s) + a \nu} {}_2F_1\left(-\frac{c i (m - 2 s) + a \nu}{2 a}, -\nu; -\frac{c i (m - 2 s) + a (\nu - 2)}{2 a}; e^{2 a z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2684.01

$$\int \cos^{m}(c z) \sinh^{\nu}(a z) \, dz = 2^{-m-\nu} \left(i^{\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1) (\nu \bmod 2 - 1) + i^{\nu+1} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \frac{e^{-i c (m - 2 s) z} \left(-1 + e^{2 i c (m - 2 s) z}\right)}{c (m - 2 s)} + \frac{1}{a} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{k} \frac{(-1)^k e^{a (2 k - \nu) z} \left(-(-1)^{\nu} + e^{2 a (\nu - 2 k) z}\right)}{2 k - \nu} - \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{e^{(a (\nu - 2 k) - i c (m - 2 s)) z}}{c i (m - 2 s) + a (2 k - \nu)} + \frac{e^{i \pi \nu + (c i (m - 2 s) + a (2 k - \nu)) z}}{a (\nu - 2 k) - i c (m - 2 s)} + \frac{e^{i \pi \nu - (c i (m - 2 s) + a (\nu - 2 k)) z}}{c i (m - 2 s) + a (\nu - 2 k)} + \frac{e^{(c i (m - 2 s) + a (\nu - 2 k)) z}}{a (2 k - \nu) - i c (m - 2 s)}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^{\mu}(c z + d) \sinh^{\nu}(a z)$

01.19.21.2685.01

$$\int \cos^{\mu}(d+c z) \sinh^{\nu}(a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(d+c z) \left(-\frac{i\left(1+e^{2 i (d+c z)}\right)^{-\mu}}{c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{\mu}{2}, -\mu; 1-\frac{\mu}{2}; -e^{2 i (d+c z)}\right) (\nu \bmod 2 - 1) + i^{-\nu} \left(1+e^{-2 i (d+c z)}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-a z \nu + i \pi \nu + 2 a k z}}{2 a k - a \nu + i c \mu} {}_2F_1\left(\frac{i (2 a k - a \nu + i c \mu)}{2 c}, -\mu; \frac{i (2 a k - a \nu + c i (\mu-2))}{2 c}; -e^{-2 i (d+c z)}\right) - \frac{e^{a (\nu - 2 k) z}}{2 a k - a \nu - i c \mu} {}_2F_1\left(\frac{i (a (\nu-2 k) + i c \mu)}{2 c}, -\mu; \frac{i (a (\nu - 2 k) + c i (\mu-2))}{2 c}; -e^{-2 i (d+c z)}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2686.01

$$\int \cos^{m}(d+c z) \sinh^{\nu}(a z)\, dz = 2^{-m} \left(1-e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) \left(\frac{1}{a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(-\frac{\nu}{2}, -\nu; 1-\frac{\nu}{2}; e^{2 a z}\right) (m \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d (m-2 s)} \binom{m}{s} \left(\frac{i e^{i (m-2 s)(2 d + c z)}}{c (m-2 s) + i a \nu} {}_2F_1\left(\frac{i (c (m-2 s) + i a \nu)}{2 a}, -\nu; \frac{i c (m-2 s) - a (\nu-2)}{2 a}; e^{2 a z}\right) + \frac{e^{-i c (m-2 s) z}}{c i (m-2 s) + a \nu} {}_2F_1\left(-\frac{c i (m-2 s) + a \nu}{2 a}, -\nu; -\frac{c i (m-2 s) + a (\nu-2)}{2 a}; e^{2 a z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2687.01

$$\int \cos^{m}(d+c z) \sinh^{\nu}(a z)\, dz = 2^{-m-\nu} \left(i^{\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1) + \frac{i^{\nu+1}}{c} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{e^{-i (m-2 s)(d+c z)} \left(-1+e^{2 i (m-2 s)(d+c z)}\right) \binom{m}{s}}{m-2 s} + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k e^{a (2 k - \nu) z} \left(-(-1)^{\nu} + e^{2 a (\nu - 2 k) z}\right) \binom{\nu}{k}}{a (2 k - \nu)} - \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d (m+2 s)} \binom{m}{s} \left(\frac{e^{2 i d m + i \pi \nu + (c i (m-2 s) + a (2 k - \nu)) z}}{a (\nu - 2 k) - i c (m-2 s)} - \frac{e^{2 i d m + (c i (m-2 s) + a (\nu - 2 k)) z}}{c i (m-2 s) + a (\nu - 2 k)} + \frac{e^{4 i d s + 2 i c z s + i \pi \nu + 2 a k z - i c m z - a \nu z}}{c i (m-2 s) + a (\nu - 2 k)} + \frac{e^{4 i d s + (a (\nu - 2 k) - i c (m-2 s)) z}}{c i (m-2 s) + a (2 k - \nu)}\right)\right) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $\cos^{\mu}(c z) \sinh^{\nu}(a z + b)$

01.19.21.2688.01

$$\int \cos^{\mu}(c z) \sinh^{\nu}(b + a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(c z) \left(-\frac{i}{c\mu} \left(1 + e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\!\left(-\frac{\mu}{2}, -\mu; 1 - \frac{\mu}{2}; -e^{2 i c z}\right) (\nu \bmod 2 - 1) + i^{-\nu} \left(1 + e^{-2 i c z}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b(\nu - 2k)} \binom{\nu}{k} \left(\frac{1}{2 a k - a \nu + i c \mu} \left(e^{4 b k + 2 a z k - 2 b \nu + i \pi \nu - a \nu z} {}_2F_1\!\left(\frac{i(2 a k - a \nu + i c \mu)}{2c}, -\mu; \frac{i(2 a k - a \nu + c\, i(\mu - 2))}{2c}; -e^{-2 i c z}\right)\right) - \frac{e^{a(\nu - 2k) z}}{2 a k - a \nu - i c \mu} {}_2F_1\!\left(\frac{i(a(\nu - 2k) + i c \mu)}{2c}, -\mu; \frac{i(a(\nu - 2k) + c\, i(\mu - 2))}{2c}; -e^{-2 i c z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2689.01

$$\int \cos^{m}(c z) \sinh^{\nu}(b + a z)\, dz = 2^{-m} \left(1 - e^{2(b + a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \left(\frac{1}{a\nu} \binom{m}{\frac{m}{2}} {}_2F_1\!\left(-\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}; e^{2(b + a z)}\right) (m \bmod 2 - 1) - \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{i\, e^{i(m - 2s) c z}}{c(m - 2s) + i a \nu} {}_2F_1\!\left(\frac{i(c(m - 2s) + i a \nu)}{2a}, -\nu; \frac{i c(m - 2s) - a(\nu - 2)}{2a}; e^{2(b + a z)}\right) + \frac{e^{-i c(m - 2s) z}}{c\, i(m - 2s) + a \nu} {}_2F_1\!\left(-\frac{c\, i(m - 2s) + a \nu}{2a}, -\nu; -\frac{c\, i(m - 2s) + a(\nu - 2)}{2a}; e^{2(b + a z)}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2690.01

$$\int \cos^{m}(c z) \sinh^{\nu}(b + a z)\, dz = 2^{-m-\nu} \left(i^{\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (m \bmod 2 - 1)(\nu \bmod 2 - 1) + \frac{i^{\nu+1}}{c} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{e^{-i(m - 2s) c z} \left(-1 + e^{2 i (m - 2s) c z}\right) \binom{m}{s}}{m - 2s} + \binom{m}{\frac{m}{2}} (m \bmod 2 - 1) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k e^{a(2k - \nu) z - b(2k + \nu)} \left(-e^{4 b k + i \pi \nu} + e^{2 b \nu + 2 a(\nu - 2k) z}\right) \binom{\nu}{k}}{a(2k - \nu)} - \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-b(2k + \nu)} \binom{m}{s} \left(\frac{e^{4 b k + i \pi \nu + (c\, i(m - 2s) + a(2k - \nu)) z}}{a(\nu - 2k) - i c(m - 2s)} - \frac{e^{2 b \nu + (c\, i(m - 2s) + a(\nu - 2k)) z}}{c\, i(m - 2s) + a(\nu - 2k)} + \frac{e^{4 b k + 2 a z k + i \pi \nu - i c m z + 2 i c s z - a \nu z}}{c\, i(m - 2s) + a(\nu - 2k)} + \frac{e^{2 b \nu + (a(\nu - 2k) - i c(m - 2s)) z}}{c\, i(m - 2s) + a(2k - \nu)}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^{\mu}(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.2691.01

$$\int \cos^{\mu}(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = \left(\frac{i}{2}\right)^{\nu}\cos^{\mu}(d+c\,z)$$
$$\left(-\frac{i\left(1+e^{2\,i\,(d+c\,z)}\right)^{-\mu}(\nu \bmod 2-1)}{c\,\mu}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(-\frac{\mu}{2},-\mu;1-\frac{\mu}{2};-e^{2\,i\,(d+c\,z)}\right)+i^{-\nu}\left(1+e^{-2\,i\,(d+c\,z)}\right)^{-\mu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\,e^{b\,(\nu-2\,k)}\right.$$
$$\binom{\nu}{k}\left(\frac{e^{4\,b\,k+2\,a\,z\,k-2\,b\,\nu+i\,\pi\,\nu-a\,\nu\,z}}{2\,a\,k-a\,\nu+i\,c\,\mu}\,{}_2F_1\left(\frac{i\,(2\,a\,k-a\,\nu+i\,c\,\mu)}{2\,c},-\mu;\frac{i\,(2\,a\,k-a\,\nu+c\,i\,(\mu-2))}{2\,c};-e^{-2\,i\,(d+c\,z)}\right)-\right.$$
$$\left.\left.\frac{e^{a\,(\nu-2\,k)\,z}}{2\,a\,k-a\,\nu-i\,c\,\mu}\,{}_2F_1\left(\frac{i\,(a\,(\nu-2\,k)+i\,c\,\mu)}{2\,c},-\mu;\frac{i\,(a\,(\nu-2\,k)+c\,i\,(\mu-2))}{2\,c};-e^{-2\,i\,(d+c\,z)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2692.01

$$\int \cos^{m}(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = 2^{-m}\left(1-e^{2\,(b+a\,z)}\right)^{-\nu}\sinh^{\nu}(b+a\,z)\left(\frac{m \bmod 2-1}{a\,\nu}\binom{m}{\frac{m}{2}}\,{}_2F_1\left(-\frac{\nu}{2},-\nu;1-\frac{\nu}{2};e^{2\,(b+a\,z)}\right)-\right.$$
$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-i\,d\,(m-2\,s)}\binom{m}{s}\left(\frac{i\,e^{i\,(m-2\,s)\,(2\,d+c\,z)}}{c\,(m-2\,s)+i\,a\,\nu}\,{}_2F_1\left(\frac{i\,(c\,(m-2\,s)+i\,a\,\nu)}{2\,a},-\nu;\frac{i\,c\,(m-2\,s)-a\,(\nu-2)}{2\,a};e^{2\,(b+a\,z)}\right)+\right.$$
$$\left.\left.\frac{e^{-i\,c\,(m-2\,s)\,z}}{c\,i\,(m-2\,s)+a\,\nu}\,{}_2F_1\left(-\frac{c\,i\,(m-2\,s)+a\,\nu}{2\,a},-\nu;-\frac{c\,i\,(m-2\,s)+a\,(\nu-2)}{2\,a};e^{2\,(b+a\,z)}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2693.01

$$\int \cos^{m}(d+c\,z)\sinh^{\nu}(b+a\,z)\,dz = 2^{-m-\nu}$$
$$\left(i^{\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(m \bmod 2-1)(\nu \bmod 2-1)+\frac{i^{\nu+1}}{c}\binom{\nu}{\frac{\nu}{2}}(\nu \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\frac{e^{-i\,(m-2\,s)\,(d+c\,z)}\left(-1+e^{2\,i\,(m-2\,s)\,(d+c\,z)}\right)}{m-2\,s}+\right.$$
$$\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{k}\frac{(-1)^k\,e^{a\,(2\,k-\nu)\,z-b\,(2\,k+\nu)}\left(-e^{4\,b\,k+i\,\pi\,\nu}+e^{2\,b\,\nu+2\,a\,(\nu-2\,k)\,z}\right)}{a\,(2\,k-\nu)}-$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-i\,d\,(m+2\,s)-b\,(2\,k+\nu)}\binom{m}{s}\left(\frac{e^{4\,b\,k+2\,i\,d\,m+i\,\pi\,\nu+(c\,i\,(m-2\,s)+a\,(2\,k-\nu))\,z}}{a\,(\nu-2\,k)-i\,c\,(m-2\,s)}-\frac{e^{2\,i\,d\,m+2\,b\,\nu+(c\,i\,(m-2\,s)+a\,(\nu-2\,k))\,z}}{c\,i\,(m-2\,s)+a\,(\nu-2\,k)}+\right.$$
$$\left.\left.\frac{e^{4\,b\,k+2\,a\,z\,k+4\,i\,d\,s+i\,\pi\,\nu-i\,c\,m\,z+2\,i\,c\,s\,z-a\,\nu\,z}}{c\,i\,(m-2\,s)+a\,(\nu-2\,k)}+\frac{e^{4\,i\,d\,s+2\,b\,\nu+(a\,(\nu-2\,k)-i\,c\,(m-2\,s))\,z}}{c\,i\,(m-2\,s)+a\,(2\,k-\nu)}\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^{m}(b\,z^{r})\sinh^{\nu}(c\,z)$

01.19.21.2694.01

$$\int \cos^m\left(b z^2\right) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} C\left(\frac{b (m-2k) \sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b (m-2k)}}\right)}{\sqrt{-b (m-2k)}} +$$

$$\frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2 c k z + \frac{1}{2} i \nu (2 i c z + \pi)\right)}{2k - \nu} +$$

$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(\frac{(2 i c k - i c \nu)^2}{4 (2 b s - b m)} + \frac{\pi \nu}{2} \right) C\left(\frac{2 i c k - i c \nu + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) + \right.\right.$$

$$\left. S\left(\frac{2 i c k - i c \nu + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) \sin\left(\frac{(2 i c k - i c \nu)^2}{4 (2 b s - b m)} + \frac{\pi \nu}{2} \right) \right) +$$

$$\frac{1}{\sqrt{b m - 2 b s}} \left(\cos\left(\frac{(2 i c k - i c \nu)^2}{4 (b m - 2 b s)} + \frac{\pi \nu}{2} \right) C\left(\frac{2 i c k - i c \nu + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) + \right.$$

$$\left.\left.\left. S\left(\frac{2 i c k - i c \nu + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) \sin\left(\frac{(2 i c k - i c \nu)^2}{4 (b m - 2 b s)} + \frac{\pi \nu}{2} \right) \right) \right) \right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2695.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh^\nu(c\,z)\,dz = (-1)^m\,i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2)+$$
$$\frac{1}{b^2}\left(i^{-\nu}\,2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b\,(2k-m)\sqrt{z}\right)+b\,(2k-m)\sqrt{z}\,\sin\left(b\,(2k-m)\sqrt{z}\right)\right)}{(m-2k)^2}\right)-$$
$$\frac{(-1)^m\,i^{\nu+1}\,2^{-m-\nu+1}}{c}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\sin\left(\frac{\pi\nu}{2}+c\,i\,(\nu-2k)\,z\right)}{\nu-2k}+$$
$$i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{(2\,i\,c\,k-i\,c\,\nu)^{3/2}}\left(2\sqrt{2\,i\,c\,k-i\,c\,\nu}\,\sin\left(\sqrt{z}\,(b\,m-2\,b\,s)-\frac{\pi\nu}{2}+c\,i\,(2k-\nu)\,z\right)-\right.\right.$$
$$b\sqrt{2\pi}\,(m-2s)\left(\cos\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,c\,k-c\,\nu)}-\frac{\pi\nu}{2}\right)C\left(\frac{b\,(m-2s)+2\,c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)-\right.$$
$$\left.\left.S\left(\frac{b\,(m-2s)+2\,c\,i\,(2k-\nu)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)\sin\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,c\,k-c\,\nu)}-\frac{\pi\nu}{2}\right)\right)\right)+$$
$$\frac{1}{(2\,i\,c\,k-i\,c\,\nu)^{3/2}}\left(b\sqrt{2\pi}\,(m-2s)\left(\cos\left(\frac{\pi\nu}{2}-\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,c\,k-c\,\nu)}\right)C\left(\frac{2\,i\,c\,(2k-\nu)\sqrt{z}-b\,(m-2s)}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)+\right.\right.$$
$$\left.S\left(\frac{2\,i\,c\,(2k-\nu)\sqrt{z}-b\,(m-2s)}{\sqrt{2\pi}\,\sqrt{i\,c\,(2k-\nu)}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,c\,k-c\,\nu)}\right)\right)-$$
$$\left.\left.\left.2\sqrt{2\,i\,c\,k-i\,c\,\nu}\,\sin\left(-\sqrt{z}\,(2\,b\,s-b\,m)+\frac{\pi\nu}{2}-i\,c\,(2k-\nu)\,z\right)\right)\right)\right)/;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m\left(b\,z^r+e\right)\sinh^\nu(c\,z)$

01.19.21.2696.01

$$\int \cos^m\left(b z^2+e\right) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos(e(m-2k))\, C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) \sin(e(m-2k))\right)}{\sqrt{-b(m-2k)}} + \frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2ckz+\frac{1}{2} i \nu (2icz+\pi)\right)}{2k-\nu} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2bs-bm}} \left(\cos\left(-\frac{(2ick-ic\nu)^2}{4(2bs-bm)} + e(2s-m) - \frac{\pi \nu}{2}\right) C\left(\frac{2ick-ic\nu+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) - S\left(\frac{2ick-ic\nu+2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) \sin\left(-\frac{(2ick-ic\nu)^2}{4(2bs-bm)} + e(2s-m) - \frac{\pi\nu}{2}\right)\right) + \frac{1}{\sqrt{bm-2bs}} \left(\cos\left(\frac{(2ick-ic\nu)^2}{4(bm-2bs)} + e(2s-m) + \frac{\pi\nu}{2}\right) C\left(\frac{2ick-ic\nu+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) + S\left(\frac{2ick-ic\nu+2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) \sin\left(\frac{(2ick-ic\nu)^2}{4(bm-2bs)} + e(2s-m) + \frac{\pi\nu}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2697.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right) \sinh^\nu(c z)\, dz = (-1)^m\, i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)\, (1-\nu \bmod 2) + \frac{1}{b^2}\Bigg(i^{-\nu}\, 2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left(\binom{m}{k} \left(\cos\left(2ek-em+b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\, \sin\left(2ek-em+b(2k-m)\sqrt{z}\right)\right)\right)\Bigg) -$$

$$\frac{(-1)^m\, i^{\nu+1}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi \nu}{2}+c\, i\, (\nu-2k)\, z\right)}{\nu-2k}}{c} + i^\nu\, 2^{-m-\nu}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(\frac{1}{(2ick-ic\nu)^{3/2}} \Bigg(2\sqrt{2ick-ic\nu}\, \sin\left(em-2es-\frac{\pi \nu}{2}+c\, i\, (2k-\nu)\, z+(bm-2bs)\sqrt{z}\right) -$$

$$b\sqrt{2\pi}\, (m-2s) \left(\cos\left(\frac{i\, (bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{\pi \nu}{2}\right) C\left(\frac{b(m-2s)+2c\, i\, (2k-\nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, c\, (2k-\nu)}}\right) -\right.$$

$$\left. S\left(\frac{b(m-2s)+2c\, i\, (2k-\nu)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{i\, c\, (2k-\nu)}}\right) \sin\left(\frac{i\, (bm-2bs)^2}{4(2ck-c\nu)}+em-2es-\frac{\pi \nu}{2}\right)\right)\Bigg) + \frac{1}{(2ick-ic\nu)^{3/2}}$$

$$\Bigg(b\sqrt{2\pi}\, (m-2s) \left(\cos\left(-\frac{i\, (bm-2bs)^2}{4(2ck-c\nu)}+em-2es+\frac{\pi \nu}{2}\right) C\left(\frac{2\, i\, c\, (2k-\nu)\sqrt{z}-b(m-2s)}{\sqrt{2\pi}\, \sqrt{i\, c\, (2k-\nu)}}\right) +\right.$$

$$\left. S\left(\frac{2\, i\, c\, (2k-\nu)\sqrt{z}-b(m-2s)}{\sqrt{2\pi}\, \sqrt{i\, c\, (2k-\nu)}}\right) \sin\left(-\frac{i\, (bm-2bs)^2}{4(2ck-c\nu)}+em-2es+\frac{\pi \nu}{2}\right)\right) -$$

$$2\sqrt{2ick-ic\nu}\, \sin\left(em-2es+\frac{\pi \nu}{2}-i\, c\, (2k-\nu)\, z-(2bs-bm)\sqrt{z}\right)\Bigg)\Bigg) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z\right) \sinh^\nu(c z)$

01.19.21.2698.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) \sin\left(\frac{d^2(m-2k)}{4b}\right)\right)\right) + \frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2ckz + \frac{1}{2} i \nu (2icz + \pi)\right)}{2k - \nu} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(\frac{(2ick - dm + 2ds - icv)^2}{4(2bs - bm)} + \frac{\pi \nu}{2}\right) C\left(\frac{2ick - dm + 2ds - icv + 2(2bs - bm)z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) + S\left(\frac{2ick - dm + 2ds - icv + 2(2bs - bm)z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) \sin\left(\frac{(2ick - dm + 2ds - icv)^2}{4(2bs - bm)} + \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2ick + dm - 2ds - icv)^2}{4(bm - 2bs)} + \frac{\pi \nu}{2}\right) C\left(\frac{2ick + dm - 2ds - icv + 2(bm - 2bs)z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) + S\left(\frac{2ick + dm - 2ds - icv + 2(bm - 2bs)z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) \sin\left(\frac{(2ick + dm - 2ds - icv)^2}{4(bm - 2bs)} + \frac{\pi \nu}{2}\right)\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2699.01

$$\int \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu(c\, z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d\,(m-2k))^{3/2}} \left(\binom{m}{k} \left(b\,(m-2k) \sqrt{2\pi} \left(\cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{\sqrt{d\,(2k-m)}\, \left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{d\,(2k-m)}\, \left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{b^2 (m-2k)}{4d}\right) \right) - 2\sqrt{-d\,(m-2k)}\, \sin\left(d\, z\,(m-2k) + b\sqrt{z}\,(m-2k)\right) \right) \right) - \frac{i^{\nu+1} (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi\nu}{2} + c\, i\,(\nu-2k)\, z\right)}{\nu - 2k} + i^\nu 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\sqrt{2\pi}\, (2bs - bm) \cos\left(\frac{(bm-2bs)^2}{4(2ick + dm - 2ds - icv)} + \frac{\pi\nu}{2}\right) C\left(\frac{bm - 2bs + 2(2ick + dm - 2ds - icv)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2ick + dm - 2ds - icv}}\right) - \sqrt{2\pi}\, (bm - 2bs)\, S\left(\frac{bm - 2bs + 2(2ick + dm - 2ds - icv)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2ick + dm - 2ds - icv}}\right) \sin\left(\frac{(bm-2bs)^2}{4(2ick + dm - 2ds - icv)} + \frac{\pi\nu}{2}\right) + 2\sqrt{2ick + dm - 2ds - icv}\, \sin\left(\sqrt{z}\,(bm - 2bs) + (2ick + dm - 2ds - icv)\, z - \frac{\pi\nu}{2}\right) \right) \Big/ (2ick + dm - 2ds - icv)^{3/2} + \left(\sqrt{2\pi}\, (bm - 2bs) \cos\left(\frac{(2bs - bm)^2}{4(2ick - dm + 2ds - icv)} + \frac{\pi\nu}{2}\right) C\left(\frac{-bm + 2bs + 2(2ick - dm + 2ds - icv)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2ick - dm + 2ds - icv}}\right) - \sqrt{2\pi}\, (2bs - bm)\, S\left(\frac{-bm + 2bs + 2(2ick - dm + 2ds - icv)\sqrt{z}}{\sqrt{2\pi}\, \sqrt{2ick - dm + 2ds - icv}}\right) \sin\left(\frac{(2bs - bm)^2}{4(2ick - dm + 2ds - icv)} + \frac{\pi\nu}{2}\right) - 2\sqrt{2ick - dm + 2ds - icv}\, \sin\left(-\sqrt{z}\,(2bs - bm) + \frac{\pi\nu}{2} - (2ick - dm + 2ds - icv)\, z\right) \right) \Big/ (2ick - dm + 2ds - icv)^{3/2} \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + d\, z + e\right) \sinh^\nu(c\, z)$

01.19.21.2700.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh^\nu(c z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b (m - 2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{1}{4} \left(\frac{(m - 2k) d^2}{b} + 8 e k - 4 e m \right) \right) \right. \right.$$
$$\left.\left. C\left(\frac{\sqrt{b (2k - m)}\, (d + 2 b z)}{b \sqrt{2\pi}} \right) - S\left(\frac{\sqrt{b (2k - m)}\, (d + 2 b z)}{b \sqrt{2\pi}} \right) \sin\left(\frac{1}{4} \left(\frac{(m - 2k) d^2}{b} + 8 e k - 4 e m \right) \right) \right) \right) +$$
$$\frac{i^\nu (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(2 c k z + \frac{1}{2} i \nu (2 i c z + \pi)\right)}{2k - \nu} +$$
$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2 b s - b m}} \left(\cos\left(-\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4 (2 b s - b m)} + e (2 s - m) - \frac{\pi \nu}{2} \right) \right. \right.$$
$$C\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right) - S\left(\frac{2 i c k - d m + 2 d s - i c \nu + 2 (2 b s - b m) z}{\sqrt{2\pi} \sqrt{2 b s - b m}} \right)$$
$$\left. \sin\left(-\frac{(2 i c k - d m + 2 d s - i c \nu)^2}{4 (2 b s - b m)} + e (2 s - m) - \frac{\pi \nu}{2} \right) \right) + \frac{1}{\sqrt{b m - 2 b s}}$$
$$\left(\cos\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4 (b m - 2 b s)} + e (2 s - m) + \frac{\pi \nu}{2} \right) C\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right) + \right.$$
$$S\left(\frac{2 i c k + d m - 2 d s - i c \nu + 2 (b m - 2 b s) z}{\sqrt{2\pi} \sqrt{b m - 2 b s}} \right)$$
$$\left.\left.\left. \sin\left(\frac{(2 i c k + d m - 2 d s - i c \nu)^2}{4 (b m - 2 b s)} + e (2 s - m) + \frac{\pi \nu}{2} \right) \right) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2701.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d\, z\right) \sinh^\nu(c\, z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d\,(m-2k))^{3/2}} \left(\binom{m}{k} \left(b\,(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)\,b^2}{d} + 8\,e\,k - 4\,e\,m\right)\right) C\left(\frac{\sqrt{d\,(2k-m)}\,\left(b + 2\,d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - \right.\right.\right.$$
$$\left. S\left(\frac{\sqrt{d\,(2k-m)}\,\left(b+2\,d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)\,b^2}{d} + 8\,e\,k - 4\,e\,m\right)\right)\right) -$$
$$\left.\left. 2\sqrt{-d\,(m-2k)}\, \sin\left(e\,(m-2k) + d\,z\,(m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right) -$$
$$\frac{i^{\nu+1} (-1)^m 2^{-m-\nu+1}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi\nu}{2} + c\, i\,(\nu - 2k)\, z\right)}{\nu - 2k} +$$
$$i^\nu 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\sqrt{2\pi}\,(2\,b\,s - b\,m) \cos\left(-\frac{(b\,m - 2\,b\,s)^2}{4\,(2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)} + e\,m - 2\,e\,s - \frac{\pi\nu}{2}\right) \right.\right.$$
$$C\left(\frac{b\,m - 2\,b\,s + 2\,(2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu}}\right) +$$
$$\sqrt{2\pi}\,(b\,m - 2\,b\,s)\, S\left(\frac{b\,m - 2\,b\,s + 2\,(2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu}}\right)$$
$$\sin\left(-\frac{(b\,m - 2\,b\,s)^2}{4\,(2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)} + e\,m - 2\,e\,s - \frac{\pi\nu}{2}\right) + 2\sqrt{2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu}$$
$$\left.\sin\left(e\,m - 2\,e\,s + (2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)\,z + (b\,m - 2\,b\,s)\sqrt{z} - \frac{\pi\nu}{2}\right)\right) \Big/$$
$$(2\,i\,c\,k + d\,m - 2\,d\,s - i\,c\,\nu)^{3/2} + \left(\sqrt{2\pi}\,(b\,m - 2\,b\,s) \cos\left(\frac{(2\,b\,s - b\,m)^2}{4\,(2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)} + e\,m - 2\,e\,s + \frac{\pi\nu}{2}\right) \right.$$
$$C\left(\frac{-b\,m + 2\,b\,s + 2\,(2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu}}\right) - \sqrt{2\pi}\,(2\,b\,s - b\,m)$$
$$S\left(\frac{-b\,m + 2\,b\,s + 2\,(2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu}}\right) \sin\left(\frac{(2\,b\,s - b\,m)^2}{4\,(2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)} + e\,m - 2\,e\,s + \right.$$
$$\left.\frac{\pi\nu}{2}\right) - 2\sqrt{2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu}\, \sin\left(e\,m - 2\,e\,s + \frac{\pi\nu}{2} - (2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)\,z - \right.$$
$$\left.\left.\left.(2\,b\,s - b\,m)\sqrt{z}\right)\right) \Big/ (2\,i\,c\,k - d\,m + 2\,d\,s - i\,c\,\nu)^{3/2}\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m(b z^r)\sinh^v(f z + g)$

01.19.21.2702.01

$$\int \cos^m(b z^2)\sinh^v(g + f z)\,dz = i^{-v}(-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)(1 - v \bmod 2) - i^{-v} 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{-b(m-2k)}}\right)}{\sqrt{-b(m-2k)}} + \frac{i^v(-1)^m 2^{-m-v+1}}{f}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sinh\left(g(2k-v) + 2fkz + \frac{1}{2} i v(2 i f z + \pi)\right)}{2k-v} + i^v 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{\sqrt{2bs-bm}}\left(\cos\left(-\frac{(2 i f k - i f v)^2}{4(2bs-bm)} + g i(2k-v) - \frac{\pi v}{2}\right) C\left(\frac{2 i f k - i f v + 2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right) - S\left(\frac{2 i f k - i f v + 2(2bs-bm)z}{\sqrt{2\pi}\sqrt{2bs-bm}}\right)\sin\left(-\frac{(2 i f k - i f v)^2}{4(2bs-bm)} + g i(2k-v) - \frac{\pi v}{2}\right)\right) + \frac{1}{\sqrt{bm-2bs}}\left(\cos\left(\frac{(2 i f k - i f v)^2}{4(bm-2bs)} - i g(2k-v) + \frac{\pi v}{2}\right) C\left(\frac{2 i f k - i f v + 2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right) + S\left(\frac{2 i f k - i f v + 2(bm-2bs)z}{\sqrt{2\pi}\sqrt{bm-2bs}}\right)\sin\left(\frac{(2 i f k - i f v)^2}{4(bm-2bs)} - i g(2k-v) + \frac{\pi v}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2703.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh^v(g+f\,z)\,dz = i^{-v}(-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) + \frac{i^{-v} 2^{-m-v+2}}{b^2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\,\sin\left(b(2k-m)\sqrt{z}\right)\right)}{(m-2k)^2} - \frac{i^{v+1}(-1)^m 2^{-m-v+1}}{f}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sin\left(\frac{\pi v}{2}+g\,i\,(v-2k)+f\,i\,(v-2k)\,z\right)}{v-2k} + i^v 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{(2\,i\,f\,k-i\,f\,v)^{3/2}}\left(\sqrt{2\pi}\,(b\,m-2\,b\,s)\cosh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-i\,f\,v)}+2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}\right)C\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,f\,k-i\,f\,v}}\right) + i\sqrt{2\pi}\,(2\,b\,s-b\,m)\,S\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,f\,k-i\,f\,v}}\right)\sinh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-i\,f\,v)}+2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}\right)+2\,i\sqrt{2\,i\,f\,k-i\,f\,v}\,\sinh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}-i\,(2\,i\,f\,k-i\,f\,v)\,z-i\,(2\,b\,s-b\,m)\sqrt{z}\right)\right) + \frac{1}{(2\,i\,f\,k-i\,f\,v)^{3/2}}\left(\sqrt{2\pi}\,(2\,b\,s-b\,m)\cosh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k-i\,f\,v)}+2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}\right) C\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,f\,k-i\,f\,v}}\right)+i\sqrt{2\pi}\,(b\,m-2\,b\,s)\,S\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2\,i\,f\,k-i\,f\,v}}\right) \sinh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k-i\,f\,v)}+2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}\right)+2\,i\sqrt{2\,i\,f\,k-i\,f\,v}\, \sinh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}-i\,(2\,i\,f\,k-i\,f\,v)\,z-i\,(b\,m-2\,b\,s)\sqrt{z}\right)\right)\right) /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\left(b\,z^r+e\right)\sinh^v(f\,z+g)$

01.19.21.2704.01

$$\int \cos^m\left(b z^2 + e\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m\, 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) -$$

$$i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos(e(m-2k))\, C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) + S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{-b(m-2k)}}\right) \sin(e(m-2k))\right)}{\sqrt{-b(m-2k)}} +$$

$$\frac{i^\nu (-1)^m\, 2^{-m-\nu+1}}{f} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2 f k z + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu} +$$

$$i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s}$$

$$\left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g i (2k - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi} \sqrt{2bs - bm}}\right) - \right.\right.$$

$$\left. S\left(\frac{2 i f k - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi} \sqrt{2bs - bm}}\right) \sin\left(-\frac{(2 i f k - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g i (2k - \nu) - \frac{\pi \nu}{2}\right)\right) +$$

$$\frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2 i f k - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g(2k - \nu) + \frac{\pi \nu}{2}\right)\right.$$

$$C\left(\frac{2 i f k - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi} \sqrt{bm - 2bs}}\right) + S\left(\frac{2 i f k - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi} \sqrt{bm - 2bs}}\right)$$

$$\left.\left.\sin\left(\frac{(2 i f k - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g(2k - \nu) + \frac{\pi \nu}{2}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2705.01

$$\int \cos^m\left(\sqrt{z}\, b + e\right) \sinh^\nu(g + f\, z)\, dz = i^{-\nu} (-1)^m\, 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2) + \frac{1}{b^2} \left(i^{-\nu}\, 2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(m-2k)^2} \left(\binom{m}{k} \left(\cos\left(2 e k - e m + b (2k - m) \sqrt{z}\right) + b (2k - m) \sqrt{z} \sin\left(2 e k - e m + b (2k - m) \sqrt{z}\right) \right) \right) \right) - \frac{i^{\nu+1} (-1)^m\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi \nu}{2} + g\, i\, (\nu - 2k) + f\, i\, (\nu - 2k)\, z\right)}{\nu - 2k}}{f} +$$

$$i^\nu\, 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(2 i f k - i f \nu)^{3/2}} \left(\sqrt{2\pi}\, (b m - 2 b s) \cosh\left(\frac{i (2 b s - b m)^2}{4 (2 i f k - i f \nu)} + 2 g k + i e m - 2 i e s - g \nu + \frac{i \pi \nu}{2} \right) C\left(\frac{-b m + 2 b s + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}} \right) + i \sqrt{2\pi}\, (2 b s - b m)\, S\left(\frac{-b m + 2 b s + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}} \right) \sinh\left(\frac{i (2 b s - b m)^2}{4 (2 i f k - i f \nu)} + 2 g k + i e m - 2 i e s - g \nu + \frac{i \pi \nu}{2} \right) + 2 i \sqrt{2 i f k - i f \nu} \sinh\left(2 g k + i e m - 2 i e s - g \nu + \frac{i \pi \nu}{2} - i (2 i f k - i f \nu) z - i (2 b s - b m) \sqrt{z} \right) \right) + \frac{1}{(2 i f k - i f \nu)^{3/2}} \left(\sqrt{2\pi}\, (2 b s - b m) \cosh\left(\frac{i (b m - 2 b s)^2}{4 (2 i f k - i f \nu)} + 2 g k - i e m + 2 i e s - g \nu + \frac{i \pi \nu}{2} \right) C\left(\frac{b m - 2 b s + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}} \right) + i \sqrt{2\pi}\, (b m - 2 b s)\, S\left(\frac{b m - 2 b s + 2 (2 i f k - i f \nu) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - i f \nu}} \right) \sinh\left(\frac{i (b m - 2 b s)^2}{4 (2 i f k - i f \nu)} + 2 g k - i e m + 2 i e s - g \nu + \frac{i \pi \nu}{2} \right) + 2 i \sqrt{2 i f k - i f \nu} \sinh\left(2 g k - i e m + 2 i e s - g \nu + \frac{i \pi \nu}{2} - i (2 i f k - i f \nu) z - i (b m - 2 b s) \sqrt{z} \right) \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + d\, z\right) \sinh^\nu(f\, z + g)$

01.19.21.2706.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = \\
i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \\
\left(\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{\sqrt{b(2k-m)}\,(d + 2bz)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) \sin\left(\frac{d^2 (m-2k)}{4b}\right)\right)\right) + \\
\frac{i^\nu (-1)^m 2^{-m-\nu+1}}{f} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2fkz + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu} + \\
i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + g i (2k - \nu) - \frac{\pi \nu}{2}\right) \right.\right. \\
C\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) - S\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\sqrt{2bs - bm}}\right) \\
\left. \sin\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + g i (2k - \nu) - \frac{\pi \nu}{2}\right)\right) + \\
\frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} - i g (2k - \nu) + \frac{\pi \nu}{2}\right) \right. \\
C\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) + S\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\sqrt{bm - 2bs}}\right) \\
\left.\left.\left. \sin\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} - i g (2k - \nu) + \frac{\pi \nu}{2}\right)\right)\right)\right) /;\, m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2707.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z)\, dz = \\
i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \\
\left(\binom{m}{k} \left(b(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \right.\right.\right. \\
\left.\left.\left. \sin\left(\frac{b^2 (m-2k)}{4d}\right)\right) - 2\sqrt{-d(m-2k)}\, \sin\left(d z (m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right) - \\
\frac{i^{\nu+1} (-1)^m 2^{-m-\nu+1}}{f} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k) + f i (\nu - 2k) z\right)}{\nu - 2k} +$$

$$i^v 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(\Bigg(\Bigg(\sqrt{2\pi}\, (b m - 2 b s) \cosh\left(\frac{i (2 b s - b m)^2}{4 (2 i f k - d m + 2 d s - i f v)} + 2 g k - g v + \frac{i \pi v}{2} \right)$$

$$C\left(\frac{-b m + 2 b s + 2 (2 i f k - d m + 2 d s - i f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - d m + 2 d s - i f v}} \right) +$$

$$i \sqrt{2\pi}\, (2 b s - b m) S\left(\frac{-b m + 2 b s + 2 (2 i f k - d m + 2 d s - i f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k - d m + 2 d s - i f v}} \right)$$

$$\sinh\left(\frac{i (2 b s - b m)^2}{4 (2 i f k - d m + 2 d s - i f v)} + 2 g k - g v + \frac{i \pi v}{2} \right) + 2 i \sqrt{2 i f k - d m + 2 d s - i f v}$$

$$\sinh\left(2 g k - g v + \frac{i \pi v}{2} - i (2 i f k - d m + 2 d s - i f v) z - i (2 b s - b m) \sqrt{z} \right) \Bigg) \Bigg/$$

$$(2 i f k - d m + 2 d s - i f v)^{3/2} + \Bigg(\sqrt{2\pi}\, (2 b s - b m) \cosh\Bigg(\frac{i (b m - 2 b s)^2}{4 (2 i f k + d m - 2 d s - i f v)} +$$

$$2 g k - g v + \frac{i \pi v}{2} \Bigg) C\left(\frac{b m - 2 b s + 2 (2 i f k + d m - 2 d s - i f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k + d m - 2 d s - i f v}} \right) + i \sqrt{2\pi}\, (b m - 2 b s)$$

$$S\left(\frac{b m - 2 b s + 2 (2 i f k + d m - 2 d s - i f v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2 i f k + d m - 2 d s - i f v}} \right) \sinh\Bigg(\frac{i (b m - 2 b s)^2}{4 (2 i f k + d m - 2 d s - i f v)} + 2 g k - g v +$$

$$\frac{i \pi v}{2} \Bigg) + 2 i \sqrt{2 i f k + d m - 2 d s - i f v}\, \sinh\Bigg(2 g k - g v + \frac{i \pi v}{2} - i (2 i f k + d m - 2 d s - i f v)$$

$$z - i (b m - 2 b s) \sqrt{z} \Bigg) \Bigg) \Bigg/ (2 i f k + d m - 2 d s - i f v)^{3/2} \Bigg) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + d z + e) \sinh^v(f z + g)$

01.19.21.2708.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{-b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right) C\left(\frac{\sqrt{b(2k-m)}\,(d + 2bz)}{b\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{b(2k-m)}\,(d+2bz)}{b\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right)\right)\right) + \frac{i^\nu (-1)^m 2^{-m-\nu+1}}{f} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \sinh\left(g(2k-\nu) + 2fkz + \frac{1}{2} i \nu (2 i f z + \pi)\right)}{2k - \nu} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{2bs - bm}} \left(\cos\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g i (2k - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\, \sqrt{2bs - bm}}\right) - S\left(\frac{2 i f k - d m + 2 d s - i f \nu + 2(2bs - bm) z}{\sqrt{2\pi}\, \sqrt{2bs - bm}}\right) \sin\left(-\frac{(2 i f k - d m + 2 d s - i f \nu)^2}{4(2bs - bm)} + e(2s - m) + g i (2k - \nu) - \frac{\pi \nu}{2}\right)\right) + \frac{1}{\sqrt{bm - 2bs}} \left(\cos\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g (2k - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\, \sqrt{bm - 2bs}}\right) + S\left(\frac{2 i f k + d m - 2 d s - i f \nu + 2(bm - 2bs) z}{\sqrt{2\pi}\, \sqrt{bm - 2bs}}\right) \sin\left(\frac{(2 i f k + d m - 2 d s - i f \nu)^2}{4(bm - 2bs)} + e(2s - m) - i g (2k - \nu) + \frac{\pi \nu}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2709.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(g + f z)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left(\binom{m}{k} \left(b(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)b^2}{d} + 8ek - 4em\right)\right) C\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) - S\left(\frac{\sqrt{d(2k-m)}\,\left(b + 2d\sqrt{z}\right)}{d\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)b^2}{d} + 8ek - 4em\right)\right)\right) - 2\sqrt{-d(m-2k)}\, \sin\left(e(m-2k) + dz(m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right) -$$

$$\frac{i^{v+1}(-1)^m 2^{-m-v+1}}{f}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\sin\left(\frac{\pi v}{2}+g\,i\,(v-2k)+f\,i\,(v-2k)\,z\right)}{v-2k}+$$

$$i^v 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\Bigg(\sqrt{2\pi}\,(b\,m-2\,b\,s)\cosh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)}+2\,g\,k+i\,e\,m-2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)$$

$$C\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}}\right)+i\sqrt{2\pi}\,(2\,b\,s-b\,m)$$

$$S\left(\frac{-b\,m+2\,b\,s+2\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}}\right)\sinh\left(\frac{i\,(2\,b\,s-b\,m)^2}{4\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)}+2\,g\,k+\right.$$

$$\left.i\,e\,m-2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)+2\,i\sqrt{2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v}\,\sinh\left(2\,g\,k+i\,e\,m-2\,i\,e\,s-g\,v+\right.$$

$$\left.\left.\frac{i\,\pi\,v}{2}-i\,(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)\,z-i\,(2\,b\,s-b\,m)\sqrt{z}\right)\right)\Bigg/(2\,i\,f\,k-d\,m+2\,d\,s-i\,f\,v)^{3/2}+$$

$$\Bigg(\sqrt{2\pi}\,(2\,b\,s-b\,m)\cosh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)}+2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)$$

$$C\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}}\right)+$$

$$i\sqrt{2\pi}\,(b\,m-2\,b\,s)\,S\left(\frac{b\,m-2\,b\,s+2\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}}\right)$$

$$\sinh\left(\frac{i\,(b\,m-2\,b\,s)^2}{4\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)}+2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)+$$

$$2\,i\sqrt{2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v}\,\sinh\left(2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}-i\,(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)\right.$$

$$\left.\left.z-i\,(b\,m-2\,b\,s)\sqrt{z}\right)\right)\Bigg/(2\,i\,f\,k+d\,m-2\,d\,s-i\,f\,v)^{3/2}\Bigg)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(b\,z)\sinh^v(c\,z^r)$

01.19.21.2710.01

$$\int \cos^m(b z) \sinh^v(c z^2)\, dz = i^{-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + i^{v+1} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} \frac{(-1)^k}{\sqrt{i c (v-2k)}} \binom{v}{k} \left(\cos\left(\frac{\pi v}{2}\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (v-2k) z}{\sqrt{i c (v-2k)}}\right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (v-2k) z}{\sqrt{i c (v-2k)}}\right) \sin\left(\frac{\pi v}{2}\right)\right) + \frac{i^{-v} 2^{-m-v+1}}{b} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{\binom{m}{k} \sin(b (m-2k) z)}{m-2k} + i^v 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{\sqrt{i c v - 2 i c s}} \left(\cos\left(\frac{(2bk - bm)^2}{4(i c v - 2 i c s)} - \frac{\pi v}{2}\right) C\left(\frac{2bk - bm + 2(i c v - 2 i c s) z}{\sqrt{2\pi} \sqrt{i c v - 2 i c s}}\right) + S\left(\frac{2bk - bm + 2(i c v - 2 i c s) z}{\sqrt{2\pi} \sqrt{i c v - 2 i c s}}\right) \sin\left(\frac{(2bk - bm)^2}{4(i c v - 2 i c s)} - \frac{\pi v}{2}\right)\right) + \frac{1}{\sqrt{2 i c s - i c v}} \left(\cos\left(\frac{(2bk - bm)^2}{4(2 i c s - i c v)} + \frac{\pi v}{2}\right) C\left(\frac{2bk - bm + 2(2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{2 i c s - i c v}}\right) + S\left(\frac{2bk - bm + 2(2 i c s - i c v) z}{\sqrt{2\pi} \sqrt{2 i c s - i c v}}\right) \sin\left(\frac{(2bk - bm)^2}{4(2 i c s - i c v)} + \frac{\pi v}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2711.01

$$\begin{aligned}
&\int \cos^m(b\,z)\sinh^v\!\left(c\sqrt{z}\right)dz = i^{-v}\,2^{-m-v}\,z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2) - \frac{1}{c^2}\Bigg(i^v\,2^{-m-v+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \\
&\quad \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k\binom{v}{k}\left(\cosh\!\left(c\sqrt{z}\,(2k-v)+\frac{i\pi v}{2}\right)-c\,(2k-v)\sqrt{z}\,\sinh\!\left(c\sqrt{z}\,(2k-v)+\frac{i\pi v}{2}\right)\right)}{(v-2k)^2}\Bigg)+ \\
&\quad \frac{i^{-v}\,2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(b\,(m-2k)\,z)}{m-2k}}{b}+ \\
&\quad i^v\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(\frac{1}{(2bk-bm)^{3/2}}\Bigg(\sqrt{2\pi}\,(2ics-icv)\cos\!\left(\frac{\pi v}{2}-\frac{(icv-2ics)^2}{4(2bk-bm)}\right) \\
&\qquad C\!\left(\frac{2\sqrt{z}\,(2bk-bm)-2ics+icv}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(icv-2ics)\,S\!\left(\frac{2\sqrt{z}\,(2bk-bm)-2ics+icv}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right) \\
&\qquad \sin\!\left(\frac{\pi v}{2}-\frac{(icv-2ics)^2}{4(2bk-bm)}\right)+2\sqrt{2bk-bm}\,\sin\!\left(\frac{\pi v}{2}+(2bk-bm)\,z+(icv-2ics)\sqrt{z}\right)\Bigg)+ \\
&\qquad \frac{1}{(2bk-bm)^{3/2}}\Bigg(\sqrt{2\pi}\,(icv-2ics)\cos\!\left(\frac{(2ics-icv)^2}{4(2bk-bm)}+\frac{\pi v}{2}\right)C\!\left(\frac{2\sqrt{z}\,(2bk-bm)+2ics-icv}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)- \\
&\qquad \sqrt{2\pi}\,(2ics-icv)\,S\!\left(\frac{2\sqrt{z}\,(2bk-bm)+2ics-icv}{\sqrt{2bk-bm}\,\sqrt{2\pi}}\right)\sin\!\left(\frac{(2ics-icv)^2}{4(2bk-bm)}+\frac{\pi v}{2}\right)+ \\
&\qquad 2\sqrt{2bk-bm}\,\sin\!\left(-\frac{\pi v}{2}+(2bk-bm)\,z+(2ics-icv)\sqrt{z}\right)\Bigg)\Bigg)\;/;\; m\in\mathbb{N}^+\land v\in\mathbb{N}^+
\end{aligned}$$

Involving $\cos^m(d\,z+e)\sinh^v\left(c\,z^r\right)$

01.19.21.2712.01

$$\int \cos^m(e+d z)\sinh^\nu\left(c z^2\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}}$$

$$(1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{i c (\nu - 2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}}\right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2}\right)\right) +$$

$$\frac{i^{-\nu} 2^{-m-\nu+1}}{d} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \sin(e(2k - m) - m d z + 2 d k z)}{2k - m} + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\frac{1}{\sqrt{i c \nu - 2 i c s}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (i c \nu - 2 i c s)} + e(2k - m) + \frac{\pi \nu}{2}\right) C\left(\frac{2 d k - d m + 2 (i c \nu - 2 i c s) z}{\sqrt{2\pi} \sqrt{i c \nu - 2 i c s}}\right) - \right.\right.$$

$$\left. S\left(\frac{2 d k - d m + 2 (i c \nu - 2 i c s) z}{\sqrt{2\pi} \sqrt{i c \nu - 2 i c s}}\right) \sin\left(-\frac{(2 d k - d m)^2}{4 (i c \nu - 2 i c s)} + e(2k - m) + \frac{\pi \nu}{2}\right)\right) +$$

$$\frac{1}{\sqrt{2 i c s - i c \nu}} \left(\cos\left(-\frac{(2 d k - d m)^2}{4 (2 i c s - i c \nu)} + e(2k - m) - \frac{\pi \nu}{2}\right) C\left(\frac{2 d k - d m + 2 (2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{2 i c s - i c \nu}}\right) - \right.$$

$$\left.\left. S\left(\frac{2 d k - d m + 2 (2 i c s - i c \nu) z}{\sqrt{2\pi} \sqrt{2 i c s - i c \nu}}\right) \sin\left(-\frac{(2 d k - d m)^2}{4 (2 i c s - i c \nu)} + e(2k - m) - \frac{\pi \nu}{2}\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2713.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}\right.$$
$$\left.(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c\,(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)}{(\nu-2k)^2}\right)+$$
$$\frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2k)+d\,z\,(m-2k))}{m-2k}}{d}+i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2\,d\,k-d\,m)^{3/2}}\right.$$
$$\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+\frac{\pi\nu}{2}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\right.$$
$$\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)-2\,i\,c\,s+i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m+\frac{\pi\nu}{2}\right)+$$
$$\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m+\frac{\pi\nu}{2}+(2\,d\,k-d\,m)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)+\frac{1}{(2\,d\,k-d\,m)^{3/2}}$$
$$\left(\sqrt{2\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{\pi\nu}{2}\right)C\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)+\right.$$
$$\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,\nu)\,S\left(\frac{2\sqrt{z}\,(2\,d\,k-d\,m)+2\,i\,c\,s-i\,c\,\nu}{\sqrt{2\,d\,k-d\,m}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m)}+2\,e\,k-e\,m-\frac{\pi\nu}{2}\right)+$$
$$\left.\left.2\sqrt{2\,d\,k-d\,m}\,\sin\left(2\,e\,k-e\,m+(2\,d\,k-d\,m)\,z+(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}-\frac{\pi\nu}{2}\right)\right)\right)/;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m\left(a\,z^r\right)\sinh^\nu\left(c\,z^r\right)$

01.19.21.2714.01

$$\int \cos^m(b z^r) \sinh^\nu(c z^r)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - \frac{1}{r}\left(i^{-\nu} 2^{-m-\nu} z \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{1}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-1/r} + ((2 i b k - i b m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m) z^r\right)\right)\right) - \frac{1}{r}\left((-1)^{m+\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{1}{r}, (c \nu - 2 c k) z^r\right) ((c \nu - 2 c k) z^r)^{-1/r} + (-1)^\nu ((2 c k - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - c \nu) z^r\right)\right)\right) - \frac{1}{r}\left(2^{-m-\nu} z \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c \nu) z^r\right) ((-2 b i k + i b m - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu ((2 i b k - i b m - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - 2 c s + c \nu) z^r\right) + ((-2 b i k + i b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c \nu) z^r\right) + ((2 i b k - i b m + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m + 2 c s - c \nu) z^r\right)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2715.01

$$\int \cos^m(b z^2) \sinh^\nu(c z^2)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) +$$
$$i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} C\left(\frac{b (m-2k) \sqrt{\frac{2}{\pi}}\, z}{\sqrt{b (m-2k)}} \right)}{\sqrt{b (m-2k)}} + i^{\nu+1} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{i c (\nu - 2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}} \right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (\nu - 2k) z}{\sqrt{i c (\nu - 2k)}} \right) \sin\left(\frac{\pi \nu}{2}\right) \right) +$$
$$i^{\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m + 2 i c s - i c \nu}\, z \right) + \right.\right.$$
$$\left. S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m + 2 i c s - i c \nu}\, z \right) \sin\left(\frac{\pi \nu}{2}\right) \right) \Big/ \left(\sqrt{2 b k - b m + 2 i c s - i c \nu} \right) +$$
$$\left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m - 2 i c s + i c \nu}\, z \right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2 b k - b m - 2 i c s + i c \nu}\, z \right) \sin\left(\frac{\pi \nu}{2}\right) \right) \Big/$$
$$\left.\left(\sqrt{2 b k - b m - 2 i c s + i c \nu} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2716.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\,\sin\left(b(2k-m)\sqrt{z}\right)\right)}{(2k-m)^2}}{b^2} - \frac{1}{c^2}\left(i^{-\nu}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)+c\,i\,(2k-\nu)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}\right)\right)}{(2k-\nu)^2}\right) + i^{-\nu}\,2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(\frac{\pi\nu}{2}+(b(2k-m)-i\,c(\nu-2s))\sqrt{z}\right)+(b(2k-m)-i\,c(\nu-2s))\sqrt{z}\,\sin\left(\frac{\pi\nu}{2}+(b(2k-m)-i\,c(\nu-2s))\sqrt{z}\right)\right)\Big/(b(2k-m)-i\,c(\nu-2s))^2 + \left(\cos\left(\frac{\pi\nu}{2}-(b(2k-m)+c\,i(\nu-2s))\sqrt{z}\right)-(b(2k-m)+c\,i(\nu-2s))\sqrt{z}\,\sin\left(\frac{\pi\nu}{2}-(b(2k-m)+c\,i(\nu-2s))\sqrt{z}\right)\right)\Big/(b(2k-m)+c\,i(\nu-2s))^2\right)\;/;\; m\in\mathbb{N}^+\wedge\nu\in\mathbb{N}^+$$

Involving $\cos^m(a z^r + e)\sinh^\nu(c z^r)$

01.19.21.2717.01

$$\int \cos^m(b z^r+e)\sinh^\nu(c z^r)\,dz = i^{-\nu}(-1)^m\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - \frac{i^{-\nu}\,2^{-m-\nu}\,z}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2iek-iem}\,\Gamma\left(\frac{1}{r},(i\,b\,m-2\,i\,b\,k)z^r\right)((i\,b\,m-2\,i\,b\,k)z^r)^{-1/r} + e^{iem-2iek}((2\,i\,b\,k-i\,b\,m)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m)z^r\right)\right) - \frac{(-1)^{m+\nu}\,2^{-m-\nu}\,z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\Gamma\left(\frac{1}{r},(c\nu-2ck)z^r\right)((c\nu-2ck)z^r)^{-1/r}+(-1)^\nu((2ck-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2ck-c\nu)z^r\right)\right) - \frac{2^{-m-\nu}\,z}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{2iek-iem}\,\Gamma\left(\frac{1}{r},(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)z^r)^{-1/r} + (-1)^\nu e^{iem-2iek}((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)z^r\right) + e^{2iek-iem}((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)z^r\right) + e^{iem-2iek}((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)z^r\right)\right)\;/;\; m\in\mathbb{N}^+\wedge\nu\in\mathbb{N}^+$$

01.19.21.2718.01

$$\int \cos^m\left(b z^2+e\right)\sinh^\nu\left(c z^2\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2) + i^{-\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{\binom{m}{k}\left(\cos(e\,(m-2k))\,C\left(\frac{b\,(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2k)}}\right) - S\left(\frac{b\,(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b\,(m-2k)}}\right)\sin(e\,(m-2k))\right)}{\sqrt{b\,(m-2k)}} + i^{\nu+1}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}} (1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{i\,c\,(\nu-2k)}}\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}\right)\right) + i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(e\,(2k-m)+\frac{\pi\nu}{2}\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2ics+ic\nu}\;z\right) - S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2ics+ic\nu}\;z\right)\sin\left(e\,(2k-m)+\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(e\,(2k-m)-\frac{\pi\nu}{2}\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2ics-ic\nu}\;z\right) - S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2ics-ic\nu}\;z\right)\sin\left(e\,(2k-m)-\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2719.01

$$\int \cos^m\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(c \sqrt{z}\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + \frac{1}{b^2} \left(i^{-\nu} 2^{-m-\nu+2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(2k-m)^2} \left(\binom{m}{k} \left(\cos\left(e(m-2k) - b(2k-m)\sqrt{z}\right) - b(2k-m)\sqrt{z} \sin\left(e(m-2k) - b(2k-m)\sqrt{z}\right) \right) \right) \right) - \frac{1}{c^2} \left(i^{-\nu} 2^{-m-\nu+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \left(\cos\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right) + c\, i (2k-\nu) \sqrt{z} \sin\left(c\, i \sqrt{z}\, (2k-\nu) + \frac{\pi \nu}{2}\right) \right)}{(2k-\nu)^2} \right) + i^{-\nu} 2^{-m-\nu+2} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(e(m-2k) + \frac{\pi \nu}{2} - (b(2k-m) + c\, i(\nu-2s))\sqrt{z}\right) - (b(2k-m) + c\, i(\nu-2s)) \sqrt{z} \sin\left(e(m-2k) + \frac{\pi \nu}{2} - (b(2k-m) + c\, i(\nu-2s))\sqrt{z}\right) \right) \Big/ (b(2k-m) + c\, i(\nu-2s))^2 + \left(\cos\left(e(m-2k) - \frac{\pi \nu}{2} - (b(2k-m) - i\, c(\nu-2s))\sqrt{z}\right) - (b(2k-m) - i\, c(\nu-2s)) \sqrt{z} \sin\left(e(m-2k) - \frac{\pi \nu}{2} - (b(2k-m) - i\, c(\nu-2s))\sqrt{z}\right) \right) \Big/ (b(2k-m) - i\, c(\nu-2s))^2 \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m\left(b z^r + d z\right) \sinh^\nu\left(c z^r\right)$

01.19.21.2720.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh^\nu\left(c z^2\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{d^2 (m-2k)}{4b}\right)\right)}{\sqrt{b(m-2k)}} - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^{k+\nu}}{\sqrt{i c (\nu - 2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (2k - \nu) z}{\sqrt{i c (\nu - 2k)}}\right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (2k - \nu) z}{\sqrt{i c (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2}\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(\frac{\pi \nu}{2} - \frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)}\right) C\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) - \right.\right.$$

$$\left. S\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)}\right)\right) \Big/$$

$$\left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{\pi \nu}{2}\right)\right.$$

$$C\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) + S\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right)$$

$$\left.\left.\sin\left(\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{\pi \nu}{2}\right)\right)\Big/\left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2721.01

$$\int \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(c \sqrt{z}\right) dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-i\, b (m-2k) \sqrt{2\pi} \left(\cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{(2k-m)\left(i\, b + 2\, i\, d \sqrt{z}\right)}{\sqrt{-d(m-2k)}\, \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)\left(i\, b + 2\, i\, d \sqrt{z}\right)}{\sqrt{-d(m-2k)}\, \sqrt{2\pi}}\right) \sin\left(\frac{b^2 (m-2k)}{4d}\right) \right) - 2 \sqrt{-d(m-2k)}\, \sin\left(d\, z (m-2k) + b \sqrt{z}\, (m-2k)\right) \right) \right) - \frac{1}{c^2} \left(i^\nu (-1)^m 2^{-m-\nu+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k \binom{\nu}{k} \left(\cosh\left(c \sqrt{z}\, (2k-\nu) + \frac{i \pi \nu}{2}\right) - c (2k-\nu) \sqrt{z}\, \sinh\left(c \sqrt{z}\, (2k-\nu) + \frac{i \pi \nu}{2}\right) \right)}{(\nu-2k)^2} \right) + i^\nu 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(d\, m - 2\, d\, s)^{3/2}} \left(\sqrt{2\pi}\, (-2\, c\, i\, k - b\, m + 2\, b\, s + i\, c\, \nu) \cos\left(\frac{(2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu)^2}{4 (d\, m - 2\, d\, s)} + \frac{\pi \nu}{2}\right) C\left(\frac{2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu + 2 (d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d\, m - 2\, d\, s}}\right) - \sqrt{2\pi}\, (2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu) S\left(\frac{2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu + 2 (d\, m - 2\, d\, s) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{d\, m - 2\, d\, s}}\right) \sin\left(\frac{(2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu)^2}{4 (d\, m - 2\, d\, s)} + \frac{\pi \nu}{2}\right) + 2 \sqrt{d\, m - 2\, d\, s}\, \sin\left(-\frac{\pi \nu}{2} + (d\, m - 2\, d\, s) z + (2\, i\, c\, k + b\, m - 2\, b\, s - i\, c\, \nu) \sqrt{z}\right) \right) + \frac{1}{(2\, d\, s - d\, m)^{3/2}} \left(\sqrt{2\pi}\, (-2\, c\, i\, k + b\, m - 2\, b\, s + i\, c\, \nu) \cos\left(\frac{(2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu)^2}{4 (2\, d\, s - d\, m)} + \frac{\pi \nu}{2}\right) C\left(\frac{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu + 2 (2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, s - d\, m}}\right) - \sqrt{2\pi}\, (2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu) S\left(\frac{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu + 2 (2\, d\, s - d\, m) \sqrt{z}}{\sqrt{2\pi}\, \sqrt{2\, d\, s - d\, m}}\right) \sin\left(\frac{(2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu)^2}{4 (2\, d\, s - d\, m)} + \frac{\pi \nu}{2}\right) - 2 \sqrt{2\, d\, s - d\, m}\, \sin\left(\frac{\pi \nu}{2} - (2\, d\, s - d\, m) z - (2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu) \sqrt{z}\right) \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + d\, z + e\right) \sinh^\nu\left(c\, z^r\right)$

01.19.21.2722.01

$$\int \cos^m(b z^2 + d z + e) \sinh^\nu(c z^2)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^{k+\nu}}{\sqrt{i c(\nu-2k)}} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2}\right) C\left(\frac{c \sqrt{\frac{2}{\pi}}\, (2k-\nu) z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c \sqrt{\frac{2}{\pi}}\, (2k-\nu) z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi \nu}{2}\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + e(2k-m) + \frac{\pi\nu}{2}\right) C\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) - S\left(\frac{2dk-dm+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) \sin\left(-\frac{(2dk-dm)^2}{4(2bk-bm-2ics+ic\nu)} + e(2k-m) + \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + e(2k-m) - \frac{\pi\nu}{2}\right) C\left(\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) - S\left(\frac{2dk-dm+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) \sin\left(-\frac{(2dk-dm)^2}{4(2bk-bm+2ics-ic\nu)} + e(2k-m) - \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2723.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu\left(c\sqrt{z}\right) dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-i b (m-2k) \sqrt{2\pi} \left(\cos\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) C\left(\frac{(2k-m)\left(i b + 2 i d \sqrt{z}\right)}{\sqrt{-d(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)\left(i b + 2 i d\sqrt{z}\right)}{\sqrt{-d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right)\right) - \right.\right.$$

$$2\sqrt{-d(m-2k)}\,\sin\Big(e(m-2k)+d\,z(m-2k)+b\sqrt{z}\,(m-2k)\Big)\Bigg)\Bigg)-\frac{1}{c^2}\Bigg(i^\nu(-1)^m\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}$$

$$(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k\binom{\nu}{k}\left(\cosh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)-c(2k-\nu)\sqrt{z}\,\sinh\left(c\sqrt{z}\,(2k-\nu)+\frac{i\pi\nu}{2}\right)\right)}{(\nu-2k)^2}\Bigg)+i^\nu\,2^{-m-\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\frac{1}{(d\,m-2d\,s)^{3/2}}\Bigg(\sqrt{2\pi}\,(-2c\,i\,k-b\,m+2b\,s+i\,c\,\nu)\cos\Bigg(-\frac{(2i\,c\,k+b\,m-2b\,s-i\,c\,\nu)^2}{4(d\,m-2d\,s)}+$$

$$e\,m-2e\,s-\frac{\pi\nu}{2}\Bigg)C\Bigg(\frac{2i\,c\,k+b\,m-2b\,s-i\,c\,\nu+2(d\,m-2d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m-2d\,s}}\Bigg)+$$

$$\sqrt{2\pi}\,(2i\,c\,k+b\,m-2b\,s-i\,c\,\nu)\,S\Bigg(\frac{2i\,c\,k+b\,m-2b\,s-i\,c\,\nu+2(d\,m-2d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m-2d\,s}}\Bigg)$$

$$\sin\Bigg(-\frac{(2i\,c\,k+b\,m-2b\,s-i\,c\,\nu)^2}{4(d\,m-2d\,s)}+e\,m-2e\,s-\frac{\pi\nu}{2}\Bigg)+$$

$$2\sqrt{d\,m-2d\,s}\,\sin\Bigg(e\,m-2e\,s+(d\,m-2d\,s)z+(2i\,c\,k+b\,m-2b\,s-i\,c\,\nu)\sqrt{z}-\frac{\pi\nu}{2}\Bigg)\Bigg)+$$

$$\frac{1}{(2d\,s-d\,m)^{3/2}}\Bigg(\sqrt{2\pi}\,(-2c\,i\,k+b\,m-2b\,s+i\,c\,\nu)\cos\Bigg(\frac{(2i\,c\,k-b\,m+2b\,s-i\,c\,\nu)^2}{4(2d\,s-d\,m)}+$$

$$e\,m-2e\,s+\frac{\pi\nu}{2}\Bigg)C\Bigg(\frac{2i\,c\,k-b\,m+2b\,s-i\,c\,\nu+2(2d\,s-d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2d\,s-d\,m}}\Bigg)-$$

$$\sqrt{2\pi}\,(2i\,c\,k-b\,m+2b\,s-i\,c\,\nu)\,S\Bigg(\frac{2i\,c\,k-b\,m+2b\,s-i\,c\,\nu+2(2d\,s-d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2d\,s-d\,m}}\Bigg)$$

$$\sin\Bigg(\frac{(2i\,c\,k-b\,m+2b\,s-i\,c\,\nu)^2}{4(2d\,s-d\,m)}+e\,m-2e\,s+\frac{\pi\nu}{2}\Bigg)-2\sqrt{2d\,s-d\,m}$$

$$\sin\Bigg(e\,m-2e\,s+\frac{\pi\nu}{2}-(2d\,s-d\,m)z-(2i\,c\,k-b\,m+2b\,s-i\,c\,\nu)\sqrt{z}\Bigg)\Bigg)\Bigg)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m(d\,z)\sinh^\nu(c\,z^r+g)$

01.19.21.2724.01

$$\int \cos^m(d\,z)\sinh^\nu\left(c\,z^2+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+i^{\nu+1}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}(-1)^k \binom{\nu}{k}\left(\cos\left(\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right)\right)+ \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(2\,d\,k\,z-m\,d\,z)}{2k-m}+i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-i\,g\,(2s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)- S\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}-i\,g\,(2s-\nu)+\frac{\pi\,\nu}{2}\right)\right)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+g\,i\,(2s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)- S\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+g\,i\,(2s-\nu)-\frac{\pi\,\nu}{2}\right)\right)\right) /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2725.01

$$\int \cos^m(d\,z)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)-\frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\right.\right.$$

$$\left.\left.\left(\cosh\left(2gk-g\nu+\frac{i\pi\nu}{2}+c(2k-\nu)\sqrt{z}\right)-c(2k-\nu)\sqrt{z}\,\sinh\left(2gk-g\nu+\frac{i\pi\nu}{2}+c(2k-\nu)\sqrt{z}\right)\right)\right)\right)+$$

$$\frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d\,(m-2k)\,z)}{m-2k}}{d}+i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\right.$$

$$\left(\sqrt{2\pi}\,(2ics-ic\nu)\cos\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}-2igs+ig\nu+\frac{\pi\nu}{2}\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\right.$$

$$\sqrt{2\pi}\,(ic\nu-2ics)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}-2igs+ig\nu+\right.$$

$$\left.\left.\frac{\pi\nu}{2}\right)+2\sqrt{2dk-dm}\,\sin\left(-2gis+ig\nu+\frac{\pi\nu}{2}+(2dk-dm)z+(ic\nu-2ics)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(ic\nu-2ics)\cos\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2igs-ig\nu-\frac{\pi\nu}{2}\right)\right.$$

$$C\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2ics-ic\nu)$$

$$S\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2igs-ig\nu-\frac{\pi\nu}{2}\right)+$$

$$\left.\left.2\sqrt{2dk-dm}\,\sin\left(2igs-ig\nu+(2dk-dm)z+(2ics-ic\nu)\sqrt{z}-\frac{\pi\nu}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.2726.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(c\,z^2+g\right) dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+i^{\nu+1}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}\,(\nu-2k)\,z}{\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}+g\,i\,(\nu-2k)\right)\right)\right)+\frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(2k-m)-m\,d\,z+2\,d\,k\,z)}{2k-m}+i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-i\,g\,(2s-\nu)+\frac{\pi\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-i\,g\,(2s-\nu)+\frac{\pi\nu}{2}\right)\right)+\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)+g\,i\,(2s-\nu)-\frac{\pi\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(-\frac{(2\,d\,k-d\,m)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)+g\,i\,(2s-\nu)-\frac{\pi\nu}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2727.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)-\frac{1}{c^2}\left(i^\nu\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(\nu-2k)^2}\left((-1)^k\binom{\nu}{k}\left(\cosh\left(2gk-g\nu+\frac{i\pi\nu}{2}+c(2k-\nu)\sqrt{z}\right)-c(2k-\nu)\sqrt{z}\,\sinh\left(2gk-g\nu+\frac{i\pi\nu}{2}+c(2k-\nu)\sqrt{z}\right)\right)\right)\right)+\frac{i^{-\nu}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e(m-2k)+d\,z(m-2k))}{m-2k}}{d}+i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(2ics-ic\nu)\cos\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}+2ek-em-2igs+ig\nu+\frac{\pi\nu}{2}\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(ic\nu-2ics)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)-2ics+ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(ic\nu-2ics)^2}{4(2dk-dm)}+2ek-em-2igs+ig\nu+\frac{\pi\nu}{2}\right)+2\sqrt{2dk-dm}\,\sin\left(2ek-em-2igs+ig\nu+\frac{\pi\nu}{2}+(2dk-dm)z+(ic\nu-2ics)\sqrt{z}\right)\right)+\frac{1}{(2dk-dm)^{3/2}}\left(\sqrt{2\pi}\,(ic\nu-2ics)\cos\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2ek-em+2igs-ig\nu-\frac{\pi\nu}{2}\right)C\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)+\sqrt{2\pi}\,(2ics-ic\nu)\,S\left(\frac{2\sqrt{z}\,(2dk-dm)+2ics-ic\nu}{\sqrt{2dk-dm}\,\sqrt{2\pi}}\right)\sin\left(-\frac{(2ics-ic\nu)^2}{4(2dk-dm)}+2ek-em+2igs-ig\nu-\frac{\pi\nu}{2}\right)+2\sqrt{2dk-dm}\,\sin\left(2ek-em+2igs-ig\nu+(2dk-dm)z+(2ics-ic\nu)\sqrt{z}-\frac{\pi\nu}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m(a\,z^r)\sinh^\nu(c\,z^r+g)$

01.19.21.2728.01

$$\int \cos^m(b z^r)\sinh^v(c z^r+g)\,dz = i^{-v}(-1)^m 2^{-m-v} z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2) - \frac{i^{-v}2^{-m-v}z}{r}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$
$$\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{1}{r},(i b m-2 i b k)z^r\right)((i b m-2 i b k)z^r)^{-1/r}+((2 i b k-i b m)z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2 i b k-i b m)z^r\right)\right)-$$
$$\frac{(-1)^{m+v}2^{-m-v}z}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\lfloor\frac{v-1}{2}\rfloor}(-1)^k\binom{v}{k}$$
$$\left(e^{2gk-gv}\Gamma\left(\frac{1}{r},(c v-2 c k)z^r\right)((c v-2 c k)z^r)^{-1/r}+(-1)^v e^{g v-2 g k}((2 c k-c v)z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2 c k-c v)z^r\right)\right)-\frac{2^{-m-v}z}{r}$$
$$\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\sum_{s=0}^{\lfloor\frac{v-1}{2}\rfloor}(-1)^s\binom{v}{s}\left((-1)^v e^{2gs-gv}\Gamma\left(\frac{1}{r},(-2 b i k+i b m-2 c s+c v)z^r\right)((-2 b i k+i b m-2 c s+c v)z^r)^{-1/r}+\right.$$
$$(-1)^v e^{2gs-gv}((2 i b k-i b m-2 c s+c v)z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2 i b k-i b m-2 c s+c v)z^r\right)+$$
$$e^{g v-2 g s}((-2 b i k+i b m+2 c s-c v)z^r)^{-1/r}\Gamma\left(\frac{1}{r},(-2 b i k+i b m+2 c s-c v)z^r\right)+$$
$$\left.e^{g v-2 g s}((2 i b k-i b m+2 c s-c v)z^r)^{-1/r}\Gamma\left(\frac{1}{r},(2 i b k-i b m+2 c s-c v)z^r\right)\right)/;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2729.01

$$\int \cos^m(b z^2)\sinh^v(c z^2+g)\,dz = i^{-v}2^{-m-v}z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)+$$
$$i^{-v}2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\frac{\binom{m}{k}C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)}{\sqrt{b(m-2k)}}+i^{v+1}2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\lfloor\frac{v-1}{2}\rfloor}\frac{1}{\sqrt{i c(v-2k)}}$$
$$\left((-1)^k\binom{v}{k}\left(\cos\left(\frac{\pi v}{2}+g i(v-2k)\right)C\left(\frac{c\sqrt{\frac{2}{\pi}}(v-2k)z}{\sqrt{i c(v-2k)}}\right)+S\left(\frac{c\sqrt{\frac{2}{\pi}}(v-2k)z}{\sqrt{i c(v-2k)}}\right)\sin\left(\frac{\pi v}{2}+g i(v-2k)\right)\right)\right)+$$
$$i^v 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\sum_{s=0}^{\lfloor\frac{v-1}{2}\rfloor}(-1)^s\binom{v}{s}\left(\left(\cos\left(\frac{\pi v}{2}-i g(2s-v)\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2ics+icv}\;z\right)-\right.\right.$$
$$\left.S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm-2ics+icv}\;z\right)\sin\left(\frac{\pi v}{2}-i g(2s-v)\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+icv}\right)+$$
$$\left(\cos\left(i g(2s-v)-\frac{\pi v}{2}\right)C\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2ics-icv}\;z\right)-S\left(\sqrt{\frac{2}{\pi}}\sqrt{2bk-bm+2ics-icv}\;z\right)\right.$$
$$\left.\left.\sin\left(i g(2s-v)-\frac{\pi v}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-icv}\right)\right)/;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.2730.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)+\frac{i^{-\nu}\,2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b\,(2k-m)\sqrt{z}\right)+b\,(2k-m)\sqrt{z}\,\sin\left(b\,(2k-m)\sqrt{z}\right)\right)}{(2k-m)^2}}{b^2}-\frac{1}{c^2}\left(i^{-\nu}\,2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(2k-\nu)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g\,(\nu-2k)\right)+c\,i\,(2k-\nu)\sqrt{z}\,\sin\left(c\,i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\,g\,(\nu-2k)\right)\right)\right)\right)+$$

$$i^{-\nu}\,2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(\frac{\pi\nu}{2}-i\,g\,(\nu-2s)-(b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)-(b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\,\sin\left(\frac{\pi\nu}{2}-i\,g\,(\nu-2s)-(b\,(2k-m)+c\,i\,(\nu-2s))\sqrt{z}\right)\right)\Big/(b\,(2k-m)+c\,i\,(\nu-2s))^2+\left(\cos\left(-\frac{\pi\nu}{2}+g\,i\,(\nu-2s)-(b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\right)-(b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\,\sin\left(-\frac{\pi\nu}{2}+g\,i\,(\nu-2s)-(b\,(2k-m)-i\,c\,(\nu-2s))\sqrt{z}\right)\right)\Big/(b\,(2k-m)-i\,c\,(\nu-2s))^2\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $\cos^m\left(a\,z^r+e\right)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.2731.01

$$\int \cos^m(b z^r + e) \sinh^v(c z^r + g)\, dz = i^{-v} (-1)^m 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) -$$

$$\frac{i^{-v} 2^{-m-v} z}{r} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \Bigg(e^{2 i e k - i e m}\, \Gamma\!\left(\frac{1}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-1/r} +$$

$$e^{i e m - 2 i e k} ((2 i b k - i b m) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (2 i b k - i b m) z^r\right)\Bigg) -$$

$$\frac{(-1)^{m+v} 2^{-m-v} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \Bigg(e^{2 g k - g v}\, \Gamma\!\left(\frac{1}{r}, (c v - 2 c k) z^r\right) ((c v - 2 c k) z^r)^{-1/r} +$$

$$(-1)^v e^{g v - 2 g k} ((2 c k - c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (2 c k - c v) z^r\right)\Bigg) - \frac{2^{-m-v} z}{r} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v e^{2 i e k - i e m + 2 g s - g v}\, \Gamma\!\left(\frac{1}{r}, (-2 b i k + i b m - 2 c s + c v) z^r\right) ((-2 b i k + i b m - 2 c s + c v) z^r)^{-1/r} +$$

$$(-1)^v e^{-2 e i k + i e m + 2 g s - g v} ((2 i b k - i b m - 2 c s + c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (2 i b k - i b m - 2 c s + c v) z^r\right) +$$

$$e^{2 i e k - i e m - 2 g s + g v} ((-2 b i k + i b m + 2 c s - c v) z^r)^{-1/r}\, \Gamma\!\left(\frac{1}{r}, (-2 b i k + i b m + 2 c s - c v) z^r\right) +$$

$$e^{-2 e i k + i e m - 2 g s + g v} ((2 i b k - i b m + 2 c s - c v) z^r)^{-1/r}$$

$$\Gamma\!\left(\frac{1}{r}, (2 i b k - i b m + 2 c s - c v) z^r\right)\Bigg) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2732.01

$$\int \cos^m\left(b z^2+e\right) \sinh^v\left(c z^2+g\right) dz = i^{-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2) + i^{-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos(e(m-2k))\, C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) - S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right) \sin(e(m-2k))\right)}{\sqrt{b(m-2k)}} + i^{v+1} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (v-2k)}} \left((-1)^k \binom{v}{k} \left(\cos\left(\frac{\pi v}{2}+g\, i (v-2k)\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}\, (v-2k) z}{\sqrt{i c (v-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}\, (v-2k) z}{\sqrt{i c (v-2k)}}\right) \sin\left(\frac{\pi v}{2}+g\, i (v-2k)\right)\right)\right) + i^v 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\left(\cos\left(e(2k-m) - i g (2s-v) + \frac{\pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2ics+icv}\; z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm-2ics+icv}\; z\right) \sin\left(e(2k-m) - i g(2s-v) + \frac{\pi v}{2}\right)\right) \Big/ \left(\sqrt{2bk-bm-2ics+icv}\right) + \left(\cos\left(e(2k-m) + g\, i (2s-v) - \frac{\pi v}{2}\right) C\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2ics-icv}\; z\right) - S\left(\sqrt{\frac{2}{\pi}} \sqrt{2bk-bm+2ics-icv}\; z\right) \sin\left(e(2k-m) + g\, i(2s-v) - \frac{\pi v}{2}\right)\right) \Big/ \left(\sqrt{2bk-bm+2ics-icv}\right)\right) /;\; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2733.01

$$\int \cos^m\left(\sqrt{z}\, b+e\right)\sinh^\nu\left(\sqrt{z}\, c+g\right) dz = i^{-\nu}\, 2^{-m-\nu}\, z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{1}{b^2}\left(i^{-\nu}\, 2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(2k-m)^2}\left(\binom{m}{k}\left(\cos\left(e(m-2k)-b(2k-m)\sqrt{z}\right)-b(2k-m)\sqrt{z}\,\sin\left(e(m-2k)-b(2k-m)\sqrt{z}\right)\right)\right)\right)-$$

$$\frac{1}{c^2}\left(i^{-\nu}\, 2^{-m-\nu+2}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(2k-\nu)^2}\left((-1)^k\binom{\nu}{k}\left(\cos\left(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\, g(\nu-2k)\right)+c\, i(2k-\nu)\sqrt{z}\,\sin\left(c\, i\sqrt{z}\,(2k-\nu)+\frac{\pi\nu}{2}-i\, g(\nu-2k)\right)\right)\right)\right)+$$

$$i^{-\nu}\, 2^{-m-\nu+2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(e(m-2k)+\frac{\pi\nu}{2}-i\, g(\nu-2s)-(b(2k-m)+c\, i(\nu-2s))\sqrt{z}\right)-(b(2k-m)+c\, i(\nu-2s))\sqrt{z}\,\sin\left(e(m-2k)+\frac{\pi\nu}{2}-i\, g(\nu-2s)-(b(2k-m)+c\, i(\nu-2s))\sqrt{z}\right)\right)\Big/(b(2k-m)+c\, i(\nu-2s))^2+\left(\cos\left(e(m-2k)-\frac{\pi\nu}{2}+g\, i(\nu-2s)-(b(2k-m)-i\, c(\nu-2s))\sqrt{z}\right)-(b(2k-m)-i\, c(\nu-2s))\sqrt{z}\,\sin\left(e(m-2k)-\frac{\pi\nu}{2}+g\, i(\nu-2s)-(b(2k-m)-i\, c(\nu-2s))\sqrt{z}\right)\right)\Big/(b(2k-m)-i\, c(\nu-2s))^2\right)\,/;\, m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r+d\, z\right)\sinh^\nu\left(c\, z^r+g\right)$

01.19.21.2734.01

$$\int \cos^m(b z^2 + d z) \sinh^\nu(c z^2 + g) \, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{d^2 (m-2k)}{4b}\right) \right)}{\sqrt{b(m-2k)}} - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} + g i (\nu - 2k)\right) C\left(\frac{c \sqrt{\frac{2}{\pi}} (2k - \nu) z}{\sqrt{i c (\nu - 2k)}}\right) + S\left(\frac{c \sqrt{\frac{2}{\pi}} (2k - \nu) z}{\sqrt{i c (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2} + g i (\nu - 2k)\right) \right) \right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(\Bigg(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)} - i g (2s - \nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) - S\left(\frac{2dk - dm + 2(2bk - bm - 2ics + ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm - 2ics + ic\nu)} - i g (2s - \nu) + \frac{\pi \nu}{2}\right) \Bigg) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \Bigg(\cos\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + g i (2s - \nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2ics - ic\nu) z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) \sin\left(-\frac{(2dk - dm)^2}{4(2bk - bm + 2ics - ic\nu)} + g i (2s - \nu) - \frac{\pi \nu}{2}\right) \Bigg) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right) \Bigg) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2735.01

$$\int \cos^m(\sqrt{z}\, b + d z) \sinh^\nu(\sqrt{z}\, c + g) \, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-i b (m - 2k) \sqrt{2\pi} \left(\cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{(2k-m)(i b + 2 i d \sqrt{z})}{\sqrt{-d(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(i b + 2 i d \sqrt{z})}{\sqrt{-d(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{b^2 (m-2k)}{4d}\right) \right) - 2 \sqrt{-d(m-2k)} \sin\left(d z (m - 2k) + b \sqrt{z} (m - 2k)\right) \right) \right) -$$

$$\frac{1}{c^2}\left(i^v (-1)^m 2^{-m-v+2} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(v-2k)^2} \left((-1)^k \binom{v}{k} \left(\cosh\left(2gk - gv + \frac{i\pi v}{2} + c(2k-v)\sqrt{z}\right) - c(2k-v)\sqrt{z} \sinh\left(2gk - gv + \frac{i\pi v}{2} + c(2k-v)\sqrt{z}\right)\right)\right)\right) + i^v 2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{(2ds-dm)^{3/2}} \left(\sqrt{2\pi} (-2cik + bm - 2bs + icv) \cosh\left(\frac{i(2ick - bm + 2bs - icv)^2}{4(2ds-dm)} + 2gk - gv + \frac{i\pi v}{2}\right) C\left(\frac{2ick - bm + 2bs - icv + 2(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ds-dm}}\right) + i\sqrt{2\pi} (2ick - bm + 2bs - icv) S\left(\frac{2ick - bm + 2bs - icv + 2(2ds-dm)\sqrt{z}}{\sqrt{2\pi}\sqrt{2ds-dm}}\right) \sinh\left(\frac{i(2ick - bm + 2bs - icv)^2}{4(2ds-dm)} + 2gk - gv + \frac{i\pi v}{2}\right) + 2i\sqrt{2ds-dm} \sinh\left(2gk - gv + \frac{i\pi v}{2} - i(2ds-dm)z - i(2ick - bm + 2bs - icv)\sqrt{z}\right)\right) + \frac{1}{(dm-2ds)^{3/2}} \left(\sqrt{2\pi} (-2cik - bm + 2bs + icv) \cosh\left(\frac{i(2ick + bm - 2bs - icv)^2}{4(dm-2ds)} + 2gk - gv + \frac{i\pi v}{2}\right) C\left(\frac{2ick + bm - 2bs - icv + 2(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\sqrt{dm-2ds}}\right) + i\sqrt{2\pi} (2ick + bm - 2bs - icv) S\left(\frac{2ick + bm - 2bs - icv + 2(dm-2ds)\sqrt{z}}{\sqrt{2\pi}\sqrt{dm-2ds}}\right) \sinh\left(\frac{i(2ick + bm - 2bs - icv)^2}{4(dm-2ds)} + 2gk - gv + \frac{i\pi v}{2}\right) + 2i\sqrt{dm-2ds} \sinh\left(2gk - gv + \frac{i\pi v}{2} - i(dm-2ds)z - i(2ick + bm - 2bs - icv)\sqrt{z}\right)\right)\right) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + d z + e) \sinh^v(c z^r + g)$

01.19.21.2736.01

$$\int \cos^m(b z^2 + d z + e) \sinh^\nu(c z^2 + g)\, dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \frac{1}{\sqrt{b(m-2k)}} \left(\binom{m}{k} \left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} + g i(\nu - 2k)\right) C\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{c\sqrt{\frac{2}{\pi}}(2k-\nu)z}{\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi \nu}{2} + g i(\nu-2k)\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{k} \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk - bm - 2ics + icv)} + e(2k-m) - i g(2s-\nu) + \frac{\pi \nu}{2}\right) C\left(\frac{2dk - dm + 2(2bk - bm - 2ics + icv)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + icv}}\right) - S\left(\frac{2dk - dm + 2(2bk - bm - 2ics + icv)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + icv}}\right) \sin\left(-\frac{(2dk-dm)^2}{4(2bk - bm - 2ics + icv)} + e(2k-m) - i g(2s-\nu) + \frac{\pi \nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + icv}\right) + \left(\cos\left(-\frac{(2dk-dm)^2}{4(2bk - bm + 2ics - icv)} + e(2k-m) + g i(2s-\nu) - \frac{\pi \nu}{2}\right) C\left(\frac{2dk - dm + 2(2bk - bm + 2ics - icv)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - icv}}\right) - S\left(\frac{2dk - dm + 2(2bk - bm + 2ics - icv)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - icv}}\right) \sin\left(-\frac{(2dk-dm)^2}{4(2bk - bm + 2ics - icv)} + e(2k-m) + g i(2s-\nu) - \frac{\pi \nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - icv}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2737.01

$$\int \cos^m(\sqrt{z}\, b + e + d z) \sinh^\nu(\sqrt{z}\, c + g)\, dz = i^{-\nu} (-1)^m 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \frac{1}{(-d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-i b(m-2k)\sqrt{2\pi} \left(\cos\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) C\left(\frac{(2k-m)(i b + 2 i d\sqrt{z})}{\sqrt{-d(m-2k)}\sqrt{2\pi}}\right) + \right.\right.\right.$$

$$S\left(\frac{(2k-m)\left(i\,b+2\,i\,d\sqrt{z}\right)}{\sqrt{-d\,(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{b^2\,(m-2k)}{4\,d}-e\,(m-2k)\right)\Bigg)-$$

$$2\sqrt{-d\,(m-2k)}\,\sin\left(e\,(m-2k)+d\,z\,(m-2k)+b\sqrt{z}\,(m-2k)\right)\Bigg)\Bigg)-$$

$$\frac{1}{c^2}\left(i^v\,(-1)^m\,2^{-m-v+2}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(v-2k)^2}\left((-1)^k\binom{v}{k}\left(\cosh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}+c\,(2k-v)\sqrt{z}\right)-\right.\right.\right.$$

$$\left.\left.\left.c\,(2k-v)\sqrt{z}\,\sinh\left(2\,g\,k-g\,v+\frac{i\,\pi\,v}{2}+c\,(2k-v)\sqrt{z}\right)\right)\right)\right)+i^v\,2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{(2\,d\,s-d\,m)^{3/2}}\left(\sqrt{2\pi}\,(-2\,c\,i\,k+b\,m-2\,b\,s+i\,c\,v)\cosh\left(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)^2}{4\,(2\,d\,s-d\,m)}+\right.\right.\right.$$

$$\left.2\,g\,k+i\,e\,m-2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)C\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v+2\,(2\,d\,s-d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,s-d\,m}}\right)+$$

$$i\sqrt{2\pi}\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v+2\,(2\,d\,s-d\,m)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,s-d\,m}}\right)$$

$$\sinh\left(\frac{i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)^2}{4\,(2\,d\,s-d\,m)}+2\,g\,k+i\,e\,m-2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)+2\,i\sqrt{2\,d\,s-d\,m}$$

$$\left.\sinh\left(2\,g\,k+i\,e\,m-2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}-i\,(2\,d\,s-d\,m)\,z-i\,(2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v)\sqrt{z}\right)\right)+$$

$$\frac{1}{(d\,m-2\,d\,s)^{3/2}}\left(\sqrt{2\pi}\,(-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v)\cosh\left(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)^2}{4\,(d\,m-2\,d\,s)}+\right.\right.$$

$$\left.2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)C\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v+2\,(d\,m-2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m-2\,d\,s}}\right)+$$

$$i\sqrt{2\pi}\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v+2\,(d\,m-2\,d\,s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{d\,m-2\,d\,s}}\right)$$

$$\sinh\left(\frac{i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)^2}{4\,(d\,m-2\,d\,s)}+2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}\right)+$$

$$2\,i\sqrt{d\,m-2\,d\,s}\,\sinh\left(2\,g\,k-i\,e\,m+2\,i\,e\,s-g\,v+\frac{i\,\pi\,v}{2}-i\,(d\,m-2\,d\,s)\,z-\right.$$

$$\left.\left.\left.i\,(2\,i\,c\,k+b\,m-2\,b\,s-i\,c\,v)\sqrt{z}\right)\right)\right)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(d\,z)\sinh^v(c\,z^r+f\,z)$

01.19.21.2738.01

$$\int \cos^m(d z)\sinh^\nu(c z^2+f z)\,dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\, i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)\right)\right)+ \frac{i^{-\nu}2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(2dkz-mdz)}{2k-m}+i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i c\nu-2ics}}\left(\cos\left(\frac{\pi\nu}{2}-\frac{(2dk-dm-2ifs+if\nu)^2}{4(ic\nu-2ics)}\right)C\left(\frac{2dk-dm-2ifs+if\nu+2(ic\nu-2ics)z}{\sqrt{2\pi}\sqrt{ic\nu-2ics}}\right)-S\left(\frac{2dk-dm-2ifs+if\nu+2(ic\nu-2ics)z}{\sqrt{2\pi}\sqrt{ic\nu-2ics}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{(2dk-dm-2ifs+if\nu)^2}{4(ic\nu-2ics)}\right)\right)+\frac{1}{\sqrt{2ics-ic\nu}}\left(\cos\left(\frac{(2dk-dm+2ifs-if\nu)^2}{4(2ics-ic\nu)}+\frac{\pi\nu}{2}\right)C\left(\frac{2dk-dm+2ifs-if\nu+2(2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2ics-ic\nu}}\right)+S\left(\frac{2dk-dm+2ifs-if\nu+2(2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2ics-ic\nu}}\right)\sin\left(\frac{(2dk-dm+2ifs-if\nu)^2}{4(2ics-ic\nu)}+\frac{\pi\nu}{2}\right)\right)\right)\ /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2739.01

$$\int \cos^m(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)+ \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d\,(m-2\,k)\,z)}{m-2\,k}+i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}} \left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f\,(\nu-2\,k)}\;\sin\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\sqrt{z}\right)-c\sqrt{2\,\pi}\;(\nu-2\,k)\left(\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right) C\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\;\sqrt{i\,f\,(\nu-2\,k)}}\right)+S\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\;\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right)\right)\right)+$$

$$i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(\sqrt{2\,\pi}\;(2\,i\,c\,s-i\,c\,\nu)\cos\left(\frac{\pi\,\nu}{2}-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}\right) C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)+\sqrt{2\,\pi}\;(i\,c\,\nu-2\,i\,c\,s) S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}\right)+ 2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}\;\sin\left(\frac{\pi\,\nu}{2}+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)\Big/ (2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(\sqrt{2\,\pi}\;(i\,c\,\nu-2\,i\,c\,s)\cos\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+\frac{\pi\,\nu}{2}\right) C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)-\sqrt{2\,\pi}\;(2\,i\,c\,s-i\,c\,\nu) S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\;\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+\frac{\pi\,\nu}{2}\right)+ 2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}\;\sin\left(-\frac{\pi\,\nu}{2}+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\,z+(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\Big/ (2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh^\nu\left(c\,z^r+f\,z\right)$

01.19.21.2740.01

$$\int \cos^m(e+d\,z)\sinh^\nu\!\left(c\,z^2+f\,z\right)dz = \\
i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2) - 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\right. \\
\left.\left(\cos\!\left(\frac{\pi\nu}{2}-\frac{i\,f^2\,(\nu-2k)}{4c}\right)C\!\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\,\sqrt{i\,c\,(\nu-2k)}}\right)+S\!\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\,\sqrt{i\,c\,(\nu-2k)}}\right)\sin\!\left(\frac{\pi\nu}{2}-\frac{i\,f^2\,(\nu-2k)}{4c}\right)\right)\right)+ \\
\frac{i^{-\nu}}{d}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(2k-m)-m\,d\,z+2\,d\,k\,z)}{2k-m}+i^\nu\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi} \\
\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\!\left(-\frac{(2dk-dm-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)+\frac{\pi\nu}{2}\right)C\!\left(\right.\right.\right. \\
\left.\frac{2dk-dm-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-S\!\left(\frac{2dk-dm-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\,\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right) \\
\left.\sin\!\left(-\frac{(2dk-dm-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)+\frac{\pi\nu}{2}\right)\right)+ \\
\frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\!\left(-\frac{(2dk-dm+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)-\frac{\pi\nu}{2}\right)C\!\left(\right.\right. \\
\left.\frac{2dk-dm+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\!\left(\frac{2dk-dm+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\,\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right) \\
\left.\left.\left.\sin\!\left(-\frac{(2dk-dm+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)-\frac{\pi\nu}{2}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2741.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}$$

$$(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2\,k)+d\,z\,(m-2\,k))}{m-2\,k} + i^\nu\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2\,k))^{3/2}}$$

$$\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f\,(\nu-2\,k)}\,\sin\left(\frac{\pi\,\nu}{2}+f\,i\,(\nu-2\,k)\,z+c\,i\,(\nu-2\,k)\sqrt{z}\right)-c\sqrt{2\,\pi}\,(\nu-2\,k)\left(\cos\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right.\right.\right.$$

$$\left.\left.\left.C\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)+S\left(\frac{(2\,k-\nu)\left(c+2\,f\sqrt{z}\right)}{\sqrt{2\,\pi}\,\sqrt{i\,f\,(\nu-2\,k)}}\right)\sin\left(\frac{\pi\,\nu}{2}-\frac{i\,c^2\,(\nu-2\,k)}{4\,f}\right)\right)\right)\right)+$$

$$i^\nu\,2^{-m-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\left(\sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)\cos\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+2\,e\,k-e\,m+\frac{\pi\,\nu}{2}\right)\right.\right.\right.$$

$$C\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)+$$

$$\sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,\nu+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}}\right)$$

$$\sin\left(-\frac{(i\,c\,\nu-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)}+2\,e\,k-e\,m+\frac{\pi\,\nu}{2}\right)+2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu}$$

$$\left.\sin\left(2\,e\,k-e\,m+\frac{\pi\,\nu}{2}+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)\,z+(i\,c\,\nu-2\,i\,c\,s)\sqrt{z}\right)\right)\Big/$$

$$(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^{3/2}+\left(\sqrt{2\,\pi}\,(i\,c\,\nu-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+\right.\right.$$

$$\left.2\,e\,k-e\,m-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)+\sqrt{2\,\pi}\,(2\,i\,c\,s-i\,c\,\nu)$$

$$S\left(\frac{2\,i\,c\,s-i\,c\,\nu+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\sqrt{z}}{\sqrt{2\,\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}}\right)\sin\left(-\frac{(2\,i\,c\,s-i\,c\,\nu)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)}+2\,e\,k-\right.$$

$$\left.e\,m-\frac{\pi\,\nu}{2}\right)+2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu}\,\sin\left(2\,e\,k-e\,m-\frac{\pi\,\nu}{2}+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)\right.$$

$$\left.\left.\left.z+(2\,i\,c\,s-i\,c\,\nu)\sqrt{z}\right)\right)\Big/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

Involving $\cos^m(b z^r)\sinh^v(c z^r + f z)$

01.19.21.2742.01

$$\int \cos^m(b z^2)\sinh^v(c z^2 + f z)\,dz = 2^{-m-v} i^{-v} z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1 - m \bmod 2)(1 - v \bmod 2) + i^{-v} 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\, z}{\sqrt{b(m-2k)}}\right)}{\sqrt{b(m-2k)}} - i^{v+1} 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(v-2k)}}\left((-1)^k\binom{v}{k}\left(\cos\left(\frac{\pi v}{2} - \frac{i f^2 (v-2k)}{4c}\right) C\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(v-2k)}}\right) + S\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(v-2k)}}\right)\sin\left(\frac{\pi v}{2} - \frac{i f^2(v-2k)}{4c}\right)\right)\right) + i^v 2^{-m-v+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\cos\left(\frac{\pi v}{2} - \frac{(i f v - 2 i f s)^2}{4(2bk - bm - 2ics + icv)}\right) C\left(\frac{-2 f i s + i f v + 2(2bk - bm - 2ics + icv) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + icv}}\right) - S\left(\frac{-2 f i s + i f v + 2(2bk - bm - 2ics + icv) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + icv}}\right)\sin\left(\frac{\pi v}{2} - \frac{(i f v - 2 i f s)^2}{4(2bk - bm - 2ics + icv)}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + icv}\right) + \left(\cos\left(\frac{(2 i f s - i f v)^2}{4(2bk - bm + 2ics - icv)} + \frac{\pi v}{2}\right) C\left(\frac{2 i f s - i f v + 2(2bk - bm + 2ics - icv) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - icv}}\right) + S\left(\frac{2 i f s - i f v + 2(2bk - bm + 2ics - icv) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - icv}}\right)\sin\left(\frac{(2 i f s - i f v)^2}{4(2bk - bm + 2ics - icv)} + \frac{\pi v}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - icv}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2743.01

$$\int \cos^m\left(b\sqrt{z}\right)\sinh^v\left(\sqrt{z}\, c + f z\right) dz = i^{-v}\, 2^{-m-v}\, z \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2) +$$
$$\frac{i^{-v}\, 2^{-m-v+2}}{b^2}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b\,(2k-m)\sqrt{z}\right) + b\,(2k-m)\sqrt{z}\,\sin\left(b\,(2k-m)\sqrt{z}\right)\right)}{(m-2k)^2} +$$
$$i^{v}\, 2^{-m-v}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i\, f\,(v-2k))^{3/2}}$$
$$\left((-1)^k\binom{v}{k}\left(2\sqrt{i\, f\,(v-2k)}\,\sin\left(\frac{\pi v}{2} + f\, i\,(v-2k)\, z + c\, i\,(v-2k)\sqrt{z}\right) - c\sqrt{2\pi}\,(v-2k)\left(\cos\left(\frac{\pi v}{2} - \frac{i\, c^2\,(v-2k)}{4 f}\right)\right.\right.\right.$$
$$\left.\left.\left. C\left(\frac{(2k-v)\left(c + 2 f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(v-2k)}}\right) + S\left(\frac{(2k-v)\left(c + 2 f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i\, f\,(v-2k)}}\right)\sin\left(\frac{\pi v}{2} - \frac{i\, c^2\,(v-2k)}{4 f}\right)\right)\right)\right) + i^{v}\, 2^{-m-v}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i\, f\, v - 2\, i\, f\, s)^{3/2}}\left(\sqrt{2\pi}\,(-2 b k + b m + 2 i c s - i c v)\cos\left(\frac{\pi v}{2} - \frac{(2 b k - b m - 2 i c s + i c v)^2}{4\,(i\, f\, v - 2\, i\, f\, s)}\right)\right.\right.$$
$$C\left(\frac{2 b k - b m - 2 i c s + i c v + 2\,(i\, f\, v - 2\, i\, f\, s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\, f\, v - 2\, i\, f\, s}}\right) + \sqrt{2\pi}\,(2 b k - b m - 2 i c s + i c v)$$
$$S\left(\frac{2 b k - b m - 2 i c s + i c v + 2\,(i\, f\, v - 2\, i\, f\, s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i\, f\, v - 2\, i\, f\, s}}\right)\sin\left(\frac{\pi v}{2} - \frac{(2 b k - b m - 2 i c s + i c v)^2}{4\,(i\, f\, v - 2\, i\, f\, s)}\right) +$$
$$\left. 2\sqrt{i\, f\, v - 2\, i\, f\, s}\,\sin\left(\frac{\pi v}{2} + (i\, f\, v - 2\, i\, f\, s)\, z + (2 b k - b m - 2 i c s + i c v)\sqrt{z}\right)\right) +$$
$$\frac{1}{(2\, i\, f\, s - i\, f\, v)^{3/2}}\left(\sqrt{2\pi}\,(-2 b k + b m - 2 i c s + i c v)\cos\left(\frac{(2 b k - b m + 2 i c s - i c v)^2}{4\,(2\, i\, f\, s - i\, f\, v)} + \frac{\pi v}{2}\right)\right.$$
$$C\left(\frac{2 b k - b m + 2 i c s - i c v + 2\,(2\, i\, f\, s - i\, f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\, i\, f\, s - i\, f\, v}}\right) - \sqrt{2\pi}\,(2 b k - b m + 2 i c s - i c v)$$
$$S\left(\frac{2 b k - b m + 2 i c s - i c v + 2\,(2\, i\, f\, s - i\, f\, v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\, i\, f\, s - i\, f\, v}}\right)\sin\left(\frac{(2 b k - b m + 2 i c s - i c v)^2}{4\,(2\, i\, f\, s - i\, f\, v)} + \frac{\pi v}{2}\right) +$$
$$\left.\left. 2\sqrt{2\, i\, f\, s - i\, f\, v}\,\sin\left(-\frac{\pi v}{2} + (2\, i\, f\, s - i\, f\, v)\, z + (2 b k - b m + 2 i c s - i c v)\sqrt{z}\right)\right)\right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\cos^m\left(b\, z^r + e\right)\sinh^v\left(c\, z^r + f\, z\right)$

01.19.21.2744.01

$$\int \cos^m(b z^2+e)\sinh^\nu(c z^2+f z)\,dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos(e(m-2k))\,C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin(e(m-2k))\right)}{\sqrt{b(m-2k)}} - i^{\nu+1} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(\frac{\pi\nu}{2}-\frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(-\frac{(i f\nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)+\frac{\pi\nu}{2}\right)C\left(\frac{-2fis+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)-S\left(\frac{-2fis+if\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)\sin\left(-\frac{(i f\nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)+\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+ic\nu}\right)+\left(\cos\left(-\frac{(2 i f s-i f\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)-\frac{\pi\nu}{2}\right)C\left(\frac{2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)-S\left(\frac{2ifs-if\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)\sin\left(-\frac{(2 i f s-i f\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)-\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2745.01

$$\int \cos^m(\sqrt{z}\,b+e)\sinh^\nu(\sqrt{z}\,c+f z)\,dz = i^{-\nu}2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{1}{b^2}i^{-\nu}2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2k)^2}\left(\binom{m}{k}\left(\cos\left(2ek-em+b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\,\sin\left(2ek-em+b(2k-m)\sqrt{z}\right)\right)\right)+ i^\nu 2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i f(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i f(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+f i(\nu-2k)z+c i(\nu-2k)\sqrt{z}\right)-c\sqrt{2\pi}\,(\nu-2k)\left(\cos\left(\frac{\pi\nu}{2}-\frac{i c^2(\nu-2k)}{4f}\right)\right.\right.\right.$$

$$C\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f (v-2k)}}\right)+S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f (v-2k)}}\right)\sin\left(\frac{\pi v}{2}-\frac{i c^2 (v-2k)}{4f}\right)\Bigg)\Bigg)\Bigg)+i^v 2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i f v-2 i f s)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2ics-icv)\cos\left(-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2 i f s)}+\right.\right.\right.$$

$$\left.2ek-em+\frac{\pi v}{2}\right)C\left(\frac{2bk-bm-2ics+icv+2(i f v-2 i f s)\sqrt{z}}{\sqrt{2\pi}\sqrt{i f v-2 i f s}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2ics+icv)\,S\left(\frac{2bk-bm-2ics+icv+2(i f v-2 i f s)\sqrt{z}}{\sqrt{2\pi}\sqrt{i f v-2 i f s}}\right)$$

$$\sin\left(-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2 i f s)}+2ek-em+\frac{\pi v}{2}\right)+$$

$$\left.2\sqrt{i f v-2 i f s}\,\sin\left(2ek-em+\frac{\pi v}{2}+(i f v-2 i f s)z+(2bk-bm-2ics+icv)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2 i f s-i f v)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2ics+icv)\cos\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2 i f s-i f v)}+\right.\right.$$

$$\left.2ek-em-\frac{\pi v}{2}\right)C\left(\frac{2bk-bm+2ics-icv+2(2 i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f s-i f v}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm+2ics-icv)\,S\left(\frac{2bk-bm+2ics-icv+2(2 i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\sqrt{2 i f s-i f v}}\right)$$

$$\sin\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2 i f s-i f v)}+2ek-em-\frac{\pi v}{2}\right)+2\sqrt{2 i f s-i f v}$$

$$\left.\left.\sin\left(2ek-em-\frac{\pi v}{2}+(2 i f s-i f v)z+(2bk-bm+2ics-icv)\sqrt{z}\right)\right)\right)/;\, m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\left(b z^r+d z\right)\sinh^v\left(c z^r+f z\right)$

01.19.21.2746.01

$$\int \cos^m\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{d^2 (m-2k)}{4b}\right)\right)}{\sqrt{b(m-2k)}} - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (\nu - 2k)}} \left((-1)^{k+\nu} \binom{\nu}{k} \left(\cos\left(\frac{\pi \nu}{2} - \frac{i f^2 (\nu - 2k)}{4c}\right) C\left(\frac{(2k-\nu)(f + 2cz)}{\sqrt{2\pi} \sqrt{i c (\nu - 2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi} \sqrt{i c (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{i f^2 (\nu - 2k)}{4c}\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\cos\left(\frac{\pi \nu}{2} - \frac{(2dk - dm - 2ifs + if\nu)^2}{4(2bk - bm - 2ics + ic\nu)}\right) C\left(\frac{2dk - dm - 2ifs + if\nu + 2(2bk - bm - 2ics + ic\nu)z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) - S\left(\frac{2dk - dm - 2ifs + if\nu + 2(2bk - bm - 2ics + ic\nu)z}{\sqrt{2\pi} \sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{(2dk - dm - 2ifs + if\nu)^2}{4(2bk - bm - 2ics + ic\nu)}\right)\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(\frac{(2dk - dm + 2ifs - if\nu)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{\pi\nu}{2}\right) C\left(\frac{2dk - dm + 2ifs - if\nu + 2(2bk - bm + 2ics - ic\nu)z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) + S\left(\frac{2dk - dm + 2ifs - if\nu + 2(2bk - bm + 2ics - ic\nu)z}{\sqrt{2\pi} \sqrt{2bk - bm + 2ics - ic\nu}}\right) \sin\left(\frac{(2dk - dm + 2ifs - if\nu)^2}{4(2bk - bm + 2ics - ic\nu)} + \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2747.01

$$\int \cos^m\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{b^2 (m-2k)}{4d}\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)} \sqrt{2\pi}}\right) - b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)} \sqrt{2\pi}}\right) \sin\left(\frac{b^2 (m-2k)}{4d}\right) + 2\sqrt{d(m-2k)} \sin\left(dz(m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right) + i^\nu 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i f(\nu - 2k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c\sqrt{2\pi}\,(2k - \nu)\right.\right.$$

$$\left(\cos\left(\frac{\pi v}{2} - \frac{i c^2 (v-2k)}{4 f}\right) C\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f (v-2k)}}\right) + S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f (v-2k)}}\right)\sin\left(\frac{\pi v}{2} - \frac{i c^2 (v-2k)}{4 f}\right) + 2\sqrt{i f (v-2k)}\,\sin\left(\frac{\pi v}{2} + f i (v-2k) z + c i (v-2k)\sqrt{z}\right)\right)\Bigg) +$$

$$i^{-v} 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \Bigg(\Bigg(\sqrt{2\pi}\,(-2bk+bm+2ics-icv)\cos\left(\frac{\pi v}{2} - \frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}\right) C\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\,\sqrt{2dk-dm-2ifs+ifv}\right)\right) + \sqrt{2\pi}\,(2bk-bm-2ics+icv) S\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\,\sqrt{2dk-dm-2ifs+ifv}\right)\right) \sin\left(\frac{\pi v}{2} - \frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}\right) + 2\sqrt{2dk-dm-2ifs+ifv}\,\sin\left(\frac{\pi v}{2} + (2dk-dm-2ifs+ifv)z + (2bk-bm-2ics+icv)\sqrt{z}\right)\Bigg)\Big/(2dk-dm-2ifs+ifv)^{3/2} +$$

$$\Bigg(\sqrt{2\pi}\,(-2bk+bm-2ics+icv)\cos\left(\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)} + \frac{\pi v}{2}\right) C\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\,\sqrt{2dk-dm+2ifs-ifv}\right)\right) - \sqrt{2\pi}\,(2bk-bm+2ics-icv) S\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\,\sqrt{2dk-dm+2ifs-ifv}\right)\right)\sin\left(\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)} + \frac{\pi v}{2}\right) + 2\sqrt{2dk-dm+2ifs-ifv}\,\sin\left(-\frac{\pi v}{2} + (2dk-dm+2ifs-ifv)z + (2bk-bm+2ics-icv)\sqrt{z}\right)\Bigg)\Big/(2dk-dm+2ifs-ifv)^{3/2}\Bigg) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + d z + e) \sinh^v(c z^r + f z)$

01.19.21.2748.01

$$\int \cos^m\left(b z^2 + d z + e\right) \sinh^\nu\left(c z^2 + f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\sqrt{b(m-2k)}} \left(\binom{m}{k}\left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}} \left((-1)^{k+\nu} \binom{\nu}{k}\left(\cos\left(\frac{\pi\nu}{2} - \frac{i f^2(\nu-2k)}{4c}\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) \sin\left(\frac{\pi\nu}{2} - \frac{i f^2(\nu-2k)}{4c}\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\cos\left(-\frac{(2dk - dm - 2ifs + if\nu)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) + \frac{\pi\nu}{2}\right) C\left(\frac{2dk - dm - 2ifs + if\nu + 2(2bk - bm - 2ics + ic\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + ic\nu}}\right) - S\left(\frac{2dk - dm - 2ifs + if\nu + 2(2bk - bm - 2ics + ic\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2ics + ic\nu}}\right) \sin\left(-\frac{(2dk - dm - 2ifs + if\nu)^2}{4(2bk - bm - 2ics + ic\nu)} + e(2k-m) + \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2ics + ic\nu}\right) + \left(\cos\left(-\frac{(2dk - dm + 2ifs - if\nu)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) - \frac{\pi\nu}{2}\right) C\left(\frac{2dk - dm + 2ifs - if\nu + 2(2bk - bm + 2ics - ic\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - ic\nu}}\right) - S\left(\frac{2dk - dm + 2ifs - if\nu + 2(2bk - bm + 2ics - ic\nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2ics - ic\nu}}\right) \sin\left(-\frac{(2dk - dm + 2ifs - if\nu)^2}{4(2bk - bm + 2ics - ic\nu)} + e(2k-m) - \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2ics - ic\nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2749.01

$$\int \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) + i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(d(m-2k))^{3/2}} \left(\binom{m}{k}\left(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) - b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) + 2\sqrt{d(m-2k)}\, \sin\left(e(m-2k) + dz(m-2k) + b\sqrt{z}\,(m-2k)\right)\right)\right) +$$

$$i^{\nu}\, 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{(i\, f\, (\nu - 2k))^{3/2}} \left((-1)^k \binom{\nu}{k} \left(c \sqrt{2\pi}\, (2k - \nu) \right.\right.$$

$$\left(\cos\left(\frac{\pi \nu}{2} - \frac{i\, c^2 (\nu - 2k)}{4 f}\right) C\left(\frac{(2k-\nu)\left(c + 2 f \sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{i\, f\, (\nu - 2k)}}\right) + S\left(\frac{(2k-\nu)\left(c + 2 f \sqrt{z}\right)}{\sqrt{2\pi}\, \sqrt{i\, f\, (\nu - 2k)}}\right) \sin\left(\frac{\pi \nu}{2} - \frac{i\, c^2 (\nu - 2k)}{4 f}\right)\right) +$$

$$\left.\left. 2 \sqrt{i\, f\, (\nu - 2k)}\, \sin\left(\frac{\pi \nu}{2} + f\, i\, (\nu - 2k)\, z + c\, i\, (\nu - 2k) \sqrt{z}\right)\right)\right) +$$

$$i^{-\nu}\, 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s+\nu} \binom{\nu}{s} \left(\left(\left(\sqrt{2\pi}\, (-2bk + bm + 2icS - ic\nu) \cos\left(-\frac{(2bk - bm - 2ics + ic\nu)^2}{4 (2dk - dm - 2ifs + if\nu)} + \right.\right.\right.\right.$$

$$\left. 2ek - em + \frac{\pi \nu}{2}\right) C\left(\left(2bk - bm - 2ics + ic\nu + 2 (2dk - dm - 2ifs + if\nu) \sqrt{z}\right) \Big/ \right.$$

$$\left.\left(\sqrt{2\pi}\, \sqrt{2dk - dm - 2ifs + if\nu}\right)\right) + \sqrt{2\pi}\, (2bk - bm - 2ics + ic\nu)\, S\left(\left(2bk - bm - \right.\right.$$

$$\left.\left. 2ics + ic\nu + 2 (2dk - dm - 2ifs + if\nu) \sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\, \sqrt{2dk - dm - 2ifs + if\nu}\right)\right)$$

$$\sin\left(-\frac{(2bk - bm - 2ics + ic\nu)^2}{4 (2dk - dm - 2ifs + if\nu)} + 2ek - em + \frac{\pi \nu}{2}\right) + 2 \sqrt{2dk - dm - 2ifs + if\nu}$$

$$\left.\left. \sin\left(2ek - em + \frac{\pi \nu}{2} + (2dk - dm - 2ifs + if\nu)\, z + (2bk - bm - 2ics + ic\nu) \sqrt{z}\right)\right) \Big/ \right.$$

$$(2dk - dm - 2ifs + if\nu)^{3/2} + \left(\sqrt{2\pi}\, (-2bk + bm - 2ics + ic\nu) \right.$$

$$\cos\left(-\frac{(2bk - bm + 2ics - ic\nu)^2}{4 (2dk - dm + 2ifs - if\nu)} + 2ek - em - \frac{\pi \nu}{2}\right) C\left(\left(2bk - bm + 2ics - ic\nu + \right.\right.$$

$$\left.\left. 2 (2dk - dm + 2ifs - if\nu) \sqrt{z}\right) \Big/ \left(\sqrt{2\pi}\, \sqrt{2dk - dm + 2ifs - if\nu}\right)\right) +$$

$$\sqrt{2\pi}\, (2bk - bm + 2ics - ic\nu)\, S\left(\left(2bk - bm + 2ics - ic\nu + 2 (2dk - dm + 2ifs - if\nu) \sqrt{z}\right) \Big/ \right.$$

$$\left.\left(\sqrt{2\pi}\, \sqrt{2dk - dm + 2ifs - if\nu}\right)\right) \sin\left(-\frac{(2bk - bm + 2ics - ic\nu)^2}{4 (2dk - dm + 2ifs - if\nu)} + 2ek - em - \frac{\pi \nu}{2}\right) +$$

$$2 \sqrt{2dk - dm + 2ifs - if\nu}\, \sin\left(2ek - em - \frac{\pi \nu}{2} + (2dk - dm + 2ifs - if\nu)\, z + \right.$$

$$\left.\left.\left.\left. (2bk - bm + 2ics - ic\nu) \sqrt{z}\right)\right) \Big/ (2dk - dm + 2ifs - if\nu)^{3/2}\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $\cos^m(d\, z) \sinh^{\nu}\left(c\, z^r + f\, z + g\right)$

01.19.21.2750.01

$$\int \cos^m(d z)\sinh^\nu\left(c z^2+f z+g\right)dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\, i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(-\frac{i(\nu-2k) f^2}{4c}+\frac{\pi\nu}{2}+g i(\nu-2k)\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k) f^2}{4c}+\frac{\pi\nu}{2}+g i(\nu-2k)\right)\right)\right) + \frac{i^{-\nu}}{d} 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(2dkz-mdz)}{2k-m} + i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i c\nu-2 i c s}}\left(\cos\left(-\frac{(2dk-dm-2 i f s+i f\nu)^2}{4(i c\nu-2 i c s)}-i g(2s-\nu)+\frac{\pi\nu}{2}\right) C\left(\frac{2dk-dm-2 i f s+i f\nu+2(i c\nu-2 i c s)z}{\sqrt{2\pi}\sqrt{i c\nu-2 i c s}}\right)-S\left(\frac{2dk-dm-2 i f s+i f\nu+2(i c\nu-2 i c s)z}{\sqrt{2\pi}\sqrt{i c\nu-2 i c s}}\right)\sin\left(-\frac{(2dk-dm-2 i f s+i f\nu)^2}{4(i c\nu-2 i c s)}-i g(2s-\nu)+\frac{\pi\nu}{2}\right)\right)+\frac{1}{\sqrt{2 i c s-i c\nu}}\left(\cos\left(-\frac{(2dk-dm+2 i f s-i f\nu)^2}{4(2 i c s-i c\nu)}+g i(2s-\nu)-\frac{\pi\nu}{2}\right) C\left(\frac{2dk-dm+2 i f s-i f\nu+2(2 i c s-i c\nu)z}{\sqrt{2\pi}\sqrt{2 i c s-i c\nu}}\right)-S\left(\frac{2dk-dm+2 i f s-i f\nu+2(2 i c s-i c\nu)z}{\sqrt{2\pi}\sqrt{2 i c s-i c\nu}}\right)\sin\left(-\frac{(2dk-dm+2 i f s-i f\nu)^2}{4(2 i c s-i c\nu)}+g i(2s-\nu)-\frac{\pi\nu}{2}\right)\right)\right) /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2751.01

$$\int \cos^m(d z)\sinh^\nu\left(\sqrt{z}\, c+g+f z\right)dz = i^{-\nu} 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{i^{-\nu} 2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(d(m-2k)z)}{m-2k} + i^\nu 2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i f(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i f(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+g i(\nu-2k)+f i(\nu-2k)z+c i(\nu-2k)\sqrt{z}\right)- c\sqrt{2\pi}\,(\nu-2k)\left(\cos\left(-\frac{i(\nu-2k)c^2}{4f}+\frac{\pi\nu}{2}+g i(\nu-2k)\right) C\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f(\nu-2k)}}\right)+ S\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)c^2}{4f}+\frac{\pi\nu}{2}+g i(\nu-2k)\right)\right)\right)\right)+$$

$$i^{v}\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\cos\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}-2\,i\,g\,s+i\,g\,v+\frac{\pi\,v}{2}\right)\right.\right.\right.$$

$$C\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\,S\left(\frac{-2\,c\,i\,s+i\,c\,v+2\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}}\right)$$

$$\sin\left(-\frac{(i\,c\,v-2\,i\,c\,s)^2}{4\,(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)}-2\,i\,g\,s+i\,g\,v+\frac{\pi\,v}{2}\right)+2\sqrt{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v}$$

$$\left.\left.\sin\left(-2\,g\,i\,s+i\,g\,v+\frac{\pi\,v}{2}+(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)\,z+(i\,c\,v-2\,i\,c\,s)\sqrt{z}\right)\right)\right/$$

$$(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,v)^{3/2}+\left(\sqrt{2\pi}\,(i\,c\,v-2\,i\,c\,s)\cos\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+\right.\right.$$

$$\left.2\,i\,g\,s-i\,g\,v-\frac{\pi\,v}{2}\right)C\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)+$$

$$\sqrt{2\pi}\,(2\,i\,c\,s-i\,c\,v)\,S\left(\frac{2\,i\,c\,s-i\,c\,v+2\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}}\right)$$

$$\sin\left(-\frac{(2\,i\,c\,s-i\,c\,v)^2}{4\,(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)}+2\,i\,g\,s-i\,g\,v-\frac{\pi\,v}{2}\right)+$$

$$2\sqrt{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v}\,\sin\left(2\,i\,g\,s-i\,g\,v-\frac{\pi\,v}{2}+(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)\,z+\right.$$

$$\left.\left.\left.(2\,i\,c\,s-i\,c\,v)\sqrt{z}\right)\right)\right/(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,v)^{3/2}\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $\cos^m(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.2752.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(c\,z^2+f\,z+g\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) - 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,i^{\nu+1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i\,c\,(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(-\frac{i\,(\nu-2k)\,f^2}{4c}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right) C\left(\frac{(2k-\nu)(f+2c\,z)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2c\,z)}{\sqrt{2\pi}\sqrt{i\,c\,(\nu-2k)}}\right)\sin\left(-\frac{i\,(\nu-2k)\,f^2}{4c}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right)\right)\right)+ \frac{i^{-\nu}}{d}\,2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(2k-m)-m\,d\,z+2\,d\,k\,z)}{2k-m}+i^{\nu}\,2^{-m-\nu+\frac{1}{2}}\sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\frac{1}{\sqrt{i\,c\,\nu-2\,i\,c\,s}}\left(\cos\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-i\,g\,(2s-\nu)+\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)-S\left(\frac{2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu+2\,(i\,c\,\nu-2\,i\,c\,s)\,z}{\sqrt{2\pi}\sqrt{i\,c\,\nu-2\,i\,c\,s}}\right)\sin\left(-\frac{(2\,d\,k-d\,m-2\,i\,f\,s+i\,f\,\nu)^2}{4\,(i\,c\,\nu-2\,i\,c\,s)}+e\,(2k-m)-i\,g\,(2s-\nu)+\frac{\pi\,\nu}{2}\right)\right)+ \frac{1}{\sqrt{2\,i\,c\,s-i\,c\,\nu}}\left(\cos\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)+g\,i\,(2s-\nu)-\frac{\pi\,\nu}{2}\right)C\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)-S\left(\frac{2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu+2\,(2\,i\,c\,s-i\,c\,\nu)\,z}{\sqrt{2\pi}\sqrt{2\,i\,c\,s-i\,c\,\nu}}\right)\sin\left(-\frac{(2\,d\,k-d\,m+2\,i\,f\,s-i\,f\,\nu)^2}{4\,(2\,i\,c\,s-i\,c\,\nu)}+e\,(2k-m)+g\,i\,(2s-\nu)-\frac{\pi\,\nu}{2}\right)\right)\right)\; /;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2753.01

$$\int \cos^m(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g+f\,z\right)dz = i^{-\nu}\,2^{-m-\nu}\,z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{i^{-\nu}\,2^{-m-\nu+1}}{d}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\sin(e\,(m-2k)+d\,z\,(m-2k))}{m-2k}+i^{\nu}\,2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i\,f\,(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i\,f\,(\nu-2k)}\;\sin\left(\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)+f\,i\,(\nu-2k)\,z+c\,i\,(\nu-2k)\sqrt{z}\right)- c\sqrt{2\pi}\;(\nu-2k)\left(\cos\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right)C\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right)+ S\left(\frac{(2k-\nu)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i\,f\,(\nu-2k)}}\right)\sin\left(-\frac{i\,(\nu-2k)\,c^2}{4f}+\frac{\pi\,\nu}{2}+g\,i\,(\nu-2k)\right)\right)\right)\right)+$$

$$i^v 2^{-m-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(\Bigg(\Bigg(\sqrt{2\pi}\, (2\,i\,c\,s - i\,c\,v) \cos\Bigg(-\frac{(i\,c\,v - 2\,i\,c\,s)^2}{4\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)} + 2\,e\,k - e\,m - 2\,i\,g\,s + i\,g\,v + \frac{\pi\,v}{2} \Bigg) C\Bigg(\frac{-2\,c\,i\,s + i\,c\,v + 2\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v}} \Bigg) + \sqrt{2\pi}\,(i\,c\,v - 2\,i\,c\,s)\, S\Bigg(\frac{-2\,c\,i\,s + i\,c\,v + 2\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v}} \Bigg) \sin\Bigg(-\frac{(i\,c\,v - 2\,i\,c\,s)^2}{4\,(2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)} + 2\,e\,k - e\,m - 2\,i\,g\,s + i\,g\,v + \frac{\pi\,v}{2} \Bigg) + 2\sqrt{2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v}\, \sin\Bigg(2\,e\,k - e\,m - 2\,i\,g\,s + i\,g\,v + \frac{\pi\,v}{2} + (2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)\,z + (i\,c\,v - 2\,i\,c\,s)\sqrt{z} \Bigg) \Bigg) \Bigg/ (2\,d\,k - d\,m - 2\,i\,f\,s + i\,f\,v)^{3/2} + \Bigg(\sqrt{2\pi}\,(i\,c\,v - 2\,i\,c\,s) \cos\Bigg(-\frac{(2\,i\,c\,s - i\,c\,v)^2}{4\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)} + 2\,e\,k - e\,m + 2\,i\,g\,s - i\,g\,v - \frac{\pi\,v}{2} \Bigg) C\Bigg(\frac{2\,i\,c\,s - i\,c\,v + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}} \Bigg) + \sqrt{2\pi}\,(2\,i\,c\,s - i\,c\,v)\, S\Bigg(\frac{2\,i\,c\,s - i\,c\,v + 2\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}} \Bigg) \sin\Bigg(-\frac{(2\,i\,c\,s - i\,c\,v)^2}{4\,(2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)} + 2\,e\,k - e\,m + 2\,i\,g\,s - i\,g\,v - \frac{\pi\,v}{2} \Bigg) + 2\sqrt{2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v}\, \sin\Bigg(2\,e\,k - e\,m + 2\,i\,g\,s - i\,g\,v - \frac{\pi\,v}{2} + (2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)\,z + (2\,i\,c\,s - i\,c\,v)\sqrt{z} \Bigg) \Bigg) \Bigg/ (2\,d\,k - d\,m + 2\,i\,f\,s - i\,f\,v)^{3/2} \Bigg) \,/;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\cos^m(b\,z^r)\,\sinh^v(c\,z^r + f\,z + g)$

01.19.21.2754.01

$$\int \cos^m(b z^2)\sinh^\nu(c z^2+f z+g)\,dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k} C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)}{\sqrt{b(m-2k)}} - i^{\nu+1} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g i(\nu-2k)\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g i(\nu-2k)\right)\right)\right) + i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(-\frac{(i f \nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}-i g(2s-\nu)+\frac{\pi\nu}{2}\right) C\left(\frac{-2 f i s+i f \nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right) - S\left(\frac{-2 f i s+i f \nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)\sin\left(-\frac{(i f \nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)} - i g(2s-\nu)+\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+ic\nu}\right) + \left(\cos\left(-\frac{(2 i f s-i f \nu)^2}{4(2bk-bm+2ics-ic\nu)}+g i(2s-\nu)-\frac{\pi\nu}{2}\right) C\left(\frac{2 i f s-i f \nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right) - S\left(\frac{2 i f s-i f \nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)\sin\left(-\frac{(2 i f s-i f \nu)^2}{4(2bk-bm+2ics-ic\nu)} + g i(2s-\nu)-\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right) /; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

01.19.21.2755.01

$$\int \cos^m(b\sqrt{z})\sinh^\nu(\sqrt{z}\,c+g+f z)\,dz = i^{-\nu} 2^{-m-\nu} z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) + \frac{1}{b^2}\left(i^{-\nu}\left(2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{\binom{m}{k}\left(\cos\left(b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\,\sin\left(b(2k-m)\sqrt{z}\right)\right)}{(m-2k)^2}\right)\right) + i^\nu 2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{(i f(\nu-2k))^{3/2}}\left((-1)^k\binom{\nu}{k}\left(2\sqrt{i f(\nu-2k)}\,\sin\left(\frac{\pi\nu}{2}+g i(\nu-2k)+f i(\nu-2k)z+c i(\nu-2k)\sqrt{z}\right)-\right.\right.$$

$$c\sqrt{2\pi}\,(v-2k)\left(\cos\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)C\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f(v-2k)}}\right)+\right.$$

$$\left.\left.\left.S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f(v-2k)}}\right)\sin\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)\right)\right)\right)+i^v\,2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\frac{1}{(i f v-2i f s)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm+2ics-icv)\cos\left(-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2i f s)}-\right.\right.\right.$$

$$\left.2igs+igv+\frac{\pi v}{2}\right)C\left(\frac{2bk-bm-2ics+icv+2(i f v-2i f s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2i f s}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm-2ics+icv)\,S\left(\frac{2bk-bm-2ics+icv+2(i f v-2i f s)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{i f v-2i f s}}\right)$$

$$\sin\left(-\frac{(2bk-bm-2ics+icv)^2}{4(i f v-2i f s)}-2igs+igv+\frac{\pi v}{2}\right)+$$

$$\left.2\sqrt{i f v-2i f s}\,\sin\left(-2gis+igv+\frac{\pi v}{2}+(i f v-2i f s)z+(2bk-bm-2ics+icv)\sqrt{z}\right)\right)+$$

$$\frac{1}{(2i f s-i f v)^{3/2}}\left(\sqrt{2\pi}\,(-2bk+bm-2ics+icv)\cos\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2i f s-i f v)}+\right.\right.$$

$$\left.2igs-igv-\frac{\pi v}{2}\right)C\left(\frac{2bk-bm+2ics-icv+2(2i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2i f s-i f v}}\right)+$$

$$\sqrt{2\pi}\,(2bk-bm+2ics-icv)\,S\left(\frac{2bk-bm+2ics-icv+2(2i f s-i f v)\sqrt{z}}{\sqrt{2\pi}\,\sqrt{2i f s-i f v}}\right)$$

$$\sin\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2i f s-i f v)}+2igs-igv-\frac{\pi v}{2}\right)+2\sqrt{2i f s-i f v}$$

$$\left.\left.\sin\left(2igs-igv-\frac{\pi v}{2}+(2i f s-i f v)z+(2bk-bm+2ics-icv)\sqrt{z}\right)\right)\right)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m\left(b z^r+e\right)\sinh^v\left(c z^r+f z+g\right)$

01.19.21.2756.01

$$\int \cos^m(b z^2+e)\sinh^\nu(c z^2+f z+g)\,dz = 2^{-m-\nu} i^{-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+i^{-\nu} 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\frac{\binom{m}{k}\left(\cos(e(m-2k))\,C\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)-S\left(\frac{b(m-2k)\sqrt{\frac{2}{\pi}}\,z}{\sqrt{b(m-2k)}}\right)\sin(e(m-2k))\right)}{\sqrt{b(m-2k)}}-i^{\nu+1}2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor}\frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^k\binom{\nu}{k}\left(\cos\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)+S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)f^2}{4c}+\frac{\pi\nu}{2}+g\,i(\nu-2k)\right)\right)\right)+i^\nu 2^{-m-\nu+\frac{1}{2}}\sqrt{\pi}\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\sum_{s=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^s\binom{\nu}{s}\left(\left(\cos\left(-\frac{(i f\nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-i g(2s-\nu)+\frac{\pi\nu}{2}\right)C\left(\frac{-2 f i s+i f\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)-S\left(\frac{-2 f i s+i f\nu+2(2bk-bm-2ics+ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm-2ics+ic\nu}}\right)\sin\left(-\frac{(i f\nu-2 i f s)^2}{4(2bk-bm-2ics+ic\nu)}+e(2k-m)-i g(2s-\nu)+\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm-2ics+ic\nu}\right)+\left(\cos\left(-\frac{(2 i f s-i f\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)+g\,i(2s-\nu)-\frac{\pi\nu}{2}\right)C\left(\frac{2 i f s-i f\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)-S\left(\frac{2 i f s-i f\nu+2(2bk-bm+2ics-ic\nu)z}{\sqrt{2\pi}\sqrt{2bk-bm+2ics-ic\nu}}\right)\sin\left(-\frac{(2 i f s-i f\nu)^2}{4(2bk-bm+2ics-ic\nu)}+e(2k-m)+g\,i(2s-\nu)-\frac{\pi\nu}{2}\right)\right)\Big/\left(\sqrt{2bk-bm+2ics-ic\nu}\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2757.01

$$\int \cos^m(\sqrt{z}\,b+e)\sinh^\nu(\sqrt{z}\,c+g+f z)\,dz = i^{-\nu}2^{-m-\nu}z\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)+\frac{1}{b^2}\left(i^{-\nu}\left(2^{-m-\nu+2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\frac{1}{(m-2k)^2}\left(\binom{m}{k}\left(\cos\left(2ek-em+b(2k-m)\sqrt{z}\right)+b(2k-m)\sqrt{z}\,\sin\left(2ek-em+b(2k-m)\sqrt{z}\right)\right)\right)\right)\right)+$$

$$i^{v}\, 2^{-m-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{(i\, f\, (v-2k))^{3/2}} \left((-1)^k \binom{v}{k} \right.$$

$$\left(2 \sqrt{i\, f\, (v-2k)}\, \sin\!\left(\frac{\pi v}{2} + g\, i\, (v-2k) + f\, i\, (v-2k)\, z + c\, i\, (v-2k) \sqrt{z} \right) - \right.$$

$$c \sqrt{2\pi}\, (v-2k) \left(\cos\!\left(-\frac{i\, (v-2k)\, c^2}{4 f} + \frac{\pi v}{2} + g\, i\, (v-2k) \right) C\!\left(\frac{(2k-v)\left(c + 2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{i\, f\, (v-2k)}} \right) + \right.$$

$$\left.\left.\left. S\!\left(\frac{(2k-v)\left(c + 2 f \sqrt{z}\right)}{\sqrt{2\pi} \sqrt{i\, f\, (v-2k)}} \right) \sin\!\left(-\frac{i\, (v-2k)\, c^2}{4 f} + \frac{\pi v}{2} + g\, i\, (v-2k) \right) \right) \right) \right) + i^{v}\, 2^{-m-v}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(\frac{1}{(i\, f\, v - 2\, i\, f\, s)^{3/2}} \left(\sqrt{2\pi}\, (-2 b k + b m + 2\, i\, c\, s - i\, c\, v) \cos\!\left(-\frac{(2 b k - b m - 2\, i\, c\, s + i\, c\, v)^2}{4 (i\, f\, v - 2\, i\, f\, s)} + \right.\right.\right.$$

$$\left. 2 e k - e m - 2\, i\, g\, s + i\, g\, v + \frac{\pi v}{2} \right) C\!\left(\frac{2 b k - b m - 2\, i\, c\, s + i\, c\, v + 2 (i\, f\, v - 2\, i\, f\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i\, f\, v - 2\, i\, f\, s}} \right) +$$

$$\sqrt{2\pi}\, (2 b k - b m - 2\, i\, c\, s + i\, c\, v)\, S\!\left(\frac{2 b k - b m - 2\, i\, c\, s + i\, c\, v + 2 (i\, f\, v - 2\, i\, f\, s) \sqrt{z}}{\sqrt{2\pi} \sqrt{i\, f\, v - 2\, i\, f\, s}} \right)$$

$$\sin\!\left(-\frac{(2 b k - b m - 2\, i\, c\, s + i\, c\, v)^2}{4 (i\, f\, v - 2\, i\, f\, s)} + 2 e k - e m - 2\, i\, g\, s + i\, g\, v + \frac{\pi v}{2} \right) + 2 \sqrt{i\, f\, v - 2\, i\, f\, s}$$

$$\left.\sin\!\left(2 e k - e m - 2\, i\, g\, s + i\, g\, v + \frac{\pi v}{2} + (i\, f\, v - 2\, i\, f\, s)\, z + (2 b k - b m - 2\, i\, c\, s + i\, c\, v) \sqrt{z} \right) \right) +$$

$$\frac{1}{(2\, i\, f\, s - i\, f\, v)^{3/2}} \left(\sqrt{2\pi}\, (-2 b k + b m - 2\, i\, c\, s + i\, c\, v) \cos\!\left(-\frac{(2 b k - b m + 2\, i\, c\, s - i\, c\, v)^2}{4 (2\, i\, f\, s - i\, f\, v)} + \right.\right.$$

$$\left. 2 e k - e m + 2\, i\, g\, s - i\, g\, v - \frac{\pi v}{2} \right) C\!\left(\frac{2 b k - b m + 2\, i\, c\, s - i\, c\, v + 2 (2\, i\, f\, s - i\, f\, v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, i\, f\, s - i\, f\, v}} \right) +$$

$$\sqrt{2\pi}\, (2 b k - b m + 2\, i\, c\, s - i\, c\, v)\, S\!\left(\frac{2 b k - b m + 2\, i\, c\, s - i\, c\, v + 2 (2\, i\, f\, s - i\, f\, v) \sqrt{z}}{\sqrt{2\pi} \sqrt{2\, i\, f\, s - i\, f\, v}} \right)$$

$$\sin\!\left(-\frac{(2 b k - b m + 2\, i\, c\, s - i\, c\, v)^2}{4 (2\, i\, f\, s - i\, f\, v)} + 2 e k - e m + 2\, i\, g\, s - i\, g\, v - \frac{\pi v}{2} \right) +$$

$$2 \sqrt{2\, i\, f\, s - i\, f\, v}\, \sin\!\left(2 e k - e m + 2\, i\, g\, s - i\, g\, v - \frac{\pi v}{2} + (2\, i\, f\, s - i\, f\, v)\, z + \right.$$

$$\left.\left.\left. (2 b k - b m + 2\, i\, c\, s - i\, c\, v) \sqrt{z} \right) \right) \right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $\cos^m(b z^r + d z) \sinh^v(c z^r + f z + g)$

01.19.21.2758.01

$$\int \cos^m(b z^2 + d z) \sinh^v(c z^2 + f z + g)\, dz = i^{-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) - i^{-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{\binom{m}{k} \left(\cos\left(\frac{d^2 (m-2k)}{4b}\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{d^2(m-2k)}{4b}\right)\right)}{\sqrt{b(m-2k)}} - i^{1-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{\sqrt{i c (v-2k)}} \left((-1)^{k+v} \binom{v}{k} \left(\cos\left(-\frac{i(v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k)\right) C\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi}\sqrt{i c (v-2k)}}\right) + S\left(\frac{(2k-v)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(v-2k)}}\right) \sin\left(-\frac{i(v-2k) f^2}{4c} + \frac{\pi v}{2} + g i (v-2k)\right)\right)\right) + i^{-v} 2^{-m-v+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{s+v} \binom{v}{s} \left(\left(\cos\left(-\frac{(2dk - dm - 2 i f s + i f v)^2}{4(2bk - bm - 2 i c s + i c v)} - i g (2s - v) + \frac{\pi v}{2}\right) C\left(\frac{2dk - dm - 2 i f s + i f v + 2(2bk - bm - 2 i c s + i c v) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2 i c s + i c v}}\right) - S\left(\frac{2dk - dm - 2 i f s + i f v + 2(2bk - bm - 2 i c s + i c v) z}{\sqrt{2\pi}\sqrt{2bk - bm - 2 i c s + i c v}}\right) \sin\left(-\frac{(2dk - dm - 2 i f s + i f v)^2}{4(2bk - bm - 2 i c s + i c v)} - i g (2s - v) + \frac{\pi v}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2 i c s + i c v}\right) + \left(\cos\left(-\frac{(2dk - dm + 2 i f s - i f v)^2}{4(2bk - bm + 2 i c s - i c v)} + g i (2s - v) - \frac{\pi v}{2}\right) C\left(\frac{2dk - dm + 2 i f s - i f v + 2(2bk - bm + 2 i c s - i c v) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2 i c s - i c v}}\right) - S\left(\frac{2dk - dm + 2 i f s - i f v + 2(2bk - bm + 2 i c s - i c v) z}{\sqrt{2\pi}\sqrt{2bk - bm + 2 i c s - i c v}}\right) \sin\left(-\frac{(2dk - dm + 2 i f s - i f v)^2}{4(2bk - bm + 2 i c s - i c v)} + g i (2s - v) - \frac{\pi v}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2 i c s - i c v}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2759.01

$$\int \cos^m(\sqrt{z}\, b + d z) \sinh^v(\sqrt{z}\, c + g + f z)\, dz = i^{-v} 2^{-m-v} z \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) + i^{-v} 2^{-m-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{(d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-b(m-2k)\sqrt{2\pi} \cos\left(\frac{b^2(m-2k)}{4d}\right) C\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) - b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k) + 2d\sqrt{z}\,(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{b^2(m-2k)}{4d}\right) + \right.\right.$$

$$2\sqrt{d(m-2k)}\,\sin\!\left(d z(m-2k)+b\sqrt{z}\,(m-2k)\right)\Bigg)\Bigg)+i^{v}\,2^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i f (v-2k))^{3/2}}\left((-1)^k\binom{v}{k}\left(c\sqrt{2\pi}\,(2k-v)\left(\cos\!\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)C\!\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f(v-2k)}}\right)+\right.\right.\right.$$

$$S\!\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\,\sqrt{i f(v-2k)}}\right)\sin\!\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g\,i(v-2k)\right)\Bigg)+$$

$$2\sqrt{i f(v-2k)}\,\sin\!\left(\frac{\pi v}{2}+g\,i(v-2k)+f\,i(v-2k)z+c\,i(v-2k)\sqrt{z}\right)\Bigg)\Bigg)+$$

$$i^{-v}\,2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s+v}\binom{v}{s}\left(\left(\left(\sqrt{2\pi}\,(-2bk+bm+2ics-icv)\cos\!\left(-\frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}-\right.\right.\right.\right.$$

$$\left.2igs+igv+\frac{\pi v}{2}\right)C\!\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\right.$$

$$\left.\left(\sqrt{2\pi}\,\sqrt{2dk-dm-2ifs+ifv}\right)\right)+\sqrt{2\pi}\,(2bk-bm-2ics+icv)$$

$$S\!\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\right.\right.$$

$$\left.\left.\sqrt{2dk-dm-2ifs+ifv}\right)\right)\sin\!\left(-\frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}-2igs+igv+\frac{\pi v}{2}\right)+$$

$$2\sqrt{2dk-dm-2ifs+ifv}\,\sin\!\left(-2gis+igv+\frac{\pi v}{2}+(2dk-dm-2ifs+ifv)z+\right.$$

$$\left.(2bk-bm-2ics+icv)\sqrt{z}\right)\Bigg)\Big/(2dk-dm-2ifs+ifv)^{3/2}+$$

$$\left(\sqrt{2\pi}\,(-2bk+bm-2ics+icv)\cos\!\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)}+2igs-igv-\frac{\pi v}{2}\right)\right.$$

$$C\!\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\right.$$

$$\left.\left(\sqrt{2\pi}\,\sqrt{2dk-dm+2ifs-ifv}\right)\right)+\sqrt{2\pi}\,(2bk-bm+2ics-icv)$$

$$S\!\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\right.\right.$$

$$\left.\left.\sqrt{2dk-dm+2ifs-ifv}\right)\right)\sin\!\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)}+2igs-igv-\frac{\pi v}{2}\right)+$$

$$2\sqrt{2dk-dm+2ifs-ifv}\,\sin\!\left(2igs-igv-\frac{\pi v}{2}+(2dk-dm+2ifs-ifv)z+\right.$$

$$\left.(2bk-bm+2ics-icv)\sqrt{z}\right)\Bigg)\Big/(2dk-dm+2ifs-ifv)^{3/2}\Bigg)\;/;\;m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $\cos^m(b z^r + d z + e)\sinh^\nu(c z^r + f z + g)$

01.19.21.2760.01

$$\int \cos^m(b z^2 + d z + e)\sinh^\nu(c z^2 + f z + g)\,dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1 - m \bmod 2)(1 - \nu \bmod 2) - i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\sqrt{b(m-2k)}}\left(\binom{m}{k}\left(\cos\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right) C\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) + S\left(\frac{(2k-m)(d+2bz)}{\sqrt{b(m-2k)}\sqrt{2\pi}}\right) \sin\left(\frac{1}{4}\left(\frac{(m-2k)d^2}{b} + 8ek - 4em\right)\right)\right)\right) - i^{1-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\sqrt{i c(\nu-2k)}}\left((-1)^{k+\nu}\binom{\nu}{k}\left(\cos\left(-\frac{i(\nu-2k)f^2}{4c} + \frac{\pi\nu}{2} + g i(\nu-2k)\right) C\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right) + S\left(\frac{(2k-\nu)(f+2cz)}{\sqrt{2\pi}\sqrt{i c(\nu-2k)}}\right)\sin\left(-\frac{i(\nu-2k)f^2}{4c} + \frac{\pi\nu}{2} + g i(\nu-2k)\right)\right)\right) + i^{-\nu} 2^{-m-\nu+\frac{1}{2}} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^{s+\nu}\binom{\nu}{s}\left(\left(\cos\left(-\frac{(2dk - dm - 2 i f s + i f \nu)^2}{4(2bk - bm - 2 i c s + i c \nu)} + e(2k-m) - i g(2s-\nu) + \frac{\pi\nu}{2}\right) C\left(\frac{2dk - dm - 2 i f s + i f \nu + 2(2bk - bm - 2 i c s + i c \nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2 i c s + i c \nu}}\right) - S\left(\frac{2dk - dm - 2 i f s + i f \nu + 2(2bk - bm - 2 i c s + i c \nu)z}{\sqrt{2\pi}\sqrt{2bk - bm - 2 i c s + i c \nu}}\right) \sin\left(-\frac{(2dk - dm - 2 i f s + i f \nu)^2}{4(2bk - bm - 2 i c s + i c \nu)} + e(2k-m) - i g(2s-\nu) + \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm - 2 i c s + i c \nu}\right) + \left(\cos\left(-\frac{(2dk - dm + 2 i f s - i f \nu)^2}{4(2bk - bm + 2 i c s - i c \nu)} + e(2k-m) + g i(2s-\nu) - \frac{\pi\nu}{2}\right) C\left(\frac{2dk - dm + 2 i f s - i f \nu + 2(2bk - bm + 2 i c s - i c \nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2 i c s - i c \nu}}\right) - S\left(\frac{2dk - dm + 2 i f s - i f \nu + 2(2bk - bm + 2 i c s - i c \nu)z}{\sqrt{2\pi}\sqrt{2bk - bm + 2 i c s - i c \nu}}\right) \sin\left(-\frac{(2dk - dm + 2 i f s - i f \nu)^2}{4(2bk - bm + 2 i c s - i c \nu)} + e(2k-m) + g i(2s-\nu) - \frac{\pi\nu}{2}\right)\right) \Big/ \left(\sqrt{2bk - bm + 2 i c s - i c \nu}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2761.01

$$\int \cos^m\left(b z^2+d z+e\right) \sinh^\nu\left(c z^2+f z+g\right) dz = i^\nu 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)+\frac{1}{b}\left(i^{\nu+1} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{m-2 s}\left(e^{-\frac{i\left(-d^2-4 b e\right)(2 s-m)}{4 b}} \binom{m}{s}\left(e^{2 i e(m-2 s)} \sqrt{i b(m-2 s)} \operatorname{erfi}\left(\frac{(2 s-m)(i d+2 i b z)}{2 \sqrt{i b(m-2 s)}}\right)-i e^{\frac{i d^2(m-2 s)}{2 b}} \sqrt{i b(2 s-m)} \operatorname{erf}\left(\frac{\sqrt{i b(2 s-m)}(i d+2 i b z)}{2 b}\right)\right)\right)\right)-\frac{1}{c}\left(i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\nu-2 k}\left((-1)^k e^{-\frac{(\nu-2 k) f^2}{4 c}+2 g k-\left(g+\frac{i \pi}{2}\right) \nu} \binom{\nu}{k}\left(e^{\frac{(\nu-2 k) f^2}{2 c}+i \pi \nu} \sqrt{c(2 k-\nu)} \operatorname{erfi}\left(\frac{\sqrt{c(2 k-\nu)}(f+2 c z)}{2 c}\right)+e^{2 g(\nu-2 k)} \sqrt{c(\nu-2 k)} \operatorname{erfi}\left(\frac{(2 k-\nu)(f+2 c z)}{2 \sqrt{c(\nu-2 k)}}\right)\right)\right)\right)+$$

$$i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s}\left(\left(e^{-\frac{(2 f k+d i(m-2 s)-f \nu)^2}{8 c k+4 i b m-8 i b s-4 c \nu}+e i(m-2 s)-2 g \nu+g(\nu-2 k)-\frac{i \pi \nu}{2}}\left(e^{2\left(\frac{(2 f k+i d m-2 i d s-f \nu)^2}{8 c k+4 i b m-8 i b s-4 c \nu}+e i(2 s-m)+g \nu\right)} \sqrt{-2 c k-i b m+2 i b s+c \nu} \operatorname{erfi}\left(\frac{(2 s-m)(i d+2 i b z)-2 k(f+2 c z)+\nu(f+2 c z)}{2 \sqrt{-2 c k-i b m+2 i b s+c \nu}}\right)-e^{4 g k+i \pi \nu} \sqrt{2 c k+i b m-2 i b s-c \nu} \operatorname{erfi}\left(\frac{-(2 s-m)(i d+2 i b z)+2 k(f+2 c z)-\nu(f+2 c z)}{2 \sqrt{2 c k+i b m-2 i b s-c \nu}}\right)\right)\right) \Big/ (-2 c k-i b m+2 i b s+c \nu)+\left(e^{\frac{(-2 f k+i d m-2 i d s+f \nu)^2}{8 c k-4 i b m+8 i b s-4 c \nu}+e i(m-2 s)+g(\nu-2 k)-\frac{i \pi \nu}{2}} \operatorname{erfi}\left(\frac{-(2 s-m)(i d+2 i b z)-2 k(f+2 c z)+\nu(f+2 c z)}{2 \sqrt{b i(m-2 s)+c(\nu-2 k)}}\right)\right) \Big/ \left(\sqrt{b i(m-2 s)+c(\nu-2 k)}\right)-\left(e^{-\frac{(-2 f k+i d m-2 i d s+f \nu)^2}{8 c k-4 i b m+8 i b s-4 c \nu}+e i(2 s-m)+g(2 k-\nu)+\frac{i \pi \nu}{2}} \sqrt{2 c k-i b m+2 i b s-c \nu} \operatorname{erfi}\left(\frac{(2 s-m)(i d+2 i b z)+2 k(f+2 c z)-\nu(f+2 c z)}{2 \sqrt{2 c k-i b m+2 i b s-c \nu}}\right)\right) \Big/ (b i(m-2 s)+c(\nu-2 k))\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2762.01

$$\int \cos^m\left(\sqrt{z}\, b+d z+e\right) \sinh^\nu\left(\sqrt{z}\, c+f z+g\right) dz = i^{-\nu} 2^{-m-\nu} z \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)+i^{-\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{(d(m-2k))^{3/2}} \left(\binom{m}{k} \left(-b(m-2k)\sqrt{2\pi}\cos\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) C\left(\frac{b(m-2k)+2d\sqrt{z}(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right) - b(m-2k)\sqrt{2\pi}\, S\left(\frac{b(m-2k)+2d\sqrt{z}(m-2k)}{\sqrt{d(m-2k)}\sqrt{2\pi}}\right)\sin\left(\frac{b^2(m-2k)}{4d} - e(m-2k)\right) + 2\sqrt{d(m-2k)}\sin\left(e(m-2k)+dz(m-2k)+b\sqrt{z}(m-2k)\right)\right)\right) +$$

$$i^v 2^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{(i f(v-2k))^{3/2}}\left((-1)^k\binom{v}{k}\left(c\sqrt{2\pi}(2k-v)\left(\cos\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g i(v-2k)\right) C\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f(v-2k)}}\right) + S\left(\frac{(2k-v)\left(c+2f\sqrt{z}\right)}{\sqrt{2\pi}\sqrt{i f(v-2k)}}\right)\sin\left(-\frac{i(v-2k)c^2}{4f}+\frac{\pi v}{2}+g i(v-2k)\right)\right) + 2\sqrt{i f(v-2k)}\sin\left(\frac{\pi v}{2}+g i(v-2k)+f i(v-2k)z+c i(v-2k)\sqrt{z}\right)\right)\right) +$$

$$i^{-v} 2^{-m-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s+v}\binom{v}{s}\left(\left(\left(\sqrt{2\pi}(-2bk+bm+2ics-icv)\cos\left(-\frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}+2ek-em-2igs+igv+\frac{\pi v}{2}\right) C\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\sqrt{2dk-dm-2ifs+ifv}\right)\right) + \sqrt{2\pi}(2bk-bm-2ics+icv) S\left(\left(2bk-bm-2ics+icv+2(2dk-dm-2ifs+ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\sqrt{2dk-dm-2ifs+ifv}\right)\right)\sin\left(-\frac{(2bk-bm-2ics+icv)^2}{4(2dk-dm-2ifs+ifv)}+2ek-em-2igs+igv+\frac{\pi v}{2}\right) + 2\sqrt{2dk-dm-2ifs+ifv}\sin\left(2ek-em-2igs+igv+\frac{\pi v}{2}+(2dk-dm-2ifs+ifv)z+(2bk-bm-2ics+icv)\sqrt{z}\right)\right)\Big/(2dk-dm-2ifs+ifv)^{3/2} +$$

$$\left(\sqrt{2\pi}(-2bk+bm-2ics+icv)\cos\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)}+2ek-em+2igs-igv-\frac{\pi v}{2}\right) C\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\sqrt{2dk-dm+2ifs-ifv}\right)\right) + \sqrt{2\pi}(2bk-bm+2ics-icv) S\left(\left(2bk-bm+2ics-icv+2(2dk-dm+2ifs-ifv)\sqrt{z}\right)\Big/\left(\sqrt{2\pi}\sqrt{2dk-dm+2ifs-ifv}\right)\right)$$

$$\sin\left(-\frac{(2bk-bm+2ics-icv)^2}{4(2dk-dm+2ifs-ifv)}+2ek-em+2igs-igv-\frac{\pi v}{2}\right)+$$
$$2\sqrt{2dk-dm+2ifs-ifv}\,\sin\left(2ek-em+2igs-igv-\frac{\pi v}{2}+(2dk-dm+2ifs-ifv)z+\right.$$
$$\left.\left.(2bk-bm+2ics-icv)\sqrt{z}\right)\right)\Big/(2dk-dm+2ifs-ifv)^{3/2}\Bigg)\;/;\; m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2763.01

$$\int\cos^m\left(\sqrt{z}\,b+e+dz\right)\sinh^v\left(\sqrt{z}\,c+g+fz\right)dz=$$
$$i^v\,2^{-m-v}z\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)+i^{v+1}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-ie(m-2s)}\binom{m}{s}$$
$$\left(\frac{b\,e^{\frac{ib^2(m-2s)}{4d}}\sqrt{\pi}\,(m-2s)\,\text{erfi}\left(\frac{\sqrt{-id(m-2s)}\left(b+2d\sqrt{z}\right)}{2d}\right)}{(-id(m-2s))^{3/2}}+\frac{1}{d^2(m-2s)}\left(b\,e^{-\frac{i\left(b^2-8de\right)(m-2s)}{4d}}\sqrt{\pi}\sqrt{id(m-2s)}\right.\right.$$
$$\left.\left.\text{erfi}\left(\frac{\sqrt{id(m-2s)}\left(b+2d\sqrt{z}\right)}{2d}\right)-2d\,e^{-i(m-2s)\left(b+d\sqrt{z}\right)\sqrt{z}}\left(-1+e^{2i(m-2s)\left(\sqrt{z}\,b+e+dz\right)}\right)\right)\right)+$$
$$\frac{1}{f}\left(2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k e^{-g(v-2k)}\binom{v}{k}\left(\frac{\left(2e^{(2k-v)\left(c+f\sqrt{z}\right)\sqrt{z}}\left(e^{i\pi v}-e^{2(v-2k)\left(\sqrt{z}\,c+g+fz\right)}\right)\right)(-1)}{v-2k}-\right.\right.$$
$$\frac{\left((-1)^v c\,e^{\frac{c^2(v-2k)}{4f}}\sqrt{\pi}\right)\text{erfi}\left(\frac{\sqrt{f(2k-v)}\left(c+2f\sqrt{z}\right)}{2f}\right)}{\sqrt{f(2k-v)}}+$$
$$\left.\left.\frac{(-1)^{v-1}\left(c\,e^{-\frac{(v-2k)c^2}{4f}-4gk+2gv-i\pi v}\sqrt{\pi}\right)\text{erfi}\left(\frac{\sqrt{f(v-2k)}\left(c+2f\sqrt{z}\right)}{2f}\right)}{\sqrt{f(v-2k)}}\right)\right)+i^v\,2^{-m-v-1}$$
$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-ie(m-2s)-g(2k-v)-\frac{i\pi v}{2}}\left(\frac{2\,e^{2\left(ei(m-2s)+g(2k-v)+\frac{i\pi v}{2}\right)+(di(m-2s)+f(2k-v))z+(bi(m-2s)+c(2k-v))\sqrt{z}}}{di(m-2s)+f(2k-v)}-\right.\right.$$
$$\left(e^{2\left(ei(m-2s)+g(2k-v)+\frac{i\pi v}{2}\right)-\frac{(bi(m-2s)+c(2k-v))^2}{4(di(m-2s)+f(2k-v))}}\sqrt{\pi}\,(bi(m-2s)+c(2k-v))\,\text{erfi}\Bigg(\right.$$

$$\left.\left.\frac{b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{d\,i\,(m-2\,s)+f\,(2\,k-v)}}\right)\right)\Big/(d\,i\,(m-2\,s)+f\,(2\,k-v))^{3/2}+$$

$$\frac{2\,e^{\sqrt{z}\,(-i\,b\,(m-2\,s)-c\,(2\,k-v))+(f\,(v-2\,k)-i\,d\,(m-2\,s))\,z}}{f\,(v-2\,k)-i\,d\,(m-2\,s)}-\left(e^{-\frac{(-i\,b\,(m-2\,s)-c\,(2\,k-v))^2}{4\,(f\,(v-2\,k)-i\,d\,(m-2\,s))}}\sqrt{\pi}\,(b\,i\,(m-2\,s)+c\,(2\,k-v))\,\mathrm{erfi}\left(\right.\right.$$

$$\left.\left.\left.\frac{b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}}{2\,\sqrt{f\,(v-2\,k)-i\,d\,(m-2\,s)}}\right)\right)\Big/(f\,(v-2\,k)-i\,d\,(m-2\,s))^{3/2}\right)+$$

$$e^{-i\,e\,(m-2\,s)+\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\left(\frac{2\,e^{\sqrt{z}\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))+(f\,(2\,k-v)-i\,d\,(m-2\,s))\,z}}{f\,(2\,k-v)-i\,d\,(m-2\,s)}-\left(e^{-\frac{(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(f\,(2\,k-v)-i\,d\,(m-2\,s))}}\sqrt{\pi}\right.\right.$$

$$\left.\left.(b\,i\,(m-2\,s)+c\,(v-2\,k))\,\mathrm{erfi}\left(\frac{b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{f\,(2\,k-v)-i\,d\,(m-2\,s)}}\right)\right)\Big/\right.$$

$$(f\,(2\,k-v)-i\,d\,(m-2\,s))^{3/2}+\frac{2\,e^{\sqrt{z}\,(b\,i\,(m-2\,s)+c\,(v-2\,k))+2\left(e\,i\,(m-2\,s)+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}\right)+(d\,i\,(m-2\,s)+f\,(v-2\,k))\,z}}{d\,i\,(m-2\,s)+f\,(v-2\,k)}-$$

$$\left(e^{2\left(e\,i\,(m-2\,s)+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}\right)-\frac{(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}}\sqrt{\pi}\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\right.$$

$$\left.\mathrm{erfi}\left(\frac{b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}}{2\,\sqrt{d\,i\,(m-2\,s)+f\,(v-2\,k)}}\right)\right)\Big/$$

$$\left.\left.(d\,i\,(m-2\,s)+f\,(v-2\,k))^{3/2}\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving tan

01.19.21.2764.01

$$\int \tan(b\,z)\sinh^{\nu}(c\,z)\,dz = -\frac{\left(\frac{i}{2}\right)^{\nu}\log(\cos(b\,z))\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)}{b} - i\,2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^{\nu}\left(\frac{e^{(2\,i\,b+2\,c\,k-c\,\nu)\,z}}{2\,i\,b+2\,c\,k-c\,\nu}\,{}_2F_1\!\left(\frac{2\,b-i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{4\,b-i\,(2\,c\,k-c\,\nu)}{2\,b};-e^{2\,i\,b\,z}\right)-\frac{e^{(2\,c\,k-c\,\nu)\,z}}{2\,c\,k-c\,\nu}\,{}_2F_1\!\left(-\frac{i\,(2\,c\,k-c\,\nu)}{2\,b},1;1-\frac{i\,(2\,c\,k-c\,\nu)}{2\,b};-e^{2\,i\,b\,z}\right)\right)-\frac{e^{c\,(\nu-2\,k)\,z}}{c\,(\nu-2\,k)}\,{}_2F_1\!\left(\frac{i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{i\,(2\,c\,k-c\,\nu)}{2\,b}+1;-e^{2\,i\,b\,z}\right)+\frac{e^{(2\,i\,b+c\,(\nu-2\,k))\,z}}{2\,i\,b+c\,(\nu-2\,k)}\,{}_2F_1\!\left(\frac{2\,b+i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{4\,b+i\,(2\,c\,k-c\,\nu)}{2\,b};-e^{2\,i\,b\,z}\right)\right)/;\ \nu\in\mathbb{N}^+$$

Involving cot

01.19.21.2765.01

$$\int \cot(b\,z)\sinh^{\nu}(c\,z)\,dz = \left(\frac{i}{2}\right)^{\nu}\frac{\log(\sin(b\,z))\ (1-\nu\bmod 2)}{b}\binom{\nu}{\frac{\nu}{2}} + i\,2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^{\nu}\left(-\frac{e^{(2\,c\,k-c\,\nu)\,z}}{2\,c\,k-c\,\nu}\,{}_2F_1\!\left(-\frac{i\,(2\,c\,k-c\,\nu)}{2\,b},1;1-\frac{i\,(2\,c\,k-c\,\nu)}{2\,b};e^{2\,i\,b\,z}\right)-\frac{e^{(2\,i\,b+2\,c\,k-c\,\nu)\,z}}{2\,i\,b+2\,c\,k-c\,\nu}\,{}_2F_1\!\left(\frac{2\,b-i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{4\,b-i\,(2\,c\,k-c\,\nu)}{2\,b};e^{2\,i\,b\,z}\right)\right)-\frac{e^{c\,(\nu-2\,k)\,z}}{c\,(\nu-2\,k)}\,{}_2F_1\!\left(\frac{i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{i\,(2\,c\,k-c\,\nu)}{2\,b}+1;e^{2\,i\,b\,z}\right)-\frac{e^{(2\,i\,b+c\,(\nu-2\,k))\,z}}{2\,i\,b+c\,(\nu-2\,k)}\,{}_2F_1\!\left(\frac{2\,b+i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{4\,b+i\,(2\,c\,k-c\,\nu)}{2\,b};e^{2\,i\,b\,z}\right)\right)/;\ \nu\in\mathbb{N}^+$$

Involving csc

01.19.21.2766.01

$$\int \csc(b\,z)\sinh^{\nu}(c\,z)\,dz = -\frac{i^{\nu}\,2^{1-\nu}\tanh^{-1}\!\left(e^{i\,b\,z}\right)(1-\nu\bmod 2)}{b}\binom{\nu}{\frac{\nu}{2}} + 2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((-1)^k\,e^{(i\,b-c\,(2\,k+\nu))\,z}\binom{\nu}{k}\left(e^{2\,c\,\nu\,z}\,(i\,b+2\,c\,k-c\,\nu)\,{}_2F_1\!\left(\frac{b+i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{3\,b+i\,(2\,c\,k-c\,\nu)}{2\,b};e^{2\,i\,b\,z}\right)+e^{i\,\pi\,\nu+4\,c\,k\,z}\,(i\,b+c\,(\nu-2\,k))\,{}_2F_1\!\left(\frac{b-i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{3\,b-i\,(2\,c\,k-c\,\nu)}{2\,b};e^{2\,i\,b\,z}\right)\right)\right)\Big/\left((i\,b+2\,c\,k-c\,\nu)\,(-b-2\,i\,c\,k+i\,c\,\nu)\right)/;\ \nu\in\mathbb{N}^+$$

Involving sec

01.19.21.2767.01

$$\int \sec(b\,z)\,\sinh^{\nu}(c\,z)\,dz = -\frac{i\,i^{\nu}\,2^{1-\nu}\tan^{-1}\left(e^{i\,b\,z}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)}{b} + 2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((-1)^k\,e^{(i\,b-c\,(2\,k+\nu))\,z}\binom{\nu}{k}\left(e^{2\,c\,\nu\,z}\,(i\,b+2\,c\,k-c\,\nu)\,{}_2F_1\left(\frac{b+i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{3\,b+i\,(2\,c\,k-c\,\nu)}{2\,b};-e^{2\,i\,b\,z}\right)+e^{i\,\pi\,\nu+4\,c\,k\,z}\,(i\,b+c\,(\nu-2\,k))\,{}_2F_1\left(\frac{b-i\,(2\,c\,k-c\,\nu)}{2\,b},1;\frac{3\,b-i\,(2\,c\,k-c\,\nu)}{2\,b};-e^{2\,i\,b\,z}\right)\right)\Big/\left((i\,b+2\,c\,k-c\,\nu)\,(i\,b+c\,(\nu-2\,k))\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving products of the direct function and trigonometric functions

Involving sin

Involving $\sin(a\,z)\sinh(b\,z)\sinh(c\,z)$

01.19.21.2768.01

$$\int \sin(a\,z)\,\sinh(b\,z)\,\sinh(c\,z)\,dz = -\frac{1}{4}\,i\left(\frac{\cosh((-b-c+i\,a)\,z)}{-b-c+i\,a}+\frac{\cosh((b-c+i\,a)\,z)}{-b+c-i\,a}+\frac{\cosh((-b+c+i\,a)\,z)}{b-c-i\,a}+\frac{\cosh((b+c+i\,a)\,z)}{b+c+i\,a}\right)$$

Involving rational functions of sin

Involving $\frac{\sinh(e\,z)\sinh(d\,z)}{a+b\sin(c\,z)}$

01.19.21.2769.01

$$\int \frac{\sinh(e z)\sinh(d z)}{a+b\sin(c z)}\,dz = -\frac{1}{4\sqrt{b^2-a^2}}\left(b\left(\frac{e^{(-d-e+i c) z}\,{}_2F_1\left(\frac{c+(d+e) i}{c}, 1; \frac{2c+(d+e) i}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(c+(d+e) i)} + \frac{e^{(-d-e+i c) z}\,{}_2F_1\left(\frac{c+(d+e) i}{c}, 1; \frac{2c+(d+e) i}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(c+(d+e) i)} + \frac{e^{(d+e+i c) z}\,{}_2F_1\left(\frac{c-i(d+e)}{c}, 1; \frac{2c-i(d+e)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(c-i(d+e))} + \frac{e^{(d+e+i c) z}\,{}_2F_1\left(\frac{c-i(d+e)}{c}, 1; \frac{2c-i(d+e)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(c-i(d+e))} - \frac{e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 1; \frac{2c+(d-e) i}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(c+(d-e) i)} - \frac{e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 1; \frac{2c+(d-e) i}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(c+(d-e) i)} - \frac{e^{(d-e+i c) z}\,{}_2F_1\left(\frac{c-i d+i e}{c}, 1; \frac{2c-i d+i e}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(c-i d+i e)} - \frac{e^{(d-e+i c) z}\,{}_2F_1\left(\frac{c-i d+i e}{c}, 1; \frac{2c-i d+i e}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(c-i d+i e)}\right)\right)$$

Involving $\sinh(e z)\sinh(d z)(a+b\sin(c z))^{-n}$

01.19.21.2770.01

$$\int \frac{\sinh(e z)\sinh(d z)}{(a+b\sin(c z))^2}\,dz = -\frac{1}{8\left(b^2-a^2\right)^{3/2}}\left(i b\left(\frac{e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 1; \frac{2c+(d-e) i}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c+(d-e) i} - \frac{e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 1; \frac{2c+(d-e) i}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c+(d-e) i} + \frac{\left(-i a+\sqrt{b^2-a^2}\right) e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 1; \frac{2c+(d-e) i}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right)(c+(d-e) i)} + \frac{2\sqrt{b^2-a^2}\, e^{(-d+e+i c) z}\,{}_2F_1\left(\frac{c+(d-e) i}{c}, 2; \frac{2c+(d-e) i}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right)(c+(d-e) i)} + \frac{e^{(d-e+i c) z}\,{}_2F_1\left(\frac{c-i(d-e)}{c}, 1; \frac{2c-i(d-e)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c-i(d-e)} - \frac{e^{(d-e+i c) z}\,{}_2F_1\left(\frac{c-i(d-e)}{c}, 1; \frac{2c-i(d-e)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c-i(d-e)} + \right.\right.$$

$$\frac{\left(-i\,a+\sqrt{b^2-a^2}\right)e^{(d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d-e)}{c},\,1;\,\frac{2\,c-i\,(d-e)}{c};\,-\frac{b\,e^{i\,c\,z}}{i\,a+\sqrt{b^2-a^2}}\right)}{\left(i\,a+\sqrt{b^2-a^2}\right)(c-i\,(d-e))}+$$

$$\frac{2\sqrt{b^2-a^2}\;e^{(d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d-e)}{c},\,2;\,\frac{2\,c-i\,(d-e)}{c};\,\frac{b\,e^{i\,c\,z}}{-i\,a+\sqrt{b^2-a^2}}\right)}{\left(-i\,a+\sqrt{b^2-a^2}\right)(c-i\,(d-e))}-$$

$$\frac{e^{(-d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c+(d+e)\,i}{c},\,1;\,\frac{2\,c+(d+e)\,i}{c};\,\frac{b\,e^{i\,c\,z}}{-i\,a+\sqrt{b^2-a^2}}\right)}{c+(d+e)\,i}+$$

$$\frac{\left(i\,a+\sqrt{b^2-a^2}\right)e^{(-d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c+(d+e)\,i}{c},\,1;\,\frac{2\,c+(d+e)\,i}{c};\,\frac{b\,e^{i\,c\,z}}{-i\,a+\sqrt{b^2-a^2}}\right)}{\left(-i\,a+\sqrt{b^2-a^2}\right)(c+(d+e)\,i)}+$$

$$\frac{e^{(-d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c+(d+e)\,i}{c},\,1;\,\frac{2\,c+(d+e)\,i}{c};\,-\frac{b\,e^{i\,c\,z}}{i\,a+\sqrt{b^2-a^2}}\right)}{c+(d+e)\,i}+$$

$$\frac{2\sqrt{b^2-a^2}\;e^{(-d-e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c+(d+e)\,i}{c},\,2;\,\frac{2\,c+(d+e)\,i}{c};\,-\frac{b\,e^{i\,c\,z}}{i\,a+\sqrt{b^2-a^2}}\right)}{\left(i\,a+\sqrt{b^2-a^2}\right)(c+(d+e)\,i)}-$$

$$\frac{e^{(d+e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d+e)}{c},\,1;\,\frac{2\,c-i\,(d+e)}{c};\,\frac{b\,e^{i\,c\,z}}{-i\,a+\sqrt{b^2-a^2}}\right)}{c-i\,(d+e)}+$$

$$\frac{\left(i\,a+\sqrt{b^2-a^2}\right)e^{(d+e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d+e)}{c},\,1;\,\frac{2\,c-i\,(d+e)}{c};\,\frac{b\,e^{i\,c\,z}}{-i\,a+\sqrt{b^2-a^2}}\right)}{\left(-i\,a+\sqrt{b^2-a^2}\right)(c-i\,(d+e))}+$$

$$\frac{e^{(d+e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d+e)}{c},\,1;\,\frac{2\,c-i\,(d+e)}{c};\,-\frac{b\,e^{i\,c\,z}}{i\,a+\sqrt{b^2-a^2}}\right)}{c-i\,(d+e)}+$$

$$\frac{2\sqrt{b^2-a^2}\;e^{(d+e+i\,c)\,z}\,{}_2F_1\!\left(\frac{c-i\,(d+e)}{c},\,2;\,\frac{2\,c-i\,(d+e)}{c};\,-\frac{b\,e^{i\,c\,z}}{i\,a+\sqrt{b^2-a^2}}\right)}{\left(i\,a+\sqrt{b^2-a^2}\right)(c-i\,(d+e))}-$$

$$\frac{\left(i\, a+\sqrt{b^2-a^2}\right) e^{(-d+e+i\, c)\, z}\, {}_2F_1\left(\frac{c+(d-e)\, i}{c},\, 1;\, \frac{2\, c+(d-e)\, i}{c};\, \frac{b\, e^{i\, c\, z}}{-i\, a+\sqrt{b^2-a^2}}\right)}{\left(-i\, a+\sqrt{b^2-a^2}\right) (c+(d-e)\, i)}-$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(-d+e+i\, c)\, z}\, {}_2F_1\left(\frac{c+(d-e)\, i}{c},\, 2;\, \frac{2\, c+(d-e)\, i}{c};\, -\frac{b\, e^{i\, c\, z}}{i\, a+\sqrt{b^2-a^2}}\right)}{\left(i\, a+\sqrt{b^2-a^2}\right) (c+(d-e)\, i)}-$$

$$\frac{\left(i\, a+\sqrt{b^2-a^2}\right) e^{(d-e+i\, c)\, z}\, {}_2F_1\left(\frac{c-i\, (d-e)}{c},\, 1;\, \frac{2\, c-i\, (d-e)}{c};\, \frac{b\, e^{i\, c\, z}}{-i\, a+\sqrt{b^2-a^2}}\right)}{\left(-i\, a+\sqrt{b^2-a^2}\right) (c-i\, (d-e))}-$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(d-e+i\, c)\, z}\, {}_2F_1\left(\frac{c-i\, (d-e)}{c},\, 2;\, \frac{2\, c-i\, (d-e)}{c};\, -\frac{b\, e^{i\, c\, z}}{i\, a+\sqrt{b^2-a^2}}\right)}{\left(i\, a+\sqrt{b^2-a^2}\right) (c-i\, (d-e))}-$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(-d-e+i\, c)\, z}\, {}_2F_1\left(\frac{c+(d+e)\, i}{c},\, 2;\, \frac{2\, c+(d+e)\, i}{c};\, \frac{b\, e^{i\, c\, z}}{-i\, a+\sqrt{b^2-a^2}}\right)}{\left(-i\, a+\sqrt{b^2-a^2}\right) (c+(d+e)\, i)}-$$

$$\frac{\left(-i\, a+\sqrt{b^2-a^2}\right) e^{(-d-e+i\, c)\, z}\, {}_2F_1\left(\frac{c+(d+e)\, i}{c},\, 1;\, \frac{2\, c+(d+e)\, i}{c};\, -\frac{b\, e^{i\, c\, z}}{i\, a+\sqrt{b^2-a^2}}\right)}{\left(i\, a+\sqrt{b^2-a^2}\right) (c+(d+e)\, i)}-$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(d+e+i\, c)\, z}\, {}_2F_1\left(\frac{c-i\, (d+e)}{c},\, 2;\, \frac{2\, c-i\, (d+e)}{c};\, \frac{b\, e^{i\, c\, z}}{-i\, a+\sqrt{b^2-a^2}}\right)}{\left(-i\, a+\sqrt{b^2-a^2}\right) (c-i\, (d+e))}-$$

$$\left.\left.\frac{\left(-i\, a+\sqrt{b^2-a^2}\right) e^{(d+e+i\, c)\, z}\, {}_2F_1\left(\frac{c-i\, (d+e)}{c},\, 1;\, \frac{2\, c-i\, (d+e)}{c};\, -\frac{b\, e^{i\, c\, z}}{i\, a+\sqrt{b^2-a^2}}\right)}{\left(i\, a+\sqrt{b^2-a^2}\right) (c-i\, (d+e))}\right)\right)$$

Involving $\frac{\sinh(e\, z) \sinh(d\, z)}{a+b \sin^2(c\, z)}$

01.19.21.2771.01

$$\int \frac{\sinh(e z)\sinh(d z)}{b\sin^2(c z)+a}\,dz = \frac{1}{4\sqrt{a}\,b\sqrt{a+b}}\left(i\left(\frac{1}{2c+(d-e)i}\left(e^{(d-e-2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{2c-i(d-e)}\left(e^{(-d+e-2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c-id+ie}{2c},1;\frac{4c-id+ie}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-id+ie}{2c},1;\frac{4c-id+ie}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)-\frac{1}{2c+(d+e)i}\left(e^{(d+e-2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{i(d+e)-2c}\left(e^{(-d-e-2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{-2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{-2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)\right)$$

Involving $\sinh(e\,z)\sinh(d\,z)\left(a+b\sin^2(c\,z)\right)^{-n}$

01.19.21.2772.01

$$\int \frac{\sinh(e z)\sinh(d z)}{\left(a+b\sin^2(c z)\right)^2}\,dz = \frac{1}{16a^{3/2}(a+b)^{3/2}}\left(i\,b\left(\frac{e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d-e)i}-\frac{e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d-e)i}+\frac{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+(d-e)i)}+\right.\right.$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},2;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+(d-e)i)}+$$

$$\frac{e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d-e)}-$$

$$\frac{e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d-e)}+$$

$$\frac{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c-i(d-e))}+$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},2;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c-i(d-e))}-$$

$$\frac{e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d+e)i}+$$

$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+(d+e)i)\right)+\frac{e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d+e)i}+$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},2;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+(d+e)i)}-$$

$$\frac{e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d+e)}+$$

$$\frac{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c-i(d+e))}+$$

$$\frac{e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d+e)}+$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},2;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d+e))}-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},2;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c+(d-e)i)}-$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c+(d-e)i)\right)-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},2;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d-e))}-$$

$$\frac{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c-i(d-e))}-$$

$$\frac{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c+(d+e)i)}-$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},2;\frac{4c+(d+e)i}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c+(d+e)i)}-$$

$$\frac{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d+e))}-$$

$$\left.\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},2;\frac{4c-i(d+e)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c-i(d+e))}\right)\Bigg)$$

Involving algebraic functions of sin

Involving $\sinh(d\,z)\sinh(e\,z)\,(a+b\sin(c\,z))^{\beta}$

01.19.21.2773.01

$$\int \sinh(d z)\sinh(e z)(a+b\sin(c z))^{\beta}\,dz = \frac{1}{4}\left(1+\frac{i b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)^{-\beta}\left(1-\frac{i b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)^{-\beta}\left(a-\frac{1}{2} i b e^{-i c z}\left(-1+e^{2 i c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(e-d) z}}{d-e+i c \beta} F_1\left(\frac{i(d-e+i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c+(d-e) i}{c}; \frac{i b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{i c z}}{a-\sqrt{a^2-b^2}}\right) - \right.$$
$$\frac{e^{-(d+e) z}}{d+e+i c \beta} F_1\left(\frac{i(d+e+i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c+(d+e) i}{c}; \frac{i b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{i c z}}{a-\sqrt{a^2-b^2}}\right) +$$
$$\frac{e^{(d-e) z}}{-d+e+i c \beta} F_1\left(-\frac{i d-i e+c \beta}{c}; -\beta, -\beta; \frac{-\beta c+c-i d+i e}{c}; \frac{i b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{i c z}}{a-\sqrt{a^2-b^2}}\right) +$$
$$\left.\frac{e^{(d+e) z}}{d+e-i c \beta} F_1\left(-\frac{i(d+e-i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c-i(d+e)}{c}; \frac{i b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{i b e^{i c z}}{a-\sqrt{a^2-b^2}}\right)\right)$$

Involving $\sinh(d z)\sinh(e z)\left(a+b\sin^2(c z)\right)^{\beta}$

01.19.21.2774.01

$$\int \sinh(d z)\sinh(e z)\left(b \sin^2(c z)+a\right)^{\beta} dz =$$
$$\frac{1}{4} i \left(1-\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a(a+b)}}\right)^{-\beta}\left(1-\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a(a+b)}}\right)^{-\beta}\left(\frac{1}{d^2+2 e d+e^2+4 c^2 \beta^2}\right.$$
$$\left(e^{(d+e) z}\left(i e^{-2(d+e) z}(d+e-2 i c \beta) F_1\left(\frac{i(d+e+2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i(d+e)-2 c(\beta-1)}{2 c}; \frac{b e^{2 i c z}}{2 a+b+2\sqrt{a(a+b)}},\right.\right.\right.$$
$$\left.\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a(a+b)}}\right) - i(d+e+2 i c \beta) F_1\left(-\frac{i(d+e-2 i c \beta)}{2 c}; -\beta, -\beta;\right.$$
$$\left.\left.\left.-\frac{i(d+e)+2 c(\beta-1)}{2 c}; \frac{b e^{2 i c z}}{2 a+b+2\sqrt{a(a+b)}}, \frac{b e^{2 i c z}}{2 a+b-2\sqrt{a(a+b)}}\right)\right)\right) -$$
$$\frac{1}{d^2-2 e d+e^2+4 c^2 \beta^2}\left(e^{(d-e) z}\left(e^{2(e-d) z}(i d-i e+2 c \beta) F_1\left(\frac{i(d-e+2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i(d-e)-2 c(\beta-1)}{2 c};\right.\right.\right.$$
$$\left.\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a(a+b)}}, \frac{b e^{2 i c z}}{2 a+b-2\sqrt{a(a+b)}}\right) + (-i d+i e+2 c \beta) F_1\left(-\frac{i d-i e+2 c \beta}{2 c}; -\beta,\right.$$
$$\left.\left.\left.\left.-\beta; -\frac{i(d-e)+2 c(\beta-1)}{2 c}; \frac{b e^{2 i c z}}{2 a+b+2\sqrt{a(a+b)}}, \frac{b e^{2 i c z}}{2 a+b-2\sqrt{a(a+b)}}\right)\right)\right)\right)\left(b \sin^2(c z)+a\right)^{\beta}$$

Involving cos

Involving $\cos(a\, z) \sinh(b\, z) \sinh(c\, z)$

01.19.21.2775.01

$$\int \cos(a\, z) \sinh(b\, z) \sinh(c\, z)\, dz = \frac{1}{4}\left(-\frac{i \sinh((-b-c+i\, a)\, z)}{a+(b+c)\, i} + \frac{\sinh((b-c+i\, a)\, z)}{-b+c-i\, a} + \frac{\sinh((-b+c+i\, a)\, z)}{b-c-i\, a} + \frac{\sinh((b+c+i\, a)\, z)}{b+c+i\, a}\right)$$

Involving rational functions of cos

Involving $\frac{\sinh(e\, z) \sinh(d\, z)}{a+b \cos(c\, z)}$

01.19.21.2776.01

$$\int \frac{\sinh(e\, z) \sinh(d\, z)}{a+b \cos(c\, z)}\, dz = -\frac{i}{4\, b \sqrt{a^2-b^2}} \Bigg(-\frac{1}{c+(d-e)\, i} \Bigg(e^{(-d+e+i\, c)\, z} \Bigg(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\!\left(\frac{c+(d-e)\, i}{c}, 1; \frac{2\, c+(d-e)\, i}{c}; \frac{b\, e^{i\, c\, z}}{\sqrt{a^2-b^2} - a}\right) +$$
$$\left(\sqrt{a^2-b^2} - a\right) {}_2F_1\!\left(\frac{c+(d-e)\, i}{c}, 1; \frac{2\, c+(d-e)\, i}{c}; -\frac{b\, e^{i\, c\, z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg) -$$
$$\frac{1}{c-i\, (d-e)} \Bigg(e^{(d-e+i\, c)\, z} \Bigg(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\!\left(\frac{c-i\, d+i\, e}{c}, 1; \frac{2\, c-i\, d+i\, e}{c}; \frac{b\, e^{i\, c\, z}}{\sqrt{a^2-b^2} - a}\right) +$$
$$\left(\sqrt{a^2-b^2} - a\right) {}_2F_1\!\left(\frac{c-i\, d+i\, e}{c}, 1; \frac{2\, c-i\, d+i\, e}{c}; -\frac{b\, e^{i\, c\, z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg) +$$
$$\frac{1}{c+(d+e)\, i} \Bigg(e^{(-d-e+i\, c)\, z} \Bigg(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\!\left(\frac{c+(d+e)\, i}{c}, 1; \frac{2\, c+(d+e)\, i}{c}; \frac{b\, e^{i\, c\, z}}{\sqrt{a^2-b^2} - a}\right) +$$
$$\left(\sqrt{a^2-b^2} - a\right) {}_2F_1\!\left(\frac{c+(d+e)\, i}{c}, 1; \frac{2\, c+(d+e)\, i}{c}; -\frac{b\, e^{i\, c\, z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg) +$$
$$\frac{1}{c-i\, (d+e)} \Bigg(e^{(d+e+i\, c)\, z} \Bigg(\left(a+\sqrt{a^2-b^2}\right) {}_2F_1\!\left(\frac{c-i\, (d+e)}{c}, 1; \frac{2\, c-i\, (d+e)}{c}; \frac{b\, e^{i\, c\, z}}{\sqrt{a^2-b^2} - a}\right) +$$
$$\left(\sqrt{a^2-b^2} - a\right) {}_2F_1\!\left(\frac{c-i\, (d+e)}{c}, 1; \frac{2\, c-i\, (d+e)}{c}; -\frac{b\, e^{i\, c\, z}}{a+\sqrt{a^2-b^2}}\right)\Bigg)\Bigg)\Bigg)$$

Involving $\sinh(e\, z) \sinh(d\, z)\, (a+b \cos(c\, z))^{-n}$

01.19.21.2777.01

$$\int \frac{\sinh(e\,z)\sinh(d\,z)}{(a+b\cos(c\,z))^2}\,dz = \frac{1}{8\left(a^2-b^2\right)^{3/2}}\left(i\,b\left(\frac{e^{(-d+e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d-e)\,i}{c},1;\frac{2\,c+(d-e)\,i}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{c+(d-e)\,i}-\frac{e^{(-d+e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d-e)\,i}{c},1;\frac{2\,c+(d-e)\,i}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{c+(d-e)\,i}+\right.\right.$$

$$\frac{\left(\sqrt{a^2-b^2}-a\right)e^{(-d+e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d-e)\,i}{c},1;\frac{2\,c+(d-e)\,i}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right)(c+(d-e)\,i)}+$$

$$\frac{2\sqrt{a^2-b^2}\;e^{(-d+e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d-e)\,i}{c},2;\frac{2\,c+(d-e)\,i}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c+(d-e)\,i)}+$$

$$\frac{e^{(d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c-i\,(d-e)}{c},1;\frac{2\,c-i\,(d-e)}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{c-i\,(d-e)}-\frac{e^{(d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c-i\,(d-e)}{c},1;\frac{2\,c-i\,(d-e)}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{c-i\,(d-e)}+$$

$$\frac{\left(\sqrt{a^2-b^2}-a\right)e^{(d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c-i\,(d-e)}{c},1;\frac{2\,c-i\,(d-e)}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right)(c-i\,(d-e))}+$$

$$\frac{2\sqrt{a^2-b^2}\;e^{(d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c-i\,(d-e)}{c},2;\frac{2\,c-i\,(d-e)}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c-i\,(d-e))}-\frac{e^{(-d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d+e)\,i}{c},1;\frac{2\,c+(d+e)\,i}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{c+(d+e)\,i}+$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right)e^{(-d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d+e)\,i}{c},1;\frac{2\,c+(d+e)\,i}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c+(d+e)\,i)}+$$

$$\frac{e^{(-d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d+e)\,i}{c},1;\frac{2\,c+(d+e)\,i}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{c+(d+e)\,i}+$$

$$\frac{2\sqrt{a^2-b^2}\;e^{(-d-e+i\,c)\,z}\,{}_2F_1\left(\frac{c+(d+e)\,i}{c},2;\frac{2\,c+(d+e)\,i}{c};-\frac{b\,e^{i\,c\,z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right)(c+(d+e)\,i)}-\frac{e^{(d+e+i\,c)\,z}\,{}_2F_1\left(\frac{c-i\,(d+e)}{c},1;\frac{2\,c-i\,(d+e)}{c};\frac{b\,e^{i\,c\,z}}{\sqrt{a^2-b^2}-a}\right)}{c-i\,(d+e)}+$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right) e^{(d+e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d+e)}{c}, 1; \frac{2 c-i (d+e)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c-i (d+e))}+$$

$$\frac{e^{(d+e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d+e)}{c}, 1; \frac{2 c-i (d+e)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{c-i (d+e)}+\frac{2 \sqrt{a^2-b^2}\, e^{(d+e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d+e)}{c}, 2; \frac{2 c-i (d+e)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d+e))}-$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right) e^{(-d+e+i c) z}\, {}_2F_1\!\left(\frac{c+(d-e) i}{c}, 1; \frac{2 c+(d-e) i}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c+(d-e) i)}-$$

$$\frac{2 \sqrt{a^2-b^2}\, e^{(-d+e+i c) z}\, {}_2F_1\!\left(\frac{c+(d-e) i}{c}, 2; \frac{2 c+(d-e) i}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c+(d-e) i)}-$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right) e^{(d-e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d-e)}{c}, 1; \frac{2 c-i (d-e)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c-i (d-e))}-$$

$$\frac{2 \sqrt{a^2-b^2}\, e^{(d-e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d-e)}{c}, 2; \frac{2 c-i (d-e)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d-e))}-$$

$$\frac{2 \sqrt{a^2-b^2}\, e^{(-d-e+i c) z}\, {}_2F_1\!\left(\frac{c+(d+e) i}{c}, 2; \frac{2 c+(d+e) i}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c+(d+e) i)}-$$

$$\frac{\left(\sqrt{a^2-b^2}-a\right) e^{(-d-e+i c) z}\, {}_2F_1\!\left(\frac{c+(d+e) i}{c}, 1; \frac{2 c+(d+e) i}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c+(d+e) i)}-$$

$$\frac{2 \sqrt{a^2-b^2}\, e^{(d+e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d+e)}{c}, 2; \frac{2 c-i (d+e)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c-i (d+e))}-$$

$$\left.\left.\frac{\left(\sqrt{a^2-b^2}-a\right) e^{(d+e+i c) z}\, {}_2F_1\!\left(\frac{c-i (d+e)}{c}, 1; \frac{2 c-i (d+e)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d+e))}\right)\right)$$

Involving $\frac{\sinh(e z)\sinh(d z)}{a+b\cos^2(c z)}$

01.19.21.2778.01

$$\int \frac{\sinh(e z)\sinh(d z)}{a+b\cos^2(c z)}\,dz = \frac{i}{4\sqrt{a}\,b\sqrt{a+b}}\left(\frac{1}{-2c-i(d-e)}\left(e^{(-d+e+2ic)z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{i(d-e)-2c}\left(e^{(d-e+2ic)z}\left(\left(2a-2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-id+ie}{2c},1;\frac{4c-id+ie}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)-\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-id+ie}{2c},1;\frac{4c-id+ie}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)-\frac{1}{2c+(d+e)i}\left(e^{(-d-e+2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{i(d+e)-2c}\left(e^{(d+e+2ic)z}\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)+\left(2a+2\sqrt{a+b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $\sinh(e z)\sinh(d z)\left(a+b\cos^2(c z)\right)^{-n}$

01.19.21.2779.01

$$\int \frac{\sinh(e z)\sinh(d z)}{\left(a+b\cos^2(c z)\right)^2}\,dz = \frac{1}{16a^{3/2}(a+b)^{3/2}}\left(i\,b\left(-\frac{e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d-e)i}+\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+(d-e)i)\right)+\frac{e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+(d-e)i}+\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},2;\frac{4c+(d-e)i}{2c};-\frac{b e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+(d-e)i)}-\right.\right.$$

$$\frac{e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d-e)}+$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c-i(d-e))\right)+\frac{e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d-e)}+$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},2;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d-e))}+$$

$$\frac{e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c+(d+e)i}-$$

$$\frac{e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c+(d+e)i}+$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c+(d+e)i)\right)+$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},2;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c+(d+e)i)}+$$

$$\frac{e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d+e)}-$$

$$\frac{e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d+e)}+$$

$$\frac{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d+e))}+$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},2;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c-i(d+e))}-$$

$$\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},1;\frac{4c+(d-e)i}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/$$
$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+(d-e)i)\right)-$$
$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d+e+2ic)z}\,{}_2F_1\left(\frac{2c+(d-e)i}{2c},2;\frac{4c+(d-e)i}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+(d-e)i)}-$$
$$\frac{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},1;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c-i(d-e))}-$$
$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(d-e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d-e)}{2c},2;\frac{4c-i(d-e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c-i(d-e))}-$$
$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},2;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+(d+e)i)}-$$
$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(-d-e+2ic)z}\,{}_2F_1\left(\frac{2c+(d+e)i}{2c},1;\frac{4c+(d+e)i}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/$$
$$\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+(d+e)i)\right)-$$
$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},2;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c-i(d+e))}-$$
$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(d+e+2ic)z}\,{}_2F_1\left(\frac{2c-i(d+e)}{2c},1;\frac{4c-i(d+e)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/$$
$$\left.\left.\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c-i(d+e))\right)\right)\right)$$

Involving algebraic functions of cos

Involving $\sinh(e\,z)\sinh(d\,z)\,(a+b\cos(c\,z))^{\beta}$

01.19.21.2780.01

$$\int \sinh(e\,z)\sinh(d\,z)\,(a+b\cos(c\,z))^{\beta}\,dz = \frac{1}{4}\left(\frac{e^{i c z} b}{a-\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(\frac{e^{i c z} b}{a+\sqrt{a^2-b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2} b\, e^{-i c z}\left(1+e^{2 i c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(e-d) z}}{d-e+i c \beta} F_1\left(\frac{i (d-e+i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c+(d-e) i}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)-\right.$$
$$\frac{e^{-(d+e) z}}{d+e+i c \beta} F_1\left(\frac{i (d+e+i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c+(d+e) i}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)-$$
$$\frac{e^{(d-e) z}}{d-e-i c \beta} F_1\left(-\frac{i d-i e+c \beta}{c}; -\beta, -\beta; \frac{-\beta c+c-i d+i e}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)+$$
$$\left.\frac{e^{(d+e) z}}{d+e-i c \beta} F_1\left(-\frac{i (d+e-i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c+c-i (d+e)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}, \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)\right)$$

Involving $\sinh(e\,z)\sinh(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta}$

01.19.21.2781.01

$$\int \sinh(e\,z)\sinh(d\,z)\left(a+b\cos^2(c\,z)\right)^{\beta} dz =$$
$$\frac{1}{4}\left(\frac{e^{2 i c z} b}{2 a+b-2\sqrt{a (a+b)}}+1\right)^{-\beta}\left(\frac{e^{2 i c z} b}{2 a+b+2\sqrt{a (a+b)}}+1\right)^{-\beta}\left(a+\frac{1}{4} b\left(2+e^{-2 i c z}+e^{2 i c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(e-d) z}}{d-e+2 i c \beta} F_1\left(\frac{i (d-e+2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i (d-e)-2 c (\beta-1)}{2 c}; -\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a (a+b)}}, -\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a (a+b)}}\right)-\right.$$
$$\frac{e^{-(d+e) z}}{d+e+2 i c \beta} F_1\left(\frac{i (d+e+2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i (d+e)-2 c (\beta-1)}{2 c}; -\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a (a+b)}},\right.$$
$$\left.-\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a (a+b)}}\right)-\frac{e^{(d-e) z}}{d-e-2 i c \beta} F_1\left(-\frac{i (d-e-2 i c \beta)}{2 c}; -\beta, -\beta;\right.$$
$$\left.-\frac{i (d-e)+2 c (\beta-1)}{2 c}; -\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a (a+b)}}, -\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a (a+b)}}\right)+\frac{e^{(d+e) z}}{d+e-2 i c \beta}$$
$$\left.F_1\left(-\frac{i (d+e-2 i c \beta)}{2 c}; -\beta, -\beta; -\frac{i (d+e)+2 c (\beta-1)}{2 c}; -\frac{b e^{2 i c z}}{2 a+b+2\sqrt{a (a+b)}}, -\frac{b e^{2 i c z}}{2 a+b-2\sqrt{a (a+b)}}\right)\right)$$

Involving rational functions of the direct function and trigonometric functions

Involving sin

Involving $\frac{\sin(d\,z)}{a+b\sinh(c\,z)}$

01.19.21.2782.01

$$\int \frac{\sin(d\,z)}{a+b\sinh(c\,z)}\,dz = -\frac{i}{2\,b\,\sqrt{a^2+b^2}}\left(\frac{1}{c-i\,d}\,e^{(c-i\,d)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)-\frac{1}{c+i\,d}\,e^{(c+i\,d)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)$$

Involving $\sin(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.2783.01

$$\int \frac{\sin(d\,z)}{(a+b\sinh(c\,z))^2}\,dz = \frac{1}{2\left(a^2+b^2\right)^{3/2}}\left(i\,b\,e^{(c-i\,d)\,z}\left(\frac{a\,e^{2\,i\,d\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d)}+\frac{a\,e^{2\,i\,d\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d)}+\frac{\sqrt{a^2+b^2}\;e^{2\,i\,d\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{c},2;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d)}+\frac{\sqrt{a^2+b^2}\;{}_2F_1\!\left(1-\frac{i\,d}{c},2;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d)}-\frac{\sqrt{a^2+b^2}\;e^{2\,i\,d\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{c},2;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d)}-\frac{a\,{}_2F_1\!\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d)}-\frac{a\,{}_2F_1\!\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d)}-\frac{\sqrt{a^2+b^2}\;{}_2F_1\!\left(1-\frac{i\,d}{c},2;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d)}\right)\right)$$

Involving $\frac{\sin(d\,z)}{a+b\sinh^2(c\,z)}$

01.19.21.2784.01

$$\int \frac{\sin(d z)}{a + b \sinh^2(c z)} \, dz = \frac{1}{2 \sqrt{a} \sqrt{a-b}} \left(i b e^{(2c - i d) z} \left(\frac{e^{2 i d z}}{2c + i d} \left(\frac{1}{-2a + 2\sqrt{a-b} \sqrt{a} + b} \, {}_2F_1\left(1 + \frac{i d}{2c}, 1; 2 + \frac{i d}{2c}; \frac{b e^{2 c z}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + \frac{1}{2a + 2\sqrt{a-b}\sqrt{a} - b} \, {}_2F_1\left(1 + \frac{i d}{2c}, 1; 2 + \frac{i d}{2c}; \frac{b e^{2 c z}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right)\right) - \frac{1}{\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right)(2c - i d)} \, {}_2F_1\left(1 - \frac{i d}{2c}, 1; 2 - \frac{i d}{2c}; \frac{b e^{2 c z}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right) - \frac{1}{\left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right)(2c - i d)} \, {}_2F_1\left(1 - \frac{i d}{2c}, 1; 2 - \frac{i d}{2c}; \frac{b e^{2 c z}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right)\right)\right)$$

Involving $\sin(d z)\left(a + b \sinh^2(c z)\right)^{-n}$

01.19.21.2785.01

$$\int \frac{\sin(d\,z)}{\left(a+b\sinh^2(c\,z)\right)^2}\,dz = -\frac{1}{4\,a^{3/2}\,(a-b)^{3/2}}\left(i\,b\left(\frac{2\sqrt{a}\,\sqrt{a-b}\,e^{(2c+i\,d)z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},2;2+\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c+i\,d)}+\right.\right.$$

$$\frac{(2\,a-b)\,e^{(2c-i\,d)z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},1;2-\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c-i\,d)}+$$

$$\frac{(2\,a-b)\,e^{(2c-i\,d)z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},1;2-\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c-i\,d)}+$$

$$\frac{2\sqrt{a}\,\sqrt{a-b}\,e^{(2c-i\,d)z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},2;2-\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c-i\,d)}-$$

$$\frac{(2\,a-b)\,e^{(2c+i\,d)z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},1;2+\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c+i\,d)}-$$

$$\frac{2\sqrt{a}\,\sqrt{a-b}\,e^{(2c+i\,d)z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},2;2+\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c+i\,d)}-$$

$$\frac{(2\,a-b)\,e^{(2c+i\,d)z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},1;2+\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c+i\,d)}-$$

$$\left.\left.\frac{2\sqrt{a}\,\sqrt{a-b}\,e^{(2c-i\,d)z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},2;2-\frac{i\,d}{2\,c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c-i\,d)}\right)\right)$$

Involving $\frac{\sin(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}$

01.19.21.2786.01

$$\int \frac{\sin(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{4\,b\sqrt{a^2+b^2}}\Bigg(i\Bigg(-\frac{1}{c-d+i\,e}\Bigg(e^{(c-d+i\,e)z}\Bigg(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)+$$
$$\frac{1}{c+d+i\,e}\Bigg(e^{(c+d+i\,e)z}\Bigg(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c+d+i\,e}{c},1;\frac{d+i\,e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c+d+i\,e}{c},1;\frac{d+i\,e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)+$$
$$\frac{1}{c-d-i\,e}\Bigg(e^{(c-d-i\,e)z}\Bigg(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d-i\,e}{c},1;2-\frac{d+i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c-d-i\,e}{c},1;2-\frac{d+i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)-$$
$$\frac{1}{c+d-i\,e}\Bigg(e^{(c+d-i\,e)z}\Bigg(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c+d-i\,e}{c},1;\frac{d-i\,e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left(\sqrt{a^2+b^2}-a\right){}_2F_1\!\left(\frac{c+d-i\,e}{c},1;\frac{d-i\,e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\sin(e\,z)\sinh(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.2787.01

$$\int \frac{\sin(e\,z)\sinh(d\,z)}{(a+b\sinh(c\,z))^2}\,dz = \frac{1}{4\,b\left(a^2+b^2\right)^{3/2}}\Bigg(i\Bigg(\frac{1}{c-d+i\,e}\Bigg(e^{(c-d+i\,e)z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\!\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$
$$\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\!\left(\frac{c-d+i\,e}{c},2;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c-d+i e}{c}, 2; 2-\frac{d-i e}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)-$$

$$\frac{1}{c+d+i e}\left(e^{(c+d+i e) z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i e}{c}, 1; \frac{d+i e}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i e}{c}, 1; \frac{d+i e}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c+d+i e}{c}, 2; \frac{d+i e}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left.\left.\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c+d+i e}{c}, 2; \frac{d+i e}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-$$

$$\frac{1}{c-d-i e}\left(e^{(c-d-i e) z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i e}{c}, 1; 2-\frac{d+i e}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i e}{c}, 1; 2-\frac{d+i e}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c-d-i e}{c}, 2; 2-\frac{d+i e}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left.\left.\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c-d-i e}{c}, 2; 2-\frac{d+i e}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+$$

$$\frac{1}{c+d-i e}\left(e^{(c+d-i e) z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i e}{c}, 1; \frac{d-i e}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i e}{c}, 1; \frac{d-i e}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c+d-i e}{c}, 2; \frac{d-i e}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c+d-i e}{c}, 2; \frac{d-i e}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{\sin(e z)\sinh(d z)}{a+b\sinh^2(c z)}$

01.19.21.2788.01

$$\int \frac{\sin(e z)\sinh(d z)}{a+b\sinh^2(c z)}\,dz = \frac{i}{4\sqrt{a}\,\sqrt{a-b}\,b}\left(\frac{1}{2c+d+i e}\left(e^{-(2c+d+i e)z}\left(\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d+i e}{2c},1;\frac{4c+d+i e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+i e}{2c},1;\frac{4c+d+i e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c-d+i e}\left(e^{-(2c+d-i e)z}\left(\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d-i e}{2c},1;\frac{4c+d-i e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-i e}{2c},1;\frac{4c+d-i e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)\right)-\frac{1}{-2c+d+i e}\left(e^{(-2c+d+i e)z}\left(\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d+i e}{2c},1;2-\frac{d+i e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d+i e}{2c},1;2-\frac{d+i e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c+d-i e}\left(e^{(-2c+d-i e)z}\left(\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d-i e}{2c},1;2-\frac{d-i e}{2c};\frac{b\,e^{-2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d-i e}{2c},1;2-\frac{d-i e}{2c};\frac{b\,e^{-2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $\sin(e z)\sinh(d z)\left(a+b\sinh^2(c z)\right)^{-n}$

01.19.21.2789.01

$$\int \frac{\sin(e z)\sinh(d z)}{\left(a+b\sinh^2(c z)\right)^2}\,dz = \frac{1}{8a^{3/2}(a-b)^{3/2}\,b}\left(i\left(-\frac{1}{2c+d+i e}\left(e^{(2c+d+i e)z}\left((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d+i e}{2c}+1,1;\frac{d+i e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d+i e}{2c}+1,1;\frac{d+i e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e}{2c}+1,2;\frac{d+i e}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e}{2c}+1,2;\frac{d+i e}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\right)\right)\right)+\frac{1}{2c+d-i e}$$

$$\Bigg(e^{(2c+d-ie)z}\bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\bigg(\frac{d-ie}{2c}+1,\,1;\,\frac{d-ie}{2c}+2;\,\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\bigg(\frac{d-ie}{2c}+1,\,1;\,\frac{d-ie}{2c}+2;\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$2\sqrt{a}\,\bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\bigg(\frac{d-ie}{2c}+1,\,2;\,\frac{d-ie}{2c}+2;$$

$$\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1$$

$$\bigg(\frac{d-ie}{2c}+1,\,2;\,\frac{d-ie}{2c}+2;\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)\bigg)\bigg)\Bigg)-\frac{1}{2c-d-ie}$$

$$\Bigg(e^{(2c-d-ie)z}\bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\bigg(1-\frac{d+ie}{2c},\,1;\,2-\frac{d+ie}{2c};\,\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\bigg(1-\frac{d+ie}{2c},\,1;\,2-\frac{d+ie}{2c};\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$2\sqrt{a}\,\bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\bigg(1-\frac{d+ie}{2c},\,2;\,2-\frac{d+ie}{2c};$$

$$\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1$$

$$\bigg(1-\frac{d+ie}{2c},\,2;\,2-\frac{d+ie}{2c};\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)\bigg)\bigg)\Bigg)+\frac{1}{2c-d+ie}$$

$$\Bigg(e^{(2c-d+ie)z}\bigg((2a-b)\Big(2a+2\sqrt{a-b}\,\sqrt{a}-b\Big)\,{}_2F_1\bigg(1-\frac{d-ie}{2c},\,1;\,2-\frac{d-ie}{2c};\,\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$(2a-b)\Big(-2a+2\sqrt{a-b}\,\sqrt{a}+b\Big)\,{}_2F_1\bigg(1-\frac{d-ie}{2c},\,1;\,2-\frac{d-ie}{2c};\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+$$

$$2\sqrt{a}\,\bigg(\Big(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1\bigg(1-\frac{d-ie}{2c},\,2;\,2-\frac{d-ie}{2c};$$

$$\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\bigg)+\Big(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\Big)\,{}_2F_1$$

$$\bigg(1-\frac{d-ie}{2c},\,2;\,2-\frac{d-ie}{2c};\,\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\bigg)\bigg)\bigg)\Bigg)\Bigg)$$

Involving cos

Involving $\frac{\cos(d\,z)}{a+b\sinh(c\,z)}$

01.19.21.2790.01

$$\int \frac{\cos(d\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{2\,b\sqrt{a^2+b^2}}\left(-\frac{1}{c+i\,d}\,e^{(c+i\,d)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)-\frac{1}{c-i\,d}\,e^{(c-i\,d)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)$$

Involving $\cos(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.2791.01

$$\int \frac{\cos(d\,z)}{(a+b\sinh(c\,z))^2}\,dz = -\frac{1}{2\left(a^2+b^2\right)^{3/2}}\left(b\left(\frac{a\,e^{(c+i\,d)\,z}\,{}_2F_1\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d)}+\frac{a\,e^{(c+i\,d)\,z}\,{}_2F_1\left(1+\frac{i\,d}{c},1;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d)}+\frac{\sqrt{a^2+b^2}\,e^{(c+i\,d)\,z}\,{}_2F_1\left(1+\frac{i\,d}{c},2;2+\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d)}+\frac{a\,e^{(c-i\,d)\,z}\,{}_2F_1\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d)}+\frac{a\,e^{(c-i\,d)\,z}\,{}_2F_1\left(1-\frac{i\,d}{c},1;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d)}+\frac{\sqrt{a^2+b^2}\,e^{(c-i\,d)\,z}\,{}_2F_1\left(1-\frac{i\,d}{c},2;2-\frac{i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d)}-\frac{\sqrt{a^2+b^2}\,e^{(c+i\,d)\,z}\,{}_2F_1\left(1+\frac{i\,d}{c},2;2+\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d)}-\frac{\sqrt{a^2+b^2}\,e^{(c-i\,d)\,z}\,{}_2F_1\left(1-\frac{i\,d}{c},2;2-\frac{i\,d}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d)}\right)\right)$$

Involving $\frac{\cos(d\,z)}{a+b\sinh^2(c\,z)}$

01.19.21.2792.01

$$\int \frac{\cos(d\,z)}{b\sinh^2(c\,z)+a}\,dz = -\frac{1}{2\sqrt{a}\sqrt{a-b}}\,b\left(\frac{e^{(2c+i d)z}}{2c+i d}\left(\frac{1}{-2a+2\sqrt{a-b}\sqrt{a}+b}\,{}_2F_1\left(1+\frac{i d}{2c},1;2+\frac{i d}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\right.\right.$$

$$\left.\frac{1}{2a+2\sqrt{a-b}\sqrt{a}-b}\,{}_2F_1\left(1+\frac{i d}{2c},1;2+\frac{i d}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)+$$

$$\frac{e^{(2c-i d)z}}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d)}\,{}_2F_1\left(1-\frac{i d}{2c},1;2-\frac{i d}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$\left.\frac{e^{(2c-i d)z}}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c-i d)}\,{}_2F_1\left(1-\frac{i d}{2c},1;2-\frac{i d}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)$$

Involving $\cos(d\,z)\left(a+b\sinh^2(c\,z)\right)^{-n}$

01.19.21.2793.01

$$\int \frac{\cos(d\,z)}{\left(a+b\sinh^2(c\,z)\right)^2}\,dz = -\frac{1}{4\,a^{3/2}\,(a-b)^{3/2}}\left(b\left(\frac{(2\,a-b)\,e^{(2\,c+i\,d)\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},1;2+\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c+i\,d)}+\right.\right.$$

$$\frac{(2\,a-b)\,e^{(2\,c+i\,d)\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},1;2+\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a-2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\,\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c+i\,d)}+$$

$$\frac{2\,\sqrt{a}\,\sqrt{a-b}\,e^{(2\,c+i\,d)\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},2;2+\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a-2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\,\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c+i\,d)}+$$

$$\frac{(2\,a-b)\,e^{(2\,c-i\,d)\,z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},1;2-\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c-i\,d)}+$$

$$\frac{(2\,a-b)\,e^{(2\,c-i\,d)\,z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},1;2-\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a-2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\,\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c-i\,d)}+$$

$$\frac{2\,\sqrt{a}\,\sqrt{a-b}\,e^{(2\,c-i\,d)\,z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},2;2-\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a-2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2\,a+2\,\sqrt{a-b}\,\sqrt{a}-b\right)(2\,c-i\,d)}-$$

$$\frac{2\,\sqrt{a}\,\sqrt{a-b}\,e^{(2\,c+i\,d)\,z}\,{}_2F_1\!\left(1+\frac{i\,d}{2\,c},2;2+\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c+i\,d)}-$$

$$\left.\left.\frac{2\,\sqrt{a}\,\sqrt{a-b}\,e^{(2\,c-i\,d)\,z}\,{}_2F_1\!\left(1-\frac{i\,d}{2\,c},2;2-\frac{i\,d}{2\,c};\frac{b\,e^{2\,c\,z}}{-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2\,a+2\,\sqrt{a-b}\,\sqrt{a}+b\right)(2\,c-i\,d)}\right)\right)$$

Involving $\frac{\cos(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}$

01.19.21.2794.01

$$\int \frac{\cos(e\,z)\sinh(d\,z)}{a+b\sinh(c\,z)}\,dz = \frac{1}{4\,b\sqrt{a^2+b^2}}\left(\frac{1}{c-d+i\,e}\left(e^{(c-d+i\,e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-\frac{1}{c+d+i\,e}\left(e^{(c+d+i\,e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i\,e}{c},1;\frac{d+i\,e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+d+i\,e}{c},1;\frac{d+i\,e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+\frac{1}{c-d-i\,e}\left(e^{(c-d-i\,e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i\,e}{c},1;2-\frac{d+i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c-d-i\,e}{c},1;2-\frac{d+i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)-\frac{1}{c+d-i\,e}\left(e^{(c+d-i\,e)\,z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i\,e}{c},1;\frac{d-i\,e}{c}+2;\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+d-i\,e}{c},1;\frac{d-i\,e}{c}+2;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\right)\right)\right)$$

Involving $\cos(e\,z)\sinh(d\,z)\,(a+b\sinh(c\,z))^{-n}$

01.19.21.2795.01

$$\int \frac{\cos(e\,z)\sinh(d\,z)}{(a+b\sinh(c\,z))^2}\,dz = \frac{1}{4\,b\left(a^2+b^2\right)^{3/2}}\left(-\frac{1}{c-d+i\,e}\left(e^{(c-d+i\,e)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d+i\,e}{c},1;2-\frac{d-i\,e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+\left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d+i\,e}{c},2;2-\frac{d-i\,e}{c};\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.\right.$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c-d+i\,e}{c},\,2;\,2-\frac{d-i\,e}{c};\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c+d+i\,e}\left(e^{(c+d+i\,e)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i\,e}{c},\,1;\,\frac{d+i\,e}{c}+2;\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i\,e}{c},\,1;\,\frac{d+i\,e}{c}+2;\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c+d+i\,e}{c},\,2;\,\frac{d+i\,e}{c}+2;\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c+d+i\,e}{c},\,2;\,\frac{d+i\,e}{c}+2;\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)-$$

$$\frac{1}{c-d-i\,e}\left(e^{(c-d-i\,e)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i\,e}{c},\,1;\,2-\frac{d+i\,e}{c};\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i\,e}{c},\,1;\,2-\frac{d+i\,e}{c};\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c-d-i\,e}{c},\,2;\,2-\frac{d+i\,e}{c};\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c-d-i\,e}{c},\,2;\,2-\frac{d+i\,e}{c};\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)+$$

$$\frac{1}{c+d-i\,e}\left(e^{(c+d-i\,e)\,z}\left(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i\,e}{c},\,1;\,\frac{d-i\,e}{c}+2;\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$

$$a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i\,e}{c},\,1;\,\frac{d-i\,e}{c}+2;\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+$$

$$\left(a^2+\sqrt{a^2+b^2}\ a+b^2\right){}_2F_1\left(\frac{c+d-i\,e}{c},\,2;\,\frac{d-i\,e}{c}+2;\,\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+$$

$$\left(-a^2+\sqrt{a^2+b^2}\ a-b^2\right){}_2F_1\left(\frac{c+d-i\,e}{c},\,2;\,\frac{d-i\,e}{c}+2;\,-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

Involving $\frac{\cos(e z)\sinh(d z)}{a+b\sinh^2(c z)}$

01.19.21.2796.01

$$\int \frac{\cos(e z)\sinh(d z)}{a+b\sinh^2(c z)}\,dz = \frac{1}{4\sqrt{a}\sqrt{a-b}\,b}\left(\frac{1}{2c+d+ie}\left(e^{-(2c+d+ie)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d+ie}{2c},1;\frac{4c+d+ie}{2c};\frac{b e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d+ie}{2c},1;\frac{4c+d+ie}{2c};\frac{b e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)-\frac{1}{-2c-d+ie}\left(e^{-(2c+d-ie)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{2c+d-ie}{2c},1;\frac{4c+d-ie}{2c};\frac{b e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{2c+d-ie}{2c},1;\frac{4c+d-ie}{2c};\frac{b e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c+d+ie}\left(e^{(-2c+d+ie)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{d+ie}{2c},1;2-\frac{d+ie}{2c};\frac{b e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{d+ie}{2c},1;2-\frac{d+ie}{2c};\frac{b e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)+\frac{1}{-2c+d-ie}\left(e^{(-2c+d-ie)z}\left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(1-\frac{d-ie}{2c},1;2-\frac{d-ie}{2c};\frac{b e^{-2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(1-\frac{d-ie}{2c},1;2-\frac{d-ie}{2c};\frac{b e^{-2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $\cos(e z)\sinh(d z)\left(a+b\sinh^2(c z)\right)^{-n}$

01.19.21.2797.01

$$\int \frac{\cos(e z)\sinh(d z)}{\left(a+b\sinh^2(c z)\right)^2}\,dz = \frac{1}{8a^{3/2}(a-b)^{3/2}b}\left(\frac{1}{2c+d+ie}\left(e^{(2c+d+ie)z}\left((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d+ie}{2c}+1,1;\frac{d+ie}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d+ie}{2c}+1,1;\frac{d+ie}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+ie}{2c}+1,2;\frac{d+ie}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+ie}{2c}+1,2;\frac{d+ie}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)+\frac{1}{2c+d-ie}$$

$$
\begin{aligned}
&\Bigg(e^{(2c+d-ie)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(\frac{d-ie}{2c}+1,1;\frac{d-ie}{2c}+2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(\frac{d-ie}{2c}+1,1;\frac{d-ie}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad2\sqrt{a}\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\Bigg(\frac{d-ie}{2c}+1,2;\frac{d-ie}{2c}+\\
&\qquad2;\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)\\
&\qquad{}_2F_1\left(\frac{d-ie}{2c}+1,2;\frac{d-ie}{2c}+2;\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)-\frac{1}{2c-d-ie}\\
&\Bigg(e^{(2c-d-ie)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d+ie}{2c},1;2-\frac{d+ie}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d+ie}{2c},1;2-\frac{d+ie}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad2\sqrt{a}\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\Bigg(1-\frac{d+ie}{2c},2;2-\frac{d+ie}{2c};\\
&\qquad\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\Bigg)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right)\\
&\qquad{}_2F_1\left(1-\frac{d+ie}{2c},2;2-\frac{d+ie}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)-\frac{1}{2c-d+ie}\\
&\Bigg(e^{(2c-d+ie)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right){}_2F_1\left(1-\frac{d-ie}{2c},1;2-\frac{d-ie}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad(2a-b)\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right){}_2F_1\left(1-\frac{d-ie}{2c},1;2-\frac{d-ie}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)+\\
&\quad2\sqrt{a}\Bigg(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right)\\
&\qquad{}_2F_1\left(1-\frac{d-ie}{2c},2;2-\frac{d-ie}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)+\Bigg(2a^{3/2}-2\sqrt{a-b}\,a-2b\\
&\qquad\sqrt{a}+\sqrt{a-b}\,b\Bigg){}_2F_1\left(1-\frac{d-ie}{2c},2;2-\frac{d-ie}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)\Bigg)\Bigg)\Bigg)\Bigg)
\end{aligned}
$$

Involving algebraic functions of the direct function and trigonometric functions

Involving sin

Involving $\sin(d\,z)\,(a+b\sinh(c\,z))^{\beta}$

01.19.21.2798.01

$$\int \sin(d\,z)\,(a+b\sinh(c\,z))^{\beta}\,dz = -\frac{1}{2\left(d^2+c^2\beta^2\right)}\,e^{-i\,d\,z}\left(\frac{e^{c\,z}\,b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{c\,z}\,b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta} (a+b\sinh(c\,z))^{\beta}\left(e^{2\,i\,d\,z}\,(d-i\,c\,\beta)\,F_1\!\left(\frac{i\,d}{c}-\beta;-\beta,-\beta;1+\frac{i\,d}{c}-\beta;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ (d+i\,c\,\beta)\,F_1\!\left(-\frac{i\,d}{c}-\beta;-\beta,-\beta;1-\frac{i\,d}{c}-\beta;-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)\right)$$

Involving $\sin(d\,z)\left(a+b\sinh^2(c\,z)\right)^{\beta}$

01.19.21.2799.01

$$\int \sin(d\,z)\left(a+b\sinh^2(c\,z)\right)^{\beta}dz = -\frac{1}{2\left(d^2+4\,c^2\beta^2\right)}\left(e^{-i\,d\,z}\left(\frac{e^{2\,c\,z}\,b}{2\,a-b+2\sqrt{a\,(a-b)}}+1\right)^{-\beta}\left(1-\frac{b\,e^{2\,c\,z}}{-2\,a+b+2\sqrt{a\,(a-b)}}\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2\,c\,z}\left(-1+e^{2\,c\,z}\right)^2+a\right)^{\beta} \left(e^{2\,i\,d\,z}\,(d-2\,i\,c\,\beta)\,F_1\!\left(\frac{i\,d}{2\,c}-\beta;-\beta,-\beta;1+\frac{i\,d}{2\,c}-\beta;\frac{b\,e^{2\,c\,z}}{-2\,a+b-2\sqrt{a\,(a-b)}},\frac{b\,e^{2\,c\,z}}{-2\,a+b+2\sqrt{a\,(a-b)}}\right)+ (d+2\,i\,c\,\beta)\,F_1\!\left(-\frac{i\,d}{2\,c}-\beta;-\beta,-\beta;1-\frac{i\,d}{2\,c}-\beta;\frac{b\,e^{2\,c\,z}}{-2\,a+b-2\sqrt{a\,(a-b)}},\frac{b\,e^{2\,c\,z}}{-2\,a+b+2\sqrt{a\,(a-b)}}\right)\right)\right)$$

Involving $\sin(d\,z)\sinh(e\,z)\,(a+b\sinh(c\,z))^{\beta}$

01.19.21.2800.01

$$\int \sin(d\,z)\sinh(e\,z)\,(a+b\sinh(c\,z))^{\beta}\,dz = -\frac{1}{4}\,i\left(\frac{e^{c\,z}\,b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{c\,z}\,b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-c\,z}\left(-1+e^{2\,c\,z}\right)\right)^{\beta} \left(\frac{e^{(e-i\,d)\,z}}{-e+i\,d+c\,\beta}\,F_1\!\left(\frac{e-i\,d-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-i\,d+e}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ \frac{e^{(e+i\,d)\,z}}{e+i\,d-c\,\beta}\,F_1\!\left(\frac{e+i\,d-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+e+i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ e^{-e\,z-i\,d\,z}\left(\frac{e^{2\,i\,d\,z}}{e-i\,d+c\,\beta}\,F_1\!\left(-\frac{e-i\,d+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-e+i\,d}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)- \frac{1}{e+i\,d+c\,\beta}\,F_1\!\left(-\frac{e+i\,d+c\,\beta}{c};-\beta,-\beta;-\frac{e+i\,d+c\,(\beta-1)}{c};-\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)\right)\right)$$

Involving $\sin(d\,z)\sinh(e\,z)\left(a+b\sinh^2(c\,z)\right)^\beta$

01.19.21.2801.01

$$\int \sin(d\,z)\sinh(e\,z)\left(a+b\sinh^2(c\,z)\right)^\beta dz = -\frac{1}{4}i\left(\frac{e^{2cz}b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(\frac{1}{4}b\,e^{-2cz}\left(-1+e^{2cz}\right)^2+a\right)^\beta \left(\frac{e^{(e-id)z}}{-e+i\,d+2c\beta}F_1\left(\frac{e-i\,d-2c\beta}{2c};-\beta,-\beta;\frac{e-i\,d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)+\frac{e^{(e+id)z}}{e+i\,d-2c\beta}F_1\left(\frac{e+i\,d-2c\beta}{2c};-\beta,-\beta;\frac{e+i\,d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)+e^{-ez-idz}\left(\frac{e^{2idz}}{e-i\,d+2c\beta}F_1\left(-\frac{e-i\,d+2c\beta}{2c};-\beta,-\beta;1+\frac{i(d+i\,e)}{2c}-\beta;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)-\frac{1}{e+i\,d+2c\beta}F_1\left(-\frac{e+i\,d+2c\beta}{2c};-\beta,-\beta;-\frac{e+i\,d}{2c}-\beta+1;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)$$

Involving cos

Involving $\cos(d\,z)\,(a+b\sinh(c\,z))^\beta$

01.19.21.2802.01

$$\int \cos(d\,z)\,(a+b\sinh(c\,z))^\beta dz = \frac{1}{2(d+i\,c\,\beta)(i\,d+c\,\beta)}e^{-idz}\left(\frac{e^{cz}b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{cz}b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}(a+b\sinh(c\,z))^\beta\left(e^{2idz}(d-i\,c\,\beta)F_1\left(\frac{i\,d}{c}-\beta;-\beta,-\beta;1+\frac{i\,d}{c}-\beta;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)-(d+i\,c\,\beta)F_1\left(-\frac{i\,d}{c}-\beta;-\beta,-\beta;1-\frac{i\,d}{c}-\beta;-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)\right)$$

Involving $\cos(d\,z)\left(a+b\sinh^2(c\,z)\right)^\beta$

01.19.21.2803.01

$$\int \cos(d\,z)\left(a+b\sinh^2(c\,z)\right)^\beta\,dz = -\frac{1}{2\left(d^2+4c^2\beta^2\right)}\left(i\,e^{-i\,d\,z}\left(\frac{e^{2cz}\,b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(\frac{1}{4}\,b\,e^{-2cz}\left(-1+e^{2cz}\right)^2+a\right)^\beta \left(e^{2idz}(d-2\,i\,c\,\beta)\,F_1\left(\frac{i\,d}{2c}-\beta;-\beta,-\beta;1+\frac{i\,d}{2c}-\beta;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)-(d+2\,i\,c\,\beta)\,F_1\left(-\frac{i\,d}{2c}-\beta;-\beta,-\beta;1-\frac{i\,d}{2c}-\beta;\frac{b\,e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b\,e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)$$

Involving $\cos(d\,z)\sinh(e\,z)\,(a+b\sinh(c\,z))^\beta$

01.19.21.2804.01

$$\int \cos(d\,z)\sinh(e\,z)\,(a+b\sinh(c\,z))^\beta\,dz = \frac{1}{4}\left(\frac{e^{cz}\,b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{cz}\,b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}\,b\,e^{-cz}\left(-1+e^{2cz}\right)\right)^\beta \left(\frac{e^{(e-id)z}}{e-i\,d-c\,\beta}\,F_1\left(\frac{e-i\,d-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-i\,d+e}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\frac{e^{(e+id)z}}{e+i\,d-c\,\beta}\,F_1\left(\frac{e+i\,d-c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c+e+i\,d}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+e^{-ez-idz}\left(\frac{e^{2idz}}{e-i\,d+c\,\beta}\,F_1\left(-\frac{e-i\,d+c\,\beta}{c};-\beta,-\beta;\frac{-\beta\,c+c-e+i\,d}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\frac{1}{e+i\,d+c\,\beta}\,F_1\left(-\frac{e+i\,d+c\,\beta}{c};-\beta,-\beta;-\frac{e+i\,d+c(\beta-1)}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)\right)\right)$$

Involving $\cos(d\,z)\sinh(e\,z)\left(a+b\sinh^2(c\,z)\right)^\beta$

01.19.21.2805.01

$$\int \cos(d\, z) \sinh(e\, z) \left(a + b \sinh^2(c\, z)\right)^{\beta} dz = \frac{1}{4} \left(\frac{e^{2 c z} b}{2 a - b + 2 \sqrt{a (a-b)}} + 1\right)^{-\beta} \left(1 - \frac{b\, e^{2 c z}}{-2 a + b + 2 \sqrt{a (a-b)}}\right)^{-\beta} \left(\frac{1}{4} b\, e^{-2 c z} \left(-1 + e^{2 c z}\right)^2 + a\right)^{\beta} \left(\frac{e^{(e - i d) z}}{e - i d - 2 c \beta} F_1\left(\frac{e - i d - 2 c \beta}{2 c}; -\beta, -\beta; \frac{e - i d}{2 c} - \beta + 1; \frac{b\, e^{2 c z}}{-2 a + b - 2 \sqrt{a (a-b)}}, \frac{b\, e^{2 c z}}{-2 a + b + 2 \sqrt{a (a-b)}}\right) + \frac{e^{(e + i d) z}}{e + i d - 2 c \beta} F_1\left(\frac{e + i d - 2 c \beta}{2 c}; -\beta, -\beta; \frac{e + i d}{2 c} - \beta + 1; \frac{b\, e^{2 c z}}{-2 a + b - 2 \sqrt{a (a-b)}}, \frac{b\, e^{2 c z}}{-2 a + b + 2 \sqrt{a (a-b)}}\right) + e^{-e z - i d z} \left(\frac{e^{2 i d z}}{e - i d + 2 c \beta} F_1\left(-\frac{e - i d + 2 c \beta}{2 c}; -\beta, -\beta; 1 + \frac{i (d + i e)}{2 c} - \beta; \frac{b\, e^{2 c z}}{-2 a + b - 2 \sqrt{a (a-b)}}, \frac{b\, e^{2 c z}}{-2 a + b + 2 \sqrt{a (a-b)}}\right) + \frac{1}{e + i d + 2 c \beta} F_1\left(-\frac{e + i d + 2 c \beta}{2 c}; -\beta, -\beta; -\frac{e + i d}{2 c} - \beta + 1; \frac{b\, e^{2 c z}}{-2 a + b - 2 \sqrt{a (a-b)}}, \frac{b\, e^{2 c z}}{-2 a + b + 2 \sqrt{a (a-b)}}\right)\right)\right)$$

Involving functions of the direct function, trigonometric and a power functions

Involving powers of the direct function, trigonometric and a power functions

Involving sin and power

Involving $z^{\alpha-1} \sin(c\, z) \sinh^{\nu}(a\, z)$

01.19.21.2806.01

$$\int z^{\alpha-1} \sin(c\, z) \sinh^{\nu}(a\, z)\, dz = -2^{-\nu-1} e^{\frac{1}{2} i \pi (\nu-1)} \binom{\nu}{\frac{\nu}{2}} \left((-i c z)^{-\alpha} \Gamma(\alpha, -i c z) - (i c z)^{-\alpha} \Gamma(\alpha, i c z)\right) (1 - \nu \bmod 2) z^{\alpha} - 2^{-\nu-1} i z^{\alpha} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-e^{i \pi \nu} \Gamma(\alpha, (-i c - 2 a s + a \nu) z) ((-i c - 2 a s + a \nu) z)^{-\alpha} + e^{i \pi \nu} ((i c - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - 2 a s + a \nu) z) - ((-i c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c + 2 a s - a \nu) z) + ((i c + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c + 2 a s - a \nu) z)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2807.01

$$\int z^n \sin(c\,z) \sinh^\nu(a\,z)\,dz = \frac{1}{2}\,i\left(1-e^{-2\,a\,z}\right)^{-\nu} n!\,\sinh^\nu(a\,z) \left(e^{-i\,c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\,c+a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{i\,c-a\,\nu}{2\,a}, \ldots, \frac{i\,c-a\,\nu}{2\,a}, -\nu; \frac{i\,c-a\,\nu}{2\,a}+1, \ldots, \frac{i\,c-a\,\nu}{2\,a}+1; e^{-2\,a\,z}\right) - e^{i\,c\,z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\,c+a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{-i\,c-a\,\nu}{2\,a}, \ldots, \frac{-i\,c-a\,\nu}{2\,a}, -\nu; \frac{-i\,c-a\,\nu}{2\,a}+1, \ldots, \frac{-i\,c-a\,\nu}{2\,a}+1; e^{-2\,a\,z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin(c\,z+d) \sinh^\nu(a\,z)$

01.19.21.2808.01

$$\int z^{\alpha-1} \sin(d+c\,z) \sinh^\nu(a\,z)\,dz = -2^{-\nu-1} e^{-i\,d+\frac{1}{2}\,i\,\pi(\nu-1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{2\,i\,d} (-i\,c\,z)^{-\alpha}\,\Gamma(\alpha, -i\,c\,z) - (i\,c\,z)^{-\alpha}\,\Gamma(\alpha, i\,c\,z)\right)(1-\nu \bmod 2)\,z^\alpha - 2^{-\nu-1}\,i\,e^{-i\,d} z^\alpha \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(-e^{2\,i\,d+i\,\pi\,\nu}\,\Gamma(\alpha, (-i\,c-2\,a\,s+a\,\nu)\,z)\,((-i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha} + e^{i\,\pi\,\nu} ((i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c-2\,a\,s+a\,\nu)\,z) - e^{2\,i\,d} ((-i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (-i\,c+2\,a\,s-a\,\nu)\,z) + ((i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c+2\,a\,s-a\,\nu)\,z)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2809.01

$$\int z^n \sin(d+c\,z) \sinh^\nu(a\,z)\,dz = \frac{1}{2}\,i\left(1-e^{-2\,a\,z}\right)^{-\nu} n!\,\sinh^\nu(a\,z) \left(e^{-i\,(d+c\,z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\,c+a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{i\,c-a\,\nu}{2\,a}, \ldots, \frac{i\,c-a\,\nu}{2\,a}, -\nu; \frac{i\,c-a\,\nu}{2\,a}+1, \ldots, \frac{i\,c-a\,\nu}{2\,a}+1; e^{-2\,a\,z}\right) - e^{i\,(d+c\,z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\,c+a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{-i\,c-a\,\nu}{2\,a}, \ldots, \frac{-i\,c-a\,\nu}{2\,a}, -\nu; \frac{-i\,c-a\,\nu}{2\,a}+1, \ldots, \frac{-i\,c-a\,\nu}{2\,a}+1; e^{-2\,a\,z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin(c\,z) \sinh^\nu(a\,z+b)$

01.19.21.2810.01

$$\int z^{\alpha-1} \sin(c\,z) \sinh^\nu(b+a\,z)\,dz = -2^{-\nu-1} e^{\frac{1}{2}\,i\,\pi(\nu-1)} \binom{\nu}{\frac{\nu}{2}} \left((-i\,c\,z)^{-\alpha}\,\Gamma(\alpha, -i\,c\,z) - (i\,c\,z)^{-\alpha}\,\Gamma(\alpha, i\,c\,z)\right)(1-\nu \bmod 2)\,z^\alpha - 2^{-\nu-1}\,i\,z^\alpha \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s e^{-2\,b\,s-b\,\nu} \binom{\nu}{s} \left(-e^{4\,b\,s+i\,\pi\,\nu}\,\Gamma(\alpha, (-i\,c-2\,a\,s+a\,\nu)\,z)\,((-i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha} + e^{4\,b\,s+i\,\pi\,\nu} ((i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c-2\,a\,s+a\,\nu)\,z) + e^{2\,b\,\nu} \left(((i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c+2\,a\,s-a\,\nu)\,z) - ((-i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (-i\,c+2\,a\,s-a\,\nu)\,z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2811.01

$$\int z^n \sin(c\, z) \sinh^\nu(b + a\, z)\, dz = \frac{1}{2}\, i \left(1 - e^{-2(b+a z)}\right)^{-\nu} n!\, \sinh^\nu(b + a\, z) \left(e^{-i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\, c + a\, \nu)^{-j-1}}{(n-j)!}\; {}_{j+2}F_{j+1}\left(\frac{i\, c - a\, \nu}{2\, a}, \ldots, \frac{i\, c - a\, \nu}{2\, a}, -\nu; \frac{i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right) - e^{i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\, c + a\, \nu)^{-j-1}}{(n-j)!}\; {}_{j+2}F_{j+1}\left(\frac{-i\, c - a\, \nu}{2\, a}, \ldots, \frac{-i\, c - a\, \nu}{2\, a}, -\nu; \frac{-i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{-i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^{\alpha-1} \sin(c\, z + d) \sinh^\nu(a\, z + b)$

01.19.21.2812.01

$$\int z^{\alpha-1} \sin(d + c\, z) \sinh^\nu(b + a\, z)\, dz = -2^{-\nu-1} e^{-i d + \frac{1}{2} i \pi (\nu-1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} (-i\, c\, z)^{-\alpha}\, \Gamma(\alpha, -i\, c\, z) - (i\, c\, z)^{-\alpha}\, \Gamma(\alpha, i\, c\, z)\right) (1 - \nu \bmod 2)\, z^\alpha - 2^{-\nu-1}\, i\, z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-i d - 2 b s - b \nu} \binom{\nu}{s} \left(-e^{2 i d + 4 b s + i \pi \nu}\, \Gamma(\alpha, (-i\, c - 2\, a\, s + a\, \nu)\, z)\, ((-i\, c - 2\, a\, s + a\, \nu)\, z)^{-\alpha} + e^{4 b s + i \pi \nu} ((i\, c - 2\, a\, s + a\, \nu)\, z)^{-\alpha}\, \Gamma(\alpha, (i\, c - 2\, a\, s + a\, \nu)\, z) + e^{2 b \nu} \left(((i\, c + 2\, a\, s - a\, \nu)\, z)^{-\alpha}\, \Gamma(\alpha, (i\, c + 2\, a\, s - a\, \nu)\, z) - e^{2 i d} ((-i\, c + 2\, a\, s - a\, \nu)\, z)^{-\alpha}\, \Gamma(\alpha, (-i\, c + 2\, a\, s - a\, \nu)\, z)\right)\right) /;\, \nu \in \mathbb{N}^+$$

01.19.21.2813.01

$$\int z^n \sin(d + c\, z) \sinh^\nu(b + a\, z)\, dz = \frac{1}{2}\, i \left(1 - e^{-2(b+a z)}\right)^{-\nu} n!\, \sinh^\nu(b + a\, z) \left(e^{-i (d + c z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\, c + a\, \nu)^{-j-1}}{(n-j)!}\; {}_{j+2}F_{j+1}\left(\frac{i\, c - a\, \nu}{2\, a}, \ldots, \frac{i\, c - a\, \nu}{2\, a}, -\nu; \frac{i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right) - e^{i (d + c z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\, c + a\, \nu)^{-j-1}}{(n-j)!}\; {}_{j+2}F_{j+1}\left(\frac{-i\, c - a\, \nu}{2\, a}, \ldots, \frac{-i\, c - a\, \nu}{2\, a}, -\nu; \frac{-i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{-i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right)\right) /;\, n \in \mathbb{N}$$

Involving $z^n \sin\left(b\, z^r\right) \sinh^\nu(c\, z)$

01.19.21.2814.01

$$\int z^n \sin(b z^2) \sinh^\nu(c z)\, dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left((-i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) - i^{1-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4b} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(-c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(\nu-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{i c^2 (\nu-2k)^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(\nu-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{i c^2 (\nu-2k)^2}{4b} - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b z - c(\nu-2k))^{j+1} \left(\frac{i(2 i b z - c(\nu-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - c(\nu-2k))^2}{4b}\right) - (i b)^{-n-1} e^{\frac{c^2 i (\nu-2k)^2}{4b} + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) + 2 i b z)^{j+1} \left(\frac{i(c(\nu-2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c(\nu-2k) + 2 i b z)^2}{4b}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2815.01

$$\int z^n \sin(b \sqrt{z}) \sinh^\nu(c z)\, dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(2(n+1), i b \sqrt{z}) - \Gamma(2(n+1), -i b \sqrt{z})\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (c(\nu-2k))^{-2(n+1)} \binom{\nu}{k} \left(e^{-\frac{b^2}{4c(\nu-2k)} - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2c(\nu-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2c(\nu-2k)\sqrt{z}\right)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-i b - 2c(\nu-2k)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i b - 2c(\nu-2k)\sqrt{z}\right)^2}{4c(\nu-2k)}\right) - \right.\right.$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$e^{-\frac{b^2}{4\,c\,(v-2\,k)}-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,c\,(v-2\,k)\sqrt{-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-$$

$$i\,b\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+2\,c\,(v-2\,k)$$

$$\sqrt{-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + e) \sinh^\nu(c z)$

01.19.21.2816.01

$$\int z^n \sin(b z^2 + e) \sinh^\nu(c z) \, dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} (-i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - e^{-i e} (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) - i^{1-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4b} - i e - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(-c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(\nu-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{-\frac{i c^2 (\nu-2k)^2}{4b} - i e + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(\nu-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{c^2 i (\nu-2k)^2}{4b} + i e - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b z - c(\nu-2k))^{j+1} \left(\frac{i(2 i b z - c(\nu-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - c(\nu-2k))^2}{4b}\right) - (i b)^{-n-1} e^{\frac{c^2 i (\nu-2k)^2}{4b} + i e + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) + 2 i b z)^{j+1} \left(\frac{i(c(\nu-2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c(\nu-2k) + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2817.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh^\nu(c z) \, dz = (-1)^n i (2i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i e} \Gamma\left(2(n+1), i b \sqrt{z}\right) - e^{i e} \Gamma\left(2(n+1), -i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{1-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (c(\nu-2k))^{-2(n+1)} \binom{\nu}{k} \left(e^{-\frac{b^2}{4c(\nu-2k)} - i e - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 c(\nu-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2 c(\nu-2k)\sqrt{z}\right)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \right.$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$e^{-\frac{b^2}{4\,c\,(v-2\,k)}+i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(i\,b\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}-i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,c\,(v-2\,k)\sqrt{-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}+i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+2\,c\,(v-2\,k)\right.$$

$$\left.\sqrt{\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{\dots}}\;\Gamma\left(\dots,\,\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{\dots}\right)\right)\bigg)$$

Involving $z^n \sin(b z^r + d z) \sinh^\nu(c z)$

01.19.21.2818.01

$$\int z^n \sin(b z^2 + d z) \sinh^\nu(c z)\, dz = i^{1-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\Bigg((i b)^{-n-1}\, e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right) -$$

$$(-i b)^{-n-1}\, e^{\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right)\Bigg) -$$

$$i^{-\nu}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{\frac{1}{2} i \pi (\nu+1) - \frac{i (-i d + c (\nu - 2 k))^2}{4 b}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d - c (\nu - 2 k))^{n-j} (-i d + c (\nu - 2 k) - 2 i b z)^{j+1}$$

$$\left(-\frac{i (-i d + c (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + c (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\Bigg) (-i b)^{-n-1} +$$

$$e^{\frac{1}{2} i \pi (1-\nu) - \frac{i (-i d - c (\nu - 2 k))^2}{4 b}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d + c (\nu - 2 k))^{n-j} (-i d - c (\nu - 2 k) - 2 i b z)^{j+1}$$

$$\left(-\frac{i (-i d - c (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - c (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\Bigg) (-i b)^{-n-1} +$$

$$(i b)^{-n-1}\, e^{\frac{i (i d + c (\nu - 2 k))^2}{4 b} + \frac{1}{2} i \pi (\nu - 1)} \sum_{j=0}^{n} 2^{j-n} (-i d - c (\nu - 2 k))^{n-j} (i d + c (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left(\frac{i (i d + c (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + c (\nu - 2 k) + 2 i b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1}\, e^{\frac{i (i d - c (\nu - 2 k))^2}{4 b} - \frac{1}{2} i \pi (\nu + 1)} \sum_{j=0}^{n} 2^{j-n} (-i d + c (\nu - 2 k))^{n-j} (i d - c (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left(\frac{i (i d - c (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - c (\nu - 2 k) + 2 i b z)^2}{4 b}\right)\Bigg) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2819.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z\right) \sinh^{\nu}(c\, z)\, dz =$$

$$(-1)^{n-1} 2^{-2n-\nu-2} i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(e^{\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d \sqrt{z}\right)^{h+j} \left(-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i\, b \left(-i\, b - 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) - 2\, i\, d \sqrt{-\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i \left(-i\, b - 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) \Bigg) - e^{-\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+j} \left(\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i \left(i\, b + 2\, i\, d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) + 2 \sqrt{\frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(i\, b + 2\, i\, d \sqrt{z}\right)^2}{4 d}\right) \Bigg) \Bigg) d^{-2(n+1)} +$$

$$2^{-2n-\nu-2} i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{\frac{b^2}{4(-i\, d + c(\nu - 2k))} + \frac{1}{2} i \pi (\nu+1)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b)^{-h-j+2n} \left(-i\, b + 2(-i\, d + c(\nu - 2k)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i\, b + 2(-i\, d + c(\nu - 2k)) \sqrt{z}\right)^2}{-i\, d + c(\nu - 2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2(-i\, d + c(\nu - 2k)) \sqrt{-\frac{\left(-i\, b + 2(-i\, d + c(\nu - 2k)) \sqrt{z}\right)^2}{-i\, d + c(\nu - 2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\, b + 2(-i\, d + c(\nu - 2k)) \sqrt{z}\right)^2}{4(-i\, d + c(\nu - 2k))}\right) -$$

$$i\, b \left(-i\, b + 2\,(-i\, d + c\,(v - 2\,k))\,\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(-i\, b + 2\,(-i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^2}{4\,(-i\, d + c\,(v - 2\,k))}\right)\Bigg)\Bigg)$$

$$(-i\, d + c\,(v - 2\,k))^{-2\,(n+1)} + e^{\frac{b^2}{4\,(i\, d + c\,(v-2\,k))} + \frac{1}{2}\,i\,\pi\,(v-1)}\,(i\, d + c\,(v - 2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\, b)^{-h-j+2\,n}\left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^2}{i\, d + c\,(v - 2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\, i \left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^2}{4\,(i\, d + c\,(v - 2\,k))}\right) +$$

$$2\,\sqrt{-\frac{\left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^2}{i\, d + c\,(v - 2\,k)}}\,(i\, d + c\,(v - 2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h + j + 2),\right.$$

$$\left.-\frac{\left(i\, b + 2\,(i\, d + c\,(v - 2\,k))\,\sqrt{z}\right)^2}{4\,(i\, d + c\,(v - 2\,k))}\right)\Bigg) + e^{\frac{b^2}{4\,(-i\, d - c\,(v-2\,k))} + \frac{1}{2}\,i\,\pi\,(1-v)}$$

$$(-i\, d - c\,(v - 2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\, b)^{-h-j+2\,n}\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^2}{-i\, d - c\,(v - 2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\, d - c\,(v - 2\,k))$$

$$\sqrt{-\frac{\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^2}{-i\, d - c\,(v - 2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h + j + 2), -\frac{\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^2}{4\,(-i\, d - c\,(v - 2\,k))}\right) -$$

$$i\, b\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(-i\, b + 2\,(-i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^2}{4\,(-i\, d - c\,(v - 2\,k))}\right)\Bigg) +$$

$$e^{\frac{b^2}{4\,(i\, d - c\,(v-2\,k))} - \frac{1}{2}\,i\,\pi\,(v+1)}\,(i\, d - c\,(v - 2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\, b)^{-h-j+2\,n}\left(i\, b + 2\,(i\, d - c\,(v - 2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-c\,(v-2\,k))}\right)+2\sqrt{-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}}\,(i\,d-c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-c\,(v-2\,k))}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+d\,z+e\right)\sinh^v(c\,z)$

01.19.21.2820.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh^\nu(c z)\, dz = i^{1-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((i b)^{-n-1} e^{i e - \frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right) - (-i b)^{-n-1} e^{\frac{i d^2}{4 b} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right) \right) - i^{-\nu}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + c (\nu - 2 k))^2}{4 b} - i e + \frac{1}{2} i \pi (\nu+1)} \left(\sum_{j=0}^{n} 2^{j-n} (i d - c (\nu - 2 k))^{n-j} (-i d + c (\nu - 2 k) - 2 i b z)^{j+1} \left(-\frac{i (-i d + c (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + c (\nu - 2 k) - 2 i b z)^2}{4 b}\right) \right) (-i b)^{-n-1} + e^{-\frac{i (-i d - c (\nu - 2 k))^2}{4 b} - i e + \frac{1}{2} i \pi (1-\nu)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + c (\nu - 2 k))^{n-j} (-i d - c (\nu - 2 k) - 2 i b z)^{j+1} \left(-\frac{i (-i d - c (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - c (\nu - 2 k) - 2 i b z)^2}{4 b}\right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i (i d + c (\nu - 2 k))^2}{4 b} + i e + \frac{1}{2} i \pi (\nu-1)} \sum_{j=0}^{n} 2^{j-n} (-i d - c (\nu - 2 k))^{n-j} (i d + c (\nu - 2 k) + 2 i b z)^{j+1} \left(\frac{i (i d + c (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + c (\nu - 2 k) + 2 i b z)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i (i d - c (\nu - 2 k))^2}{4 b} + i e - \frac{1}{2} i \pi (\nu+1)} \sum_{j=0}^{n} 2^{j-n} (-i d + c (\nu - 2 k))^{n-j} (i d - c (\nu - 2 k) + 2 i b z)^{j+1} \left(\frac{i (i d - c (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - c (\nu - 2 k) + 2 i b z)^2}{4 b}\right) \right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2821.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \sinh^\nu(c z)\, dz = (-1)^{n-1}\, 2^{-2 n-\nu-2}\, i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i b^2}{4 d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i b)^{-h-j+2 n} \left(-i b - 2 i d \sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(-i b\left(-i b-2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left. 2 i d \sqrt{-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)-$$

$$e^{i e-\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j}(-1)^{j-h} 4^j (i b)^{-h-j+2 n}\left(i b+2 i d \sqrt{z}\right)^{h+j}\left(\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(b i\left(i b+2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.\left. 2 \sqrt{\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)\right) d^{-2(n+1)}+$$

$$2^{-2 n-\nu-2}\, i^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k \binom{\nu}{k}\left(e^{\frac{b^2}{4(-i d+c(\nu-2 k))}-i e+\frac{1}{2} i \pi(\nu+1)}\left(\sum_{j=0}^{n} \sum_{h=0}^{j}(-1)^{j-h} 4^j (-i b)^{-h-j+2 n}\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right)^2}{-i d+c(\nu-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2(-i d+c(\nu-2 k))\right.$$

$$\sqrt{-\frac{\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right)^2}{-i d+c(\nu-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right)^2}{4(-i d+c(\nu-2 k))}\right)-$$

$$\left.\left.\left. i b\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(-i b+2(-i d+c(\nu-2 k)) \sqrt{z}\right)^2}{4(-i d+c(\nu-2 k))}\right)\right)\right)\right)$$

$$(-i d+c(\nu-2 k))^{-2(n+1)}+e^{\frac{b^2}{4(i d+c(\nu-2 k))}+i e+\frac{1}{2} i \pi(\nu-1)}(i d+c(\nu-2 k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+c\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+c\,(v-2\,k)}}\;(i\,d+c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+c\,(v-2\,k))}\right)\right)+e^{\frac{b^2}{4\,(-i\,d-c\,(v-2\,k))}-i\,e+\frac{1}{2}\,i\,\pi\,(1-v)}$$

$$(-i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-c\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-c\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-c\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^2}{4\,(i\,d-c\,(v-2\,k))}+i\,e-\frac{1}{2}\,i\,\pi\,(v+1)}\,(i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-c\,(v-2\,k))}\right)+2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}}$$

Involving $z^n \sin(b z^r) \sinh^\nu(f z + g)$

01.19.21.2822.01

$$\int z^n \sin(b z^2) \sinh^\nu(f z+g)\, dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(-i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-\nu \bmod 2) - i^{1-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i f^2 (\nu-2k)^2}{4b} - g(\nu-2k) - \frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (-f(\nu-2k)-2 i b z)^{j+1} \left(-\frac{i(-f(\nu-2k)-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f(\nu-2k)-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} + e^{-\frac{i f^2 (\nu-2k)^2}{4b} + g(\nu-2k) + \frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2k))^{n-j} (f(\nu-2k)-2 i b z)^{j+1} \left(-\frac{i(f(\nu-2k)-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f(\nu-2k)-2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} - (i b)^{-n-1} e^{\frac{f^2 i (\nu-2k)^2}{4b} - g(\nu-2k) - \frac{i\pi\nu}{2}} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (2 i b z - f(\nu-2k))^{j+1} \left(\frac{i(2 i b z - f(\nu-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - f(\nu-2k))^2}{4b}\right) - (i b)^{-n-1} e^{\frac{f^2 i (\nu-2k)^2}{4b} + g(\nu-2k) + \frac{i\pi\nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2k))^{n-j} (f(\nu-2k)+2 i b z)^{j+1} \left(\frac{i(f(\nu-2k)+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f(\nu-2k)+2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2823.01

$$\int z^n \sin(b\sqrt{z}) \sinh^\nu(f z+g)\, dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), i b \sqrt{z}\right) - \Gamma\left(2(n+1), -i b\sqrt{z}\right)\right)(1-\nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} i^{1-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{b^2}{4 f(\nu-2k)} - g(\nu-2k) - \frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 f(\nu-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2 f(\nu-2k)\sqrt{z}\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\right.$$

$$\left.\left.(v-2\,k)\,\sqrt{\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)$$

$$(-f\,(v-2\,k))^{-2\,(n+1)}-e^{-\frac{b^2}{4\,f\,(v-2\,k)}-g\,(v-2\,k)-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(i\,b\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)\right.$$

$$\left.\left.\sqrt{\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)(-f\,(v-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{b^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,f\,(v-2\,k)\,\sqrt{-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)-$$

$$e^{\frac{b^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\, b+2\, f\, (v-2\, k) \sqrt{z}\right)^2}{f\, (v-2\, k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\, i \left(i\, b+2\, f\, (v-2\, k) \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(i\, b+2\, f\, (v-2\, k) \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)+2\, f\, (v-2\, k)\right.$$

$$\left.\left.\sqrt{-\frac{\left(i\, b+2\, f\, (v-2\, k) \sqrt{z}\right)^2}{f\, (v-2\, k)}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(i\, b+2\, f\, (v-2\, k) \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b\, z^r+e\right) \sinh^v(f\, z+g)$

01.19.21.2824.01

$$\int z^n \sin\left(b\, z^2+e\right) \sinh^v(f\, z+g)\, dz =$$

$$i^{1-v}\, 2^{-v-2}\, z^{n+1} \binom{v}{\frac{v}{2}} \left(e^{i\, e}\left(-i\, b\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, -i\, b\, z^2\right)-e^{-i\, e}\left(i\, b\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, i\, b\, z^2\right)\right)(1-v \bmod 2)-$$

$$i^{1-v}\, 2^{-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{i\, f^2 (v-2\, k)^2}{4\, b}-g\, (v-2\, k)-i\, e-\frac{i\, \pi\, v}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\, (v-2\, k))^{n-j}\, (-f\, (v-2\, k)-2\, i\, b\, z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{i\, (-f\, (v-2\, k)-2\, i\, b\, z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, -\frac{i\, (-f\, (v-2\, k)-2\, i\, b\, z)^2}{4\, b}\right)\right)(-i\, b)^{-n-1}+$$

$$e^{-\frac{i\, f^2 (v-2\, k)^2}{4\, b}+g\, (v-2\, k)-i\, e+\frac{i\, \pi\, v}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (-f\, (v-2\, k))^{n-j}\, (f\, (v-2\, k)-2\, i\, b\, z)^{j+1} \left(-\frac{i\, (f\, (v-2\, k)-2\, i\, b\, z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\right.$$

$$\left.\Gamma\!\left(\frac{j+1}{2},\, -\frac{i\, (f\, (v-2\, k)-2\, i\, b\, z)^2}{4\, b}\right)\right)(-i\, b)^{-n-1}-(i\, b)^{-n-1}\, e^{\frac{f^2\, i\, (v-2\, k)^2}{4\, b}-g\, (v-2\, k)+i\, e-\frac{i\, \pi\, v}{2}} \sum_{j=0}^{n} 2^{j-n}\, (f\, (v-2\, k))^{n-j}$$

$$(2\, i\, b\, z-f\, (v-2\, k))^{j+1} \left(\frac{i\, (2\, i\, b\, z-f\, (v-2\, k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{i\, (2\, i\, b\, z-f\, (v-2\, k))^2}{4\, b}\right)-$$

$$(i\, b)^{-n-1}\, e^{\frac{f^2\, i\, (v-2\, k)^2}{4\, b}+g\, (v-2\, k)+i\, e+\frac{i\, \pi\, v}{2}} \sum_{j=0}^{n} 2^{j-n}\, (-f\, (v-2\, k))^{n-j}\, (f\, (v-2\, k)+2\, i\, b\, z)^{j+1}$$

$$\left.\left(\frac{i\, (f\, (v-2\, k)+2\, i\, b\, z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{i\, (f\, (v-2\, k)+2\, i\, b\, z)^2}{4\, b}\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.19.21.2825.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh^{\nu}(f\, z + g)\, dz = = $$
$$(-1)^n\, i\, (2\, i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i\, e}\, \Gamma\left(2\,(n+1),\, i\, b \sqrt{z}\right) - e^{i\, e}\, \Gamma\left(2\,(n+1),\, -i\, b\sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2\,(n+1)} +$$
$$2^{-2\,n-\nu-2}\, i^{1-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{-\frac{b^2}{4\, f\,(\nu-2\,k)} - i\, e - g\,(\nu-2\,k) - \frac{i\,\pi\,\nu}{2}}$$
$$\Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\,n} \left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j} \Bigg(-i\, b\left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right) \Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\, f\,(\nu-2\,k)}\right) - 2\, f$$
$$(\nu-2\,k)\sqrt{\frac{\left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}}\; \Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(-i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\, f\,(\nu-2\,k)}\right)\Bigg)\Bigg)$$
$$(-f\,(\nu-2\,k))^{-2\,(n+1)} - e^{-\frac{b^2}{4\, f\,(\nu-2\,k)} + i\, e - g\,(\nu-2\,k) - \frac{i\,\pi\,\nu}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2\,n} \left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^{h+j}$$
$$\left(\frac{\left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(i\, b\left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right) \Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$
$$\frac{\left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\, f\,(\nu-2\,k)}\Bigg) - 2\, f\,(\nu-2\,k)\sqrt{\frac{\left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}}\; \Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$
$$\frac{\left(i\, b - 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\, f\,(\nu-2\,k)}\Bigg)\Bigg)\Bigg) (-f\,(\nu-2\,k))^{-2\,(n+1)} + e^{\frac{b^2}{4\, f\,(\nu-2\,k)} - i\, e + \frac{i\,\pi\,\nu}{2} + g\,(\nu-2\,k)}\, (f\,(\nu-2\,k))^{-2\,(n+1)}$$
$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\,n} \left(-i\, b + 2\, f\,(\nu-2\,k)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-i\, b + 2\, f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2 f (v-2k)\sqrt{-\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)-\right.$$

$$\left.i b\left(-i b+2 f (v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)\right)-$$

$$e^{\frac{b^2}{4 f (v-2k)}+i e+\frac{i \pi v}{2}+g (v-2k)} (f (v-2k))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b+2 f (v-2k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\, i\left(i b+2 f (v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)+2 f (v-2k)\right.$$

$$\left.\left.\sqrt{-\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)\right)\right) /; n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z) \sinh^v(f z + g)$

01.19.21.2826.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh^\nu(g + f z)\, dz = -i^{1-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((-i b)^{-n-1} e^{\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right) - (i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right)\right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + f (\nu - 2 k))^2}{4 b} + \frac{1}{2} i \pi (\nu+1) + g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f (\nu - 2 k))^{n-j} (-i d + f (\nu - 2 k) - 2 i b z)^{j+1} \left(-\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + \right.$$

$$e^{-\frac{i (-i d - f (\nu - 2 k))^2}{4 b} + \frac{1}{2} i \pi (1-\nu) - g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f (\nu - 2 k))^{n-j} (-i d - f (\nu - 2 k) - 2 i b z)^{j+1} \left(-\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{i (i d + f (\nu - 2 k))^2}{4 b} + \frac{1}{2} i \pi (\nu-1) + g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d - f (\nu - 2 k))^{n-j} (i d + f (\nu - 2 k) + 2 i b z)^{j+1} \left(\frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{4 b}\right) +$$

$$\left.(i b)^{-n-1} e^{\frac{i (i d - f (\nu - 2 k))^2}{4 b} - \frac{1}{2} i \pi (\nu+1) - g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d + f (\nu - 2 k))^{n-j} (i d - f (\nu - 2 k) + 2 i b z)^{j+1} \left(\frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{4 b}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2827.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z)\, dz =$$

$$(-1)^{n-1} 2^{-2 n - \nu - 2} i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b - 2 i d \sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(-i b\left(-i b-2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left.2 i d \sqrt{-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)-$$

$$e^{-\frac{i b^2}{4 d}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b)^{-h-j+2 n}\left(i b+2 i d \sqrt{z}\right)^{h+j}\left(\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b i\left(i b+2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.\left.2 \sqrt{\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}}\; d i \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)\right) d^{-2(n+1)}+2^{-2 n-v-2} i^{-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{b^2}{4(-i d+f(v-2 k))}+\frac{1}{2} i \pi(v+1)+g(v-2 k)}\left(\sum_{j=0}^n \sum_{h=0}^j(-1)^{j-h} 4^j(-i b)^{-h-j+2 n}\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{-i d+f(v-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2(-i d+f(v-2 k))\right.$$

$$\sqrt{-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{-i d+f(v-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{4(-i d+f(v-2 k))}\right)-$$

$$\left.\left.\left.i b\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{4(-i d+f(v-2 k))}\right)\right)\right)\right)$$

$$(-i d+f(v-2 k))^{-2(n+1)}+e^{\frac{b^2}{4(i d+f(v-2 k))}+\frac{1}{2} i \pi(v-1)+g(v-2 k)}(i d+f(v-2 k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\;(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)\right)+e^{\frac{b^2}{4(-i\,d-f\,(v-2\,k))}+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,k)}$$

$$(-i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2n}\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^2}{4(i\,d-f\,(v-2\,k))}-\frac{1}{2}\,i\,\pi\,(v+1)-g\,(v-2\,k)}\,(i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}$$

$$\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}}\;(i\,d-f\,(v-2\,k))\,\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin\left(b\,z^r+d\,z+e\right)\sinh^v(f\,z+g)$

01.19.21.2828.01

$$\int z^n \sin\left(b z^2 + d z + e\right) \sinh^\nu(f z + g)\, dz == -i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left((-i b)^{-n-1} e^{\frac{i d^2}{4 b} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right) -\right.$$

$$\left.(i b)^{-n-1} e^{i e - \frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right)\right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + f (\nu - 2 k))^2}{4 b} - i e + \frac{1}{2} i \pi (\nu+1) + g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f (\nu - 2 k))^{n-j} (-i d + f (\nu - 2 k) - 2 i b z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} +$$

$$e^{-\frac{i (-i d - f (\nu - 2 k))^2}{4 b} - i e + \frac{1}{2} i \pi (1-\nu) - g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f (\nu - 2 k))^{n-j} (-i d - f (\nu - 2 k) - 2 i b z)^{j+1}\right.$$

$$\left.\left(-\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{i (i d + f (\nu - 2 k))^2}{4 b} + i e + \frac{1}{2} i \pi (\nu-1) + g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d - f (\nu - 2 k))^{n-j} (i d + f (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left(\frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{4 b}\right) +$$

$$(i b)^{-n-1} e^{\frac{i (i d - f (\nu - 2 k))^2}{4 b} + i e - \frac{1}{2} i \pi (\nu+1) - g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d + f (\nu - 2 k))^{n-j} (i d - f (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left.\left(\frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.2829.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z + e\right) \sinh^\nu(f z + g)\, dz ==$$

$$(-1)^{n-1} 2^{-2 n-\nu-2} i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i b^2}{4 d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b - 2 i d \sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(-i b\left(-i b-2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left. 2 i d \sqrt{-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)-$$

$$e^{i e-\frac{i b^2}{4 d}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (i b)^{-h-j+2 n}\left(i b+2 i d \sqrt{z}\right)^{h+j}\left(\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(b i\left(i b+2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.\left. 2 \sqrt{\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}}\; d i \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)\right) d^{-2(n+1)}+2^{-2 n-v-2} i^{-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k \binom{v}{k}\left(e^{\frac{b^2}{4(-i d+f(v-2 k))}-i e+\frac{1}{2} i \pi(v+1)+g(v-2 k)}\left(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b)^{-h-j+2 n}\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{-i d+f(v-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(2(-i d+f(v-2 k))\right.$$

$$\sqrt{-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{-i d+f(v-2 k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{4(-i d+f(v-2 k))}\right)-$$

$$\left.\left.\left. i b\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(-i b+2(-i d+f(v-2 k)) \sqrt{z}\right)^2}{4(-i d+f(v-2 k))}\right)\right)\right)\right)$$

$$(-i d+f(v-2 k))^{-2(n+1)}+e^{\frac{b^2}{4(i d+f(v-2 k))}+i e+\frac{1}{2} i \pi(v-1)+g(v-2 k)}(i d+f(v-2 k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\;(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)\right)+e^{\frac{b^2}{4(-i\,d-f\,(v-2\,k))}-i\,e+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,k)}$$

$$(-i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2n}\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^2}{4(i\,d-f\,(v-2\,k))}+i\,e-\frac{1}{2}\,i\,\pi\,(v+1)-g\,(v-2\,k)}\,(i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}$$

$$\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)+\right.$$

$$2\sqrt{-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}}\;(i\,d-f\,(v-2\,k))\,\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b\,z)\sinh^v(c\,z^r)$

01.19.21.2830.01

$$\int z^n\sin(b\,z)\sinh^v(c\,z^2)\,dz = (-1)^n\,i^{-v}\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(i\,(-i\,b)^{-n-1}\,\Gamma(n+1,\,i\,b\,z)-i\,(i\,b)^{-n-1}\,\Gamma(n+1,\,-i\,b\,z)\right)(1-v\bmod 2)-$$

$$i^{1-v}\,2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{b^2}{4\,c\,(v-2\,s)}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,b)^{n-j}\,(-i\,b-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-i\,b-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,b-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}-e^{-\frac{b^2}{4\,c\,(v-2\,s)}-\frac{i\,\pi\,v}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,b)^{n-j}\,(i\,b-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(i\,b-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,b-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)$$

$$(-c\,(v-2\,s))^{-n-1}+e^{\frac{b^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,b)^{n-j}\,(-i\,b+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left(-\frac{(-i\,b+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,b+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)-$$

$$e^{\frac{b^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,b)^{n-j}\,(i\,b+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(i\,b+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,b+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.2831.01

$$\int z^n \sin(b\,z)\sinh^{\nu}\!\left(c\sqrt{z}\right) dz = =$$

$$(-1)^{n-1}\,2^{-2n-\nu-2}\,i^{1-\nu}\left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-e^{\frac{i c^2 (\nu-2s)^2}{4b}-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,b\sqrt{\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)-c\,(\nu-2s)\right.$$

$$\left.\left.\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right)-e^{\frac{c^2\,i\,(\nu-2s)^2}{4b}+\frac{i\pi\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(\nu-2s)\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)+2\right.$$

$$\left.\left.\sqrt{\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right)+e^{-\frac{i c^2 (\nu-2s)^2}{4b}-\frac{i\pi\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2s)\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)-2\,i\,b\right.$$

$$\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\Bigg)+e^{\frac{i\,\pi\,v}{2}-\frac{i\,c^2\,(v-2\,s)^2}{4\,b}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-2$$

$$i\,b\,\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$b^{-2\,(n+1)}+(-1)^n\,2^{-v-1}\,i^{1-v}\binom{v}{\frac{v}{2}}\left((-i\,b)^{-n-1}\,\Gamma(n+1,\,i\,b\,z)-(i\,b)^{-n-1}\,\Gamma(n+1,\,-i\,b\,z)\right)$$

$$(1-v\bmod 2)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin(d\,z+e)\sinh^v\left(c\,z^r\right)$

01.19.21.2832.01

$$\int z^n \sin(e+d\,z)\sinh^\nu\left(c\,z^2\right)dz = (-1)^n\, i^{1-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\, e^{-i\,e}\,\Gamma(n+1,\, i\,d\,z)-(i\,d)^{-n-1}\, e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{1-\nu}\, 2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2}{4c(\nu-2s)}-i\,e-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} - e^{-\frac{d^2}{4c(\nu-2s)}+i\,e-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{d^2}{4c(\nu-2s)}-i\,e+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) - e^{\frac{d^2}{4c(\nu-2s)}+i\,e+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\; n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2833.01

$$\int z^n \sin(e+d\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = (-1)^{n-1}\, 2^{-2n-\nu-2}\, i^{1-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-e^{\frac{c^2\, i\,(\nu-2s)^2}{4d}+i\,e-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,s))^{-h-j+2n}\left(-c\,(\nu-2\,s)+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\sqrt{\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-c\,(\nu-2\,s)\right.\right.\right.$$

$$\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)-e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2$$

$$\sqrt{\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,s)\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2$$

$$i\, d \sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\, -\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{-2\,(n+1)} + (-1)^n\, 2^{-v-1}\, i^{1-v} \binom{v}{\frac{v}{2}} \left((-i\,d)^{-n-1}\, e^{-i\,e}\, \Gamma(n+1,\, i\,d\,z) - (i\,d)^{-n-1}\, e^{i\,e}\, \Gamma(n+1,\, -i\,d\,z)\right)$$

$$(1 - v \bmod 2)\; /;\; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin(b\, z^r) \sinh^v(c\, z^r)$

01.19.21.2834.01

$$\int z^{\alpha-1} \sin(b\, z^r) \sinh^v(c\, z^r)\, dz =$$

$$\frac{i\, 2^{-v-1}\, z^\alpha}{r} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v\, \Gamma\!\left(\frac{\alpha}{r},\, (-i\,b-2\,c\,s+c\,v)\, z^r\right) ((-i\,b-2\,c\,s+c\,v)\, z^r)^{-\frac{\alpha}{r}} + (-1)^{v+1}\, ((i\,b-2\,c\,s+c\,v)\, z^r)^{-\frac{\alpha}{r}}\right.$$

$$\Gamma\!\left(\frac{\alpha}{r},\, (i\,b-2\,c\,s+c\,v)\, z^r\right) + ((-i\,b+2\,c\,s-c\,v)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\!\left(\frac{\alpha}{r},\, (-i\,b+2\,c\,s-c\,v)\, z^r\right) -$$

$$\left. ((i\,b+2\,c\,s-c\,v)\, z^r)^{-\frac{\alpha}{r}}\, \Gamma\!\left(\frac{\alpha}{r},\, (i\,b+2\,c\,s-c\,v)\, z^r\right)\right) -$$

$$\frac{(2\,i)^{-v-1}\, z^\alpha}{r} \binom{v}{\frac{v}{2}} \left((-i\,b\,z^r)^{-\frac{\alpha}{r}}\, \Gamma\!\left(\frac{\alpha}{r},\, -i\,b\,z^r\right) - (i\,b\,z^r)^{-\frac{\alpha}{r}}\, \Gamma\!\left(\frac{\alpha}{r},\, i\,b\,z^r\right)\right) (1 - v \bmod 2)\; /;\; v \in \mathbb{N}^+$$

01.19.21.2835.01

$$\int z^n \sin\!\left(b\, z^2\right) \sinh^v\!\left(c\, z^2\right) dz =$$

$$i\, 2^{-v-2}\, z^{n+1} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v\, \Gamma\!\left(\frac{n+1}{2},\, (-i\,b-2\,c\,s+c\,v)\, z^2\right) \left((-i\,b-2\,c\,s+c\,v)\, z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{v+1}\right.$$

$$\left((i\,b-2\,c\,s+c\,v)\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, (i\,b-2\,c\,s+c\,v)\, z^2\right) + \left((-i\,b+2\,c\,s-c\,v)\, z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\left.\Gamma\!\left(\frac{n+1}{2},\, (-i\,b+2\,c\,s-c\,v)\, z^2\right) - \left((i\,b+2\,c\,s-c\,v)\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, (i\,b+2\,c\,s-c\,v)\, z^2\right)\right) -$$

$$i^{-v-1}\, 2^{-v-2}\, z^{n+1} \binom{v}{\frac{v}{2}} \left(\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, -i\,b\,z^2\right) - \left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\!\left(\frac{n+1}{2},\, i\,b\,z^2\right)\right) (1 - v \bmod 2)\; /;\; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.19.21.2836.01

$$\int z^n \sin\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = (-1)^n 2^{-\nu} i^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(2(n+1), -i b\sqrt{z}\right)-\Gamma\left(2(n+1), i b\sqrt{z}\right)\right)(1-\nu \bmod 2)\, b^{-2(n+1)} + 2^{-\nu} i \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu \Gamma\left(2(n+1), (-i b-2cs+c\nu)\sqrt{z}\right)(-i b-2cs+c\nu)^{-2(n+1)}+(-1)^{\nu+1}(i b-2cs+c\nu)^{-2(n+1)} \Gamma\left(2(n+1), (i b-2cs+c\nu)\sqrt{z}\right)+(-i b+2cs-c\nu)^{-2(n+1)}\Gamma\left(2(n+1), (-i b+2cs-c\nu)\sqrt{z}\right)-(i b+2cs-c\nu)^{-2(n+1)}\Gamma\left(2(n+1), (i b+2cs-c\nu)\sqrt{z}\right)\right) /; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin\left(b z^r+e\right)\sinh^\nu\left(c z^r\right)$

01.19.21.2837.01

$$\int z^{\alpha-1}\sin(b z^r+e)\sinh^\nu(c z^r)\,dz = \frac{i\, 2^{-\nu-1} z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e}\Gamma\left(\frac{\alpha}{r}, (-i b-2cs+c\nu)z^r\right)((-i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}+(-1)^{\nu+1} e^{-i e}((i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i b-2cs+c\nu)z^r\right)+e^{i e}((-i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-i b+2cs-c\nu)z^r\right)-e^{-i e}((i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i b+2cs-c\nu)z^r\right)\right)-\frac{(2i)^{-\nu-1}z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}(-i b z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, -i b z^r\right)-e^{-i e}(i b z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, i b z^r\right)\right)(1-\nu \bmod 2) /; \nu\in\mathbb{N}^+$$

01.19.21.2838.01

$$\int z^n\sin\left(b z^2+e\right)\sinh^\nu\left(c z^2\right)dz = i\, 2^{-\nu-2} z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e}\Gamma\left(\frac{n+1}{2}, (-i b-2cs+c\nu)z^2\right)\left((-i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}+(-1)^{\nu+1}e^{-i e}\left((i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i b-2cs+c\nu)z^2\right)+e^{i e}\left((-i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-i b+2cs-c\nu)z^2\right)-e^{-i e}\left((i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i b+2cs-c\nu)z^2\right)\right)-i^{-\nu-1}2^{-\nu-2}z^{n+1}\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\left(-i b z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, -i b z^2\right)-e^{-i e}\left(i b z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-\nu \bmod 2) /; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.2839.01

$$\int z^n \sin\left(\sqrt{z}\; b + e\right) \sinh^\nu\left(c\sqrt{z}\right) dz = (-1)^n\, 2^{-\nu}\, i^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i\, b\sqrt{z}\right) - e^{-i e}\, \Gamma\left(2(n+1), i\, b\sqrt{z}\right)\right)(1 - \nu \bmod 2)\, b^{-2(n+1)} + 2^{-\nu}\, i \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{i e}\, \Gamma\left(2(n+1), (-i\, b - 2\, c\, s + c\, \nu)\sqrt{z}\right)(-i\, b - 2\, c\, s + c\, \nu)^{-2(n+1)} + (-1)^{\nu+1} e^{-i e}\, (i\, b - 2\, c\, s + c\, \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i\, b - 2\, c\, s + c\, \nu)\sqrt{z}\right) + e^{i e}\, (-i\, b + 2\, c\, s - c\, \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (-i\, b + 2\, c\, s - c\, \nu)\sqrt{z}\right) - e^{-i e}\, (i\, b + 2\, c\, s - c\, \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i\, b + 2\, c\, s - c\, \nu)\sqrt{z}\right)\right) /;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \sin\left(b\, z^r + d\, z\right) \sinh^\nu\left(c\, z^r\right)$

01.19.21.2840.01

$$\int z^n \sin(b z^2 + d z) \sinh^\nu(c z^2)\, dz = i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b} \right) - (-i b)^{-n-1} e^{\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b} \right) \right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi (\nu+1) \right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))} \right) \right) (-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b-2 i c k + i c \nu} - 2 \pi (\nu-1) \right)} (i b + c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))} \right) + e^{\frac{1}{4} i \left(2 \pi (1-\nu) - \frac{d^2}{-b-2 i c k + i c \nu} \right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))} \right) + e^{\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi (\nu+1) \right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))} \right) \right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.19.21.2841.01

$$\int z^n \sin(\sqrt{z}\, b + d z) \sinh^\nu(c \sqrt{z})\, dz = 2^{-2n-\nu-2} i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i d)^{-2(n+1)} \left(e^{\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 i d \sqrt{z} \right)^{h+j} \right.$$

$$\left(-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(-i b\left(-i b-2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)-\right.$$

$$\left.\left.2 i d \sqrt{-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(-i b-2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)-$$

$$e^{-\frac{i b^2}{4 d}} \sum_{j=0}^n \sum_{h=0}^j(-1)^{j-h} 4^j (i b)^{-h-j+2 n}\left(i b+2 i d \sqrt{z}\right)^{h+j}\left(\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b i\left(i b+2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.\left.2 \sqrt{\frac{i\left(i b+2 i d \sqrt{z}\right)^2}{d}}\; d i \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i b+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)\right)+$$

$$2^{-2 n-\nu-2} i^{-\nu} (i d)^{-2(n+1)} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k \binom{\nu}{k}\left(e^{\frac{i(i b+c(\nu-2 k))^2}{4 d}+\frac{1}{2} i \pi(\nu-1)} \sum_{j=0}^n \sum_{h=0}^j(-1)^{j-h} 4^j (i b+c(\nu-2 k))^{-h-j+2 n}\right.$$

$$\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right)^{h+j}\left(\frac{i\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i b+c(\nu-2 k))\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right)^2}{4 d}\right)+\right.$$

$$\left.2 \sqrt{\frac{i\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right)^2}{d}}\; d i \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i b+c(\nu-2 k)+2 i d \sqrt{z}\right)^2}{4 d}\right)\right)+$$

$$e^{\frac{i(i b-c(\nu-2 k))^2}{4 d}-\frac{1}{2} i \pi(\nu+1)} \sum_{j=0}^n \sum_{h=0}^j(-1)^{j-h} 4^j (i b-c(\nu-2 k))^{-h-j+2 n}\left(i b-c(\nu-2 k)+2 i d \sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{1}{2}i\pi(v+1)-\frac{i(-i\,b+c\,(v-2\,k))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{1}{2}i\pi(1-v)-\frac{i(-i\,b-c\,(v-2\,k))^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z + e) \sinh^\nu(c z^r)$

01.19.21.2842.01

$$\int z^n \sin(b z^2 + d z + e) \sinh^\nu(c z^2) \, dz = i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left((i b)^{-n-1} e^{i e - \frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b} \right) - \right.$$

$$\left. (-i b)^{-n-1} e^{\frac{i d^2}{4 b} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b} \right) \right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} + 4 e - 2 \pi (\nu+1) \right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1} \right. \right.$$

$$\left. \left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))} \right) \right)$$

$$(-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e - 2 \pi (\nu - 1) \right)} (i b + c (\nu - 2 k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))} \right) +$$

$$e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e + 2 \pi (1 - \nu) \right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))} \right) +$$

$$e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} + 4 e - 2 \pi (\nu + 1) \right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left. \left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2843.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu\left(c \sqrt{z}\right) dz =$$

$$2^{-2n-\nu-2}\, i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, (i\, d)^{-2(n+1)} \left(e^{\frac{i b^2}{4d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d \sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b \left(-i\, b - 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4d}\right) - \right.$$

$$\left.\left. 2\, i\, d \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4d}\right)\right)\right) -$$

$$e^{i e - \frac{i b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d\sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left(b\, i \left(i\, b + 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4d}\right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4d}\right)\right)\right) +$$

$$2^{-2n-\nu-2}\, i^{-\nu}\, (i\, d)^{-2(n+1)} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i(i b + c(\nu-2k))^2}{4d} + i e + \frac{1}{2} i \pi (\nu-1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b + c\,(\nu - 2k))^{-h-j+2n} \right.$$

$$\left(i\, b + c\,(\nu-2k) + 2\, i\, d\sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + c\,(\nu-2k) + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i\, b + c\,(\nu-2k)) \left(i\, b + c\,(\nu-2k) + 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i\, b + c\,(\nu-2k) + 2\, i\, d\sqrt{z}\right)^2}{4d}\right) + \right.$$

$$2\sqrt{\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b-c\,(v-2\,k))^2}{4\,d}+i\,e-\frac{1}{2}\,i\,\pi\,(v+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{1}{2}\,i\,\pi\,(v+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b-c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{1}{2}\,i\,\pi\,(1-v)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin(d\,z)\sinh^v(c\,z^r+g)$

01.19.21.2844.01

$$\int z^n\sin(d\,z)\sinh^v(c\,z^2+g)\,dz=$$

$$(-1)^n\,i^{1-v}\,2^{-v-1}\binom{v}{\frac{v}{2}}\left((-i\,d)^{-n-1}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)-i^{1-v}\,2^{-v-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{d^2}{4c(v-2s)}-g(v-2s)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\right.\right.\right.$$

$$\left.\left.\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}-e^{-\frac{d^2}{4c(v-2s)}-g(v-2s)-\frac{i\pi v}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)$$

$$(-c\,(v-2\,s))^{-n-1}+e^{\frac{d^2}{4c(v-2s)}+\frac{i\pi v}{2}+g(v-2s)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left(-\frac{(-i\,d+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)-$$

$$e^{\frac{d^2}{4c(v-2s)}+\frac{i\pi v}{2}+g(v-2s)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left.\left(-\frac{(i\,d+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

01.19.21.2845.01

$$\int z^n \sin(d\,z) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = (-1)^{n-1}\, 2^{-2n-\nu-2}\, i^{1-\nu}\, d^{-2(n+1)} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(-e^{\frac{c^2 i (\nu-2s)^2}{4d} - g(\nu-2s) - \frac{i\pi\nu}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c(\nu-2s))^{-h-j+2n} \left(-c(\nu-2s) + 2\,i\,d\sqrt{z}\right)^{h+j} \left(\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(2\,i\,d\sqrt{\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right) - c(\nu-2s) \left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)\right) - e^{\frac{c^2 i (\nu-2s)^2}{4d} + g(\nu-2s) + \frac{i\pi\nu}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(\nu-2s))^{-h-j+2n} \left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^{h+j} \left(\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c(\nu-2s)\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)\right) + e^{-\frac{i c^2 (\nu-2s)^2}{4d} - g(\nu-2s) - \frac{i\pi\nu}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c(\nu-2s))^{-h-j+2n} \left(-c(\nu-2s) - 2\,i\,d\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-c(\nu-2s)\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^2}{4d}\right) - \right.$$

$$2\,i\,d\,\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\,\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$(-1)^n\,2^{-v-1}\,i^{1-v}\binom{v}{\frac{v}{2}}\left((-i\,d)^{-n-1}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$(1-v \bmod 2)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z+e)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2846.01

$$\int z^n \sin(e+d\,z)\sinh^\nu\left(c\,z^2+g\right)dz = (-1)^n\,i^{1-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\,e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{1-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2}{4\,c\,(\nu-2\,s)}-i\,e-g\,(\nu-2\,s)-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} - e^{-\frac{d^2}{4\,c\,(\nu-2\,s)}+i\,e-g\,(\nu-2\,s)-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{d^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) - e^{\frac{d^2}{4\,c\,(\nu-2\,s)}+i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.2847.01

$$\int z^n \sin(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = (-1)^{n-1}\,2^{-2\,n-\nu-2}\,i^{1-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(-e^{\frac{c^2\,i\,(\nu-2\,s)^2}{4\,d}-g\,(\nu-2\,s)+i\,e-\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,s))^{-h-j+2\,n}\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,\sqrt{\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-c\,(\nu-2\,s)\right.\right.\right.$$

$$\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)+i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2\right.$$

$$\left.\sqrt{\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-g\,(v-2\,s)-i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2\,s)\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)-i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\right.$$

$$i\,d\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)$$

$$d^{-2\,(n+1)}+(-1)^n\,2^{-v-1}\,i^{1-v}\binom{v}{\frac{v}{2}}\left((-i\,d)^{-n-1}\,e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$(1-v \bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin(b\,z^r)\sinh^v(c\,z^r+g)$

01.19.21.2848.01

$$\int z^{\alpha-1}\sin(b\,z^r)\sinh^v(c\,z^r+g)\,dz ==$$

$$\frac{i\,2^{-v-1}\,z^{\alpha}}{r}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-2\,c\,s+c\,v)\,z^r\right)((-i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}+$$
$$(-1)^{v+1}\,e^{2\,g\,s-g\,v}\,((i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b-2\,c\,s+c\,v)\,z^r\right)+e^{g\,v-2\,g\,s}\,((-i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}$$
$$\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b+2\,c\,s-c\,v)\,z^r\right)-e^{g\,v-2\,g\,s}\,((i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b+2\,c\,s-c\,v)\,z^r\right)\Bigg)-$$
$$\frac{(2\,i)^{-v-1}\,z^{\alpha}}{r}\binom{v}{\frac{v}{2}}\left((-i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)-(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-v \bmod 2)\;/;\;v\in\mathbb{N}^+$$

01.19.21.2849.01

$$\int z^n\sin\left(b\,z^2\right)\sinh^v\left(c\,z^2+g\right)dz ==$$

$$i\,2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-2\,c\,s+c\,v)\,z^2\right)\left((-i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}+$$
$$(-1)^{v+1}\,e^{2\,g\,s-g\,v}\left((i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,(i\,b-2\,c\,s+c\,v)\,z^2\right)+e^{g\,v-2\,g\,s}\left((-i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\!\left(\frac{n+1}{2},\,(-i\,b+2\,c\,s-c\,v)\,z^2\right)-e^{g\,v-2\,g\,s}\left((i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,(i\,b+2\,c\,s-c\,v)\,z^2\right)\Bigg)-$$
$$i^{-v-1}\,2^{-v-2}\,z^{n+1}\binom{v}{\frac{v}{2}}\left(\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,z^2\right)-\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1-v \bmod 2)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

01.19.21.2850.01

$$\int z^n \sin\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = (-1)^n 2^{-\nu} i^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(2(n+1),-i b\sqrt{z}\right)-\Gamma\left(2(n+1),i b\sqrt{z}\right)\right)(1-\nu \bmod 2)\, b^{-2(n+1)}+2^{-\nu} i \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s} \left((-1)^\nu e^{2gs-g\nu}\,\Gamma\left(2(n+1),(-i b-2cs+c\nu)\sqrt{z}\right)(-i b-2cs+c\nu)^{-2(n+1)}+(-1)^{\nu+1} e^{2gs-g\nu}(i b-2cs+c\nu)^{-2(n+1)} \Gamma\left(2(n+1),(i b-2cs+c\nu)\sqrt{z}\right)+e^{g\nu-2gs}(-i b+2cs-c\nu)^{-2(n+1)}\,\Gamma\left(2(n+1),(-i b+2cs-c\nu)\sqrt{z}\right)- e^{g\nu-2gs}(i b+2cs-c\nu)^{-2(n+1)}\,\Gamma\left(2(n+1),(i b+2cs-c\nu)\sqrt{z}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin(b z^r+e)\sinh^\nu(c z^r+g)$

01.19.21.2851.01

$$\int z^{\alpha-1}\sin(b z^r+e)\sinh^\nu(c z^r+g)\,dz = \frac{i\,2^{-\nu-1} z^\alpha}{r}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e+2gs-g\nu}\,\Gamma\left(\frac{\alpha}{r},(-i b-2cs+c\nu)z^r\right)((-i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}+ (-1)^{\nu+1} e^{-i e+2gs-g\nu}((i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i b-2cs+c\nu)z^r\right)+e^{i e-2gs+g\nu}((-i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r},(-i b+2cs-c\nu)z^r\right)-e^{-i e-2gs+g\nu}((i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(i b+2cs-c\nu)z^r\right)\right)- \frac{(2i)^{-\nu-1} z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}(-i b z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},-i b z^r\right)-e^{-i e}(i b z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},i b z^r\right)\right)(1-\nu \bmod 2)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.2852.01

$$\int z^n \sin\left(b z^2+e\right)\sinh^\nu\left(c z^2+g\right)dz = i\,2^{-\nu-2} z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e+2gs-g\nu}\,\Gamma\left(\frac{n+1}{2},(-i b-2cs+c\nu)z^2\right)\left((-i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}+ (-1)^{\nu+1} e^{-i e+2gs-g\nu}\left((i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(i b-2cs+c\nu)z^2\right)+ e^{i e-2gs+g\nu}\left((-i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(-i b+2cs-c\nu)z^2\right)- e^{-i e-2gs+g\nu}\left((i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},(i b+2cs-c\nu)z^2\right)\right)- i^{-\nu-1} 2^{-\nu-2} z^{n+1}\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\left(-i b z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},-i b z^2\right)-e^{-i e}\left(i b z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},i b z^2\right)\right)(1-\nu \bmod 2)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.2853.01

$$\int z^n \sin\left(\sqrt{z}\, b + e\right) \sinh^v\left(\sqrt{z}\, c + g\right) dz = (-1)^n 2^{-v} i^{-v-1} \binom{v}{\frac{v}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i b \sqrt{z}\right) - e^{-i e}\, \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - v \bmod 2)\, b^{-2(n+1)} + 2^{-v} i \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^v e^{i e + 2 g s - g v}\, \Gamma\left(2(n+1), (-i b - 2 c s + c v) \sqrt{z}\right) (-i b - 2 c s + c v)^{-2(n+1)} + (-1)^{v+1} e^{-i e + 2 g s - g v} (i b - 2 c s + c v)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b - 2 c s + c v) \sqrt{z}\right) + e^{i e - 2 g s + g v} (-i b + 2 c s - c v)^{-2(n+1)}\, \Gamma\left(2(n+1), (-i b + 2 c s - c v) \sqrt{z}\right) - e^{-i e - 2 g s + g v} (i b + 2 c s - c v)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b + 2 c s - c v) \sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sin\left(b z^r + d z\right) \sinh^v\left(c z^r + g\right)$

01.19.21.2854.01

$$\int z^n \sin\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + g\right) dz = i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left((i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right) - (-i b)^{-n-1} e^{\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right)\right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi (\nu+1) + 4 g i (\nu - 2 k)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))}\right)\right) (-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 2 \pi (\nu - 1) + 4 g i (\nu - 2 k)\right)} (i b + c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} + 2 \pi (1 - \nu) + 4 g i (\nu - 2 k)\right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} - 2 \pi (\nu + 1) + 4 g i (\nu - 2 k)\right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2855.01

$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2 n-\nu-2} i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i d)^{-2(n+1)} \left(e^{\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b - 2 i d \sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.\left.2\,\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)+$$

$$2^{-2\,n-\nu-2}\,i^{-\nu}\,(i\,d)^{-2\,(n+1)}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\,(i\,b+c\,(\nu-2\,k))^2}{4\,d}+\frac{1}{2}\,i\,\pi\,(\nu-1)+g\,(\nu-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(\nu-2\,k))^{-h-j+2\,n}\right.$$

$$\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(\nu-2\,k))\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\,\sqrt{\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,(i\,b-c\,(\nu-2\,k))^2}{4\,d}-\frac{1}{2}\,i\,\pi\,(\nu+1)-g\,(\nu-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(\nu-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\,\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b+c\,(v-2\,k))^2}{4\,d}+\frac{1}{2}\,i\,\pi\,(v+1)+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\,\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b-c\,(v-2\,k))^2}{4\,d}+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b z^r + d z + e) \sinh^\nu(c z^r + g)$

01.19.21.2856.01

$$\int z^n \sin(b z^2 + d z + e) \sinh^\nu(c z^2 + g)\, dz = i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left((i b)^{-n-1} e^{i e - \frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b} \right) - \right.$$

$$\left. (-i b)^{-n-1} e^{\frac{i d^2}{4 b} - i e} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b} \right) \right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} + 4 e - 2 \pi (\nu+1) + 4 g i (\nu - 2 k) \right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1} \right. \right.$$

$$\left. \left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))} \right) \right)$$

$$(-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e - 2 \pi (\nu - 1) + 4 g i (\nu - 2 k) \right)} (i b + c (\nu - 2 k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))} \right) +$$

$$e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e + 2 \pi (1 - \nu) + 4 g i (\nu - 2 k) \right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))} \right) +$$

$$e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} + 4 e - 2 \pi (\nu + 1) + 4 g i (\nu - 2 k) \right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left. \left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2857.01

$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz ==$$

$$2^{-2n-\nu-2}\, i^{1-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i b^2}{4d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b \left(-i\, b - 2\, i\, d\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right) - \right.$$

$$\left. 2\, i\, d \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right)\right) -$$

$$e^{i e - \frac{i b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d\, \sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left(b\, i \left(i\, b + 2\, i\, d\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right) + \right.$$

$$\left.\left. 2 \sqrt{\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right)\right)\right) (i\, d)^{-2(n+1)} +$$

$$2^{-2n-\nu-2}\, i^{-\nu} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i(i b + c(\nu-2k))^2}{4d} + i e + \frac{1}{2} i \pi (\nu-1) + g(\nu-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b + c(\nu - 2k))^{-h-j+2n} \right.\right.$$

$$\left(i\, b + c(\nu-2k) + 2\, i\, d\, \sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + c(\nu-2k) + 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i\, b + c(\nu-2k)) \left(i\, b + c(\nu-2k) + 2\, i\, d\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i\, b + c(\nu-2k) + 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right) + 2 \right.$$

$$\sqrt{\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b-c\,(v-2\,k))^2}{4\,d}+i\,e-\frac{1}{2}\,i\,\pi\,(v+1)-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2$$

$$\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{1}{2}\,i\,\pi\,(v+1)+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(v-2\,k))$$

$$\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d$$

$$\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b-c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{1}{2}\,i\,\pi\,(1-v)-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)(i\,d)^{-2\,(n+1)}\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2858.01

$$\int z^n \sin(d\,z)\sinh^\nu\left(c\,z^2+f\,z\right)dz = (-1)^n\,i^{1-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+\frac{1}{2}\,i\,\pi\,(1-\nu)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+f\,(\nu-2\,s))^{n-j}\,(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-\frac{1}{2}\,i\,\pi\,(\nu+1)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+f\,(\nu-2\,s))^{n-j}\,(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{1}{2}\,i\,\pi\,(\nu+1)-\frac{(-i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(\nu-2\,s))^{n-j}\,(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{\frac{1}{2}\,i\,\pi\,(\nu-1)-\frac{(i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(\nu-2\,s))^{n-j}\,(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2859.01

$$\int z^n \sin(d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z\right)dz = (-1)^n\,i^{1-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2)+i^{-\nu}\,2^{-2\,n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{1}{2}\,i\,\pi\,(\nu+1)-\frac{c^2\,(\nu-2\,s)^2}{4\,(-i\,d+f\,(\nu-2\,s))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,s))^{-h-j+2\,n}\left(c\,(\nu-2\,s)+2\,(-i\,d+f\,(\nu-2\,s))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}}$$

$$\left.\left.(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)\right)\right)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{1}{2}\,i\,\pi\,(v-1)-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d+f\,(v-2\,s))}}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}}$$

$$\left.(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)\right)+$$

$$e^{\frac{1}{2}\,i\,\pi\,(1-v)-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d-f\,(v-2\,s))}}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d-f\,(v-2\,s))}-\frac{1}{2}\,i\,\pi\,(v+1)}\,(i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}\;-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z+e)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2860.01

$$\int z^n \sin(e + d\,z) \sinh^\nu\!\left(c\,z^2 + f\,z\right) dz = (-1)^n\, i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-i\,d)^{-n-1}\, e^{-i\,e}\, \Gamma(n+1,\, i\,d\,z) - (i\,d)^{-n-1}\, e^{i\,e}\, \Gamma(n+1,\, -i\,d\,z)\right)(1 - \nu \bmod 2) - i^{-\nu}\, 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{\frac{(-i\,d - f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} - i\,e + \frac{1}{2}\,i\,\pi\,(1-\nu)} \left(\sum_{j=0}^{n} 2^{j-n}\, (i\,d + f\,(\nu-2\,s))^{n-j}\, (-i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{(-i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{(-i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) (-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(i\,d - f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} + i\,e - \frac{1}{2}\,i\,\pi\,(\nu+1)} \left(\sum_{j=0}^{n} 2^{j-n}\, (-i\,d + f\,(\nu-2\,s))^{n-j}\, (i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^{j+1} \left(\frac{(i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, \frac{(i\,d - f\,(\nu-2\,s) - 2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) (-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{(-i\,d + f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} - i\,e + \frac{1}{2}\,i\,\pi\,(\nu+1)}\, (c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\,d - f\,(\nu-2\,s))^{n-j}\, (-i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{(-i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, -\frac{(-i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{(i\,d + f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)} + i\,e + \frac{1}{2}\,i\,\pi\,(\nu-1)}\, (c\,(\nu-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\,d - f\,(\nu-2\,s))^{n-j}\, (i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^{j+1} \left(-\frac{(i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\, \Gamma\!\left(\frac{j+1}{2},\, -\frac{(i\,d + f\,(\nu-2\,s) + 2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\Bigg) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2861.01

$$\int z^n \sin(d\,z + e) \sinh^\nu\!\left(\sqrt{z}\;c + f\,z\right) dz = (-1)^n\, i^{1-\nu}\, 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-i\,d)^{-n-1}\, e^{-i\,e}\, \Gamma(n+1,\, i\,d\,z) - (i\,d)^{-n-1}\, e^{i\,e}\, \Gamma(n+1,\, -i\,d\,z)\right)(1 - \nu \bmod 2) + i^{-\nu}\, 2^{-2\,n-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{-\frac{c^2\,(\nu-2\,s)^2}{4\,(-i\,d + f\,(\nu-2\,s))} - i\,e + \frac{1}{2}\,i\,\pi\,(\nu+1)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(\nu-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}}$$

$$\left.\left.(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)\right)\right)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d+f\,(v-2\,s))}+i\,e+\frac{1}{2}\,i\,\pi\,(v-1)}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}}$$

$$\left.(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d-f\,(v-2\,s))}-i\,e+\frac{1}{2}\,i\,\pi\,(1-v)}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(i\,d-f\,(v-2s))}+i\,e-\frac{1}{2}i\,\pi\,(v+1)}\left(i\,d-f\,(v-2\,s)\right)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-c\,(v-2\,s)\right)^{-h-j+2\,n}$$

$$\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\Bigg($$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r\right)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2862.01

$$\int z^n \sin\left(b z^2\right) \sinh^\nu\left(c z^2 + f z\right) dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(-i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{-i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{4(-i b + c(\nu-2s))}\right)\right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} + 2\pi(\nu-1)\right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{4(i b + c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} - 2\pi(1-\nu)\right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{-i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b - c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} - 2\pi(\nu+1)\right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(i b - c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2863.01

$$\int z^n \sin\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), i b \sqrt{z}\right) - \Gamma\left(2(n+1), -i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f(\nu-2s)} + \frac{1}{2} i \pi (1-\nu)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n}\right.$$

$$\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,s))\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\sqrt{\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{\frac{(i\,b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-\frac{1}{2}\,i\,\pi\,(v+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b-c\,(v-2\,s))\left(i\,b-c\,(v-2\,s)-\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v+1)-\frac{(-i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b+c\,(v-2\,s))\right.$$

$$\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\, f\,(v-2\,s)\sqrt{-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v-1)-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin\left(b\,z^r+e\right)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.2864.01

$$\int z^n \sin(b z^2 + e) \sinh^\nu(c z^2 + f z) \, dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} (-i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - e^{-i e} (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right) \right) (1 - \nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 e - 2\pi(\nu+1) \right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{-i b + c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{4(-i b + c(\nu-2s))} \right) \right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} + 4 e + 2\pi(\nu-1) \right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{i b + c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{4(i b + c(\nu-2s))} \right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} + 4 e - 2\pi(1-\nu) \right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{-i b - c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b - c(\nu-2s))} \right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 e - 2\pi(\nu+1) \right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{i b - c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(i b - c(\nu-2s))} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2865.01

$$\int z^n \sin(\sqrt{z}\, b + e) \sinh^\nu(\sqrt{z}\, c + f z) \, dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i e} \Gamma(2(n+1), i b \sqrt{z}) - e^{i e} \Gamma(2(n+1), -i b \sqrt{z}) \right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f(\nu-2s)} - i e + \frac{1}{2} i \pi (1-\nu)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n} \right.$$

$$\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\, b - c\,(v-2\,s))\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) - 2\, f\,(v-2\,s)\sqrt{\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right) +$$

$$e^{\frac{(i\, b - c\,(v-2\,s))^2}{4\, f\,(v-2\,s)} + i\, e - \frac{1}{2}\, i\,\pi\,(v+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b - c\,(v-2\,s))^{-h-j+2\,n} \left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\, b - c\,(v-2\,s))\left(i\, b - c\,(v-2\,s) - \right.\right.$$

$$\left. 2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) - 2\, f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right) +$$

$$e^{-\frac{(-i\, b + c\,(v-2\,s))^2}{4\, f\,(v-2\,s)} - i\, e + \frac{1}{2}\, i\,\pi\,(v+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b + c\,(v-2\,s))^{-h-j+2\,n} \left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-i\, b + c\,(v-2\,s))\right.$$

$$\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) +$$

$$2\,f\,(v-2\,s)\sqrt{-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$
$$\left.\left.-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$
$$e^{-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e+\frac{1}{2}\,i\,\pi\,(v-1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$
$$\left(-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.\right.$$
$$\left.-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$
$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+d\,z\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\sin\left(b\,z^2+d\,z\right)\sinh^v\left(c\,z^2+f\,z\right)dz = -i^{v+1}\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\left((-i\,b)^{-n-1}\,e^{\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}\,(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)-\right.$$
$$\left.(i\,b)^{-n-1}\,e^{-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}\,(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\right)-$$
$$2^{-v-2}\,i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\,(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\right.\right.$$

$$\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{4\,(-i\,b+c\,(2\,s-v))}\right)\Bigg)(-i\,b+c\,(2\,s-v))^{-n-1}-$$

$$(-1)^v\,e^{-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}}\,(i\,b+c\,(2\,s-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(2\,s-v))^{n-j}\,(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^{j+1}$$

$$\left(-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{4\,(i\,b+c\,(2\,s-v))}\right)+$$

$$e^{-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))}}\,(-i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(v-2\,s))^{n-j}\,(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{-i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{4\,(-i\,b+c\,(v-2\,s))}\right)-$$

$$e^{-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))}}\,(i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(v-2\,s))^{n-j}\,(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{4\,(i\,b+c\,(v-2\,s))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

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$$\int z^n\sin\!\left(\sqrt{z}\;b+d\,z\right)\sinh^v\!\left(\sqrt{z}\;c+f\,z\right)dz=$$

$$i^{v+1}\,(-1)^{n-1}\,2^{-2\,n-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\,d^{-2\,n-2}\left(e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\,\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\Bigg)\Bigg)+$$

$$2^{-2\,n-v-2}\,i\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{-\frac{(-i\,b+c\,(2\,k-v))^2}{4\,(-i\,d+f\,(2\,k-v))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-v))^{-h-j+2\,n}\left(-i\,b+c\,(2\,k-v)+\right.\right.\right.$$

$$\left.2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b+c\,(2\,k-v))\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-v))}\right)+2$$

$$(-i\,d+f\,(2\,k-v))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-v))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-v)}}\right)\right)(-i\,d+f\,(2\,k-v))^{-2\,n-2}-$$

$$(-1)^{v}\, e^{-\frac{(i\, b+c\,(2\,k-v))^2}{4\,(i\, d+f\,(2\,k-v))}}\,(i\, d+f\,(2\,k-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\, b+c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\, d+f\,(2\,k-v)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i\, b+c\,(2\,k-v))\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\, d+f\,(2\,k-v))}\Bigg)+$$

$$2\sqrt{-\frac{\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\, d+f\,(2\,k-v)}}\;(i\, d+f\,(2\,k-v))\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(i\, b+c\,(2\,k-v)+2\,(i\, d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\, d+f\,(2\,k-v))}\Bigg)\Bigg)+e^{-\frac{(-i\, b+c\,(v-2\,k))^2}{4\,(-i\, d+f\,(v-2\,k))}}\,(-i\, d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-i\, b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\, b+c\,(v-2\,k)+2\,(-i\, d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b+c\,(v-2\,k)+2\,(-i\, d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\, d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\, b+c\,(v-2\,k))\left(-i\, b+c\,(v-2\,k)+2\,(-i\, d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\, b+c\,(v-2\,k)+2\,(-i\, d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\, d+f\,(v-2\,k))}\Bigg)+$$

$$2\,(-i\, d+f\,(v-2\,k))\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\, b+c\,(v-2\,k)+2\,(-i\, d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\, d+f\,(v-2\,k))}\Bigg)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\Bigg)-e^{-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\sin\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\sin\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z\right)dz = -i^{v+1}\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\Bigg((-i\,b)^{-n-1}\,e^{\frac{i\,d^2}{4\,b}-i\,e}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)-$$

$$(i\,b)^{-n-1}\,e^{i\,e-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\Bigg)-$$

$$2^{-v-2}\,i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}-i\,e}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\,(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}$$

$$\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\, d + f\,(2\, s - v) + 2\,(-i\, b + c\,(2\, s - v))\, z)^2}{4\,(-i\, b + c\,(2\, s - v))}\right)\Bigg)(-i\, b + c\,(2\, s - v))^{-n-1} -$$

$$(-1)^v\, e^{i\, e - \frac{(i\, d + f\,(2\, s - v))^2}{4\,(i\, b + c\,(2\, s - v))}}\,(i\, b + c\,(2\, s - v))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\, d - f\,(2\, s - v))^{n-j}$$

$$(i\, d + f\,(2\, s - v) + 2\,(i\, b + c\,(2\, s - v))\, z)^{j+1} \left(-\frac{(i\, d + f\,(2\, s - v) + 2\,(i\, b + c\,(2\, s - v))\, z)^2}{i\, b + c\,(2\, s - v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, -\frac{(i\, d + f\,(2\, s - v) + 2\,(i\, b + c\,(2\, s - v))\, z)^2}{4\,(i\, b + c\,(2\, s - v))}\right) +$$

$$e^{-\frac{(-i\, d + f\,(v - 2\, s))^2}{4\,(-i\, b + c\,(v - 2\, s))} - i\, e}\,(-i\, b + c\,(v - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\, d - f\,(v - 2\, s))^{n-j}\,(-i\, d + f\,(v - 2\, s) + 2\,(-i\, b + c\,(v - 2\, s))\, z)^{j+1}$$

$$\left(-\frac{(-i\, d + f\,(v - 2\, s) + 2\,(-i\, b + c\,(v - 2\, s))\, z)^2}{-i\, b + c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\, d + f\,(v - 2\, s) + 2\,(-i\, b + c\,(v - 2\, s))\, z)^2}{4\,(-i\, b + c\,(v - 2\, s))}\right) -$$

$$e^{i\, e - \frac{(i\, d + f\,(v - 2\, s))^2}{4\,(i\, b + c\,(v - 2\, s))}}\,(i\, b + c\,(v - 2\, s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\, d - f\,(v - 2\, s))^{n-j}\,(i\, d + f\,(v - 2\, s) + 2\,(i\, b + c\,(v - 2\, s))\, z)^{j+1}$$

$$\left(-\frac{(i\, d + f\,(v - 2\, s) + 2\,(i\, b + c\,(v - 2\, s))\, z)^2}{i\, b + c\,(v - 2\, s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(i\, d + f\,(v - 2\, s) + 2\,(i\, b + c\,(v - 2\, s))\, z)^2}{4\,(i\, b + c\,(v - 2\, s))}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \sin\left(\sqrt{z}\, b + d\, z + e\right) \sinh^v\left(\sqrt{z}\, c + f\, z\right) dz =$$

$$i^{v+1}\,(-1)^{n-1}\, 2^{-2\,n-v-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, d^{-2\,n-2} \Bigg(e^{\frac{i\, b^2}{4\, d} - i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\,n} \left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-i\, b\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h + j + 1), -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right) -$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{i\,e-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-2\,n-\nu-2}\,i\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}-i\,e}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}-$$

$$(-1)^{v} e^{i e-\frac{(i b+c(2k-v))^2}{4(i d+f(2k-v))}} (i d+f(2k-v))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^{j} (i b+c(2k-v))^{-h-j+2n}$$

$$\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^{h+j} \left(-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{i d+f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i b+c(2k-v))\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{4(i d+f(2k-v))}\Bigg)+$$

$$2\sqrt{-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{i d+f(2k-v)}}\ (i d+f(2k-v))\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{4(i d+f(2k-v))}\Bigg)\Bigg)+e^{-\frac{(-i b+c(v-2k))^2}{4(-i d+f(v-2k))}-i e} (-i d+f(v-2k))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^{j} (-i b+c(v-2k))^{-h-j+2n} \left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{-i d+f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i b+c(v-2k))\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{4(-i d+f(v-2k))}\Bigg)+$$

$$2(-i d+f(v-2k))\Gamma\Bigg(\frac{1}{2}(h+j+2), -\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{4(-i d+f(v-2k))}\Bigg)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\Bigg)-e^{i\,e-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin(d\,z)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin(d z) \sinh^\nu(c z^2 + f z + g)\, dz = (-1)^n i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-i d)^{-n-1} \Gamma(n+1, i d z) - (i d)^{-n-1} \Gamma(n+1, -i d z)\right)(1 - \nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(-i d - f(\nu-2s))^2}{4c(\nu-2s)} + \frac{1}{2} i \pi (1-\nu) - g(\nu-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f(\nu-2s))^{n-j} (-i d - f(\nu-2s) - 2c(\nu-2s) z)^{j+1} \left(\frac{(-i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{4c(\nu-2s)} \right) \right) (-c(\nu-2s))^{-n-1} + e^{\frac{(i d - f(\nu-2s))^2}{4c(\nu-2s)} - \frac{1}{2} i \pi (\nu+1) - g(\nu-2s)} \left(\sum_{j=0}^{n} 2^{j-n} (-i d + f(\nu-2s))^{n-j} (i d - f(\nu-2s) - 2c(\nu-2s) z)^{j+1} \left(\frac{(i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{4c(\nu-2s)} \right) \right) (-c(\nu-2s))^{-n-1} + e^{-\frac{(-i d + f(\nu-2s))^2}{4c(\nu-2s)} + \frac{1}{2} i \pi (\nu+1) + g(\nu-2s)} (c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d - f(\nu-2s))^{n-j} (-i d + f(\nu-2s) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(-i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{4c(\nu-2s)} \right) + e^{-\frac{(i d + f(\nu-2s))^2}{4c(\nu-2s)} + \frac{1}{2} i \pi (\nu-1) + g(\nu-2s)} (c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d - f(\nu-2s))^{n-j} (i d + f(\nu-2s) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{4c(\nu-2s)} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin(d z) \sinh^\nu(\sqrt{z}\, c + f z + g)\, dz = (-1)^n i^{1-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-i d)^{-n-1} \Gamma(n+1, i d z) - (i d)^{-n-1} \Gamma(n+1, -i d z)\right)(1 - \nu \bmod 2) + i^{-\nu} 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2(\nu-2s)^2}{4(-i d + f(\nu-2s))} + g(\nu-2s) + \frac{1}{2} i \pi (\nu+1)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2s))^{-h-j+2n} \right.\right.$$

$$\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\Bigg)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}}$$

$$(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)\Bigg)\Bigg)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(v-1)}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\Bigg)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}}$$

$$(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d-f\,(v-2\,s))}-g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(1-v)}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(i\,d-f\,(v-2\,s))}-g\,(v-2\,s)-\frac{1}{2}i\,\pi\,(v+1)}\left(i\,d-f\,(v-2\,s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-c\,(v-2\,s)\right)^{-h-j+2n}$$

$$\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \sin(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \sin(e+d\,z)\sinh^\nu\left(c\,z^2+f\,z+g\right)dz = (-1)^n\, i^{1-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\,e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{1}{2}\,i\,\pi\,(1-\nu)-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+f\,(\nu-2\,s))^{n-j}\,(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e-\frac{1}{2}\,i\,\pi\,(\nu+1)-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+f\,(\nu-2\,s))^{n-j}\,(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{(-i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{1}{2}\,i\,\pi\,(\nu+1)+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(\nu-2\,s))^{n-j}\,(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{(i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e+\frac{1}{2}\,i\,\pi\,(\nu-1)+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(\nu-2\,s))^{n-j}\,(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.2873.01

$$\int z^n \sin(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+f\,z+g\right)dz = (-1)^n\, i^{1-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left((-i\,d)^{-n-1}\,e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)-(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) +$$

$$i^{-v}\, 2^{-2n-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{c^2 (v-2s)^2}{4(-i d + f (v-2s))} + g (v-2s) - i e + \frac{1}{2} i \pi (v+1)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c (v-2s))^{-h-j+2n} \right.\right.$$

$$\left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right)^2}{-i d + f (v-2s)} \right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(c (v-2s) \left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \right.\right.$$

$$\left.\left. -\frac{\left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right)^2}{4(-i d + f (v-2s))} \right) + 2 \sqrt{-\frac{\left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right)^2}{-i d + f (v-2s)}}$$

$$\left.\left.\left. (-i d + f (v-2s))\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(c (v-2s) + 2 (-i d + f (v-2s)) \sqrt{z}\right)^2}{4(-i d + f (v-2s))} \right) \right)\right)\right)$$

$$(-i d + f (v-2s))^{-2(n+1)} + e^{-\frac{c^2 (v-2s)^2}{4(i d + f (v-2s))} + g (v-2s) + i e + \frac{1}{2} i \pi (v-1)}\, (i d + f (v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c (v-2s))^{-h-j+2n} \left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right)^2}{i d + f (v-2s)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(c (v-2s) \left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \right.\right.$$

$$\left. -\frac{\left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right)^2}{4(i d + f (v-2s))} \right) + 2 \sqrt{-\frac{\left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right)^2}{i d + f (v-2s)}}$$

$$\left. (i d + f (v-2s))\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(c (v-2s) + 2 (i d + f (v-2s)) \sqrt{z}\right)^2}{4(i d + f (v-2s))} \right) \right) +$$

$$e^{-\frac{c^2 (v-2s)^2}{4(-i d - f(v-2s))} - g(v-2s) - i e + \frac{1}{2} i \pi (1-v)} (-i d - f(v-2s))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2s))^{-h-j+2n}$$

$$\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^{h+j} \left(-\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{-i d - f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-i d - f(v-2s))\sqrt{-\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{-i d - f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(-i d - f(v-2s))}\right) - c(v-2s)\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1), -\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(-i d - f(v-2s))}\right)\right) +$$

$$e^{-\frac{c^2 (v-2s)^2}{4(i d - f(v-2s))} - g(v-2s) + i e - \frac{1}{2} i \pi (v+1)} (i d - f(v-2s))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2s))^{-h-j+2n}$$

$$\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^{h+j} \left(-\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d - f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(i d - f(v-2s))\sqrt{-\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d - f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d - f(v-2s))}\right) - c(v-2s)\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1), -\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d - f(v-2s))}\right)\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sin(b z^r) \sinh^v(c z^r + f z + g)$

01.19.21.2874.01

$$\int z^n \sin\left(b z^2\right) \sinh^\nu\left(c z^2 + f z + g\right) dz = i^{1-\nu} 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left(-i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i (\nu-2s) - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{-i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{4(-i b + c(\nu-2s))}\right)\right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g (\nu-2s) + 2\pi(\nu-1)\right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{4(i b + c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g (\nu-2s) - 2\pi(1-\nu)\right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{-i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b - c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i (\nu-2s) - 2\pi(\nu+1)\right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(i b - c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2875.01

$$\int z^n \sin\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + f z + g\right) dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), i b \sqrt{z}\right) - \Gamma\left(2(n+1), -i b \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f(\nu-2s)} + \frac{1}{2} i \pi (1-\nu) - g(\nu-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n}\right.$$

$$\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\, b - c\,(v-2\,s))\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2\,f\,(v-2\,s)\sqrt{\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right) +$$

$$e^{\frac{(i\,b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - \frac{1}{2}\,i\,\pi\,(v+1) - g\,(v-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\, b - c\,(v-2\,s))^{-h-j+2\,n}\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\, b - c\,(v-2\,s))\left(i\, b - c\,(v-2\,s) -\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2\,f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right) +$$

$$e^{-\frac{(-i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} + \frac{1}{2}\,i\,\pi\,(v+1) + g\,(v-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\, b + c\,(v-2\,s))^{-h-j+2\,n}\left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-i\, b + c\,(v-2\,s))\right.$$

$$\left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) +$$

$$2\, f\,(v-2\,s)\sqrt{-\frac{\left(-i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(v-1)+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)+2\, f\,(v-2\,s)\sqrt{-\frac{\left(i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\, b+c\,(v-2\,s)+2\, f\,(v-2\,s)\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin\left(b\, z^r+e\right) \sinh^v\left(c\, z^r+f\, z+g\right)$

01.19.21.2876.01

$$\int z^n \sin\left(b z^2+e\right) \sinh^\nu\left(c z^2+f z+g\right) dz = i^{1-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} z^{n+1} \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) - e^{-i e} z^{n+1} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1-\nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i (\nu-2s) + 4 e - 2\pi(\nu+1)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(-i b+c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s)+2(-i b+c(\nu-2s)) z)^2}{-i b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(-i b+c(\nu-2s)) z)^2}{4(-i b+c(\nu-2s))}\right)\right) (-i b+c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g(\nu-2s) + 4 e + 2\pi(\nu-1)\right)} (i b+c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(i b+c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s)+2(i b+c(\nu-2s)) z)^2}{i b+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(i b+c(\nu-2s)) z)^2}{4(i b+c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g(\nu-2s) + 4 e - 2\pi(1-\nu)\right)} (-i b-c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b-c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b-c(\nu-2s)) z - f(\nu-2s))^2}{-i b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b-c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b-c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i(\nu-2s) + 4 e - 2\pi(\nu+1)\right)} (i b-c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b-c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b-c(\nu-2s)) z - f(\nu-2s))^2}{i b-c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b-c(\nu-2s)) z - f(\nu-2s))^2}{4(i b-c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2877.01

$$\int z^n \sin\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+f z+g\right) dz = (-1)^n i (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{-i e} \Gamma\left(2(n+1), i b \sqrt{z}\right) - e^{i e} \Gamma\left(2(n+1), -i b \sqrt{z}\right)\right) (1-\nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b-c(\nu-2s))^2}{4 f(\nu-2s)} - i e + \frac{1}{2} i \pi(1-\nu) - g(\nu-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b-c(\nu-2s))^{-h-j+2n}\right.$$

$$\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(\left(-i\, b - c\,(v-2\,s)\right)\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg) - 2\,f\,(v-2\,s)\sqrt{\frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(-i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\Bigg) +$$

$$e^{\frac{(i\, b - c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} + i\, e - \frac{1}{2}\,i\,\pi\,(v+1) - g\,(v-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\,4^j\,(i\, b - c\,(v-2\,s))^{-h-j+2\,n} \left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(\left(i\, b - c\,(v-2\,s)\right)\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$\frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg) - 2\,f\,(v-2\,s)\sqrt{\frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\, \frac{\left(i\, b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg) + e^{-\frac{(-i\, b + c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - i\, e + \frac{1}{2}\,i\,\pi\,(v+1) + g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\,4^j\,(-i\, b + c\,(v-2\,s))^{-h-j+2\,n} \left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(\left(-i\, b + c\,(v-2\,s)\right)$$

$$\left(-i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(-i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v - 2\,s)}\right) +$$

$$2\, f\,(v - 2\,s)\sqrt{-\frac{\left(-i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{f\,(v - 2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h + j + 2),\right.$$

$$\left.\left. -\frac{\left(-i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v - 2\,s)}\right)\right)\right) + e^{-\frac{(i\,b + c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} + i\,e + \frac{1}{2}\,i\,\pi\,(v-1) + g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\, b + c\,(v - 2\,s))^{-h-j+2\,n}\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{f\,(v - 2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\, b + c\,(v - 2\,s))\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h + j + 1),\right.\right.$$

$$\left. -\frac{\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v - 2\,s)}\right) + 2\, f\,(v - 2\,s)\sqrt{-\frac{\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{f\,(v - 2\,s)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h + j + 2), -\frac{\left(i\, b + c\,(v - 2\,s) + 2\, f\,(v - 2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v - 2\,s)}\right)\right)\right) /;\, n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \sin(b\, z^r + d\, z) \sinh^v(c\, z^r + f\, z + g)$

01.19.21.2878.01

$$\int z^n \sin\!\left(b\, z^2 + d\, z\right) \sinh^v\!\left(c\, z^2 + f\, z + g\right) dz = -i^{v+1}\, 2^{-v-2}\binom{v}{\frac{v}{2}}(1 - v \bmod 2)$$

$$\left((-i\, b)^{-n-1}\, e^{\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n} 2^{j-n}\,(i\, d)^{n-j}\,(-i\, d - 2\, i\, b\, z)^{j+1}\left(-\frac{i\,(-i\, d - 2\, i\, b\, z)^2}{b}\right)^{\frac{1}{2}\,(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, -\frac{i\,(-i\, d - 2\, i\, b\, z)^2}{4\, b}\right) -\right.$$

$$(i\, b)^{-n-1}\, e^{-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n} 2^{j-n}\,(-i\, d)^{n-j}\,(i\, d + 2\, i\, b\, z)^{j+1}\left(\frac{i\,(i\, d + 2\, i\, b\, z)^2}{b}\right)^{\frac{1}{2}\,(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, \frac{i\,(i\, d + 2\, i\, b\, z)^2}{4\, b}\right)\right) -$$

$$2^{-v-2} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg((-1)^v e^{-\frac{(-i d+f(2s-v))^2}{4(-i b+c(2s-v))}+g(2s-v)+\frac{i\pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d - f(2s-v))^{n-j}$$

$$(-i d + f(2s-v) + 2(-i b + c(2s-v)) z)^{j+1} \left(-\frac{(-i d + f(2s-v) + 2(-i b + c(2s-v)) z)^2}{-i b + c(2s-v)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + f(2s-v) + 2(-i b + c(2s-v)) z)^2}{4(-i b + c(2s-v))} \right) \Bigg) (-i b + c(2s-v))^{-n-1} +$$

$$(-1)^v e^{-\frac{(i d+f(2s-v))^2}{4(i b+c(2s-v))}+g(2s-v)-\frac{i\pi}{2}} (i b + c(2s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d - f(2s-v))^{n-j}$$

$$(i d + f(2s-v) + 2(i b + c(2s-v)) z)^{j+1} \left(-\frac{(i d + f(2s-v) + 2(i b + c(2s-v)) z)^2}{i b + c(2s-v)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + f(2s-v) + 2(i b + c(2s-v)) z)^2}{4(i b + c(2s-v))} \right) +$$

$$e^{-\frac{(-i d+f(v-2s))^2}{4(-i b+c(v-2s))}+g(v-2s)+\frac{i\pi}{2}} (-i b + c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d - f(v-2s))^{n-j}$$

$$(-i d + f(v-2s) + 2(-i b + c(v-2s)) z)^{j+1} \left(-\frac{(-i d + f(v-2s) + 2(-i b + c(v-2s)) z)^2}{-i b + c(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + f(v-2s) + 2(-i b + c(v-2s)) z)^2}{4(-i b + c(v-2s))} \right) +$$

$$e^{-\frac{(i d+f(v-2s))^2}{4(i b+c(v-2s))}+g(v-2s)-\frac{i\pi}{2}} (i b + c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d - f(v-2s))^{n-j}$$

$$(i d + f(v-2s) + 2(i b + c(v-2s)) z)^{j+1} \left(-\frac{(i d + f(v-2s) + 2(i b + c(v-2s)) z)^2}{i b + c(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + f(v-2s) + 2(i b + c(v-2s)) z)^2}{4(i b + c(v-2s))} \right) \Bigg) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \sin\left(\sqrt{z}\, b + d z\right) \sinh^v\left(\sqrt{z}\, c + f z + g\right) dz =$$

$$i^{v+1} (-1)^{n-1} 2^{-2n-v-2} d^{-2n-2} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \Bigg(e^{\frac{i b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 i d \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)-$$

$$e^{-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\left(i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.\left.\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\right)+$$

$$2^{-2\,n-v-2}\,i\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{g\,(2\,k-v)-\frac{(-i\,b+c\,(2\,k-v))^2}{4\,(-i\,d+f\,(2\,k-v))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-v))^{-h-j+2\,n}\left(-i\,b+c\,(2\,k-v)+\right.\right.\right.$$

$$\left.2\,(-i\,d+f\,(2\,k-v))\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b+c\,(2\,k-v))\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-v))}\right)+2$$

$$(-i\,d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-v))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-v)+2\,(-i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-v)}}\Bigg)\Bigg)$$

$$(-i\,d+f\,(2\,k-v))^{-2\,n-2}-(-1)^v\,e^{g\,(2\,k-v)-\frac{(i\,b+c\,(2\,k-v))^2}{4\,(i\,d+f\,(2\,k-v))}}\,(i\,d+f\,(2\,k-v))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(2\,k-v))^{-h-j+2\,n}\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(2\,k-v))\left(i\,b+c\,(2\,k-v)+\right.$$

$$\left.2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-v))}\right)+$$

$$2\sqrt{-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-v)}}\,(i\,d+f\,(2\,k-v))\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-v))}\Bigg)\Bigg)+e^{g\,(v-2\,k)-\frac{(-i\,b+c\,(v-2\,k))^2}{4\,(-i\,d+f\,(v-2\,k))}}\,(-i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\Bigg)+$$

$$2\,(-i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\right)-e^{g\,(v-2\,k)-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin(b\,z^r+d\,z+e)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n\sin\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z+g\right)dz=-i^{v+1}\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left((-i\,b)^{-n-1}\,e^{\frac{i\,d^2}{4\,b}-i\,e}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)-\right.$$

$$\left.(i\,b)^{-n-1}\,e^{i\,e-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\right)-$$

$$2^{-v-2}\,i\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}-i\,e+g\,(2\,s-v)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\right.\right.$$

$$(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{4\,(-i\,b+c\,(2\,s-v))}\right)\Bigg)(-i\,b+c\,(2\,s-v))^{-n-1} -$$

$$(-1)^v\, e^{-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}+i\,e+g\,(2\,s-v)}\,(i\,b+c\,(2\,s-v))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d-f\,(2\,s-v))^{n-j}$$

$$(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^{j+1}\left(-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{4\,(i\,b+c\,(2\,s-v))}\right)+$$

$$e^{-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))}-i\,e+g\,(v-2\,s)}\,(-i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(i\,d-f\,(v-2\,s))^{n-j}$$

$$(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^{j+1}\left(-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{-i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{4\,(-i\,b+c\,(v-2\,s))}\right)-$$

$$e^{-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))}+i\,e+g\,(v-2\,s)}\,(i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d-f\,(v-2\,s))^{n-j}$$

$$(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^{j+1}\left(-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{4\,(i\,b+c\,(v-2\,s))}\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin\left(\sqrt{z}\,b+d\,z+e\right)\sinh^v\left(\sqrt{z}\,c+f\,z+g\right)dz =$$

$$i^{v+1}\,(-1)^{n-1}\,2^{-2\,n-v-2}\,d^{-2\,n-2}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\Bigg(e^{\frac{i\,b^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\left(-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1), -\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)-$$

$$e^{i\,e-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\,\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$2^{-2\,n-\nu-2}\,i\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}-i\,e+g\,(2\,k-\nu)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)$$

$$(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}-(-1)^\nu\,e^{-\frac{(i\,b+c\,(2\,k-\nu))^2}{4\,(i\,d+f\,(2\,k-\nu))}+i\,e+g\,(2\,k-\nu)}\,(i\,d+f\,(2\,k-\nu))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(2\,k-v))^{-h-j+2\,n}\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(2\,k-v))\left(i\,b+c\,(2\,k-v)+\right.$$

$$\left.2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-v))}\right)+$$

$$2\,\sqrt{-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-v)}}\;(i\,d+f\,(2\,k-v))\,\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-v))}\right)\right)+$$

$$e^{-\frac{(-i\,b+c\,(v-2\,k))^2}{4\,(-i\,d+f\,(v-2\,k))}-i\,e+g\,(v-2\,k)}\,(-i\,d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(-i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\right)-$$

$$e^{-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}+i\,e+g\,(v-2\,k)}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving powers of sin and power

Involving $z^{\alpha-1}\sin^{\mu}(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.2882.01

$$\int z^{\alpha-1}\sin^m(c\,z)\sinh^\nu(a\,z)\,dz = \frac{i^\nu 2^{-m-\nu} z^\alpha\,(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{\frac{1}{2} i\pi(\nu-m)}\binom{m}{k} \left(\Gamma(\alpha, -i\,c\,(m-2k)\,z)\,(-i\,c\,(m-2k)\,z)^{-\alpha} + e^{i\,m\,\pi}((i\,c\,m-2\,i\,c\,k)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c\,m-2\,i\,c\,k)\,z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\Gamma(\alpha, -a\,(\nu-2s)\,z)\,(-a\,(\nu-2s)\,z)^{-\alpha} + e^{i\pi\nu}((a\,\nu-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha, (a\,\nu-2\,a\,s)\,z)\right) + 2^{-m-\nu} z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-\frac{1}{2} i\,m\,\pi}\binom{\nu}{s}\Big(-e^{i\pi m + i\pi\nu}\,\Gamma(\alpha, (-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha} - e^{i\pi\nu}((2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z) - e^{i\,m\,\pi}((-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z) - ((2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)\Big)\,/;\, m\in\mathbb{N}^+ \bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2883.01

$$\int z^n\sin^\mu(c\,z)\sinh^\nu(a\,z)\,dz = 2^{-\nu} i^{-\nu}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sin^\mu(c\,z)\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2\,i\,c\,z}\right) + 2^{-\nu} i^{-\nu}\left(1-e^{2\,i\,c\,z}\right)^{-\mu} n!\,\sin^\mu(c\,z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(i^{-\nu} e^{-a(\nu-2k)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-a(\nu-2k)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{i\,a\,(-2k+\nu)-c\,\mu}{2c},\ldots,\frac{i\,a\,(-2k+\nu)-c\,\mu}{2c},-\mu;1+\frac{i\,a\,(-2k+\nu)-c\,\mu}{2c},\ldots,1+\frac{i\,a\,(-2k+\nu)-c\,\mu}{2c};e^{2\,i\,c\,z}\right) + i^\nu e^{a(\nu-2k)z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(a(\nu-2k)-i\,c\,\mu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{i\,a\,(-2k+\nu)+c\,\mu}{2c},\ldots,-\frac{i\,a\,(-2k+\nu)+c\,\mu}{2c},-\mu;1-\frac{i\,a\,(-2k+\nu)+c\,\mu}{2c},\ldots,1-\frac{i\,a\,(-2k+\nu)+c\,\mu}{2c};e^{2\,i\,c\,z}\right)\right)\,/;\,\nu\in\mathbb{N}\land n\in\mathbb{N}$$

01.19.21.2884.01

$$\int z^n \sin^m(c\,z)\sinh^\nu(a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^\nu(a\,z)\left(1-e^{2\,a\,z}\right)^{-\nu} \sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{\nu}{2},\,\ldots,\,-\frac{\nu}{2},\,-\nu;\,1-\frac{\nu}{2},\,\ldots,\,1-\frac{\nu}{2};\,e^{2\,a\,z}\right)+2^{-m}\left(1-e^{2\,a\,z}\right)^{-\nu} n!\,\sinh^\nu(a\,z) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(i^m e^{-i\,c\,(m-2\,k)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(-i\,c\,(m-2\,k)-a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(-\frac{i\,c\,(-2\,k+m)+a\,\nu}{2\,a},\,\ldots,\,-\frac{i\,c\,(-2\,k+m)+a\,\nu}{2\,a},\,-\nu;\,1-\frac{i\,c\,(-2\,k+m)+a\,\nu}{2\,a},\,\ldots,\,1-\frac{i\,c\,(-2\,k+m)+a\,\nu}{2\,a};\,e^{2\,a\,z}\right)+ i^{-m} e^{c\,i\,(m-2\,k)\,z}\sum_{p=0}^{n}\frac{(-1)^p z^{n-p}(c\,i\,(m-2\,k)-a\,\nu)^{-p-1}}{(n-p)!}\,{}_{p+2}F_{p+1}\left(\frac{i\,c\,(-2\,k+m)-a\,\nu}{2\,a},\,\ldots,\,\frac{i\,c\,(-2\,k+m)-a\,\nu}{2\,a},\,-\nu;\,1+\frac{i\,c\,(-2\,k+m)-a\,\nu}{2\,a},\,\ldots,\,1+\frac{i\,c\,(-2\,k+m)-a\,\nu}{2\,a};\,e^{2\,a\,z}\right)\Bigg)\,/;\,m\in\mathbb{N}\land n\in\mathbb{N}$$

Involving $z^{\alpha-1}\sin^\mu(c\,z+d)\sinh^\nu(a\,z)$

01.19.21.2885.01

$$\int z^{\alpha-1}\sin^m(d+c\,z)\sinh^\nu(a\,z)\,dz = \frac{i^\nu\,2^{-m-\nu} z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu} z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k e^{-2\,d\,i\,k-i\,d\,m+\frac{1}{2}\,i\,\pi\,(\nu-m)}\binom{m}{k} \left(e^{2\,i\,d\,m}\,\Gamma(\alpha,\,-i\,c\,(m-2\,k)\,z)\,(-i\,c\,(m-2\,k)\,z)^{-\alpha}+e^{4\,i\,d\,k+i\,m\,\pi}\,((i\,c\,m-2\,i\,c\,k)\,z)^{-\alpha}\,\Gamma(\alpha,\,(i\,c\,m-2\,i\,c\,k)\,z)\right)-2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\Gamma(\alpha,\,-a\,(\nu-2\,s)\,z)\,(-a\,(\nu-2\,s)\,z)^{-\alpha}+e^{i\,\pi\,\nu}\,((a\,\nu-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a\,\nu-2\,a\,s)\,z)\right)+ 2^{-m-\nu} z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2\,d\,i\,k-i\,d\,m-\frac{i\,m\,\pi}{2}}\binom{\nu}{s} \Big(-e^{4\,i\,d\,k+i\,\pi\,\nu+i\,m\,\pi}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}- e^{2\,i\,d\,m+i\,\pi\,\nu}\,((2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z)- e^{4\,i\,d\,k+i\,m\,\pi}\,((-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)- e^{2\,i\,d\,m}\,((2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)\Big)\,/;\,m\in\mathbb{N}^+\bigwedge\nu\in\mathbb{N}^+$$

01.19.21.2886.01

$$\int z^n \sin^{\mu}(d+c z)\sinh^{\nu}(a z)\,dz = 2^{-\nu} i^{-\nu}\left(1-e^{2 i (d+c z)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sin^{\mu}(d+c z) \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2 i (d+c z)}\right)+2^{-\nu} i^{-\nu}\left(1-e^{2 i (d+c z)}\right)^{-\mu} n! \sin^{\mu}(d+c z)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2} i(-2 i a z\nu+\pi\nu+4 i a k z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a(\nu-2k)-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{c\mu-i a(\nu-2k)}{2c},\ldots,-\frac{c\mu-i a(\nu-2k)}{2c},-\mu;1-\frac{c\mu-i a(\nu-2k)}{2c},\ldots,1-\frac{c\mu-i a(\nu-2k)}{2c};e^{2 i (d+c z)}\right)+e^{\frac{1}{2} i(-2 i a z\nu+\pi\nu+4 i a k z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a(\nu-2k)-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{i a(\nu-2k)+c\mu}{2c},\ldots,-\frac{i a(\nu-2k)+c\mu}{2c},-\mu;1-\frac{i a(\nu-2k)+c\mu}{2c},\ldots,1-\frac{i a(\nu-2k)+c\mu}{2c};e^{2 i (d+c z)}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2887.01

$$\int z^n \sin^{m}(d+c z)\sinh^{\nu}(a z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^{\nu}(a z)\left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\ldots,-\frac{\nu}{2},-\nu;1-\frac{\nu}{2},\ldots,1-\frac{\nu}{2};e^{-2 a z}\right)\right)\left(1-e^{-2 a z}\right)^{-\nu}+2^{-m} n!\sinh^{\nu}(a z)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2} i(4 d k+4 c z k-2 d m-2 c m z+m\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(c i(m-2k)+a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(\frac{i(2ck-cm+i a\nu)}{2a},\ldots,\frac{i(2ck-cm+i a\nu)}{2a},-\nu;\frac{i(2ck-cm+i a\nu)}{2a}+1,\ldots,\frac{i(2ck-cm+i a\nu)}{2a}+1;e^{-2 a z}\right)+e^{\frac{1}{2} i(4 d k+4 c z k-2 d m-2 c m z+m\pi)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\nu-i c(m-2k))^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(\frac{i(c(m-2k)+i a\nu)}{2a},\ldots,\frac{i(c(m-2k)+i a\nu)}{2a},-\nu;\frac{i(c(m-2k)+i a\nu)}{2a}+1,\ldots,\frac{i(c(m-2k)+i a\nu)}{2a}+1;e^{-2 a z}\right)\right)\right)\left(1-e^{-2 a z}\right)^{-\nu}\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^{\mu}(c z)\sinh^{\nu}(a z+b)$

01.19.21.2888.01

$$\int z^{\alpha-1}\sin^m(c\,z)\sinh^\nu(b+a\,z)\,dz = \frac{i^\nu\,2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,e^{\frac{1}{2}i\pi(\nu-m)}\binom{m}{k}\Big(\Gamma(\alpha,\,-i\,c\,(m-2\,k)\,z)\,(-i\,c\,(m-2\,k)\,z)^{-\alpha} + e^{i\,m\,\pi}\,((i\,c\,m-2\,i\,c\,k)\,z)^{-\alpha}\,\Gamma(\alpha,\,(i\,c\,m-2\,i\,c\,k)\,z)\Big) -$$

$$2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\,e^{-2\,b\,s-b\,\nu}\binom{\nu}{s}\Big(e^{2\,b\,\nu}\,\Gamma(\alpha,\,-a\,(\nu-2\,s)\,z)\,(-a\,(\nu-2\,s)\,z)^{-\alpha} + e^{4\,b\,s+i\,\pi\,\nu}\,((a\,\nu-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,\,(a\,\nu-2\,a\,s)\,z)\Big) +$$

$$2^{-m-\nu}\,z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\,e^{-\frac{1}{2}i\,\pi\,m-2\,b\,s-b\,\nu}\binom{\nu}{s}$$

$$\Big(-e^{i\,\pi\,m+4\,b\,s+i\,\pi\,\nu}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha} -$$
$$e^{4\,b\,s+i\,\pi\,\nu}\,((2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z) +$$
$$e^{2\,b\,\nu}\Big(-e^{i\,m\,\pi}\,\Gamma(\alpha,\,(-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha} -$$
$$((2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,\,(2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)\Big)\Big)\,/;\,m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.2889.01

$$\int z^n\sin^\mu(c\,z)\sinh^\nu(b+a\,z)\,dz = 2^{-\nu}\,i^{-\nu}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}n!\,(1-\nu \bmod 2)\sin^\mu(c\,z)$$

$$\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2},\,\ldots,\,-\frac{\mu}{2},\,-\mu;\,1-\frac{\mu}{2},\,\ldots,\,1-\frac{\mu}{2};\,e^{2\,i\,c\,z}\right) + 2^{-\nu}\,i^{-\nu}\left(1-e^{2\,i\,c\,z}\right)^{-\mu}n!\,\sin^\mu(c\,z)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2}i\,(4\,i\,b\,k+4\,i\,a\,z\,k-2\,i\,b\,\nu+\pi\,\nu-2\,i\,a\,\nu\,z)}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(-a\,(\nu-2\,k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{c\,\mu-i\,a\,(\nu-2\,k)}{2\,c},\right.\right.$$
$$\left.\ldots,\,-\frac{c\,\mu-i\,a\,(\nu-2\,k)}{2\,c},\,-\mu;\,1-\frac{c\,\mu-i\,a\,(\nu-2\,k)}{2\,c},\,\ldots,\,1-\frac{c\,\mu-i\,a\,(\nu-2\,k)}{2\,c};\,e^{2\,i\,c\,z}\right) +$$
$$e^{\frac{1}{2}i\,(4\,i\,b\,k+4\,i\,a\,z\,k-2\,i\,b\,\nu+\pi\,\nu-2\,i\,a\,\nu\,z)}\sum_{j=0}^{n}\frac{(-1)^j\,z^{n-j}\,(a\,(\nu-2\,k)-i\,c\,\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{i\,a\,(\nu-2\,k)+c\,\mu}{2\,c},\right.$$
$$\left.\left.\ldots,\,-\frac{i\,a\,(\nu-2\,k)+c\,\mu}{2\,c},\,-\mu;\,1-\frac{i\,a\,(\nu-2\,k)+c\,\mu}{2\,c},\,\ldots,\,1-\frac{i\,a\,(\nu-2\,k)+c\,\mu}{2\,c};\,e^{2\,i\,c\,z}\right)\right)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.2890.01

$$\int z^n \sin^m(c z) \sinh^\nu(b + a z)\, dz = 2^{-m} \binom{m}{\frac{m}{2}} n!\, (1 - m \bmod 2) \sinh^\nu(b + a z) \left(1 - e^{-2(b+a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}, \ldots, 1 - \frac{\nu}{2}; e^{-2(b+a z)}\right) + 2^{-m} n! \sinh^\nu(b + a z) \left(1 - e^{-2(b+a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{1}{2} i (4 c z k - 2 c m z + m\pi)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c\, i\, (m - 2k) + a\nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{i(2ck - cm + i a \nu)}{2a}, \ldots, \frac{i(2ck - cm + i a \nu)}{2a}, -\nu; \frac{i(2ck - cm + i a\nu)}{2a} + 1, \ldots, \frac{i(2ck - cm + i a\nu)}{2a} + 1; e^{-2(b+a z)}\right) + e^{\frac{1}{2} i (4 c z k - 2 c m z + m\pi)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\nu - i c (m - 2k))^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{i(c(m-2k) + i a\nu)}{2a}, \ldots, \frac{i(c(m-2k) + i a\nu)}{2a}, -\nu; \frac{i(c(m-2k) + i a\nu)}{2a} + 1, \ldots, \frac{i(c(m-2k) + i a\nu)}{2a} + 1; e^{-2(b+a z)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \sin^\mu(c z + d) \sinh^\nu(a z + b)$

01.19.21.2891.01

$$\int z^{\alpha-1} \sin^m(c z + d) \sinh^\nu(a z + b)\, dz = \frac{i^\nu 2^{-m-\nu} z^\alpha (1 - m \bmod 2)(1 - \nu \bmod 2)}{\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m + \frac{1}{2} i \pi (\nu - m)} \binom{m}{k} \left(e^{2 i d m}\, \Gamma(\alpha, -i c (m - 2k) z) (-i c (m - 2k) z)^{-\alpha} + e^{4 i d k + i m \pi} ((i c m - 2 i c k) z)^{-\alpha}\, \Gamma(\alpha, (i c m - 2 i c k) z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2bs - b\nu} \binom{\nu}{s} \left(e^{2b\nu}\, \Gamma(\alpha, -a(\nu - 2s) z) (-a(\nu - 2s) z)^{-\alpha} + e^{4bs + i\pi\nu} ((a\nu - 2as) z)^{-\alpha}\, \Gamma(\alpha, (a\nu - 2as) z)\right) + 2^{-m-\nu} z^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 d i k - i d m - 2bs - b\nu - \frac{i m \pi}{2}} \binom{\nu}{s} \left(-e^{4 i d k + 4bs + i\pi\nu + i m\pi}\, \Gamma(\alpha, (-2 c i k + i c m - 2 a s + a\nu) z) ((-2 c i k + i c m - 2 a s + a\nu) z)^{-\alpha} - e^{2 i d m + 4 b s + i\pi\nu} ((2 i c k - i c m - 2 a s + a\nu) z)^{-\alpha}\, \Gamma(\alpha, (2 i c k - i c m - 2 a s + a\nu) z) + e^{2b\nu} \left(-e^{4 i d k + i m\pi}\, \Gamma(\alpha, (-2 c i k + i c m + 2 a s - a\nu) z) ((-2 c i k + i c m + 2 a s - a\nu) z)^{-\alpha} - e^{2 i d m} ((2 i c k - i c m + 2 a s - a\nu) z)^{-\alpha}\, \Gamma(\alpha, (2 i c k - i c m + 2 a s - a\nu) z)\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2892.01

$$\int z^n \sin^\mu(d+cz)\sinh^\nu(b+az)\,dz = 2^{-\nu}\, i^{-\nu}\left(1-e^{2i(d+cz)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)$$
$$\sin^\mu(d+cz)\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};e^{2i(d+cz)}\right)+$$
$$2^{-\nu}\, i^{-\nu}\left(1-e^{2i(d+cz)}\right)^{-\mu} n!\sin^\mu(d+cz)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2}i(4ibk+4iazk-2ib\nu+\pi\nu-2ia\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\mu-ia(\nu-2k)}{2c},\right.\right.$$
$$\left.\ldots,-\frac{c\mu-ia(\nu-2k)}{2c},-\mu;1-\frac{c\mu-ia(\nu-2k)}{2c},\ldots,1-\frac{c\mu-ia(\nu-2k)}{2c};e^{2i(d+cz)}\right)+$$
$$e^{\frac{1}{2}i(4ibk+4iazk-2ib\nu+\pi\nu-2ia\nu z)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ia(\nu-2k)+c\mu}{2c},\ldots,\right.$$
$$\left.\left.-\frac{ia(\nu-2k)+c\mu}{2c},-\mu;1-\frac{ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ia(\nu-2k)+c\mu}{2c};e^{2i(d+cz)}\right)\right)\,/;\,n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

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$$\int z^n \sin^m(d+cz)\sinh^\nu(b+az)\,dz = 2^{-m}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^\nu(b+az)$$
$$\left(1-e^{-2(b+az)}\right)^{-\nu}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{\nu}{2},\ldots,-\frac{\nu}{2},-\nu;1-\frac{\nu}{2},\ldots,1-\frac{\nu}{2};e^{-2(b+az)}\right)+$$
$$2^{-m} n!\sinh^\nu(b+az)\left(1-e^{-2(b+az)}\right)^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{1}{2}i(4dk+4czk-2dm-2cmz+m\pi)}\right.$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(ci(m-2k)+a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{i(2ck-cm+ia\nu)}{2a},\ldots,\frac{i(2ck-cm+ia\nu)}{2a},-\nu;\right.$$
$$\left.\frac{i(2ck-cm+ia\nu)}{2a}+1,\ldots,\frac{i(2ck-cm+ia\nu)}{2a}+1;e^{-2(b+az)}\right)+e^{\frac{1}{2}i(4dk+4czk-2dm-2cmz+m\pi)}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\nu-ic(m-2k))^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{i(c(m-2k)+ia\nu)}{2a},\ldots,\frac{i(c(m-2k)+ia\nu)}{2a},\right.$$
$$\left.\left.-\nu;\frac{i(c(m-2k)+ia\nu)}{2a}+1,\ldots,\frac{i(c(m-2k)+ia\nu)}{2a}+1;e^{-2(b+az)}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r\right) \sinh^\nu(c z)$

01.19.21.2894.01

$$\int z^n \sin^m(b z^2) \sinh^\nu(c z)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2}} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right)\right) z^{n+1} + \frac{i^{-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma(n+1, c(\nu-2k) z) (-c(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2}} (c(\nu-2k))^{-n-1} \Gamma(n+1, -c(\nu-2k) z)\right) - i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-c(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (c(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b (m-2s) z - c(\nu-2k))^{j+1} \left(\frac{i (2 i b (m-2s) z - c(\nu-2k))^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - c(\nu-2k))^2}{4 b (m-2s)}\right) + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} + \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) + 2 b i (m-2s) z)^{j+1} \left(\frac{i (c(\nu-2k) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c(\nu-2k) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh^\nu(c\,z)\,dz = \frac{i^{-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1} + (-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2}i\pi\nu}\,\Gamma(n+1,\,c\,(\nu-2k)\,z)\,(-c\,(\nu-2k))^{-n-1} + e^{\frac{i\pi\nu}{2}}\,(c\,(\nu-2k))^{-n-1}\,\Gamma(n+1,\,-c\,(\nu-2k)\,z)\right) +$$

$$2^{-m-\nu+1}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}\,(b\,(m-2k))^{-2(n+1)}\binom{m}{k}$$

$$\left(e^{-\frac{i m\pi}{2}}\,\Gamma\left(2\,(n+1),\,-i\,b\,(m-2k)\sqrt{z}\right) + e^{\frac{i m\pi}{2}}\,\Gamma\left(2\,(n+1),\,i\,b\,(m-2k)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-\nu-1}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}(c\,(\nu-2k))^{-2(n+1)}$$

$$\left(e^{-\frac{b^2(m-2s)^2}{4c(\nu-2k)}-\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2s)\left(-i\,b\,(m-2s)-\right.\right.$$

$$\left.2\,c\,(\nu-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)-2\,c\,(\nu-2k)$$

$$\left.\left.\sqrt{\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)\right)\right. +$$

$$e^{-\frac{b^2(m-2s)^2}{4c(\nu-2k)}-\frac{i\pi\nu}{2}-\frac{i m\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s))^{-h-j+2n}\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,b\,(m-2s)\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)-2\,c\,(\nu-2k)$$

$$\sqrt{\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+$$

$$2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + e) \sinh^\nu(c z)$

01.19.21.2896.01

$$\int z^n \sin^m(b z^2 + e) \sinh^\nu(c z)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^k \binom{m}{k} \left(e^{i e (m-2k) - \frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2} - i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right) \right) \right) z^{n+1} + \frac{i^{-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma(n+1, c(\nu-2k) z) (-c(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2}} (c(\nu-2k))^{-n-1} \Gamma(n+1, -c(\nu-2k) z) \right) - i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - i e (m-2s) - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-c(\nu-2k) - 2 i b (m-2s) z)^2}{b(m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} + e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - i e (m-2s) + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(c(\nu-2k) - 2 i b (m-2s) z)^2}{b(m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} + e i (m-2s) - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b (m-2s) z - c(\nu-2k))^{j+1} \left(\frac{i(2 i b (m-2s) z - c(\nu-2k))^2}{b(m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b (m-2s) z - c(\nu-2k))^2}{4 b (m-2s)} \right) +$$

$$e^{\frac{c^2 i (v-2k)^2}{4 b (m-2s)} + e i (m-2s) + \frac{i \pi v}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c(v-2k))^{n-j}$$

$$(c(v-2k) + 2 b i (m-2s) z)^{j+1} \left(\frac{i (c(v-2k) + 2 b i (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (c(v-2k) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\Bigg) \Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.2897.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + e\right) \sinh^v(c z)\, dz = \frac{i^{-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \Gamma(n+1, c(v-2k) z) (-c(v-2k))^{-n-1} + e^{\frac{i \pi v}{2}} (c(v-2k))^{-n-1} \Gamma(n+1, -c(v-2k) z)\right) +$$

$$2^{-m-v+1} i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n} (b(m-2k))^{-2(n+1)} \binom{m}{k}$$

$$\left(e^{i e (m-2k) - \frac{i m \pi}{2}} \Gamma\left(2(n+1), -i b (m-2k) \sqrt{z}\right) + e^{\frac{i m \pi}{2} - i e (m-2k)} \Gamma\left(2(n+1), i b (m-2k) \sqrt{z}\right)\right) +$$

$$2^{-m-2n-v-1} i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (c(v-2k))^{-2(n+1)}$$

$$\Bigg(e^{-\frac{b^2 (m-2s)^2}{4 c (v-2k)} - i e (m-2s) - \frac{i \pi v}{2} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2s))^{-h-j+2n} \left(-i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^2}{c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i b (m-2s) \Big(-i b (m-2s) -$$

$$2 c (v-2k) \sqrt{z}\Big) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^2}{4 c (v-2k)}\right) - 2 c (v-2k)$$

$$\sqrt{\frac{\left(-i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^2}{c(v-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^2}{4 c (v-2k)}\right)\Bigg) +$$

$$e^{-\frac{b^2 (m-2s)^2}{4 c (v-2k)} + e i (m-2s) - \frac{i \pi v}{2} - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n} \left(i b (m-2s) - 2 c (v-2k) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(i\, b\,(m-2\,s)\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\ \frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-2\,c\,(v-2\,k)$$

$$\sqrt{\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\ \Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2 (m-2s)^2}{4 c (v-2k)}-i\, e\,(m-2 s)+\frac{i \pi v}{2}+\frac{i m \pi}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\, b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,c\,(v-2\,k)\sqrt{-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\ -\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)-i\, b\,(m-2\,s)$$

$$\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\ -\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\, b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2 (m-2s)^2}{4 c (v-2k)}+e\, i\,(m-2 s)+\frac{i \pi v}{2}-\frac{i m \pi}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\, b\,(m-2\,s))^{-h-j+2\,n}\left(b\, i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\,(m-2s)\left(b\,i\,(m-2s)+2c(v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2s)+2c(v-2k)\sqrt{z}\right)^2}{4c(v-2k)}\right)+\right.$$

$$2c(v-2k)\sqrt{-\frac{\left(b\,i\,(m-2s)+2c(v-2k)\sqrt{z}\right)^2}{c(v-2k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2s)+2c(v-2k)\sqrt{z}\right)^2}{4c(v-2k)}\right)\right)\right)\right)/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r+d\,z\right)\sinh^v(c\,z)$

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$$\int z^n\sin^m\left(b\,z^2+d\,z\right)\sinh^v(c\,z)\,dz = \frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{1}{2}i\pi v}\,\Gamma(n+1,\,c(v-2k)z)\,(-c(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}}\,(c(v-2k))^{-n-1}\,\Gamma(n+1,\,-c(v-2k)z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i(m-2k)d^2}{4b}+\frac{i\,m\,\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4b(m-2k)}\right)\right)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{-\frac{i(m-2k)d^2}{4b}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4b(m-2k)}\right)\right)-i^{-v}$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{\frac{1}{2}i\pi(m+v)-\frac{i(c(v-2k)-i\,d\,(m-2s))^2}{4b(m-2s)}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2s)-c(v-2k))^{n-j}\,(-i\,d\,(m-2s)-\right.\right.$$

$$2\,i\,b\,z\,(m-2\,s)+c\,(v-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+c\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{\frac{1}{2}i\,\pi\,(m-v)-\frac{i\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,s)+c\,(v-2\,k))^{n-j}\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-\right.$$

$$c\,(v-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-c\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{\frac{i\,(d\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}+\frac{1}{2}i\,\pi\,(v-m)}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(v-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)+$$

$$e^{\frac{i\,(i\,d\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}-\frac{1}{2}i\,\pi\,(m+v)}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(c\,(v-2\,k)-i\,d\,(m-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\;b+d\,z\right)\sinh^v(c\,z)\,dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{1}{2}i\,\pi\,v}\,\Gamma(n+1,\,c\,(v-2\,k)\,z)\,(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-c\,(v-2\,k)\,z)\right)+$$

$$2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^{k+n-1}\, (d\,(m-2k))^{-2(n+1)} \binom{m}{k}$$

$$\Bigg(e^{-\frac{i(m-2k)b^2}{4d}-\frac{i m\pi}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b\,(m-2k))^{-h-j+2n} \left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(b\,i\,(m-2k)\left(b\,i\,(m-2k)+\right.$$

$$\left.2\,d\,i\,\sqrt{z}\,(m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)+2\,d\,i\,(m-2k)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\, \frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)+$$

$$e^{\frac{i(m-2k)b^2}{4d}+\frac{i m\pi}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2k))^{-h-j+2n} \left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-i\,b\,(m-2k)$$

$$\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)\Bigg)+2^{-m-2n-\nu-1}\, i^{-\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{\frac{b^2(m-2s)^2}{4(c(\nu-2k)-i\,d\,(m-2s))}+\frac{1}{2}i\pi(m+\nu)} \Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2s))^{-h-j+2n} \left(2\,(c\,(\nu-2k)-i\,d\,(m-2s))\right.$$

$$\sqrt{z}-i\,b\,(m-2\,s)\Big)^{h+j}\left(-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)-i\,d\,(m-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(v-2\,k)-i\,d\,(m-2\,s))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(v-2\,k)-i\,d\,(m-2\,s))}\right)\Bigg)\Bigg)\Bigg)$$

$$(c\,(v-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,s)+c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)+$$

$$2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}}\Bigg)+$$

$$e^{\frac{b^2 (m-2s)^2}{4(-i d (m-2s)-c(v-2k))}+\frac{1}{2} i \pi (m-v)} (-i d (m-2s)-c(v-2k))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j$$

$$(-i b (m-2s))^{-h-j+2n} \left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)^2}{-i d (m-2s)-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg(2(-i d (m-2s)-c(v-2k))$$

$$\sqrt{\left(-\left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)^2 \Big/ (-i d (m-2s)-c(v-2k))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)^2}{4(-i d (m-2s)-c(v-2k))}\right) -$$

$$i b (m-2s) \left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i d (m-2s)-c(v-2k)) \sqrt{z} - i b (m-2s)\right)^2}{4(-i d (m-2s)-c(v-2k))}\right)\Bigg) +$$

$$e^{\frac{b^2 (m-2s)^2}{4(i d (m-2s)-c(v-2k))}-\frac{1}{2} i \pi (m+v)} (i d (m-2s)-c(v-2k))^{-2(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2s))^{-h-j+2n}$$

$$\left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)^2}{i d (m-2s)-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(b i (m-2s) \left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)^2}{4(i d (m-2s)-c(v-2k))}\right) +$$

$$2(i d (m-2s)-c(v-2k)) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)^2}{4(i d (m-2s)-c(v-2k))}\right)$$

$$\sqrt{-\frac{\left(b i (m-2s) + 2(i d (m-2s)-c(v-2k)) \sqrt{z}\right)^2}{i d (m-2s)-c(v-2k)}}\Bigg)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z + e) \sinh^\nu(c z)$

01.19.21.2900.01

$$\int z^n \sin^m(b z^2 + d z + e) \sinh^\nu(c z)\, dz = \frac{i^{-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma(n+1, c(\nu - 2k) z)(-c(\nu-2k))^{-n-1} + e^{\frac{i\pi\nu}{2}} (c(\nu-2k))^{-n-1} \Gamma(n+1, -c(\nu-2k) z) \right) -$$
$$i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{\frac{i(m-2k)d^2}{4b} - i e (m-2k) + \frac{i m \pi}{2}}$$
$$\left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1} \left(-\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{b(m-2k)} \right)^{\frac{1}{2}(-j-1)} \right.$$
$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{4b(m-2k)} \right) \right) (-i b (m-2k))^{-n-1} +$$
$$e^{-\frac{i(m-2k)d^2}{4b} + e i (m-2k) - \frac{i m \pi}{2}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 b i z (m-2k))^{j+1}$$
$$\left(\frac{i(d i (m-2k) + 2 b i z (m-2k))^2}{b(m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(d i (m-2k) + 2 b i z (m-2k))^2}{4b(m-2k)} \right) \Bigg) -$$
$$i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{i(c(\nu-2k) - i d (m-2s))^2}{4b(m-2s)} - i e (m-2s) + \frac{1}{2} i \pi (m+\nu)}$$
$$\left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c(\nu-2k))^{n-j} (-i d (m-2s) - 2 i b z (m-2s) + c(\nu-2k))^{j+1} \right.$$
$$\left(-\frac{i(-i d (m-2s) - 2 i b z (m-2s) + c(\nu-2k))^2}{b(m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$
$$\left. \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d (m-2s) - 2 i b z (m-2s) + c(\nu-2k))^2}{4b(m-2s)} \right) \right) (-i b (m-2s))^{-n-1} +$$

$$e^{-\frac{i(-i d (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}-i e (m-2 s)+\frac{1}{2} i \pi (m-v)} \left(\sum_{j=0}^{n} 2^{j-n} (d\, i (m-2 s)+c (v-2 k))^{n-j} (-i d (m-2 s)- 2 i b z (m-2 s)-c (v-2 k))^{j+1} \left(-\frac{i (-i d (m-2 s)-2 i b z (m-2 s)-c (v-2 k))^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2 s)-2 i b z (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}\right)\right) (-i b (m-2 s))^{-n-1} +$$

$$e^{\frac{i (d\, i (m-2 s)+c (v-2 k))^2}{4 b (m-2 s)}+e\, i (m-2 s)+\frac{1}{2} i \pi (v-m)} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2 s)-c (v-2 k))^{n-j} (d\, i (m-2 s)+2 b\, i z (m-2 s)+c (v-2 k))^{j+1} \left(\frac{i (d\, i (m-2 s)+2 b\, i z (m-2 s)+c (v-2 k))^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d\, i (m-2 s)+2 b\, i z (m-2 s)+c (v-2 k))^2}{4 b (m-2 s)}\right) +$$

$$e^{\frac{i (i d (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}+e\, i (m-2 s)-\frac{1}{2} i \pi (m+v)} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c (v-2 k)-i d (m-2 s))^{n-j} (d\, i (m-2 s)+2 b\, i z (m-2 s)-c (v-2 k))^{j+1} \left(\frac{i (d\, i (m-2 s)+2 b\, i z (m-2 s)-c (v-2 k))^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d\, i (m-2 s)+2 b\, i z (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}\right)\Bigg) \Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d z + e\right) \sinh^v(c z)\, dz = \frac{i^{-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \Gamma(n+1, c (v-2 k) z) (-c (v-2 k))^{-n-1} + e^{\frac{i \pi v}{2}} (c (v-2 k))^{-n-1} \Gamma(n+1, -c (v-2 k) z)\right) +$$

$$2^{-m-2 n-v-1} i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n-1} (d (m-2 k))^{-2(n+1)} \binom{m}{k}$$

$$\left(e^{-\frac{i (m-2 k) b^2}{4 d}+e\, i (m-2 k)-\frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 k))^{-h-j+2 n} \left(b\, i (m-2 k)+2 d\, i \sqrt{z}\, (m-2 k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2k)\left(b\,i\,(m-2k)+\right.\right.$$

$$\left.2\,d\,i\,\sqrt{z}\,(m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)+2\,d\,i\,(m-2k)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\right)\right)+$$

$$e^{\frac{i(m-2k)b^2}{4d}-i\,e\,(m-2k)+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2k))^{-h-j+2n}\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2k)\right.$$

$$\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\right)\right)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{\frac{b^2(m-2s)^2}{4(c(v-2k)-i\,d\,(m-2s))}-i\,e\,(m-2s)+\frac{1}{2}i\,\pi\,(m+v)}\right.$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\sqrt{z}-i\,b\,(m-2s)\right)^{h+j}\right.$$

$$\left(-\frac{\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\sqrt{z}-i\,b\,(m-2s)\right)^2}{c\,(v-2k)-i\,d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)-i\,d\,(m-2\,s)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(v-2\,k)-i\,d\,(m-2\,s))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(v-2\,k)-i\,d\,(m-2\,s))}\right)\Bigg)\Bigg)$$

$$(c\,(v-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}+e\,i\,(m-2\,s)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,s)+c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)+$$

$$2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}}\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))}-i\,e\,(m-2\,s)+\frac{1}{2}\,i\,\pi\,(m-v)}\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}-i\,b\,(m-2s)\right)^2}{-i\,d\,(m-2s)-c\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)$$

$$\sqrt{\left(-\left(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}-i\,b\,(m-2s)\right)^2\Big/\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\left(-i\,d\,(m-2s)-c\,(v-2k)\right)}\right)-$$

$$i\,b\,(m-2s)\left(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}-i\,b\,(m-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\left(-i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\left(-i\,d\,(m-2s)-c\,(v-2k)\right)}\right)\Bigg)+$$

$$e^{\frac{b^2(m-2s)^2}{4(i\,d\,(m-2s)-c\,(v-2k))}+e\,i\,(m-2s)-\frac{1}{2}i\,\pi\,(m+v)}\left(i\,d\,(m-2s)-c\,(v-2k)\right)^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,\left(i\,b\,(m-2s)\right)^{-h-j+2n}\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)^2}{i\,d\,(m-2s)-c\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2s)\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)^2}{4\left(i\,d\,(m-2s)-c\,(v-2k)\right)}\right)+$$

$$2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)^2}{4\left(i\,d\,(m-2s)-c\,(v-2k)\right)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2s)+2\left(i\,d\,(m-2s)-c\,(v-2k)\right)\sqrt{z}\right)^2}{i\,d\,(m-2s)-c\,(v-2k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sin^m\left(b\,z^r\right)\sinh^v(f\,z+g)$

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$$\int z^n \sin^m\left(b z^2\right) \sinh^\nu(f z+g)\, dz = $$

$$-i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \Biggl(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \biggl(e^{-\frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} +$$

$$e^{\frac{i m \pi}{2}} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\biggr)\Biggr) z^{n+1} +$$

$$\frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \Bigl(e^{-\frac{1}{2} i \pi \nu - g(\nu-2k)} \Gamma(n+1, f(\nu-2k) z) (-f(\nu-2k))^{-n-1} +$$

$$e^{\frac{i \pi \nu}{2} + g(\nu-2k)} (f(\nu-2k))^{-n-1} \Gamma(n+1, -f(\nu-2k) z)\Bigr) - i^{-\nu} 2^{-m-\nu-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^s \binom{m}{s} \Biggl(e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \Biggl(\sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (-f(\nu-2k) - 2 i b (m-2s) z)^{j+1}$$

$$\left(-\frac{i (-f(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Biggr)$$

$$(-i b (m-2s))^{-n-1} + e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} + g(\nu-2k) + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \Biggl(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2k))^{n-j} (f(\nu-2k) - 2 i b (m-2s) z)^{j+1}$$

$$\left(-\frac{i (f(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\Biggr)$$

$$(-i b (m-2s))^{-n-1} + e^{\frac{f^2 i (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (2 i b (m-2s) z - f(\nu-2k))^{j+1} \left(\frac{i (2 i b (m-2s) z - f(\nu-2k))^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (2 i b (m-2s) z - f(\nu-2k))^2}{4 b (m-2s)}\right) + e^{\frac{f^2 i (\nu-2k)^2}{4 b (m-2s)} + g(\nu-2k) + \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2k))^{n-j} (f(\nu-2k) + 2 b i (m-2s) z)^{j+1} \left(\frac{i (f(\nu-2k) + 2 b i (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (f(\nu-2k) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\Biggr) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh^v(g+f\,z)\,dz = \frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-v} i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$
$$\left(e^{-\frac{1}{2}i\pi v-g(v-2k)}\Gamma(n+1, f(v-2k)z)(-f(v-2k))^{-n-1} + e^{\frac{i\pi v}{2}+g(v-2k)}(f(v-2k))^{-n-1}\Gamma(n+1,-f(v-2k)z)\right)+$$
$$2^{-m-v+1} i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}(b(m-2k))^{-2(n+1)}\binom{m}{k}$$
$$\left(e^{-\frac{im\pi}{2}}\Gamma\left(2(n+1), -i\,b(m-2k)\sqrt{z}\right)+e^{\frac{im\pi}{2}}\Gamma\left(2(n+1), i\,b(m-2k)\sqrt{z}\right)\right)+$$
$$2^{-m-2n-v-1} i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{-\frac{b^2(m-2s)^2}{4f(v-2k)}-g(v-2k)-\frac{i\pi v}{2}+\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i\,b(m-2s))^{-h-j+2n}\right.\right.$$
$$\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$
$$\binom{j}{h}\binom{n}{j}\left(-i\,b(m-2s)\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$
$$\left.\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right)-2f(v-2k)\sqrt{\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}}$$
$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right)\right)\right)(-f(v-2k))^{-2(n+1)}+$$
$$e^{-\frac{b^2(m-2s)^2}{4f(v-2k)}-g(v-2k)-\frac{i\pi v}{2}-\frac{im\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i\,b(m-2s))^{-h-j+2n}\left(i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^{h+j}\right.$$
$$\left(\frac{\left(i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,b(m-2s)\left(i\,b(m-2s)-\right.\right.$$

$$2\,f\,(v-2\,k)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)$$

$$(-f\,(v-2\,k))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)+\frac{i\,m\,\pi}{2}}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,f\,(v-2\,k)\,\sqrt{-\frac{\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,f\,(v-2\,k)}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,f\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)-\frac{i\,m\,\pi}{2}}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)+$$

$$2\,f\,(v-2\,k)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + e) \sinh^\nu(f z + g)$

01.19.21.2904.01

$$\int z^n \sin^m(b z^2 + e) \sinh^\nu(g + f z)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i e (m-2k) - \frac{i m \pi}{2}} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i m \pi}{2} - i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right) \right) \right) z^{n+1} + \frac{i^{-\nu} \left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu - g(\nu-2k)} \Gamma(n+1, f(\nu-2k) z) (-f(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2} + g(\nu-2k)} (f(\nu-2k))^{-n-1} \Gamma(n+1, -f(\nu-2k) z) \right) - i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) - i e (m-2s) - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (-f(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (-f(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-f(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} + e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} + g(\nu-2k) - i e (m-2s) + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2k))^{n-j} (f(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i (f(\nu-2k) - 2 i b (m-2s) z)^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (f(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} + e^{\frac{f^2 i (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) + e i (m-2s) - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (2 i b (m-2s) z - f(\nu-2k))^{j+1} \left(\frac{i (2 i b (m-2s) z - f(\nu-2k))^2}{b (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i\,(2\,i\,b\,(m-2\,s)\,z-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)+e^{\frac{f^2\,i\,(v-2\,k)^2}{4\,b\,(m-2\,s)}+g\,(v-2\,k)+e\,i\,(m-2\,s)+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^{j+1}\left(\frac{i\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^2}{4\,b\,(m-2\,s)}\right)\right)\right) /;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2905.01

$$\int z^n\,\sin^m\left(\sqrt{z}\;b+e\right)\sinh^v(f\,z+g)\,dz=$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}\,i\,\pi\,v-g\,(v-2\,k)}\,\Gamma(n+1,\, f\,(v-2\,k)\,z)\,(-f\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-f\,(v-2\,k)\,z)\right)+$$

$$2^{-m-v+1}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+n}\,(b\,(m-2\,k))^{-2\,(n+1)}\binom{m}{k}$$

$$\left(e^{i\,e\,(m-2\,k)-\frac{i\,m\,\pi}{2}}\,\Gamma\left(2\,(n+1),\,-i\,b\,(m-2\,k)\,\sqrt{z}\right)+e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2\,k)}\,\Gamma\left(2\,(n+1),\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{-\frac{b^2\,(m-2\,s)^2}{4\,f\,(v-2\,k)}-i\,e\,(m-2\,s)-g\,(v-2\,k)-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2\,s)\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)\sqrt{\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)(-f\,(v-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}+e i (m-2 s)-g (v-2 k)-\frac{i \pi v}{2}-\frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n} \right.$$

$$\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^{h+j} \left(\frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(i b (m-2 s) \left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right) - \right.$$

$$2 f (v-2 k) \sqrt{\frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right)\right)\right) (-f (v-2 k))^{-2 (n+1)} +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}-i e (m-2 s)+\frac{i \pi v}{2}+g (v-2 k)+\frac{i m \pi}{2}} (f (v-2 k))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{f (v-2 k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 f (v-2 k) \sqrt{-\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{f (v-2 k)}} \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{4 f (v-2 k)}\right) - i b (m-2 s)$$

$$\left.\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{4 f (v-2 k)}\right)\right) +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}+e i (m-2 s)+\frac{i \pi v}{2}+g (v-2 k)-\frac{i m \pi}{2}} (f (v-2 k))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n}$$

$$\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\,(m-2s)\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right)+\right.$$

$$2f(v-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2s)+2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z) \sinh^v(f z + g)$

01.19.21.2906.01

$$\int z^n \sin^m\left(b z^2+d z\right)\sinh^v(f z+g)\,dz ==$$

$$\frac{i^{-v}\left(2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1}+(-1)^n 2^{-m-v} i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\pi v-g(v-2k)}\,\Gamma(n+1,\,f(v-2k)z)\,(-f(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}+g(v-2k)}\,(f(v-2k))^{-n-1}\,\Gamma(n+1,\,-f(v-2k)z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i(m-2k)d^2}{4b}+\frac{i m\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{-\frac{i(m-2k)d^2}{4b}-\frac{i m\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-$$

$$
\begin{aligned}
& i^{-v}\, 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{i (f (v-2k) - i d (m-2s))^2}{4 b (m-2s)} + g (v-2k) + \frac{1}{2} i \pi (m+v)} \\
& \quad \Bigg(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f (v-2k))^{n-j} (-i d (m-2s) - 2 i b z (m-2s) + f (v-2k))^{j+1} \\
& \quad \left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) + f (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2} (-j-1)} \binom{n}{j} \\
& \quad \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) + f (v-2k))^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + \\
& \quad e^{-\frac{i (-i d (m-2s) - f (v-2k))^2}{4 b (m-2s)} + \frac{1}{2} i \pi (m-v) - g (v-2k)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (d i (m-2s) + f (v-2k))^{n-j} (-i d (m-2s) - \\
& \quad 2 i b z (m-2s) - f (v-2k))^{j+1} \left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) - f (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2} (-j-1)} \\
& \quad \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) - f (v-2k))^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} + \\
& \quad e^{\frac{i (d i (m-2s) + f (v-2k))^2}{4 b (m-2s)} + g (v-2k) + \frac{1}{2} i \pi (v-m)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2s) - f (v-2k))^{n-j} \\
& \quad (d i (m-2s) + 2 b i z (m-2s) + f (v-2k))^{j+1} \left(\frac{i (d i (m-2s) + 2 b i z (m-2s) + f (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2} (-j-1)} \\
& \quad \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2s) + 2 b i z (m-2s) + f (v-2k))^2}{4 b (m-2s)} \right) + \\
& \quad e^{\frac{i (i d (m-2s) - f (v-2k))^2}{4 b (m-2s)} - g (v-2k) - \frac{1}{2} i \pi (m+v)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f (v-2k) - i d (m-2s))^{n-j} \\
& \quad (d i (m-2s) + 2 b i z (m-2s) - f (v-2k))^{j+1} \left(\frac{i (d i (m-2s) + 2 b i z (m-2s) - f (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2} (-j-1)} \\
& \quad \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2s) + 2 b i z (m-2s) - f (v-2k))^2}{4 b (m-2s)} \right) \Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+
\end{aligned}
$$

01.19.21.2907.01

$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu(f\, z + g)\, dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\left(e^{-\frac{1}{2} i \pi \nu - g(\nu - 2k)} \Gamma(n+1, f(\nu-2k)z)(-f(\nu-2k))^{-n-1} + e^{\frac{i\pi\nu}{2} + g(\nu-2k)} (f(\nu-2k))^{-n-1} \Gamma(n+1, -f(\nu-2k)z)\right) +$$

$$2^{-m-2n-\nu-1} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n-1} (d(m-2k))^{-2(n+1)} \binom{m}{k}$$

$$\Bigg(e^{-\frac{i(m-2k)b^2}{4d} - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b(m-2k))^{-h-j+2n} \left(b\, i(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i(m-2k)\Big(b\, i(m-2k) +$$

$$2\, d\, i\sqrt{z}\,(m-2k)\Big) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right) + 2\, d\, i(m-2k)$$

$$\sqrt{\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right)\Bigg) +$$

$$e^{\frac{i(m-2k)b^2}{4d} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b(m-2k))^{-h-j+2n} \left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i\, b(m-2k)$$

$$\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right) -$$

$$2\, i\, d(m-2k) \sqrt{-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}}\; \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-\nu-1}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(e^{\frac{b^2\,(m-2\,s)^2}{4\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))}+g\,(\nu-2\,k)+\frac{1}{2}\,i\,\pi\,(m+\nu)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f\,(\nu-2\,k)-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{-\frac{\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{f\,(\nu-2\,k)-i\,d\,(m-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(f\,(\nu-2\,k)-i\,d\,(m-2\,s))}\right)\Bigg)\Bigg)$$

$$(f\,(\nu-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+f\,(\nu-2\,k))}+g\,(\nu-2\,k)+\frac{1}{2}\,i\,\pi\,(\nu-m)}\,(d\,i\,(m-2\,s)+f\,(\nu-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(\nu-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(\nu-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+f\,(\nu-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(\nu-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2s)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}\right)+$$

$$2\,(d\,i\,(m-2s)+f\,(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2s)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}\right)$$

$$\left.\sqrt{-\frac{\left(b\,i\,(m-2s)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2}{d\,i\,(m-2s)+f\,(v-2k)}}\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(-i\,d\,(m-2s)-f\,(v-2k))}+\frac{1}{2}i\,\pi\,(m-v)-g\,(v-2k)}\,(-i\,d\,(m-2s)-f\,(v-2k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{-i\,d\,(m-2s)-f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\right.$$

$$\sqrt{\left(-\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2\Big/(-i\,d\,(m-2s)-f\,(v-2k))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\,(-i\,d\,(m-2s)-f\,(v-2k))}\right)-$$

$$i\,b\,(m-2s)\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(-i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\,(-i\,d\,(m-2s)-f\,(v-2k))}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(i\,d\,(m-2s)-f\,(v-2k))}-g\,(v-2k)-\frac{1}{2}i\,\pi\,(m+v)}\,(i\,d\,(m-2s)-f\,(v-2k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s))^{-h-j+2n}\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)^2}{i\,d\,(m-2s)-f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2s)\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f\,(v-2k))}\right)+$$

$$2\,(i\,d\,(m-2s)-f\,(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)^2}{4\,(i\,d\,(m-2s)-f\,(v-2k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2s)+2\,(i\,d\,(m-2s)-f\,(v-2k))\sqrt{z}\right)^2}{i\,d\,(m-2s)-f\,(v-2k)}}\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z+e\right)\sinh^v(f\,z+g)$

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$$\int z^n\sin^m\left(b\,z^2+d\,z+e\right)\sinh^v(f\,z+g)\,dz ==$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\pi v-g\,(v-2k)}\,\Gamma(n+1,\,f\,(v-2k)\,z)\,(-f\,(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}+g\,(v-2k)}\,(f\,(v-2k))^{-n-1}\,\Gamma(n+1,\,-f\,(v-2k)\,z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,(m-2k)\,d^2}{4b}-i\,e\,(m-2k)+\frac{i\,m\,\pi}{2}}$$

$$\Bigg(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\Bigg)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{-\frac{i\,(m-2k)\,d^2}{4b}+e\,i\,(m-2k)-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\Bigg)-$$

$$i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{i (f(\nu-2k) - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s) + g(\nu-2k) + \frac{1}{2} i \pi (m+\nu)}$$

$$\Bigg(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f(\nu-2k))^{n-j} (-i d (m-2s) - 2 i b z (m-2s) + f(\nu-2k))^{j+1}$$

$$\left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) + f(\nu-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) + f(\nu-2k))^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} +$$

$$e^{-\frac{i (-i d (m-2s) - f(\nu-2k))^2}{4 b (m-2s)} - i e (m-2s) + \frac{1}{2} i \pi (m-\nu) - g(\nu-2k)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (d i (m-2s) + f(\nu-2k))^{n-j} (-i d (m-2s) -$$

$$2 i b z (m-2s) - f(\nu-2k))^{j+1} \left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) - f(\nu-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) - f(\nu-2k))^2}{4 b (m-2s)} \right) \Bigg) (-i b (m-2s))^{-n-1} +$$

$$e^{\frac{i (d i (m-2s) + f(\nu-2k))^2}{4 b (m-2s)} + e i (m-2s) + g(\nu-2k) + \frac{1}{2} i \pi (\nu-m)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2s) - f(\nu-2k))^{n-j}$$

$$(d i (m-2s) + 2 b i z (m-2s) + f(\nu-2k))^{j+1} \left(\frac{i (d i (m-2s) + 2 b i z (m-2s) + f(\nu-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2s) + 2 b i z (m-2s) + f(\nu-2k))^2}{4 b (m-2s)} \right) +$$

$$e^{\frac{i (i d (m-2s) - f(\nu-2k))^2}{4 b (m-2s)} + e i (m-2s) - g(\nu-2k) - \frac{1}{2} i \pi (m+\nu)} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2k) - i d (m-2s))^{n-j}$$

$$(d i (m-2s) + 2 b i z (m-2s) - f(\nu-2k))^{j+1} \left(\frac{i (d i (m-2s) + 2 b i z (m-2s) - f(\nu-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2s) + 2 b i z (m-2s) - f(\nu-2k))^2}{4 b (m-2s)} \right) \Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu(f\, z + g)\, dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\left(e^{-\frac{1}{2} i \pi \nu - g(\nu - 2k)} \Gamma(n+1, f(\nu-2k) z)(-f(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2} + g(\nu-2k)} (f(\nu-2k))^{-n-1} \Gamma(n+1, -f(\nu-2k) z)\right) +$$

$$2^{-m-2n-\nu-1} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+n-1} (d(m-2k))^{-2(n+1)} \binom{m}{k}$$

$$\left(e^{-\frac{i(m-2k)b^2}{4d} + e\, i(m-2k) - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i\, b(m-2k))^{-h-j+2n} \left(b\, i(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i(m-2k)\left(b\, i(m-2k) + \right.\right.$$

$$\left. 2\, d\, i\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d(m-2k)}\right) + 2\, d\, i(m-2k)$$

$$\left.\left.\sqrt{\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d(m-2k)}\right)\right)\right) +$$

$$e^{\frac{i(m-2k)b^2}{4d} - i\, e(m-2k) + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i\, b(m-2k))^{-h-j+2n} \left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b(m-2k)\right.$$

$$\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{4\, d(m-2k)}\right) -$$

$$2\, i\, d(m-2k) \sqrt{-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \right.$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(e^{\frac{b^2\,(m-2\,s)^2}{4\,(f\,(v-2\,k)-i\,d\,(m-2\,s))}-i\,e\,(m-2\,s)+g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{f\,(v-2\,k)-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{-\frac{\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{f\,(v-2\,k)-i\,d\,(m-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{4\,(f\,(v-2\,k)-i\,d\,(m-2\,s))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),$$

$$-\frac{\left(2\,(f\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{4\,(f\,(v-2\,k)-i\,d\,(m-2\,s))}\Bigg)\Bigg)\Bigg)(f\,(v-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)}+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}+e\,i\,(m-2\,s)+g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}\right)+$$

$$2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+f\,(v-2\,k)}}\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}-i\,e\,(m-2\,s)+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(v-2\,k)}\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{-i\,d\,(m-2\,s)-f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))$$

$$\sqrt{\left(-\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^2\Big/(-i\,d\,(m-2\,s)-f\,(v-2\,k))\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}+e\,i\,(m-2\,s)-g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)}\,(i\,d\,(m-2\,s)-f\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d\,(m-2\,s)-f\,(v-2\,k)}}\right)\right)\;/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z)\sinh^v\left(c\,z^r\right)$

01.19.21.2910.01

$$\int z^n \sin^m(b z) \sinh^\nu(c z^2)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, -c(\nu-2k) z^2\right) \left(-c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i\pi\nu} \left(c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2k) z^2\right)\right)\right)$$

$$z^{n+1} + \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m\pi}{2}} \Gamma(n+1, i b(m-2k) z) (-i b(m-2k))^{-n-1} + e^{-\frac{i m\pi}{2}} (i b(m-2k))^{-n-1} \Gamma(n+1, -i b(m-2k) z)\right) -$$

$$i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{b^2 (m-2k)^2}{4c(\nu-2s)} - \frac{i\pi\nu}{2} + \frac{i m\pi}{2}} \right.$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (i b(m-2k))^{n-j} (-i b(m-2k) - 2c(\nu-2s) z)^{j+1} \left(\frac{(-i b(m-2k) - 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i b(m-2k) - 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) (-c(\nu-2s))^{-n-1} + e^{-\frac{b^2 (m-2k)^2}{4c(\nu-2s)} - \frac{i\pi\nu}{2} - \frac{i m\pi}{2}}$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (-i b(m-2k))^{n-j} (i b(m-2k) - 2c(\nu-2s) z)^{j+1} \left(\frac{(i b(m-2k) - 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i b(m-2k) - 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) (-c(\nu-2s))^{-n-1} + e^{\frac{b^2 (m-2k)^2}{4c(\nu-2s)} + \frac{i\pi\nu}{2} + \frac{i m\pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (i b(m-2k))^{n-j} (2c(\nu-2s) z - i b(m-2k))^{j+1} \left(-\frac{(2c(\nu-2s) z - i b(m-2k))^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2c(\nu-2s) z - i b(m-2k))^2}{4c(\nu-2s)}\right) + e^{\frac{b^2 (m-2k)^2}{4c(\nu-2s)} + \frac{i\pi\nu}{2} - \frac{i m\pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i b(m-2k))^{n-j} (b i(m-2k) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(b i(m-2k) + 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b i(m-2k) + 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2911.01

$$\int z^n \sin^m(b\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i m\pi}{2}}\Gamma(n+1,\, i\,b\,(m-2k)\,z)\,(-i\,b\,(m-2k))^{-n-1} + e^{-\frac{i m\pi}{2}}(i\,b\,(m-2k))^{-n-1}\,\Gamma(n+1,\, -i\,b\,(m-2k)\,z)\right)+$$

$$2^{-m-\nu+1} i^{-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+n}(i\,c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}$$

$$\left(e^{\frac{i\pi\nu}{2}}\Gamma\left(2(n+1),\, -c\,(\nu-2k)\sqrt{z}\right)+e^{-\frac{1}{2} i\pi\nu}\,\Gamma\left(2(n+1),\, c\,(\nu-2k)\sqrt{z}\right)\right)+2^{-m-2n-\nu-1} i^{-\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{i c^2(\nu-2s)^2}{4b(m-2k)}-\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-2\,i\,b\sqrt{z}\,(m-2k)-\right.\right.\right.$$

$$\left.c\,(\nu-2s)\right)^{h+j}\left(-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2s)\right.$$

$$\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,b\,(m-2k)}\right)-$$

$$2\,i\,b\,(m-2k)\sqrt{-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{b\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,b\,(m-2k)}\right)\right)\right)(-i\,b\,(m-2k))^{-2(n+1)}+$$

$$e^{-\frac{i c^2(\nu-2s)^2}{4b(m-2k)}+\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)-2\,i\,b\,(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(c\,(\nu-2s)-2\,i\,b\,(m-2k)\sqrt{z}\right)^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)-\right.$$

$$2\,i\,b\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\right)\right)\right)(-i\,b\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,b\,(m-2\,k)}-\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,b\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,i\,b\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,b\,(m-2\,k)}+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)+\right.$$

$$2\,b\,i\,(m-2\,k)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}\right)\right)\;/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh^v(c\,z^r)$

01.19.21.2912.01

$$\int z^n \sin^m(e+d\,z)\sinh^\nu(c\,z^2)\,dz = -i^{-\nu}\,2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\!\left(\frac{n+1}{2},-c\,(\nu-2k)\,z^2\right)\left(-c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-\frac{1}{2}i\pi\nu}\left(c\,(\nu-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},c\,(\nu-2k)\,z^2\right)\right)\right)$$

$$z^{n+1}+\frac{i^{-\nu}\left(2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i m\pi}{2}-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)-\frac{i m\pi}{2}}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)-i^{-\nu}\,2^{-m-\nu-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}-i\,e\,(m-2k)-\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^{j+1}\right.\right.$$

$$\left.\left.\left(\frac{(-i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(-i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)\right.$$

$$(-c\,(\nu-2s))^{-n-1}+e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}+e\,i\,(m-2k)-\frac{i\pi\nu}{2}-\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^{j+1}\right.$$

$$\left.\left(\frac{(i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(i\,d\,(m-2k)-2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)$$

$$(-c\,(\nu-2s))^{-n-1}+e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}-i\,e\,(m-2k)+\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\,(c\,(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(2c\,(\nu-2s)\,z-i\,d\,(m-2k))^{j+1}\left(-\frac{(2c\,(\nu-2s)\,z-i\,d\,(m-2k))^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2c\,(\nu-2s)\,z-i\,d\,(m-2k))^2}{4c\,(\nu-2s)}\right)+e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}+e\,i\,(m-2k)+\frac{i\pi\nu}{2}-\frac{i m\pi}{2}}\,(c\,(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2c\,(\nu-2s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+2c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+2c\,(\nu-2s)\,z)^2}{4c\,(\nu-2s)}\right)\right)\Bigg/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2913.01

$$\int z^n \sin^m(e+d\,z)\sinh^\nu\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} +$$

$$(-1)^n 2^{-m-\nu} i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(e^{\frac{i m\pi}{2}-i e(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} +$$

$$e^{i e(m-2k)-\frac{i m\pi}{2}}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\Big) + 2^{-m-\nu+1} i^{-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\left(2(n+1),\,-c\,(\nu-2k)\sqrt{z}\right)+e^{-\frac{1}{2}i\pi\nu}\,\Gamma\left(2(n+1),\,c\,(\nu-2k)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-\nu-1} i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}$$

$$\Bigg(e^{-\frac{i c^2(\nu-2s)^2}{4 d(m-2k)}-i e(m-2k)-\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^{h+j}$$

$$\left(-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(\nu-2s)$$

$$\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-2\,i\,d\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,d\,(m-2k)}\Bigg)\Bigg)\Bigg)(-i\,d\,(m-2k))^{-2(n+1)} +$$

$$e^{-\frac{i c^2(\nu-2s)^2}{4 d(m-2k)}-i e(m-2k)+\frac{i\pi\nu}{2}+\frac{i m\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)-2\,i\,d\,(m-2k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2s)^2}{4\,d\,(m-2\,k)}+e\,i\,(m-2\,k)-\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2s)^2}{4\,d\,(m-2\,k)}+e\,i\,(m-2\,k)+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)+\right.$$

$$2\,d\,i\,(m-2\,k)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(2\,d\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m(b\,z^r)\sinh^v(c\,z^r)$

01.19.21.2914.01

$$\int z^{\alpha-1}\sin^m(b\,z^r)\sinh^v(c\,z^r)\,dz ==$$

$$\frac{i^{-v}\left((-1)^m\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{\alpha}-\frac{1}{r}\left(i^{-m-v}\,2^{-m-v}\,z^\alpha\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\right.$$

$$\left.\left((-1)^m\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b\,m-2\,i\,b\,k)\,z^r\right)\left((i\,b\,m-2\,i\,b\,k)\,z^r\right)^{-\frac{\alpha}{r}}+\left((2\,i\,b\,k-i\,b\,m)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)\right)-$$

$$\frac{1}{r}\left((-1)^{m+v}\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(\Gamma\!\left(\frac{\alpha}{r},\,(c\,v-2\,c\,k)\,z^r\right)\left((c\,v-2\,c\,k)\,z^r\right)^{-\frac{\alpha}{r}}+\right.\right.$$

$$\left.\left.(-1)^v\left((2\,c\,k-c\,v)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,c\,k-c\,v)\,z^r\right)\right)\right)-\frac{2^{-m-v}\,i^{-m}\,z^\alpha}{r}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^{m+v}\,\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)\,z^r\right)\left((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)\,z^r\right)^{-\frac{\alpha}{r}}+\right.$$

$$(-1)^v\left((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)\,z^r\right)+$$

$$(-1)^m\left((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)\,z^r\right)+$$

$$\left.\left((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)\,z^r\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2915.01

$$\int z^n \sin^m(b z^2) \sinh^\nu(c z^2)\, dz = \frac{i^{-\nu} \left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} -$$
$$i^{-m-\nu} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$\left.\left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) -$$
$$(-1)^{m+\nu} 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (c \nu - 2 c k) z^2\right) \left((c \nu - 2 c k) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$\left.(-1)^\nu \left((2 c k - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - c \nu) z^2\right)\right) - i^{-m} 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$(-1)^\nu \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) +$$
$$(-1)^m \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) +$$
$$\left.\left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2916.01

$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-m-\nu}\, 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}(2\,i\,b\,k-i\,b\,m)^{-2(n+1)}\left((-1)^m\,\Gamma\left(2(n+1),\,(i\,b\,m-2\,i\,b\,k)\sqrt{z}\right)+\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right)-$$
$$(-1)^{m+\nu}\,2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(2\,c\,k-c\,\nu)^{-2(n+1)}$$
$$\left(\Gamma\left(2(n+1),\,(c\,\nu-2\,c\,k)\sqrt{z}\right)+(-1)^\nu\,\Gamma\left(2(n+1),\,(2\,c\,k-c\,\nu)\sqrt{z}\right)\right)-i^{-m}\,2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}\,\Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}+\right.$$
$$(-1)^\nu\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)+$$
$$(-1)^m\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)+$$
$$\left.(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}\,\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m\left(b\,z^r+e\right)\sinh^\nu\left(c\,z^r\right)$

01.19.21.2917.01

$$\int z^{\alpha-1}\sin^m(b z^r+e)\sinh^\nu(c z^r)\,dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{\alpha} -$$

$$\frac{1}{r}\left(i^{-m-\nu} 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m e^{2iek-iem}\,\Gamma\!\left(\frac{\alpha}{r},(i b m-2 i b k) z^r\right)((i b m-2 i b k) z^r)^{-\frac{\alpha}{r}} + \right.\right.$$

$$\left.\left. e^{iem-2iek}((2 i b k-i b m) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2 i b k-i b m) z^r\right)\right)\right) -$$

$$\frac{1}{r}\left((-1)^{m+\nu} 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\Gamma\!\left(\frac{\alpha}{r},(c\nu-2ck) z^r\right)((c\nu-2ck) z^r)^{-\frac{\alpha}{r}} + \right.\right.$$

$$\left.\left.(-1)^\nu((2ck-c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2ck-c\nu) z^r\right)\right)\right) - \frac{2^{-m-\nu} i^{-m}(-1)^\nu z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^m e^{2iek-iem}\,\Gamma\!\left(\frac{\alpha}{r},(-2bik+ibm-2cs+c\nu) z^r\right)((-2bik+ibm-2cs+c\nu) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$e^{iem-2iek}((2ibk-ibm-2cs+c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2ibk-ibm-2cs+c\nu) z^r\right) +$$

$$(-1)^{m+\nu} e^{2iek-iem}((-2bik+ibm+2cs-c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(-2bik+ibm+2cs-c\nu) z^r\right) +$$

$$\left.(-1)^\nu e^{iem-2iek}((2ibk-ibm+2cs-c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},(2ibk-ibm+2cs-c\nu) z^r\right)\right)\;/;\; m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2918.01

$$\int z^n \sin^m\left(b z^2+e\right) \sinh^\nu\left(c z^2\right) dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-m-\nu} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m - 2 i e k} \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) - (-1)^{m+\nu} 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (c\nu - 2ck) z^2\right) \left((c\nu - 2ck) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu \left((2ck - c\nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2ck - c\nu) z^2\right)\right) - i^{-m} (-1)^\nu 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m - 2 i e k} \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) + (-1)^{m+\nu} e^{2 i e k - i e m} \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) + (-1)^\nu e^{i e m - 2 i e k} \left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2919.01

$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} -$$
$$i^{-m-\nu} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (2 i b k - i b m)^{-2(n+1)} \left((-1)^m e^{2 i e k - i e m} \Gamma\left(2(n+1), (i b m - 2 i b k)\sqrt{z}\right) +\right.$$
$$\left. e^{i e m - 2 i e k} \Gamma\left(2(n+1), (2 i b k - i b m)\sqrt{z}\right)\right) - (-1)^{m+\nu} 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (2 c k - c \nu)^{-2(n+1)} \left(\Gamma\left(2(n+1), (c \nu - 2 c k)\sqrt{z}\right) + (-1)^\nu \Gamma\left(2(n+1), (2 c k - c \nu)\sqrt{z}\right)\right) -$$
$$i^{-m} 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} e^{2 i e k - i e m} \Gamma\left(2(n+1), (-2 b i k + i b m - 2 c s + c \nu)\sqrt{z}\right)\right.$$
$$(-2 b i k + i b m - 2 c s + c \nu)^{-2(n+1)} + (-1)^\nu e^{i e m - 2 i e k} (2 i b k - i b m - 2 c s + c \nu)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (2 i b k - i b m - 2 c s + c \nu)\sqrt{z}\right) + (-1)^m e^{2 i e k - i e m} (-2 b i k + i b m + 2 c s - c \nu)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-2 b i k + i b m + 2 c s - c \nu)\sqrt{z}\right) + e^{i e m - 2 i e k} (2 i b k - i b m + 2 c s - c \nu)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (2 i b k - i b m + 2 c s - c \nu)\sqrt{z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^n \sin^m\left(b z^r + d z\right) \sinh^\nu\left(c z^r\right)$

01.19.21.2920.01

$$\int z^n \sin^m\left(b z^2 + d z\right) \sinh^\nu\left(c z^2\right) dz ==$$
$$-i^{-\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i \pi \nu}{2}} \Gamma\left(\frac{n+1}{2}, -c(\nu-2k) z^2\right) \left(-c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} +\right.\right.$$
$$\left.\left. e^{-\frac{1}{2} i \pi \nu} \left(c(\nu-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2k) z^2\right)\right)\right) z^{n+1} +$$
$$\frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i(m-2k)d^2}{4b} + \frac{i m \pi}{2}}\right.$$
$$\left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1} \left(-\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{b (m-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{4 b (m-2k)}\right)\right) (-i b (m-2k))^{-n-1} +$$

$$e^{-\frac{i(m-2k)d^2}{4b}-\frac{i m\pi}{2}}(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2k))^{n-j}(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\ \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\Bigg)-$$

$$i^{-\nu}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{-\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu}-2\pi(m+\nu)\right)}\left(\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2s))^{n-j}(2\,(c\,(\nu-2k)-i\,b\,(m-\right.\right.$$

$$2s))\,z-i\,d\,(m-2s))^{j+1}\left(-\frac{(2\,(c\,(\nu-2k)-i\,b\,(m-2s))\,z-i\,d\,(m-2s))^2}{c\,(\nu-2k)-i\,b\,(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2\,(c\,(\nu-2k)-i\,b\,(m-2s))\,z-i\,d\,(m-2s))^2}{4\,(c\,(\nu-2k)-i\,b\,(m-2s))}\right)\right)(c\,(\nu-2k)-i\,b\,(m-2s))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,\nu}+2\pi(\nu-m)\right)}(b\,i\,(m-2s)+c\,(\nu-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2s))^{n-j}(d\,i\,(m-2s)+$$

$$2\,(b\,i\,(m-2s)+c\,(\nu-2k))\,z)^{j+1}\left(-\frac{(d\,i\,(m-2s)+2\,(b\,i\,(m-2s)+c\,(\nu-2k))\,z)^2}{b\,i\,(m-2s)+c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2s)+2\,(b\,i\,(m-2s)+c\,(\nu-2k))\,z)^2}{4\,(b\,i\,(m-2s)+c\,(\nu-2k))}\right)+e^{\frac{1}{4}i\left(2\pi(m-\nu)-\frac{d^2(m-2s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,\nu}\right)}$$

$$(-i\,b\,(m-2s)-c\,(\nu-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2s))^{n-j}(2\,(-i\,b\,(m-2s)-c\,(\nu-2k))\,z-i\,d\,(m-2s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2s)-c\,(\nu-2k))\,z-i\,d\,(m-2s))^2}{-i\,b\,(m-2s)-c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2\,(-i\,b\,(m-2s)-c\,(\nu-2k))\,z-i\,d\,(m-2s))^2}{4\,(-i\,b\,(m-2s)-c\,(\nu-2k))}\right)+e^{\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,\nu}-2\pi(m+\nu)\right)}$$

$$(i\,b\,(m-2s)-c\,(\nu-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2s))^{n-j}(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(\nu-2k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(\nu-2k))\,z)^2}{i\,b\,(m-2s)-c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\left.\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(\nu-2k))\,z)^2}{4\,(i\,b\,(m-2s)-c\,(\nu-2k))}\right)\right)\right)\text{/; } n\in\mathbb{N}\land m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(c\sqrt{z}\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (\nu - 2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right) c^{-2(n+1)} +$$

$$\frac{i^{-\nu}\, 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$(i\, d\, (m-2k))^{-2(n+1)} \left(e^{-\frac{i(m-2k)b^2}{4d} - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2k))^{-h-j+2n} \left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^{h+j} \right.$$

$$\left(\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2k) \left(b\, i\, (m-2k) + \right.\right.$$

$$\left. 2\, d\, i\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right) + 2\, d\, i\, (m-2k)$$

$$\left.\sqrt{\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right)\right) +$$

$$e^{\frac{i(m-2k)b^2}{4d} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2k))^{-h-j+2n} \left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\, (m-2k) \right.$$

$$\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right) -$$

$$2\, i\, d\, (m-2k) \sqrt{-\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.\left. - \frac{i\left(-i\, b\,(m-2\,k) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,k)\right)^2}{4\, d\,(m-2\,k)}\right)\right)\right)\right) +$$

$$2^{-m-2\,n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} (i\, d\,(m-2\,s))^{-2\,(n+1)} \left(e^{\frac{1}{2}\, i\, \pi\,(m+v) - \frac{i\,(c\,(v-2\,k) - i\, b\,(m-2\,s))^2}{4\, d\,(m-2\,s)}} \right.$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(v-2\,k) - i\, b\,(m-2\,s))^{-h-j+2\,n} \left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((c\,(v-2\,k) - i\, b\,(m-2\,s)) \left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right) \right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1), -\frac{i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right)^2}{4\, d\,(m-2\,s)}\right) - 2\, i\, d\,(m-2\,s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,s)} \left(i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right)^2\right)\right)}\, \Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left. -\frac{i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) + c\,(v-2\,k)\right)^2}{4\, d\,(m-2\,s)}\right)\right)\right) + e^{\frac{1}{2}\, i\, \pi\,(m-v) - \frac{i\,(-i\, b\,(m-2\,s) - c\,(v-2\,k))^2}{4\, d\,(m-2\,s)}}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2\,s) - c\,(v-2\,k))^{-h-j+2\,n} \left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) - c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) - c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((-i\, b\,(m-2\,s) - c\,(v-2\,k)) \left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) - c\,(v-2\,k)\right) \right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1), -\frac{i\left(-i\, b\,(m-2\,s) - 2\, i\, d\, \sqrt{z}\,\, (m-2\,s) - c\,(v-2\,k)\right)^2}{4\, d\,(m-2\,s)}\right) -$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+\frac{1}{2}\,i\,\pi\,(v-m)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\right.$$

$$\left.i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}}\right)\right)\,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r + d\,z + e)\sinh^v(c\,z^r)$

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$$\int z^n \sin^m\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2\right)dz = -i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\right.$$

$$\left.\left(e^{\frac{i\pi v}{2}}\,\Gamma\left(\frac{n+1}{2}, -c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-\frac{1}{2}i\pi v}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c\,(v-2k)\,z^2\right)\right)\right)$$

$$z^{n+1}+\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}-i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}$$

$$(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i(m-2k)d^2}{4b}-i\,e\,(m-2k)+\frac{i\,m\,\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{-\frac{i(m-2k)d^2}{4b}+e\,i\,(m-2k)-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg(e^{-\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2ick-bm+2bs-icv}+4e(m-2s)-2\pi(m+v)\right)}$$

$$\left(\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2s))^{n-j}\,(2\,(c\,(v-2k)-i\,b\,(m-2s))\,z-i\,d\,(m-2s))^{j+1}\right.$$

$$\left(-\frac{(2\,(c\,(v-2k)-i\,b\,(m-2s))\,z-i\,d\,(m-2s))^2}{c\,(v-2k)-i\,b\,(m-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},-\frac{(2\,(c\,(v-2k)-i\,b\,(m-2s))\,z-i\,d\,(m-2s))^2}{4\,(c\,(v-2k)-i\,b\,(m-2s))}\right)\right)(c\,(v-2k)-i\,b\,(m-2s))^{-n-1}+$$

$$e^{-\frac{1}{4}i\left(-\frac{d^2(m-2s)^2}{-2cik-bm+2bs+icv}-4e(m-2s)-2\pi(v-m)\right)}(b\,i\,(m-2s)+c\,(v-2k))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2s))^{n-j}\,(d\,i\,(m-2s)+2\,(b\,i\,(m-2s)+c\,(v-2k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2s)+2\,(b\,i\,(m-2s)+c\,(v-2k))\,z)^2}{b\,i\,(m-2s)+c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2s)+2\,(b\,i\,(m-2s)+c\,(v-2k))\,z)^2}{4\,(b\,i\,(m-2s)+c\,(v-2k))}\right)+e^{\frac{1}{4}i\left(-\frac{d^2(m-2s)^2}{-2cik-bm+2bs+icv}-4e(m-2s)+2\pi(m-v)\right)}$$

$$(-i\,b\,(m-2s)-c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i\,d\,(m-2s))^{n-j}\,(2\,(-i\,b\,(m-2s)-c\,(v-2k))\,z-i\,d\,(m-2s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2s)-c\,(v-2k))\,z-i\,d\,(m-2s))^2}{-i\,b\,(m-2s)-c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2\,(-i\,b\,(m-2s)-c\,(v-2k))\,z-i\,d\,(m-2s))^2}{4\,(-i\,b\,(m-2s)-c\,(v-2k))}\right)+e^{\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2ick-bm+2bs-icv}+4e(m-2s)-2\pi(m+v)\right)}$$

$$(i\,b\,(m-2s)-c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d\,(m-2s))^{n-j}\,(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(v-2k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(v-2k))\,z)^2}{i\,b\,(m-2s)-c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2s)+2\,(i\,b\,(m-2s)-c\,(v-2k))\,z)^2}{4\,(i\,b\,(m-2s)-c\,(v-2k))}\right)\right)\text{/; } n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b+e+d\, z\right) \sinh^\nu\left(c\sqrt{z}\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (\nu-2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right) c^{-2(n+1)} +$$

$$\frac{i^{-\nu}\, 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} +$$

$$2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (i\, d\,(m-2k))^{-2(n+1)}$$

$$\Bigg(e^{-\frac{i(m-2k)b^2}{4d} + e\, i(m-2k) - \frac{i m\pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(m-2k))^{-h-j+2n} \left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i\,(m-2k) \left(b\, i\,(m-2k) + \right.$$

$$\left. 2\, d\, i\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right) + 2\, d\, i\,(m-2k)$$

$$\sqrt{\frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right)\Bigg) +$$

$$e^{\frac{i(m-2k)b^2}{4d} - i\, e\,(m-2k) + \frac{i m\pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2k))^{-h-j+2n} \left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i\, b\,(m-2k)$$

$$\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right) -$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\right)\right)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}(i\,d\,(m-2s))^{-2(n+1)}\left(e^{-\frac{i(c(v-2k)-i\,b(m-2s))^2}{4\,d\,(m-2s)}-i\,e\,(m-2s)+\frac{1}{2}i\,\pi\,(m+v)}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k)-i\,b\,(m-2s))^{-h-j+2n}\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2k)-i\,b\,(m-2s))\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)-2\,i\,d\,(m-2s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2s)}\left(i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2\right)\right)}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)\right)+e^{-\frac{i(-i\,b(m-2s)-c(v-2k))^2}{4\,d\,(m-2s)}-i\,e\,(m-2s)+\frac{1}{2}i\,\pi\,(m-v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s)-c\,(v-2k))^{-h-j+2n}\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b\,(m-2s)-c\,(v-2k))\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)-2\,i\,d\,(m-2s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2s)}\left(i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2\right)\right)}\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{i\left(-i\,b\,(m-2s)-2\,i\,d\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)\right)+e^{\frac{i\,(b\,i\,(m-2s)+c\,(v-2k))^2}{4\,d\,(m-2s)}+e\,i\,(m-2s)+\frac{1}{2}\,i\,\pi\,(v-m)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(v-2k))^{-h-j+2n}\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(m-2s)+c\,(v-2k))\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\left.\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)+c\,(v-2k)\right)^2}{d\,(m-2s)}}\right)+e^{\frac{i\,(i\,b\,(m-2s)-c\,(v-2k))^2}{4\,d\,(m-2s)}+e\,i\,(m-2s)-\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s)-c\,(v-2k))^{-h-j+2n}\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2s)-c\,(v-2k))\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}}\right)\right) /; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2924.01

$$\int z^n \sin^m(d\,z)\sinh^v\left(c\,z^2+g\right)dz =$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g\,(v-2k)}\,\Gamma\left(\frac{n+1}{2}, -c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v-g\,(v-2k)}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i m\pi}{2}}\,\Gamma(n+1, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{-\frac{i m\pi}{2}}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1, -i\,d\,(m-2k)\,z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{d^2(m-2k)^2}{4c(v-2s)}-g\,(v-2s)-\frac{i\pi v}{2}+\frac{i m\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)(-c\,(v-2s))^{-n-1}+e^{-\frac{d^2(m-2k)^2}{4c(v-2s)}-g\,(v-2s)-\frac{i\pi v}{2}-\frac{i m\pi}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(i\,d\,(m-2\,k)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{d^2\,(m-2\,k)^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)+\frac{i\,m\,\pi}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(2\,c\,(v-2\,s)\,z-i\,d\,(m-2\,k))^{j+1}$$

$$\left(-\frac{(2\,c\,(v-2\,s)\,z-i\,d\,(m-2\,k))^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2\,c\,(v-2\,s)\,z-i\,d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{d^2\,(m-2\,k)^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)-\frac{i\,m\,\pi}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.2925.01

$$\int z^n\sin^m(d\,z)\sinh^v\left(\sqrt{z}\;c+g\right)dz = \frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma(n+1, i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1, -i\,d\,(m-2\,k)\,z)\right)+$$

$$2^{-m-v+1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,\Gamma\left(2\,(n+1), -c\,(v-2\,k)\sqrt{z}\right)+e^{-\frac{1}{2}i\,\pi\,v-g\,(v-2\,k)}\,\Gamma\left(2\,(n+1), c\,(v-2\,k)\sqrt{z}\right)\right)+2^{-m-2\,n-v-1}\,i^{-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\,\Big(-2\,i\,d\sqrt{z}\;(m-2\,k)-$$

$$c\,(v-2\,s)\Big)^{h+j}\left(-\frac{i\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,s)$$

$$\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left(2\,i\,d\,(m-2k)\sqrt{z}-c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)+$$

$$e^{\frac{c^2\,i\,(v-2s)^2}{4\,d\,(m-2k)}+g\,(v-2s)+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2s))^{-h-j+2n}$$

$$\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^{h+j}\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2s)\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)+$$

$$2\,d\,i\,(m-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)$$

$$\sqrt{\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh^v\left(c\,z^r+g\right)$

01.19.21.2926.01

$$\int z^n\sin^m(e+d\,z)\sinh^v\left(c\,z^2+g\right)dz==$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g\,(v-2k)}\,\Gamma\left(\frac{n+1}{2},\,-c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v-g\,(v-2k)}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},\,c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+\right.$$

$$\left.e^{i\,e\,(m-2k)-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)-$$

$$i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{-\frac{d^2 (m-2k)^2}{4 c (\nu-2s)} - i e (m-2k) - g(\nu-2s) - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}}$$

$$\Bigg(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 c (\nu-2s) z)^{j+1} \left(\frac{(-i d (m-2k) - 2 c (\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i d (m-2k) - 2 c (\nu-2s) z)^2}{4 c (\nu-2s)} \right) \Bigg) (-c(\nu-2s))^{-n-1} +$$

$$e^{-\frac{d^2 (m-2k)^2}{4 c (\nu-2s)} + e\, i (m-2k) - g(\nu-2s) - \frac{i \pi \nu}{2} - \frac{i m \pi}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (i d (m-2k) - 2 c (\nu-2s) z)^{j+1}$$

$$\left(\frac{(i d (m-2k) - 2 c (\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i d (m-2k) - 2 c (\nu-2s) z)^2}{4 c (\nu-2s)} \right) \Bigg)$$

$$(-c(\nu-2s))^{-n-1} + e^{\frac{d^2 (m-2k)^2}{4 c (\nu-2s)} - i e (m-2k) + \frac{i \pi \nu}{2} + g(\nu-2s) + \frac{i m \pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (2 c (\nu-2s) z - i d (m-2k))^{j+1} \left(-\frac{(2 c (\nu-2s) z - i d (m-2k))^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2 c (\nu-2s) z - i d (m-2k))^2}{4 c (\nu-2s)} \right) + e^{\frac{d^2 (m-2k)^2}{4 c (\nu-2s)} + e\, i (m-2k) + \frac{i \pi \nu}{2} + g(\nu-2s) - \frac{i m \pi}{2}} (c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d\, i (m-2k) + 2 c (\nu-2s) z)^{j+1} \left(-\frac{(d\, i (m-2k) + 2 c (\nu-2s) z)^2}{c(\nu-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d\, i (m-2k) + 2 c (\nu-2s) z)^2}{4 c (\nu-2s)} \right) \Bigg) \Bigg) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2927.01

$$\int z^n \sin^m(d z + e) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = \frac{i^{-\nu} \left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2) \right)}{n+1} +$$

$$(-1)^n 2^{-m-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{\frac{i m \pi}{2} - i e (m-2k)} \Gamma(n+1, i d (m-2k) z) (-i d (m-2k))^{-n-1} +$$

$$e^{i e (m-2k) - \frac{i m \pi}{2}} (i d (m-2k))^{-n-1} \Gamma(n+1, -i d (m-2k) z) \Bigg) +$$

$$2^{-m-\nu+1} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+n} (i c (\nu-2k))^{-2(n+1)} \binom{\nu}{k} \Bigg(e^{\frac{i \pi \nu}{2} + g(\nu-2k)} \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) +$$

$$e^{-\frac{1}{2} i \pi \nu - g(\nu-2k)} \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\Big) + 2^{-m-2n-\nu-1} i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{i c^2 (\nu-2s)^2}{4 d (m-2k)} - g(\nu-2s) - i e(m-2k) - \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(\nu-2s))^{-h-j+2n} \left(-2 i d \sqrt{z}\,(m-2k) - \right.\right.\right.$$

$$\left. c(\nu-2s)\right)^{h+j} \left(-\frac{i\left(-2 i d \sqrt{z}\,(m-2k) - c(\nu-2s)\right)^2}{d(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c(\nu-2s) \right.$$

$$\left(-2 i d \sqrt{z}\,(m-2k) - c(\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-2 i d \sqrt{z}\,(m-2k) - c(\nu-2s)\right)^2}{4 d(m-2k)} \right) -$$

$$2 i d(m-2k) \sqrt{-\frac{i\left(-2 i d \sqrt{z}\,(m-2k) - c(\nu-2s)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \right.$$

$$\left.\left.\left. -\frac{i\left(-2 i d \sqrt{z}\,(m-2k) - c(\nu-2s)\right)^2}{4 d(m-2k)} \right)\right)\right) (-i d(m-2k))^{-2(n+1)} +$$

$$e^{-\frac{i c^2 (\nu-2s)^2}{4 d(m-2k)} + g(\nu-2s) - i e(m-2k) + \frac{i \pi \nu}{2} + \frac{i m \pi}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2s))^{-h-j+2n} \left(c(\nu-2s) - 2 i d(m-2k)\sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(c(\nu-2s) - 2 i d(m-2k)\sqrt{z}\right)^2}{d(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c(\nu-2s) \right.$$

$$\left(c(\nu-2s) - 2 i d(m-2k)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c(\nu-2s) - 2 i d(m-2k)\sqrt{z}\right)^2}{4 d(m-2k)} \right) -$$

$$2 i d(m-2k) \sqrt{-\frac{i\left(c(\nu-2s) - 2 i d(m-2k)\sqrt{z}\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \right.$$

$$-\frac{i\left(c(v-2s)-2id(m-2k)\sqrt{z}\right)^2}{4d(m-2k)}\Bigg)\Bigg)\Bigg)(-id(m-2k))^{-2(n+1)}+$$

$$e^{\frac{c^2 i(v-2s)^2}{4d(m-2k)}-g(v-2s)+ei(m-2k)-\frac{i\pi v}{2}-\frac{im\pi}{2}}(id(m-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}$$

$$\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)^{h+j}\left(\frac{i\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2id(m-2k)\sqrt{\frac{i\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)^2}{d(m-2k)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)^2}{4d(m-2k)}\right)-c(v-2s)$$

$$\left.\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(2id(m-2k)\sqrt{z}-c(v-2s)\right)^2}{4d(m-2k)}\right)\right)+$$

$$e^{\frac{c^2 i(v-2s)^2}{4d(m-2k)}+g(v-2s)+ei(m-2k)+\frac{i\pi v}{2}-\frac{im\pi}{2}}(id(m-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2s))^{-h-j+2n}$$

$$\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)^{h+j}\left(\frac{i\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c(v-2s)\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)^2}{4d(m-2k)}\right)+\right.$$

$$2di(m-2k)\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)^2}{4d(m-2k)}\right)$$

$$\left.\sqrt{\frac{i\left(2di\sqrt{z}(m-2k)+c(v-2s)\right)^2}{d(m-2k)}}\right)\Bigg)\text{/; }n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1} \sin^m(b z^r) \sinh^\nu(c z^r + g)$

01.19.21.2928.01

$$\int z^{\alpha-1} \sin^m(b z^r) \sinh^\nu(c z^r + g) \, dz =$$

$$\frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{\alpha} - \frac{1}{r}\left(i^{-m-\nu} 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}\right.$$

$$\left.\left((-1)^m \Gamma\left(\frac{\alpha}{r}, (i b m - 2 i b k) z^r\right) ((i b m - 2 i b k) z^r)^{-\frac{\alpha}{r}} + ((2 i b k - i b m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m) z^r\right)\right)\right) -$$

$$\frac{1}{r}\left((-1)^{m+\nu} 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2 g k - g \nu} \Gamma\left(\frac{\alpha}{r}, (c \nu - 2 c k) z^r\right) ((c \nu - 2 c k) z^r)^{-\frac{\alpha}{r}} +\right.\right.$$

$$\left.\left.(-1)^\nu e^{g \nu - 2 g k} ((2 c k - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 c k - c \nu) z^r\right)\right)\right) - \frac{2^{-m-\nu} i^{-m} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} e^{2 g s - g \nu} \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m - 2 c s + c \nu) z^r\right) ((-2 b i k + i b m - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} +\right.$$

$$(-1)^\nu e^{2 g s - g \nu} ((2 i b k - i b m - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m - 2 c s + c \nu) z^r\right) +$$

$$(-1)^m e^{g \nu - 2 g s} ((-2 b i k + i b m + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m + 2 c s - c \nu) z^r\right) +$$

$$\left.e^{g \nu - 2 g s} ((2 i b k - i b m + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m + 2 c s - c \nu) z^r\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2929.01

$$\int z^n \sin^m\left(b z^2\right) \sinh^\nu\left(c z^2+g\right) dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} -$$

$$i^{-m-\nu} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right)\left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) -$$

$$(-1)^{m+\nu} 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2gk-g\nu} \Gamma\left(\frac{n+1}{2}, (c\nu - 2ck) z^2\right)\left((c\nu - 2ck) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu e^{g\nu-2gk} \left((2ck - c\nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2ck - c\nu) z^2\right)\right) -$$

$$i^{-m} 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} e^{2gs-g\nu} \Gamma\left(\frac{n+1}{2}, (-2bik + ibm - 2cs + c\nu) z^2\right) \left((-2bik + ibm - 2cs + c\nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu e^{2gs-g\nu} \left((2ibk - ibm - 2cs + c\nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2ibk - ibm - 2cs + c\nu) z^2\right) + (-1)^m e^{g\nu-2gs} \left((-2bik + ibm + 2cs - c\nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2bik + ibm + 2cs - c\nu) z^2\right) + e^{g\nu-2gs} \left((2ibk - ibm + 2cs - c\nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2ibk - ibm + 2cs - c\nu) z^2\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.2930.01

$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-m-\nu} 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}(i\,b\,m-2\,i\,b\,k)^{-2(n+1)}\left((-1)^m\,\Gamma\left(2(n+1),(i\,b\,m-2\,i\,b\,k)\sqrt{z}\right)+\Gamma\left(2(n+1),(2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right)-$$

$$(-1)^{m+\nu}2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(2\,c\,k-c\,\nu)^{-2(n+1)}\left(e^{2\,g\,k-g\,\nu}\,\Gamma\left(2(n+1),(c\,\nu-2\,c\,k)\sqrt{z}\right)+(-1)^\nu\,e^{g\,\nu-2\,g\,k}\,\Gamma\left(2(n+1),(2\,c\,k-c\,\nu)\sqrt{z}\right)\right)-$$

$$i^{-m}2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}\,e^{2\,g\,s-g\,\nu}\,\Gamma\left(2(n+1),(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)\right.$$

$$(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}+(-1)^\nu\,e^{2\,g\,s-g\,\nu}\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}$$

$$\Gamma\left(2(n+1),(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)+(-1)^m\,e^{g\,\nu-2\,g\,s}\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}$$

$$\Gamma\left(2(n+1),(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)+e^{g\,\nu-2\,g\,s}\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}$$

$$\left.\Gamma\left(2(n+1),(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\sin^m\left(b\,z^r+e\right)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.2931.01

$$\int z^{\alpha-1}\sin^m(b\,z^r+e)\sinh^\nu(c\,z^r+g)\,dz = \frac{i^{-\nu}\left((-1)^m\,2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2)\right)}{\alpha} - \frac{1}{r}\left(i^{-m-\nu}\,2^{-m-\nu}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left((-1)^m\,e^{2\,i\,e\,k-i\,e\,m}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b\,m-2\,i\,b\,k)\,z^r\right)\left((i\,b\,m-2\,i\,b\,k)\,z^r\right)^{-\frac{\alpha}{r}} + e^{i\,e\,m-2\,i\,e\,k}\left((2\,i\,b\,k-i\,b\,m)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)\right) - \frac{(-1)^{m+\nu}\,2^{-m-\nu}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{2\,g\,k-g\,\nu}\,\Gamma\!\left(\frac{\alpha}{r},\,(c\,\nu-2\,c\,k)\,z^r\right)\left((c\,\nu-2\,c\,k)\,z^r\right)^{-\frac{\alpha}{r}} + (-1)^\nu\,e^{g\,\nu-2\,g\,k}\left((2\,c\,k-c\,\nu)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,c\,k-c\,\nu)\,z^r\right)\right) - \frac{2^{-m-\nu}\,i^{-m}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}\,e^{2\,i\,e\,k-i\,e\,m+2\,g\,s-g\,\nu}\,\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)\left((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)^{-\frac{\alpha}{r}} + (-1)^\nu\,e^{-2\,e\,i\,k+i\,e\,m+2\,g\,s-g\,\nu}\left((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right) + (-1)^m\,e^{2\,i\,e\,k-i\,e\,m-2\,g\,s+g\,\nu}\left((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right) + e^{-2\,e\,i\,k+i\,e\,m-2\,g\,s+g\,\nu}\left((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)^{-\frac{\alpha}{r}}\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.2932.01

$$\int z^n \sin^m\left(b\, z^2+e\right) \sinh^v\left(c\, z^2+g\right) dz = $$

$$\frac{i^{-v}\left((-1)^m\, 2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1} - i^{-m-v}\, 2^{-m-v-1}\, z^{n+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m\, e^{2 i e k - i e m}\, \Gamma\left(\frac{n+1}{2}, (i\, b\, m-2\, i\, b\, k)\, z^2\right) \left((i\, b\, m-2\, i\, b\, k)\, z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m-2 i e k}\right.$$

$$\left.\left((2\, i\, b\, k-i\, b\, m)\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, (2\, i\, b\, k-i\, b\, m)\, z^2\right)\right) -$$

$$(-1)^{m+v}\, 2^{-m-v-1}\, z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{2 g k-g v}\, \Gamma\left(\frac{n+1}{2}, (c\, v-2\, c\, k)\, z^2\right) \left((c\, v-2\, c\, k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left.(-1)^v\, e^{g v-2 g k} \left((2\, c\, k-c\, v)\, z^2\right)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, (2\, c\, k-c\, v)\, z^2\right)\right) -$$

$$i^{-m}\, 2^{-m-v-1}\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v}\, e^{2 i e k-i e m+2 g s-g v}\, \Gamma\left(\frac{n+1}{2}, (-2\, b\, i\, k+i\, b\, m-2\, c\, s+c\, v)\, z^2\right)\right.$$

$$\left((-2\, b\, i\, k+i\, b\, m-2\, c\, s+c\, v)\, z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^v\, e^{-2 e i k+i e m+2 g s-g v} \left((2\, i\, b\, k-i\, b\, m-2\, c\, s+c\, v)\, z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\Gamma\left(\frac{n+1}{2}, (2\, i\, b\, k-i\, b\, m-2\, c\, s+c\, v)\, z^2\right) + (-1)^m\, e^{2 i e k-i e m-2 g s+g v} \left((-2\, b\, i\, k+i\, b\, m+2\, c\, s-c\, v)\, z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\Gamma\left(\frac{n+1}{2}, (-2\, b\, i\, k+i\, b\, m+2\, c\, s-c\, v)\, z^2\right) + e^{-2 e i k+i e m-2 g s+g v} \left((2\, i\, b\, k-i\, b\, m+2\, c\, s-c\, v)\, z^2\right)^{\frac{1}{2}(-n-1)}$$

$$\left.\Gamma\left(\frac{n+1}{2}, (2\, i\, b\, k-i\, b\, m+2\, c\, s-c\, v)\, z^2\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b+e\right)\sinh^v\left(\sqrt{z}\, c+g\right)dz = \frac{i^{-v}\left((-1)^m 2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1} - i^{-m-v} 2^{-m-v+1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}(2\,i\,b\,k-i\,b\,m)^{-2(n+1)} \left((-1)^m e^{2\,i\,e\,k-i\,e\,m}\,\Gamma\left(2(n+1),\,(i\,b\,m-2\,i\,b\,k)\sqrt{z}\right)+e^{i\,e\,m-2\,i\,e\,k}\,\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right) - (-1)^{m+v} 2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(2\,c\,k-c\,v)^{-2(n+1)} \left(e^{2\,g\,k-g\,v}\,\Gamma\left(2(n+1),\,(c\,v-2\,c\,k)\sqrt{z}\right)+(-1)^v e^{g\,v-2\,g\,k}\,\Gamma\left(2(n+1),\,(2\,c\,k-c\,v)\sqrt{z}\right)\right) - i^{-m} 2^{-m-v+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Big((-1)^{m+v} e^{2\,i\,e\,k-i\,e\,m+2\,g\,s-g\,v}\,\Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)\sqrt{z}\right) (-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)^{-2(n+1)}+(-1)^v e^{-2\,e\,i\,k+i\,e\,m+2\,g\,s-g\,v}(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)^{-2(n+1)} \Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)\sqrt{z}\right)+(-1)^m e^{2\,i\,e\,k-i\,e\,m-2\,g\,s+g\,v}(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)^{-2(n+1)} \Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)\sqrt{z}\right)+e^{-2\,e\,i\,k+i\,e\,m-2\,g\,s+g\,v}(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)^{-2(n+1)} \Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)\sqrt{z}\right)\Big)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m\left(b\,z^r+d\,z\right)\sinh^v\left(c\,z^r+g\right)$

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$$\int z^n \sin^m\left(b\,z^2+d\,z\right)\sinh^v\left(c\,z^2+g\right)dz = -i^{-v} 2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g(v-2k)}\,\Gamma\left(\frac{n+1}{2},\,-c(v-2k)z^2\right)\left(-c(v-2k)z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2}i\pi v-g(v-2k)}\left(c(v-2k)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,c(v-2k)z^2\right)\right)\right)z^{n+1} + \frac{i^{-v}\left(2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1} - i^{-v} 2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i(m-2k)d^2}{4b}+\frac{i\,m\,\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}(i\,d(m-2k))^{n-j}(-i\,d(m-2k)-2\,i\,b\,z(m-2k))^{j+1} \left(-\frac{i(-i\,d(m-2k)-2\,i\,b\,z(m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i(-i\,d(m-2k)-2\,i\,b\,z(m-2k))^2}{4\,b(m-2k)}\right)\right)\right.$$

$$(-i\, b\, (m-2k))^{-n-1} + e^{-\frac{i\,(m-2k)\,d^2}{4b}-\frac{i\,m\,\pi}{2}}\, (i\, b\, (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, d\, (m-2k))^{n-j}$$

$$(d\, i\, (m-2k) + 2\, b\, i\, z\, (m-2k))^{j+1} \left(\frac{i\, (d\, i\, (m-2k) + 2\, b\, i\, z\, (m-2k))^2}{b\, (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{i\, (d\, i\, (m-2k) + 2\, b\, i\, z\, (m-2k))^2}{4\, b\, (m-2k)}\right)\Bigg) - i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{1}{4} i \left(\frac{d^2\, (m-2s)^2}{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu} + 4\, g\, i\, (\nu-2k) - 2\, \pi\, (m+\nu)\right)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\, (i\, d\, (m-2s))^{n-j}\, (2\, (c\, (\nu-2k) - i\, b\, (m-2s))\, z -$$

$$i\, d\, (m-2s))^{j+1} \left(-\frac{(2\, (c\, (\nu-2k) - i\, b\, (m-2s))\, z - i\, d\, (m-2s))^2}{c\, (\nu-2k) - i\, b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(2\, (c\, (\nu-2k) - i\, b\, (m-2s))\, z - i\, d\, (m-2s))^2}{4\, (c\, (\nu-2k) - i\, b\, (m-2s))}\right)\Bigg) (c\, (\nu-2k) - i\, b\, (m-2s))^{-n-1} +$$

$$e^{-\frac{1}{4} i \left(-\frac{d^2\, (m-2s)^2}{-2\, c\, i\, k - b\, m + 2\, b\, s + i\, c\, \nu} + 4\, g\, i\, (\nu-2k) - 2\, \pi\, (\nu-m)\right)}\, (b\, i\, (m-2s) + c\, (\nu-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\, (-i\, d\, (m-2s))^{n-j}\, (d\, i\, (m-2s) + 2\, (b\, i\, (m-2s) + c\, (\nu-2k))\, z)^{j+1}$$

$$\left(-\frac{(d\, i\, (m-2s) + 2\, (b\, i\, (m-2s) + c\, (\nu-2k))\, z)^2}{b\, i\, (m-2s) + c\, (\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\, (m-2s) + 2\, (b\, i\, (m-2s) + c\, (\nu-2k))\, z)^2}{4\, (b\, i\, (m-2s) + c\, (\nu-2k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2\, (m-2s)^2}{-2\, c\, i\, k - b\, m + 2\, b\, s + i\, c\, \nu} + 2\, \pi\, (m-\nu) + 4\, g\, i\, (\nu-2k)\right)}$$

$$(-i\, b\, (m-2s) - c\, (\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\, d\, (m-2s))^{n-j}\, (2\, (-i\, b\, (m-2s) - c\, (\nu-2k))\, z - i\, d\, (m-2s))^{j+1}$$

$$\left(-\frac{(2\, (-i\, b\, (m-2s) - c\, (\nu-2k))\, z - i\, d\, (m-2s))^2}{-i\, b\, (m-2s) - c\, (\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(2\, (-i\, b\, (m-2s) - c\, (\nu-2k))\, z - i\, d\, (m-2s))^2}{4\, (-i\, b\, (m-2s) - c\, (\nu-2k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2\, (m-2s)^2}{2\, i\, c\, k - b\, m + 2\, b\, s - i\, c\, \nu} + 4\, g\, i\, (\nu-2k) - 2\, \pi\, (m+\nu)\right)}$$

$$(i\, b\, (m-2s) - c\, (\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, d\, (m-2s))^{n-j}\, (d\, i\, (m-2s) + 2\, (i\, b\, (m-2s) - c\, (\nu-2k))\, z)^{j+1}$$

$$\left(-\frac{(d\, i\, (m-2s) + 2\, (i\, b\, (m-2s) - c\, (\nu-2k))\, z)^2}{i\, b\, (m-2s) - c\, (\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\, (m-2s) + 2\, (i\, b\, (m-2s) - c\, (\nu-2k))\, z)^2}{\ldots}\right)\Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k (\nu - 2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}+g(\nu-2k)}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu - g(\nu-2k)}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right)$$
$$c^{-2(n+1)} + \frac{i^{-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k}$$
$$(i\, d\,(m-2k))^{-2(n+1)} \left(e^{-\frac{i(m-2k)b^2}{4d} - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(m-2k))^{-h-j+2n} \left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^{h+j}\right.$$
$$\left(\frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\,(m-2k)\left(b\, i\,(m-2k) + \right.\right.$$
$$\left.2\, d\, i\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right) + 2\, d\, i\,(m-2k)$$
$$\left.\sqrt{\frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\,(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right)\right) +$$
$$e^{\frac{i(m-2k)b^2}{4d} + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2k))^{-h-j+2n} \left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^{h+j}$$
$$\left(-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\,(m-2k)\right.$$
$$\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{4\, d\,(m-2k)}\right) -$$
$$2\, i\, d\,(m-2k) \sqrt{-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}(i\,d\,(m-2\,s))^{-2\,(n+1)}\Bigg(e^{-\frac{i\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-2\,i\,d\,(m-2\,s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)^2\right)\right)}\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\Bigg)\Bigg)+e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,s)-c\,(v-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\,\Big(b\,i\,(m-2\,s)+2\,d$$

$$i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\Big)^{h+j}\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}}\right)\right)\ /;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+d\,z+e)\sinh^v(c\,z^r+g)$

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$$\int z^n\sin^m(b\,z^2+d\,z+e)\sinh^v(c\,z^2+g)\,dz ==$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g\,(v-2k)}\,\Gamma\left(\frac{n+1}{2},\,-c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v-g\,(v-2k)}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}-i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,(m-2k)\,d^2}{4b}-i\,e\,(m-2k)+\frac{i\,m\pi}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{-\frac{i\,(m-2k)\,d^2}{4b}+e\,i\,(m-2k)-\frac{i\,m\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-$$

$$i^{-v}\, 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg(e^{-\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{2 i c k - b m + 2 b s - i c v} + 4 e (m-2s) + 4 g i (v-2k) - 2\pi (m+v) \right)}$$

$$\Bigg(\sum_{j=0}^{n} 2^{j-n} (i\, d\, (m-2s))^{n-j} (2 (c (v-2k) - i\, b\, (m-2s)) z - i\, d\, (m-2s))^{j+1}$$

$$\left(-\frac{(2 (c (v-2k) - i\, b\, (m-2s)) z - i\, d\, (m-2s))^2}{c (v-2k) - i\, b\, (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(2 (c (v-2k) - i\, b\, (m-2s)) z - i\, d\, (m-2s))^2}{4 (c (v-2k) - i\, b\, (m-2s))} \right) \Bigg) (c (v-2k) - i\, b\, (m-2s))^{-n-1} +$$

$$e^{-\frac{1}{4} i \left(-\frac{d^2 (m-2s)^2}{-2 c i k - b m + 2 b s + i c v} - 4 e (m-2s) + 4 g i (v-2k) - 2\pi (v-m) \right)} (b\, i\, (m-2s) + c (v-2k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i\, d\, (m-2s))^{n-j} (d\, i\, (m-2s) + 2 (b\, i\, (m-2s) + c (v-2k)) z)^{j+1}$$

$$\left(-\frac{(d\, i\, (m-2s) + 2 (b\, i\, (m-2s) + c (v-2k)) z)^2}{b\, i\, (m-2s) + c (v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \right.$$

$$\left. -\frac{(d\, i\, (m-2s) + 2 (b\, i\, (m-2s) + c (v-2k)) z)^2}{4 (b\, i\, (m-2s) + c (v-2k))} \right) + e^{\frac{1}{4} i \left(-\frac{d^2 (m-2s)^2}{-2 c i k - b m + 2 b s + i c v} - 4 e (m-2s) + 2\pi (m-v) + 4 g i (v-2k) \right)}$$

$$(-i\, b\, (m-2s) - c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\, d\, (m-2s))^{n-j} (2 (-i\, b\, (m-2s) - c (v-2k)) z - i\, d\, (m-2s))^{j+1}$$

$$\left(-\frac{(2 (-i\, b\, (m-2s) - c (v-2k)) z - i\, d\, (m-2s))^2}{-i\, b\, (m-2s) - c (v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \right.$$

$$\left. -\frac{(2 (-i\, b\, (m-2s) - c (v-2k)) z - i\, d\, (m-2s))^2}{4 (-i\, b\, (m-2s) - c (v-2k))} \right) + e^{\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{2 i c k - b m + 2 b s - i c v} + 4 e (m-2s) + 4 g i (v-2k) - 2\pi (m+v) \right)}$$

$$(i\, b\, (m-2s) - c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, d\, (m-2s))^{n-j} (d\, i\, (m-2s) + 2 (i\, b\, (m-2s) - c (v-2k)) z)^{j+1}$$

$$\left(-\frac{(d\, i\, (m-2s) + 2 (i\, b\, (m-2s) - c (v-2k)) z)^2}{i\, b\, (m-2s) - c (v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\, (m-2s) + 2 (i\, b\, (m-2s) - c (v-2k)) z)^2}{4 (i\, b\, (m-2s) - c (v-2k))} \right) \Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (\nu - 2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2} + g(\nu-2k)}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu - g(\nu-2k)}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right)$$

$$c^{-2(n+1)} + \frac{i^{-\nu}\, 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} +$$

$$2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} (i\, d\, (m-2k))^{-2(n+1)}$$

$$\left(e^{-\frac{i(m-2k)b^2}{4d} + e\, i\, (m-2k) - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2k))^{-h-j+2n} \left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\, (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2k) \left(b\, i\, (m-2k) + \right.\right.$$

$$\left. 2\, d\, i\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right) + 2\, d\, i\, (m-2k)$$

$$\left.\left.\sqrt{\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\, (m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right)\right)\right) +$$

$$e^{\frac{i(m-2k)b^2}{4d} - i\, e\, (m-2k) + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2k))^{-h-j+2n} \left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d\, (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\, (m-2k)\right.$$

$$\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right) -$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}(i\,d\,(m-2\,s))^{-2\,(n+1)}\left(e^{-\frac{i\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^2}{4\,d\,(m-2\,s)}-i\,e\,(m-2\,s)+g\,(v-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2\right)\right)}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\right)\right)+$$

$$e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-i\,e\,(m-2\,s)+\frac{1}{2}\,i\,\pi\,(m-v)-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b\,(m-2\,s)-c\,(v-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\,(m-2s) - 2\, i\, d\sqrt{z}\,(m-2s) - c\,(v-2k)\right)^2}{4\, d\,(m-2s)}\right) -$$

$$2\, i\, d\,(m-2s)\sqrt{\left(-\frac{1}{d\,(m-2s)}\left(i\left(-i\, b\,(m-2s) - 2\, i\, d\sqrt{z}\,(m-2s) - c\,(v-2k)\right)^2\right)\right)}$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, b\,(m-2s) - 2\, i\, d\sqrt{z}\,(m-2s) - c\,(v-2k)\right)^2}{4\, d\,(m-2s)}\right)\right) +$$

$$e^{\frac{i\,(b\, i\,(m-2s)+c\,(v-2k))^2}{4\, d\,(m-2s)} + e\, i\,(m-2s) + g\,(v-2k) + \frac{1}{2} i\,\pi\,(v-m)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b\, i\,(m-2s) + c\,(v-2k))^{-h-j+2n}$$

$$\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((b\, i\,(m-2s) + c\,(v-2k))\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)^2}{4\, d\,(m-2s)}\right) +$$

$$2\, d\, i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)^2}{4\, d\,(m-2s)}\right)$$

$$\left.\sqrt{\frac{i\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) + c\,(v-2k)\right)^2}{d\,(m-2s)}}\right) +$$

$$e^{\frac{i\,(i\, b\,(m-2s)-c\,(v-2k))^2}{4\, d\,(m-2s)} + e\, i\,(m-2s) - g\,(v-2k) - \frac{1}{2} i\,\pi\,(m+v)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(m-2s) - c\,(v-2k))^{-h-j+2n}$$

$$\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) - c\,(v-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\,(m-2s) + 2\, d\, i\sqrt{z}\,(m-2s) - c\,(v-2k)\right)^2}{d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\sin^m(d\,z)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\sin^m(d\,z)\sinh^v\left(c\,z^2+f\,z\right)dz = \frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{f^2(v-2\,k)}{4\,c}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k))^{n-j}\,(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)$$

$$(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}-\frac{f^2(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left.\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(-i\,d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+\frac{1}{2}i\,\pi\,(m-v)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{n-j}\right.\right.$$

$$(-i\,d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-i\,d\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{(i\,d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}-\frac{1}{2}\,i\,\pi\,(m+v)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,s)-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^{j+1}\right.$$

$$\left(\frac{(d\,i\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},\,\frac{(d\,i\,(m-2\,k)-f\,(v-2\,s)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)(-c\,(v-2\,s))^{-n-1}+$$

$$e^{\frac{1}{2}\,i\,\pi\,(m+v)-\frac{(f\,(v-2\,s)-i\,d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{1}{2}\,i\,\pi\,(v-m)-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(d\,z)\sinh^v\!\left(\sqrt{z}\;c+f\,z\right)dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)+2^{-m-2\,n-v-1}$$

$$\imath^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(\imath\, f\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}\Bigg(e^{\frac{c^2\,(v-2\,k)}{4\,f}-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}\left(\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,k)$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{i\,\pi\,v}{2}-\frac{c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,\imath^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{\frac{1}{2}\,i\,\pi\,(m+v)-\frac{c^2\,(v-2\,s)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-\imath\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\right)\right)$$

$$(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{1}{2}\,i\,\pi\,(v-m)-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{\frac{1}{2} i \pi (m-v)-\frac{c^2 (v-2 s)^2}{4 (-i d (m-2 k)-f (v-2 s))}} (-i d (m-2 k)-f (v-2 s))^{-2 (n+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j$$
$$(-c (v-2 s))^{-h-j+2 n} \left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^{h+j}$$
$$\left(-\frac{\left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{-i d (m-2 k)-f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$
$$\left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{-\frac{\left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{-i d (m-2 k)-f (v-2 s)}}\right.$$
$$\Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{4 (-i d (m-2 k)-f (v-2 s))}\right)-$$
$$c (v-2 s) \left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)$$
$$\left.\Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 (-i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{4 (-i d (m-2 k)-f (v-2 s))}\right)\right)+$$
$$e^{-\frac{c^2 (v-2 s)^2}{4 (i d (m-2 k)-f (v-2 s))}-\frac{1}{2} i \pi (m+v)} (i d (m-2 k)-f (v-2 s))^{-2 (n+1)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-c (v-2 s))^{-h-j+2 n}$$
$$\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^{h+j}$$
$$\left(-\frac{\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{i d (m-2 k)-f (v-2 s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$
$$\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{-\frac{\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{i d (m-2 k)-f (v-2 s)}}\right.$$
$$\Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{4 (i d (m-2 k)-f (v-2 s))}\right)-$$
$$c (v-2 s) \left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1),\right.$$
$$\left.\left.\left. -\frac{\left(2 (i d (m-2 k)-f (v-2 s)) \sqrt{z} -c (v-2 s)\right)^2}{4 (i d (m-2 k)-f (v-2 s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh^\nu(c\,z^r+f\,z)$

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$$\int z^n \sin^m(e+d\,z)\sinh^\nu\!\left(c\,z^2+f\,z\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} +$$
$$(-1)^n 2^{-m-\nu} i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(e^{\frac{i m\pi}{2}-i e(m-2k)}\,\Gamma(n+1,\, i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} +$$
$$e^{i e(m-2k)-\frac{i m\pi}{2}}(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\Big) -$$
$$i^{-\nu} 2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{\frac{f^2(\nu-2k)}{4c}-\frac{i\pi\nu}{2}}\Bigg(\sum_{j=0}^{n} 2^{j-n}(f\,(\nu-2k))^{n-j}(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^{j+1}$$
$$\left(\frac{(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f\,(\nu-2k)-2\,c\,z\,(\nu-2k))^2}{4\,c\,(\nu-2k)}\right)\Bigg)$$
$$(-c\,(\nu-2k))^{-n-1} + e^{\frac{i\pi\nu}{2}-\frac{f^2(\nu-2k)}{4c}}(c\,(\nu-2k))^{-n-1}\sum_{j=0}^{n} 2^{j-n}(-f\,(\nu-2k))^{n-j}(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^{j+1}$$
$$\left(-\frac{(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(f\,(\nu-2k)+2\,c\,z\,(\nu-2k))^2}{4\,c\,(\nu-2k)}\right)\Bigg) -$$
$$i^{-\nu} 2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg(e^{\frac{(-i\,d\,(m-2k)-f\,(\nu-2s))^2}{4\,c\,(\nu-2s)}-i\,e\,(m-2k)+\frac{1}{2}i\pi(m-\nu)}\Bigg(\sum_{j=0}^{n} 2^{j-n}(d\,i\,(m-2k)+f\,(\nu-2s))^{n-j}$$
$$(-i\,d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-i\,d\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{4\,c\,(\nu-2s)}\right)\Bigg)(-c\,(\nu-2s))^{-n-1} +$$
$$e^{\frac{(i\,d\,(m-2k)-f\,(\nu-2s))^2}{4\,c\,(\nu-2s)}+e\,i\,(m-2k)-\frac{1}{2}i\pi(m+\nu)}\Bigg(\sum_{j=0}^{n} 2^{j-n}(f\,(\nu-2s)-i\,d\,(m-2k))^{n-j}$$
$$(d\,i\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^{j+1}\left(\frac{(d\,i\,(m-2k)-f\,(\nu-2s)-2\,c\,(\nu-2s)\,z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(d\,i\,(m-2k)-f(v-2s)-2c(v-2s)z)^2}{4c(v-2s)}\right)\Bigg)(-c(v-2s))^{-n-1}+$$

$$e^{-\frac{(f(v-2s)-i\,d(m-2k))^2}{4c(v-2s)}-i\,e(m-2k)+\frac{1}{2}i\,\pi(m+v)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i\,d(m-2k)-f(v-2s))^{n-j}$$

$$(-i\,d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(-i\,d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)+$$

$$e^{-\frac{(d\,i\,(m-2k)+f(v-2s))^2}{4c(v-2s)}+e\,i\,(m-2k)+\frac{1}{2}i\,\pi(v-m)}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k)-f(v-2s))^{n-j}$$

$$(d\,i\,(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(e+d\,z)\sinh^v\left(\sqrt{z}\,c+f\,z\right)dz = $$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Big(e^{\frac{i\,m\,\pi}{2}-i\,e(m-2k)}\,\Gamma(n+1,\,i\,d(m-2k)z)\,(-i\,d(m-2k))^{-n-1}+e^{i\,e(m-2k)-\frac{i\,m\,\pi}{2}}\,(i\,d(m-2k))^{-n-1}$$

$$\Gamma(n+1,\,-i\,d(m-2k)z)\Big)+2^{-m-2n-v-1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(i\,f(v-2k))^{-2(n+1)}$$

$$\binom{v}{k}\Bigg(e^{\frac{c^2(v-2k)}{4f}-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(v-2k))^{-h-j+2n}\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c(v-2k)\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ \frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)-2\,f\,(v-2\,k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\ \Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\pi v}{2}-\frac{c^2 (v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\ -\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\ \Gamma\!\left(\frac{1}{2}(h+j+2),\ -\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2 (v-2s)^2}{4\,(f\,(v-2s)-i\,d\,(m-2k))}-i\,e\,(m-2k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\ -\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\,\Bigg)\Bigg)$$

$$(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}+e\,i\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\,\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-i\,e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m-v)}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)$$

$$\left.\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d\,(m-2\,k)-f\,(v-2\,s))}+e\,i\,(m-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)}\,(i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}\,-c\,(v-2\,s)\right)^2}{4\,(i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n \sin^m(b z^2) \sinh^v(c z^2 + f z)\, dz = \frac{i^{-v}\left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)\right)}{n+1} -$$

$$i^{-v} 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m \pi}{2}} z^{n+1} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$

$$\left. e^{\frac{i m \pi}{2}} z^{n+1} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right) -$$

$$i^{-v} 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{\frac{f^2 (v-2k)}{4c} - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f (v-2k))^{n-j} (-f (v-2k) - 2 c z (v-2k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f (v-2k) - 2 c z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f (v-2k) - 2 c z (v-2k))^2}{4 c (v-2k)}\right)\right)$$

$$(-c (v-2k))^{-n-1} + e^{\frac{i \pi v}{2} - \frac{f^2 (v-2k)}{4c}} (c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v-2k))^{n-j} (f (v-2k) + 2 c z (v-2k))^{j+1}$$

$$\left.\left(-\frac{(f (v-2k) + 2 c z (v-2k))^2}{c (v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2k) + 2 c z (v-2k))^2}{4 c (v-2k)}\right)\right) -$$

$$i^{-v} 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{2bk - bm + 2ics - icv} - 2\pi (m+v)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f (v-2s))^{n-j}\right.\right.$$

$$(f (v-2s) + 2 (c (v-2s) - i b (m-2k)) z)^{j+1} \left(-\frac{(f (v-2s) + 2 (c (v-2s) - i b (m-2k)) z)^2}{c (v-2s) - i b (m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2s) + 2 (c (v-2s) - i b (m-2k)) z)^2}{4 (c (v-2s) - i b (m-2k))}\right)\right) (c (v-2s) - i b (m-2k))^{-n-1} +$$

$$e^{\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-2bk + bm + 2ics - icv} + 2\pi (v-m)\right)} (b i (m-2k) + c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v-2s))^{n-j}$$

$$(f (v-2s) + 2 (b i (m-2k) + c (v-2s)) z)^{j+1} \left(-\frac{(f (v-2s) + 2 (b i (m-2k) + c (v-2s)) z)^2}{b i (m-2k) + c (v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2s) + 2 (b i (m-2k) + c (v-2s)) z)^2}{4 (b i (m-2k) + c (v-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (v-2s)^2}{-2bk + bm + 2ics - icv} - 2\pi (m-v)\right)}$$

$$(-i b (m-2k) - c (v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f (v-2s))^{n-j} (2 (-i b (m-2k) - c (v-2s)) z - f (v-2s))^{j+1}$$

$$\left(-\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{-i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-i\,b(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}-2\pi(m+v)\right)}(i\,b(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(i\,b(m-2k)-c(v-2s))}\right)\right)\right)/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(b\sqrt{z}\right)\sinh^v\left(\sqrt{z}\,c+f\,z\right)dz=(-1)^n\,2^{-m-v+1}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k(m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{-\frac{i m\pi}{2}}\Gamma\left(2(n+1),-i\,b(m-2k)\sqrt{z}\right)+e^{\frac{i m\pi}{2}}\Gamma\left(2(n+1),i\,b(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+$$

$$\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f(v-2k))^{-2(n+1)}\left((-1)^v\,e^{\frac{c^2(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(v-2k))^{-h-j+2n}\right.$$

$$\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j}\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c(v-2k)\right.$$

$$\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)-2f(v-2k)$$

$$\left.\left.\sqrt{\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-c(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\right)\right)+$$

$$e^{-\frac{c^2(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2k))^{-h-j+2n}\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)+2\,f\,(v-2\,k)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\,(f\,(v-2\,s))^{-2\,(n+1)}\left(e^{\frac{(-i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(m-v)}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b\,(m-2\,k)-c\,(v-2\,s))\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+e^{\frac{(i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2k)-c\,(v-2s))\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)-$$

$$2\,f\,(v-2s)\sqrt{\frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)\right)+e^{\frac{1}{2}i\pi(m+v)-\frac{(c(v-2s)-i\,b\,(m-2k))^2}{4\,f\,(v-2s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2s)-i\,b\,(m-2k))^{-h-j+2n}\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2s)-i\,b\,(m-2k))\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\right)+e^{\frac{1}{2}i\pi(v-m)-\frac{(b\,i\,(m-2k)+c\,(v-2s))^2}{4\,f\,(v-2s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+e)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n\sin^m(b\,z^2+e)\sinh^v(c\,z^2+f\,z)\,dz == \frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\,e\,(m-2\,k)-\frac{i\,m\,\pi}{2}}\,z^{n+1}\,\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,(m-2\,k)\,z^2\right)\left(-i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2\,k)}\,z^{n+1}\left(i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},\,i\,b\,(m-2\,k)\,z^2\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{f^2\,(v-2\,k)}{4\,c}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k))^{n-j}\,(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)$$

$$(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}-\frac{f^2\,(v-2\,k)}{4\,c}}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^{-v}2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4e(m-2k)-2\pi(m+v)\right)}\Bigg(\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{c(v-2s)-ib(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{4(c(v-2s)-ib(m-2k))}\right)\Bigg)(c(v-2s)-ib(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+4e(m-2k)+2\pi(v-m)\right)}(bi(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{bi(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{4(bi(m-2k)+c(v-2s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+4e(m-2k)-2\pi(m-v)\right)}$$

$$(-ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{-ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-ib(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4e(m-2k)-2\pi(m+v)\right)}(ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(ib(m-2k)-c(v-2s))}\right)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(\sqrt{z}\, c + f\, z\right) dz = (-1)^n\, 2^{-m-\nu+1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k\, (m-2k)^{-2(n+1)} \binom{m}{k} \left(e^{i e (m-2k) - \frac{i m \pi}{2}}\, \Gamma\left(2(n+1), -i\, b\, (m-2k) \sqrt{z}\right) + e^{\frac{i m \pi}{2} - i e (m-2k)}\, \Gamma\left(2(n+1), i\, b\, (m-2k) \sqrt{z}\right)\right)\right) b^{-2(n+1)} + \frac{i^{-\nu} \left(2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)\right)}{n+1} + 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (f\, (\nu-2k))^{-2(n+1)} \left((-1)^\nu\, e^{\frac{c^2 (\nu-2k)}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\, (\nu-2k))^{-h-j+2n} \left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right)^{h+j} \left(\frac{\left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right)^2}{f\, (\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c\, (\nu-2k) \left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right)^2}{4 f\, (\nu-2k)}\right) - 2 f\, (\nu-2k) \sqrt{\frac{\left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right)^2}{f\, (\nu-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c\, (\nu-2k) - 2 f \sqrt{z}\, (\nu-2k)\right)^2}{4 f\, (\nu-2k)}\right)\right) + e^{-\frac{c^2 (\nu-2k)}{4 f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\, (\nu-2k))^{-h-j+2n} \left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right)^{h+j} \left(-\frac{\left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right)^2}{f\, (\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c\, (\nu-2k) \left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right)^2}{4 f\, (\nu-2k)}\right) + 2 f\, (\nu-2k)\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right)^2}{4 f\, (\nu-2k)}\right) \sqrt{-\frac{\left(c\, (\nu-2k) + 2 f \sqrt{z}\, (\nu-2k)\right)^2}{f\, (\nu-2k)}}\right)\right) + $$

$$2^{-m-2n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} (f\,(v-2\,s))^{-2\,(n+1)} \Biggl(e^{\frac{(-i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - i\,e\,(m-2\,k) + \frac{1}{2}\,i\,\pi\,(m-v)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n} \left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Biggl((-i\,b\,(m-2\,k)-c\,(v-2\,s)) \left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) -$$

$$2\,f\,(v-2\,s) \sqrt{\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\; \Gamma\Biggl(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Biggr)\Biggr) + e^{\frac{(i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} + e\,i\,(m-2\,k) - \frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n} \left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Biggl((i\,b\,(m-2\,k)-c\,(v-2\,s)) \left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) -$$

$$2\, f\,(v-2\,s)\,\sqrt{\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)\right)+e^{-\frac{(c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}-i\,e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}}\right)+e^{-\frac{(b\,i\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e\,i\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)+$$

$$2f\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2f\,(v-2s)\sqrt{z}\right)^2}{4f\,(v-2s)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+d\,z)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n \sin^m(b\,z^2+d\,z)\sinh^v(c\,z^2+f\,z)\,dz =$$

$$\frac{i^v\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i m\pi}{2}-\frac{i d^2 (2k-m)}{4b}}$$

$$\Bigg(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2k-m))^{n-j}\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^{j+1}\left(\frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{4\,b\,(2k-m)}\right)\Bigg)(i\,b\,(2k-m))^{-n-1}+$$

$$e^{-\frac{i(m-2k)d^2}{4b}-\frac{i m\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\Bigg)-$$

$$i^v\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg(e^{\frac{i\pi v}{2}-\frac{f^2(2k-v)}{4c}}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2k-v))^{n-j}\,(f\,(2k-v)+2\,c\,z\,(2k-v))^{j+1}$$

$$\left(-\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{c\,(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{4\,c\,(2k-v)}\right)\Bigg)(c\,(2k-v))^{-n-1}+$$

$$e^{-\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^v 2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{\frac{1}{2}i\pi(m+v)-\frac{(di(2k-m)+f(2s-v))^2}{4(bi(2k-m)+c(2s-v))}}\Bigg(\sum_{j=0}^n 2^{j-n}(-id(2k-m)-f(2s-v))^{n-j}$$

$$(di(2k-m)+f(2s-v)+2(bi(2k-m)+c(2s-v))z)^{j+1}$$

$$\left(-(di(2k-m)+f(2s-v)+2(bi(2k-m)+c(2s-v))z)^2\big/(bi(2k-m)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(di(2k-m)+f(2s-v)+2(bi(2k-m)+c(2s-v))z)^2}{4(bi(2k-m)+c(2s-v))}\right)\Bigg)$$

$$(bi(2k-m)+c(2s-v))^{-n-1}+e^{\frac{1}{2}i\pi(v-m)-\frac{(di(m-2k)+f(2s-v))^2}{4(bi(m-2k)+c(2s-v))}}(bi(m-2k)+c(2s-v))^{-n-1}$$

$$\sum_{j=0}^n 2^{j-n}(-id(m-2k)-f(2s-v))^{n-j}(di(m-2k)+f(2s-v)+2(bi(m-2k)+c(2s-v))z)^{j+1}$$

$$\left(-(di(m-2k)+f(2s-v)+2(bi(m-2k)+c(2s-v))z)^2\big/(bi(m-2k)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(di(m-2k)+f(2s-v)+2(bi(m-2k)+c(2s-v))z)^2}{4(bi(m-2k)+c(2s-v))}\right)+$$

$$e^{\frac{1}{2}i\pi(m-v)-\frac{(di(2k-m)+f(v-2s))^2}{4(bi(2k-m)+c(v-2s))}}(bi(2k-m)+c(v-2s))^{-n-1}\sum_{j=0}^n 2^{j-n}(-id(2k-m)-f(v-2s))^{n-j}$$

$$(di(2k-m)+f(v-2s)+2(bi(2k-m)+c(v-2s))z)^{j+1}$$

$$\left(-(di(2k-m)+f(v-2s)+2(bi(2k-m)+c(v-2s))z)^2\big/(bi(2k-m)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(di(2k-m)+f(v-2s)+2(bi(2k-m)+c(v-2s))z)^2}{4(bi(2k-m)+c(v-2s))}\right)+$$

$$e^{-\frac{(di(m-2k)+f(v-2s))^2}{4(bi(m-2k)+c(v-2s))}-\frac{1}{2}i\pi(m+v)}(bi(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^n 2^{j-n}(-id(m-2k)-f(v-2s))^{n-j}$$

$$(di(m-2k)+f(v-2s)+2(bi(m-2k)+c(v-2s))z)^{j+1}$$

$$\left(-(di(m-2k)+f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2\big/(bi(m-2k)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(di(m-2k)+f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{4(bi(m-2k)+c(v-2s))}\right)\Bigg)\Bigg)/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\ b+dz\right)\sinh^v\left(\sqrt{z}\ c+fz\right)dz=$$

$$\frac{i^v 2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^{n-1}2^{-m-2n-v-1}d^{-2n-2}i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$(2k-m)^{-2n-2}\Bigg(e^{\frac{i m\pi}{2}-\frac{i b^2 (2k-m)}{4d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\, b\, (2k-m))^{-h-j+2n} \left(b\, i\, (2k-m)+2\, d\, i\, \sqrt{z}\, (2k-m)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\, (2k-m)+2\, d\, i\sqrt{z}\, (2k-m)\right)^2}{d\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(b\, i\, (2k-m)\left(b\, i\, (2k-m)+\right.$$

$$\left.2\, d\, i\sqrt{z}\, (2k-m)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(b\, i\, (2k-m)+2\, d\, i\sqrt{z}\, (2k-m)\right)^2}{4\, d\,(2k-m)}\right)+2\, d\, i\, (2k-m)$$

$$\sqrt{\frac{i\left(b\, i\, (2k-m)+2\, d\, i\sqrt{z}\, (2k-m)\right)^2}{d\,(2k-m)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\, \frac{i\left(b\, i\, (2k-m)+2\, d\, i\sqrt{z}\, (2k-m)\right)^2}{4\, d\,(2k-m)}\right)\Bigg)+$$

$$e^{-\frac{i(m-2k)b^2}{4d}-\frac{i m\pi}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\, b\, (m-2k))^{-h-j+2n} \left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\, i\, (m-2k)\left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right)+$$

$$2\, d\, i\, (m-2k)\sqrt{\frac{i\left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\, \frac{i\left(b\, i\, (m-2k)+2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f\,(2k-v))^{-2n-2}\Bigg((-1)^v\, e^{-\frac{c^2(2k-v)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c\,(2k-v))^{-h-j+2n}$$

$$\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)^{h+j}\left(-\frac{\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)^2}{f\,(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(2k-v)\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)^2}{4f\,(2k-v)}\right)+2f\,(2k-\right.$$

$$\left.v)\sqrt{-\frac{\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)^2}{f\,(2k-v)}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c\,(2k-v)+2f\sqrt{z}\,(2k-v)\right)^2}{4f\,(2k-v)}\right)\right)+$$

$$e^{-\frac{c^2(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2k)\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)+2f\,(v-2k)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c\,(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)\right)\right)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left((-1)^v\,e^{\frac{i\,m\,\pi}{2}-\frac{(b\,i\,(2s-m)+c\,(2k-v))^2}{4\,(d\,i\,(2s-m)+f\,(2k-v))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(2s-m)+c\,(2k-v))^{-h-j+2n}\right.\right.$$

$$\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(2s-m)+c\,(2k-v)+\right.\right.$$

$$\left.\left.2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/(d\,i\,(2s-m)+f\,(2k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(2s-m)+c\,(2k-v))\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(d\,i\,(2s-m)+f\,(2k-v)))\right)+2\,(d\,i\,(2s-m)+f\,(2k-v))$$

$$\Gamma\left(\frac{1}{2}(h+j+2),-\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(d\,i\,(2s-m)+f\,(2k-v)))\right)\sqrt{\left(-\left(b\,i\,(2s-m)+c\,(2k-v)+\right.\right.}$$

$$2\left(d\,i\,(2s-m)+f\,(2k-v)\right)\sqrt{z}\Big)^2\Big/\left(d\,i\,(2s-m)+f\,(2k-v)\right)\Big)\Big)\Big)$$

$$(d\,i\,(2s-m)+f\,(2k-v))^{-2n-2}+(-1)^v\,e^{-\frac{(b\,i\,(m-2s)+c\,(2k-v))^2}{4\,(d\,i\,(m-2s)+f\,(2k-v))}-\frac{i\,m\,\pi}{2}}\,(d\,i\,(m-2s)+f\,(2k-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(2k-v))^{-h-j+2n}$$

$$\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(m-2s)+c\,(2k-v)+$$

$$2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\Big)^2\Big/(d\,i\,(m-2s)+f\,(2k-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(m-2s)+c\,(2k-v))\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(m-2s)+f\,(2k-v)))\Big)+2\,(d\,i\,(m-2s)+f\,(2k-v))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(m-2s)+f\,(2k-v)))\Big)\sqrt{\Big(-\Big(b\,i\,(m-2s)+c\,(2k-v)+}$$

$$2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\Big)^2\Big/(d\,i\,(m-2s)+f\,(2k-v))\Big)\Big)+$$

$$e^{\frac{i\,m\,\pi}{2}-\frac{(b\,i\,(2s-m)+c\,(v-2k))^2}{4\,(d\,i\,(2s-m)+f\,(v-2k))}}\,(d\,i\,(2s-m)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(2s-m)+c\,(v-2k))^{-h-j+2n}$$

$$\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(2s-m)+c\,(v-2k)+$$

$$2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\Big)^2\Big/(d\,i\,(2s-m)+f\,(v-2k))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(2s-m)+c\,(v-2k))\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2s-m)+f\,(v-2k)))\Big)+2\,(d\,i\,(2s-m)+f\,(v-2k))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2s-m)+f\,(v-2k)))\Big)\sqrt{\Big(-\Big(b\,i\,(2s-m)+c\,(v-2k)+}$$

$$2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\Big)^2\Big/(d\,i\,(2s-m)+f\,(v-2k))\Big)\Big)+$$

$$e^{-\frac{(b\,i\,(m-2s)+c\,(v-2k))^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}-\frac{i\,m\,\pi}{2}}\,(d\,i\,(m-2s)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(v-2k))^{-h-j+2n}$$

$$\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(m-2s)+c\,(v-2k)+$$

$$2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\Big)^2 \Big/ (d\,i\,(m-2\,s)+f\,(v-2\,k))\Big)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\, -\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/$$

$$(4\,(d\,i\,(m-2\,s)+f\,(v-2\,k)))\Big)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\Gamma\Big(\frac{1}{2}\,(h+j+2),$$

$$-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2\,s)+$$

$$f\,(v-2\,k)))\Big)\sqrt{\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/\right.}$$

$$\left.(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)\Big)\Big) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+d\,z+e)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n \sin^m\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z\right)dz = $$

$$\frac{i^{-v}\left((-1)^m\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1} - i^{-m-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,d^2\,(2\,k-m)}{4\,b}-i\,e\,(2\,k-m)}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(2\,k-m))^{n-j}\,(-i\,d\,(2\,k-m)-2\,i\,b\,z\,(2\,k-m))^{j+1}$$

$$\left(-\frac{i\,(-i\,d\,(2\,k-m)-2\,i\,b\,z\,(2\,k-m))^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(2\,k-m)-2\,i\,b\,z\,(2\,k-m))^2}{4\,b\,(2\,k-m)}\right)\Bigg)$$

$$(-i\,b\,(2\,k-m))^{-n-1}+(-1)^m\,e^{\frac{i\,d^2\,(m-2\,k)}{4\,b}-i\,e\,(m-2\,k)}\,(-i\,b\,(m-2\,k))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\Bigg)-(-1)^{m+v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}$$

$$(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v\,e^{\frac{f^2\,(2\,k-v)}{4\,c}}\Bigg(\sum_{j=0}^{n}2^{j-n}\,(f\,(2\,k-v))^{n-j}\,(-f\,(2\,k-v)-2\,c\,z\,(2\,k-v))^{j+1}$$

$$\left(\left(\frac{(-f(2k-v)-2cz(2k-v))^2}{c(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f(2k-v)-2cz(2k-v))^2}{4c(2k-v)}\right)\right)$$

$$(-c(2k-v))^{-n-1}+e^{\frac{f^2(v-2k)}{4c}}(-c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2k))^{n-j}(-f(v-2k)-2cz(v-2k))^{j+1}$$

$$\left(\frac{(-f(v-2k)-2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f(v-2k)-2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^{-m}(-1)^v 2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v e^{-\frac{(-i d(2k-m)-f(2s-v))^2}{4(-i b(2k-m)-c(2s-v))}-i e(2k-m)}$$

$$\Bigg(\sum_{j=0}^{n}2^{j-n}(d\,i(2k-m)+f(2s-v))^{n-j}(-i d(2k-m)-f(2s-v)+2(-i b(2k-m)-c(2s-v))z)^{j+1}$$

$$\left(-(-i d(2k-m)-f(2s-v)+2(-i b(2k-m)-c(2s-v))z)^2/(-i b(2k-m)-c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},-(-i d(2k-m)-f(2s-v)+2(-i b(2k-m)-c(2s-v))z)^2/$$

$$(4(-i b(2k-m)-c(2s-v)))\Bigg)\Bigg)(-i b(2k-m)-c(2s-v))^{-n-1}+$$

$$(-1)^{m+v}e^{-\frac{(-i d(m-2k)-f(2s-v))^2}{4(-i b(m-2k)-c(2s-v))}-i e(m-2k)}(-i b(m-2k)-c(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(d\,i(m-2k)+f(2s-v))^{n-j}(-i d(m-2k)-f(2s-v)+2(-i b(m-2k)-c(2s-v))z)^{j+1}$$

$$\left(-(-i d(m-2k)-f(2s-v)+2(-i b(m-2k)-c(2s-v))z)^2/(-i b(m-2k)-c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},-(-i d(m-2k)-f(2s-v)+2(-i b(m-2k)-c(2s-v))z)^2/$$

$$(4(-i b(m-2k)-c(2s-v)))\Bigg)+e^{-\frac{(-i d(2k-m)-f(v-2s))^2}{4(-i b(2k-m)-c(v-2s))}-i e(2k-m)}(-i b(2k-m)-c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(d\,i(2k-m)+f(v-2s))^{n-j}(-i d(2k-m)-f(v-2s)+2(-i b(2k-m)-c(v-2s))z)^{j+1}$$

$$\left(-(-i d(2k-m)-f(v-2s)+2(-i b(2k-m)-c(v-2s))z)^2/(-i b(2k-m)-c(v-2s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},-(-i d(2k-m)-f(v-2s)+2(-i b(2k-m)-c(v-2s))z)^2/(4(-i b(2k-m)-$$

$$c(v-2s)))\Bigg)+(-1)^m e^{-\frac{(-i d(m-2k)-f(v-2s))^2}{4(-i b(m-2k)-c(v-2s))}-i e(m-2k)}(-i b(m-2k)-c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(d\,i(m-2k)+f(v-2s))^{n-j}(-i d(m-2k)-f(v-2s)+2(-i b(m-2k)-c(v-2s))z)^{j+1}$$

$$\left(-\left(-i\,d\,(m-2\,k)-f\,(v-2\,s)+2\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\,z\right)^2\Big/\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)\right)\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\left(-i\,d\,(m-2\,k)-f\,(v-2\,s)+2\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\,z\right)^2\Big/\right.$$
$$\left.\left(4\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\right)\right)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\;b+d\,z+e\right)\sinh^v\left(\sqrt{z}\;c+f\,z\right)dz=$$
$$\frac{i^{-v}\left((-1)^m\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+i^{-m-v}\,2^{-m-2\,n-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,b^2\,(2\,k-m)}{4\,d}-i\,e\,(2\,k-m)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,k-m))^{-h-j+2\,n}\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)^{h+j}\right.\right.$$
$$\left(-\frac{i\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)^2}{d\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(2\,k-m)$$
$$\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)^2}{4\,d\,(2\,k-m)}\right)-$$
$$2\,i\,d\,(2\,k-m)\sqrt{-\frac{i\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)^2}{d\,(2\,k-m)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$
$$\left.\left.\left.-\frac{i\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\;(2\,k-m)\right)^2}{4\,d\,(2\,k-m)}\right)\right)\right)(-i\,d\,(2\,k-m))^{-2\,n-2}+(-1)^m\,e^{\frac{i\,b^2\,(m-2\,k)}{4\,d}-i\,e\,(m-2\,k)}$$
$$(-i\,d\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\;(m-2\,k)\right)^{h+j}$$
$$\left(-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\;(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2\,k)$$
$$\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\;(m-2\,k)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\;(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+(-1)^{m+v}\,2^{-m-2\,n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{\frac{c^2\,(2\,k-v)}{4\,f}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(2\,k-v))^{-h-j+2\,n}\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^{h+j}\right.\right.$$

$$\left(\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{f\,(2\,k-v)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(2\,k-v)\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)-2\,f\,(2\,k-v)$$

$$\left.\left.\sqrt{\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{f\,(2\,k-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)\right)\right)$$

$$(-f\,(2\,k-v))^{-2\,n-2}+e^{\frac{c^2\,(v-2\,k)}{4\,f}}\,(-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}\left(\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2\,k)\right.$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\left.\left.\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)+$$

$$i^{-m}\,(-1)^v\,2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left((-1)^v\,e^{-\frac{(-i\,b\,(2\,s-m)-c\,(2\,k-v))^2}{4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))}-i\,e\,(2\,s-m)}\right.$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,s-m)-c\,(2\,k-v))^{-h-j+2\,n}\right.$$

$$\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+\right.\right.$$

$$\left.\left.2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(2\,s-m)-f\,(2\,k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left((-i\,b\,(2\,s-m)-c\,(2\,k-v))\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v)))\right)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v)))\right)\sqrt{\left(-\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+\right.\right.}$$

$$\left.\left.\left.\left.2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(2\,s-m)-f\,(2\,k-v))\right)\right)\right)$$

$$(-i\,d\,(2\,s-m)-f\,(2\,k-v))^{-2\,n-2}+(-1)^{m+v}\,e^{-\frac{(-i\,b\,(m-2\,s)-c\,(2\,k-v))^2}{4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))}-i\,e\,(m-2\,s)}$$

$$(-i\,d\,(m-2\,s)-f\,(2\,k-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+\right.\right.$$

$$\left.\left.2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(m-2\,s)-f\,(2\,k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left((-i\,b\,(m-2\,s)-c\,(2\,k-v))\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v)))\right)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v)))\right)\sqrt{\left(-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+\right.\right.}$$

$$\left.\left.\left.2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(m-2\,s)-f\,(2\,k-v))\right)\right)+$$

$$e^{-\frac{(-i\,b\,(2\,s-m)-c\,(v-2\,k))^2}{4\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))}-i\,e\,(2\,s-m)}\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,s-m)-$$

$$c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/\right.$$

$$(-i\, d\,(2\,s-m)-f\,(v-2\,k))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\Bigg((-i\, b\,(2\,s-m)-c\,(v-2\,k))\left(-i\, b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\, d\,(2\,s-m)-f\,(v-2\,k))\sqrt{z}\right)$$
$$\Gamma\Bigg(\frac{1}{2}\,(h+j+1),\,-\left(-i\, b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\, d\,(2\,s-m)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/$$
$$(4\,(-i\, d\,(2\,s-m)-f\,(v-2\,k)))\Bigg)+2\,(-i\, d\,(2\,s-m)-f\,(v-2\,k))$$
$$\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,-\left(-i\, b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\, d\,(2\,s-m)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/$$
$$(4\,(-i\, d\,(2\,s-m)-f\,(v-2\,k)))\Bigg)\sqrt{\Bigg(-\Big(-i\, b\,(2\,s-m)-c\,(v-2\,k)+}$$
$$\overline{2\,(-i\, d\,(2\,s-m)-f\,(v-2\,k))\sqrt{z}\Big)^2\Big/(-i\, d\,(2\,s-m)-f\,(v-2\,k))\Bigg)}\Bigg)+$$
$$(-1)^m\, e^{-\frac{(-i\, b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))}-i\, e\,(m-2\,s)}\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$
$$(-i\, b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\,\Big(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))$$
$$\sqrt{z}\Big)^{h+j}\,\Big(-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/$$
$$(-i\, d\,(m-2\,s)-f\,(v-2\,k))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\Bigg((-i\, b\,(m-2\,s)-c\,(v-2\,k))\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)$$
$$\Gamma\Bigg(\frac{1}{2}\,(h+j+1),\,-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/$$
$$(4\,(-i\, d\,(m-2\,s)-f\,(v-2\,k)))\Bigg)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))$$
$$\Gamma\Bigg(\frac{1}{2}\,(h+j+2),\,-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/$$
$$(4\,(-i\, d\,(m-2\,s)-f\,(v-2\,k)))\Bigg)$$
$$\sqrt{\Bigg(-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2 \Big/}$$
$$\overline{(-i\, d\,(m-2\,s)-f\,(v-2\,k))\Bigg)}\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\sin^m(d\,z)\sinh^v\left(c\,z^2+f\,z+g\right)dz ==$$
$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma(n+1, i\, d\,(m-2k)\, z)\, (-i\, d\,(m-2k))^{-n-1} + e^{-\frac{i m \pi}{2}} (i\, d\,(m-2k))^{-n-1}\, \Gamma(n+1, -i\, d\,(m-2k)\, z) \right) -$$

$$i^{-v}\, 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k}$$

$$\left(e^{\frac{(v-2k) f^2}{4c} - \frac{i \pi v}{2} - g\,(v-2k)} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\,(v-2k))^{n-j}\, (-f\,(v-2k) - 2\,c\,z\,(v-2k))^{j+1} \left(\frac{(-f\,(v-2k) - 2\,c\,z\,(v-2k))^2}{c\,(v-2k)} \right)^{\frac{1}{2}(-j-1)} \right.\right.$$

$$\left. \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(-f\,(v-2k) - 2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)} \right) \right) (-c\,(v-2k))^{-n-1} +$$

$$e^{-\frac{(v-2k) f^2}{4c} + \frac{i \pi v}{2} + g\,(v-2k)}\, (c\,(v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-f\,(v-2k))^{n-j}\, (f\,(v-2k) + 2\,c\,z\,(v-2k))^{j+1}$$

$$\left.\left(-\frac{(f\,(v-2k) + 2\,c\,z\,(v-2k))^2}{c\,(v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(f\,(v-2k) + 2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)} \right) \right) -$$

$$i^{-v}\, 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{\frac{(-i\, d\,(m-2k) - f\,(v-2s))^2}{4\,c\,(v-2s)} + \frac{1}{2} i \pi (m-v) - g\,(v-2s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (d\, i\,(m-2k) + f\,(v-2s))^{n-j} \right.\right.$$

$$(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^{j+1} \left(\frac{(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\left. \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^2}{4\,c\,(v-2s)} \right) \right) (-c\,(v-2s))^{-n-1} +$$

$$e^{\frac{(i\, d\,(m-2k) - f\,(v-2s))^2}{4\,c\,(v-2s)} - \frac{1}{2} i \pi (m+v) - g\,(v-2s)} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\,(v-2s) - i\, d\,(m-2k))^{n-j} \right.$$

$$(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^{j+1} \left(\frac{(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\left. \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\, z)^2}{4\,c\,(v-2s)} \right) \right) (-c\,(v-2s))^{-n-1} +$$

$$e^{-\frac{(f\,(v-2s) - i\, d\,(m-2k))^2}{4\,c\,(v-2s)} + \frac{1}{2} i \pi (m+v) + g\,(v-2s)}\, (c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\, d\,(m-2k) - f\,(v-2s))^{n-j}$$

$$(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s))^2}{4\,c\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(v-m)+g\,(v-2\,s)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2\,k)+f\,(v-2\,s)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\Big/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(d\,z)\sinh^v\left(\sqrt{z}\;c+f\,z+g\right)dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(i\,f\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{(v-2\,k)\,c^2}{4\,f}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,k))^{-h-j+2\,n}\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)^{h+j}\right.$$

$$\left(\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2\,k)\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\left.\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\;(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\right)+$$

$$e^{-\frac{(v-2k)c^2}{4f}+\frac{i\pi v}{2}+g(v-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c\,(v-2k))^{-h-j+2n} \left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(c\,(v-2k)\left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\,(v-2k)}\Bigg)+2 f\,(v-2k)$$

$$\sqrt{-\frac{\left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)^2}{f\,(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c\,(v-2k)+2 f \sqrt{z}\, (v-2k)\right)^2}{4 f\,(v-2k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{-\frac{c^2 (v-2s)^2}{4(f(v-2s)-i d (m-2k))}+g(v-2s)+\frac{1}{2} i \pi (m+v)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (c\,(v-2s))^{-h-j+2n} \left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)^2}{f\,(v-2s)-i\, d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2s)\left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)^2}{4\,(f\,(v-2s)-i\, d\,(m-2k))}\right)+$$

$$2\,(f\,(v-2s)-i\, d\,(m-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)^2}{4\,(f\,(v-2s)-i\, d\,(m-2k))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2s)+2\,(f\,(v-2s)-i\, d\,(m-2k))\sqrt{z}\right)^2}{f\,(v-2s)-i\, d\,(m-2k)}}\Bigg)\Bigg)$$

$$(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)+\frac{1}{2}\,i\,\pi\,(m-v)}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-i\,d(m-2k)-f(v-2s))}\right)\Bigg)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(i\,d(m-2k)-f(v-2s))}-g(v-2s)-\frac{1}{2}i\pi(m+v)}(i\,d(m-2k)-f(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{i\,d(m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2(i\,d(m-2k)-f(v-2s))\sqrt{-\frac{\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{i\,d(m-2k)-f(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(i\,d(m-2k)-f(v-2s))}\right)-$$

$$c(v-2s)\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(2(i\,d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(i\,d(m-2k)-f(v-2s))}\Bigg)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\sin^m(d\,z+e)\sinh^v\left(c\,z^2+f\,z+g\right)dz = \frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+$$

$$(-1)^n 2^{-m-v}i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,m\,\pi}{2}-i\,e(m-2k)}\Gamma(n+1, i\,d(m-2k)z)(-i\,d(m-2k))^{-n-1}+$$

$$e^{i\,e(m-2k)-\frac{i\,m\,\pi}{2}}(i\,d(m-2k))^{-n-1}\Gamma(n+1,-i\,d(m-2k)z)\Bigg)-i^{-v}2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}-g(v-2k)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2k))^{n-j}\,(-f\,(v-2k)-2\,c\,z\,(v-2k))^{j+1}\left(\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)(-c\,(v-2k))^{-n-1}+$$

$$e^{-\frac{(v-2k)f^2}{4c}+\frac{i\pi v}{2}+g(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left.\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)-i^{-v}\,2^{-m-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(-i\,d\,(m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)}-i\,e\,(m-2k)+\frac{1}{2}i\pi(m-v)-g(v-2s)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2k)+f\,(v-2s))^{n-j}\right.\right.$$

$$(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)(-c\,(v-2s))^{-n-1}+$$

$$e^{\frac{(i\,d\,(m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)}+e\,i\,(m-2k)-\frac{1}{2}i\pi(m+v)-g(v-2s)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2s)-i\,d\,(m-2k))^{n-j}\right.$$

$$(d\,i\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(d\,i\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(d\,i\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)(-c\,(v-2s))^{-n-1}+$$

$$e^{-\frac{(f\,(v-2s)-i\,d\,(m-2k))^2}{4\,c\,(v-2s)}-i\,e\,(m-2k)+\frac{1}{2}i\pi(m+v)+g(v-2s)}\,(c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k)-f\,(v-2s))^{n-j}$$

$$(-i\,d\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^{j+1}\left(-\frac{(-i\,d\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)+$$

$$e^{-\frac{(d\,i\,(m-2k)+f\,(v-2s))^2}{4c\,(v-2s)}+e\,i\,(m-2k)+\frac{1}{2}\,i\,\pi\,(v-m)+g\,(v-2s)}\,(c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k)-f\,(v-2s))^{n-j}$$
$$(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\wedge m\in\mathbb{N}^+\wedge v\in\mathbb{N}^+$$

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$$\int z^n\sin^m(d\,z+e)\sinh^v\left(\sqrt{z}\;c+f\,z+g\right)dz = $$
$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)-\frac{i\,m\,\pi}{2}}\,(i\,d\,(m-2k))^{-n-1}\right.$$
$$\left.\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)+2^{-m-2n-v-1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(i\,f\,(v-2k))^{-2(n+1)}$$
$$\binom{v}{k}\left(e^{\frac{(v-2k)\,c^2}{4f}-\frac{i\,\pi\,v}{2}-g\,(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2k))^{-h-j+2n}\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)^{h+j}\right.$$
$$\left(\frac{\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2k)\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)\Gamma\left(\right.\right.$$
$$\left.\frac{1}{2}(h+j+1),\,\frac{\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{4f\,(v-2k)}\right)-2f\,(v-2k)$$
$$\left.\left.\sqrt{\frac{\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c\,(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{4f\,(v-2k)}\right)\right)\right)+$$
$$e^{-\frac{(v-2k)\,c^2}{4f}+\frac{i\,\pi\,v}{2}+g\,(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\left(c\,(v-2k)+2f\sqrt{z}\;(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\Bigg(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2\,(v-2\,s)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}+g\,(v-2\,s)-i\,e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m+v)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\Bigg)\Bigg)(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+e\,i\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)-i\,e\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(m-v)}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2 (v-2s)^2}{4(i d (m-2k)-f(v-2s))}-g(v-2s)+e i (m-2k)-\frac{1}{2} i \pi (m+v)} (i d (m-2k)-f(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2s))^{-h-j+2n} \left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d (m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2(i d (m-2k)-f(v-2s))\sqrt{-\frac{\left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d (m-2k)-f(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d (m-2k)-f(v-2s))}\right) -$$

$$c(v-2s)\left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2(i d (m-2k)-f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d (m-2k)-f(v-2s))}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $z^n \sin^m(b z^r) \sinh^v(c z^r + f z + g)$

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$$\int z^n \sin^m(b z^2) \sinh^v(c z^2 + f z + g)\, dz = \frac{i^{-v}\left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)\right)}{n+1} -$$

$$i^{-v} 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{i m \pi}{2}} z^{n+1} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right)\left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$

$$\left. e^{\frac{i m \pi}{2}} z^{n+1} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right) - i^{-v} 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k}$$

$$\left(e^{\frac{(v-2k) f^2}{4c} - \frac{i \pi v}{2} - g(v-2k)} \left(\sum_{j=0}^{n} 2^{j-n} (f(v-2k))^{n-j} (-f(v-2k) - 2 c z (v-2k))^{j+1} \left(\frac{(-f(v-2k) - 2 c z (v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f(v-2k) - 2 c z (v-2k))^2}{4 c (v-2k)}\right)\right)(-c(v-2k))^{-n-1} +$$

$$e^{-\frac{(v-2k)f^2}{4c}+\frac{i\pi v}{2}+g(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\Bigg)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4\,g\,i\,(v-2s)-2\pi(m+v)\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2s))^{n-j}\right.\right.$$

$$(f\,(v-2s)+2\,(c\,(v-2s)-i\,b\,(m-2k))\,z)^{j+1}\left(-\frac{(f\,(v-2s)+2\,(c\,(v-2s)-i\,b\,(m-2k))\,z)^2}{c\,(v-2s)-i\,b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2s)+2\,(c\,(v-2s)-i\,b\,(m-2k))\,z)^2}{4\,(c\,(v-2s)-i\,b\,(m-2k))}\right)\right)(c\,(v-2s)-i\,b\,(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4\,i\,g\,(v-2s)+2\pi(v-m)\right)}\,(b\,i\,(m-2k)+c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2s))^{n-j}$$

$$(f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^{j+1}\left(-\frac{(f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2}{b\,i\,(m-2k)+c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2}{4\,(b\,i\,(m-2k)+c\,(v-2s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4\,i\,g\,(v-2s)-2\pi(m-v)\right)}$$

$$(-i\,b\,(m-2k)-c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2s))^{n-j}\,(2\,(-i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^2}{-i\,b\,(m-2k)-c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(2\,(-i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^2}{4\,(-i\,b\,(m-2k)-c\,(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4\,g\,i\,(v-2s)-2\pi(m+v)\right)}\,(i\,b\,(m-2k)-c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2s))^{n-j}$$

$$(2\,(i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^{j+1}\left(-\frac{(2\,(i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^2}{i\,b\,(m-2k)-c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2\,(i\,b\,(m-2k)-c\,(v-2s))\,z-f\,(v-2s))^2}{4\,(i\,b\,(m-2k)-c\,(v-2s))}\right)\right)\Bigg)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+f\,z+g\right)dz = (-1)^n\,2^{-m-\nu+1}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\,(m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{-\frac{i m\pi}{2}}\,\Gamma\left(2(n+1),\,-i\,b\,(m-2k)\sqrt{z}\right)+e^{\frac{i m\pi}{2}}\,\Gamma\left(2(n+1),\,i\,b\,(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+\frac{i^{-\nu}\left(2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\right)}{n+1}+2^{-m-2n-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(f\,(\nu-2k))^{-2(n+1)}\left((-1)^\nu\,e^{\frac{c^2(\nu-2k)}{4f}-g(\nu-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2k))^{-h-j+2n}\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^{h+j}\left(\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2k)\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)-2f\,(\nu-2k)\sqrt{\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}}\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)\right)+e^{g(\nu-2k)-\frac{c^2(\nu-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2k))^{-h-j+2n}\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^{h+j}\left(-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(\nu-2k)\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)+2f\,(\nu-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)\sqrt{-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}}\right)+$$

$$2^{-m-2n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} (f\,(v-2s))^{-2(n+1)} \left(e^{\frac{(-i\,b\,(m-2k)-c\,(v-2s))^2}{4 f\,(v-2s)}+\frac{1}{2} i\,\pi\,(m-v)-g\,(v-2s)} \right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (-i\,b\,(m-2k)-c\,(v-2s))^{-h-j+2n} \left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b\,(m-2k)-c\,(v-2s))\left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right) -$$

$$2\,f\,(v-2s)\sqrt{\frac{\left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(-i\,b\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)\right) + e^{\frac{(i\,b\,(m-2k)-c\,(v-2s))^2}{4 f\,(v-2s)}-\frac{1}{2} i\,\pi\,(m+v)-g\,(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\,b\,(m-2k)-c\,(v-2s))^{-h-j+2n} \left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2k)-c\,(v-2s))\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right) \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\, \frac{\left(b\,i\,(m-2k)-c\,(v-2s)-2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right) -$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+e^{-\frac{(c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(m+v)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(\vphantom{\int}(c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)+e^{-\frac{(b\,i\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{1}{2}\,i\,\pi\,(v-m)+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(\vphantom{\int}(b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\right)\right)/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b\,z^r+e)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n \sin^m(b\,z^2+e)\sinh^v(c\,z^2+f\,z+g)\,dz =$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1} - i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{i\,e\,(m-2k)-\frac{i\,m\,\pi}{2}}\,z^{n+1}\,\Gamma\left(\frac{n+1}{2}, -i\,b\,(m-2k)\,z^2\right)\left(-i\,b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2k)}\,z^{n+1}\right.$$

$$\left.\left(i\,b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, i\,b\,(m-2k)\,z^2\right)\right) - i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{\frac{(v-2k)f^2}{4c}-\frac{i\,\pi\,v}{2}-g\,(v-2k)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2k))^{n-j}\,(-f\,(v-2k)-2\,c\,z\,(v-2k))^{j+1}\left(\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)(-c\,(v-2k))^{-n-1} +$$

$$e^{-\frac{(v-2k)f^2}{4c}+\frac{i\,\pi\,v}{2}+g\,(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left.\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right) -$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2\,(v-2s)^2}{2\,b\,k-b\,m+2\,i\,c\,s-i\,c\,v}+4\,g\,i\,(v-2s)+4\,e\,(m-2k)-2\,\pi\,(m+v)\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2s))^{n-j}\right.\right.$$

$$(f(v-2s)+2(c(v-2s)-i\,b(m-2k))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-i\,b(m-2k))z)^2}{c(v-2s)-i\,b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-i\,b(m-2k))z)^2}{4(c(v-2s)-i\,b(m-2k))}\right)\Bigg)(c(v-2s)-i\,b(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+4e(m-2k)+2\pi(v-m)\right)}(b\,i(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2}{b\,i(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2}{4(b\,i(m-2k)+c(v-2s))}\right)+$$

$$e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+4e(m-2k)-2\pi(m-v)\right)}(-i\,b(m-2k)-c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{-i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-i\,b(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4gi(v-2s)+4e(m-2k)-2\pi(m+v)\right)}(i\,b(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(i\,b(m-2k)-c(v-2s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\sin^m\left(\sqrt{z}\,b+e\right)\sinh^v\left(\sqrt{z}\,c+f\,z+g\right)dz=(-1)^n\,2^{-m-v+1}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k(m-2k)^{-2(n+1)}\binom{m}{k}\right.$$

$$\left.\left(e^{i\,e(m-2k)-\frac{i m\pi}{2}}\Gamma\left(2(n+1),-i\,b(m-2k)\sqrt{z}\right)+e^{\frac{i m\pi}{2}-i\,e(m-2k)}\Gamma\left(2(n+1),i\,b(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+$$

$$\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1}+2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f(v-2k))^{-2(n+1)}\Bigg((-1)^v e^{\frac{c^2(v-2k)}{4f}-g(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2k))^{-h-j+2n}$$

$$\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)^{h+j}\left(\frac{\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c(v-2k)$$

$$\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\right)-2f(v-2k)$$

$$\sqrt{\frac{\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)^2}{f(v-2k)}}\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-c(v-2k)-2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\right)\Bigg)+$$

$$e^{g(v-2k)-\frac{c^2(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2k))^{-h-j+2n}\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c(v-2k)\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\Bigg)+2f(v-2k)\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\Bigg)\sqrt{-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{f(v-2k)}}\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f(v-2s))^{-2(n+1)}\Bigg(e^{\frac{(-ib(m-2k)-c(v-2s))^2}{4f(v-2s)}-ie(m-2k)+\frac{1}{2}i\pi(m-v)-g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-ib(m-2k)-c(v-2s))^{-h-j+2n}\left(-ib(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\, b\, (m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((-i\, b\,(m-2k)-c\,(v-2s))\left(-i\, b\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i\, b\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{4 f\,(v-2s)}\right)-$$

$$2 f\,(v-2s)\sqrt{\frac{\left(-i\, b\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(-i\, b\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{4 f\,(v-2s)}\right)\right)+e^{\frac{(i\, b\,(m-2k)-c\,(v-2s))^2}{4 f\,(v-2s)}+e\, i\,(m-2k)-\frac{1}{2} i\,\pi\,(m+v)-g\,(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(i\, b\,(m-2k)-c\,(v-2s))^{-h-j+2n}\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\, b\,(m-2k)-c\,(v-2s))\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{4 f\,(v-2s)}\right)-$$

$$2 f\,(v-2s)\sqrt{\frac{\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\, i\,(m-2k)-c\,(v-2s)-2 f\,(v-2s)\sqrt{z}\right)^2}{4 f\,(v-2s)}\right)\right)+e^{-\frac{(c\,(v-2s)-i\, b\,(m-2k))^2}{4 f\,(v-2s)}-i\, e\,(m-2k)+\frac{1}{2} i\,\pi\,(m+v)+g\,(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}}\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2\,k)+c\,(v-2\,s))^{2}}{4\,f\,(v-2\,s)}+e\,i\,(m-2\,k)+\frac{1}{2}\,i\,\pi\,(v-m)+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\Big(b\,i\,(m-2\,k)+$$

$$c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\Big)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{2}}{f\,(v-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^{+}\land v\in\mathbb{N}^{+}$$

Involving $z^n \sin^m(b z^r + d z) \sinh^v(c z^r + f z + g)$

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$$\int z^n \sin^m(b z^2 + d z) \sinh^v(c z^2 + f z + g)\, dz = \frac{i^v 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} - i^v 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2} - \frac{i d^2 (2k-m)}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 b i z (2k-m))^{j+1} \left(\frac{i (d i (2k-m) + 2 b i z (2k-m))^2}{b (2k-m)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (2k-m) + 2 b i z (2k-m))^2}{4 b (2k-m)} \right) \right) (i b (2k-m))^{-n-1} + e^{-\frac{i (m-2k) d^2}{4b} - \frac{i m \pi}{2}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 b i z (m-2k))^{j+1} \left(\frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{b (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{4 b (m-2k)} \right) \right) - i^v 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{(2k-v) f^2}{4c} + g (2k-v) + \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-f (2k-v))^{n-j} (f (2k-v) + 2 c z (2k-v))^{j+1} \left(-\frac{(f (2k-v) + 2 c z (2k-v))^2}{c (2k-v)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (2k-v) + 2 c z (2k-v))^2}{4 c (2k-v)} \right) \right) (c (2k-v))^{-n-1} + e^{-\frac{(v-2k) f^2}{4c} - \frac{i \pi v}{2} + g (v-2k)} (c (v-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (v-2k))^{n-j} (f (v-2k) + 2 c z (v-2k))^{j+1} \left(-\frac{(f (v-2k) + 2 c z (v-2k))^2}{c (v-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (v-2k) + 2 c z (v-2k))^2}{4 c (v-2k)} \right) \right) - i^v 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{(d i (2k-m) + f (2s-v))^2}{4 (b i (2k-m) + c (2s-v))} + g (2s-v) + \frac{1}{2} i \pi (m+v)} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m) - f (2s-v))^{n-j} (d i (2k-m) + f (2s-v) + 2 (b i (2k-m) + c (2s-v)) z)^{j+1} \left(-(d i (2k-m) + f (2s-v) + 2 (b i (2k-m) + c (2s-v)) z)^2 \Big/ (b i (2k-m) + c (2s-v)) \right)^{\frac{1}{2}(-j-1)} \right. \right.$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(2k-m)+f\,(2s-v)+2\,(b\,i\,(2k-m)+c\,(2s-v))\,z)^2}{4\,(b\,i\,(2k-m)+c\,(2s-v))}\right)\Bigg)$$

$$(b\,i\,(2k-m)+c\,(2s-v))^{-n-1} + e^{-\frac{(d\,i\,(m-2k)+f\,(2s-v))^2}{4\,(b\,i\,(m-2k)+c\,(2s-v))}+g\,(2s-v)+\frac{1}{2}\,i\,\pi\,(v-m)}\,(b\,i\,(m-2k)+c\,(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2k)-f\,(2s-v))^{n-j}\,(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^{j+1}$$

$$\left(-(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^2\big/(b\,i\,(m-2k)+c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^2}{4\,(b\,i\,(m-2k)+c\,(2s-v))}\right)+$$

$$e^{-\frac{(d\,i\,(2k-m)+f\,(v-2s))^2}{4\,(b\,i\,(2k-m)+c\,(v-2s))}+\frac{1}{2}\,i\,\pi\,(m-v)+g\,(v-2s)}\,(b\,i\,(2k-m)+c\,(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(2k-m)-f\,(v-2s))^{n-j}\,(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^{j+1}$$

$$\left(-(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^2\big/(b\,i\,(2k-m)+c\,(v-2s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^2}{4\,(b\,i\,(2k-m)+c\,(v-2s))}\right)+$$

$$e^{-\frac{(d\,i\,(m-2k)+f\,(v-2s))^2}{4\,(b\,i\,(m-2k)+c\,(v-2s))}-\frac{1}{2}\,i\,\pi\,(m+v)+g\,(v-2s)}\,(b\,i\,(m-2k)+c\,(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2k)-f\,(v-2s))^{n-j}\,(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^{j+1}$$

$$\left(-(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2\big/(b\,i\,(m-2k)+c\,(v-2s))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2}{4\,(b\,i\,(m-2k)+c\,(v-2s))}\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\,b+d\,z\right)\sinh^v\left(\sqrt{z}\,c+f\,z+g\right)dz ==$$

$$\frac{i^v\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1} + (-1)^{n-1}\,2^{-m-2n-v-1}\,d^{-2n-2}\,i^v\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$(2k-m)^{-2n-2}\left(e^{\frac{i\,m\,\pi}{2}-\frac{i\,b^2\,(2k-m)}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2k-m))^{-h-j+2n}\left(b\,i\,(2k-m)+2\,d\,i\,\sqrt{z}\,(2k-m)\right)^{h+j}\right.$$

$$\left(\frac{i\left(b\,i\,(2k-m)+2\,d\,i\,\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(2k-m)\left(b\,i\,(2k-m)+\right.$$

$$2\,d\,i\,\sqrt{z}\,(2\,k-m)\Big)\,\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(2\,k-m)+2\,d\,i\,\sqrt{z}\,(2\,k-m)\right)^2}{4\,d\,(2\,k-m)}\right)+2\,d\,i\,(2\,k-m)$$

$$\sqrt{\frac{i\left(b\,i\,(2\,k-m)+2\,d\,i\,\sqrt{z}\,(2\,k-m)\right)^2}{d\,(2\,k-m)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(2\,k-m)+2\,d\,i\,\sqrt{z}\,(2\,k-m)\right)^2}{4\,d\,(2\,k-m)}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i\,(m-2\,k)\,b^2}{4\,d}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)+$$

$$2\,d\,i\,(m-2\,k)\sqrt{\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)+2^{-m-2\,n-\nu-1}\binom{m}{\frac{m}{2}}$$

$$(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(f\,(2\,k-\nu))^{-2\,n-2}\Bigg((-1)^{\nu}\,e^{g\,(2\,k-\nu)-\frac{c^2\,(2\,k-\nu)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2\,k-\nu))^{-h-j+2\,n}$$

$$\left(c\,(2\,k-\nu)+2\,f\,\sqrt{z}\,(2\,k-\nu)\right)^{h+j}\left(-\frac{\left(c\,(2\,k-\nu)+2\,f\,\sqrt{z}\,(2\,k-\nu)\right)^2}{f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(2\,k-\nu)\left(c\,(2\,k-\nu)+2\,f\,\sqrt{z}\,(2\,k-\nu)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c\,(2\,k-\nu)+2\,f\,\sqrt{z}\,(2\,k-\nu)\right)^2}{4\,f\,(2\,k-\nu)}\right)+2\,f\,(2\,k-$$

$$v)\sqrt{-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{f\,(2\,k-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)\Bigg)+$$

$$e^{g\,(v-2\,k)-\frac{c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\Bigg((-1)^v\,e^{-\frac{(b\,i\,(2\,s-m)+c\,(2\,k-v))^2}{4\,(d\,i\,(2\,s-m)+f\,(2\,k-v))}+g\,(2\,k-v)+\frac{i\,m\,\pi}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(2\,s-m)+c\,(2\,k-v))^{-h-j+2\,n}\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}$$

$$\Big(-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/$$

$$(d\,i\,(2\,s-m)+f\,(2\,k-v))\Big)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(2\,s-m)+c\,(2\,k-v))\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\Big)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+2),\,-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\Big)\sqrt{\Big(-\Big(b\,i\,(2\,s-m)+c\,(2\,k-v)+}$$

$$\overline{2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\Big)^2\Big/(d\,i\,(2\,s-m)+f\,(2\,k-v))\Big)}\Big)\Bigg)$$

$$(d\,i\,(2\,s-m)+f\,(2\,k-v))^{-2\,n-2}+(-1)^v\,e^{-\frac{(b\,i\,(m-2\,s)+c\,(2\,k-v))^2}{4\,(d\,i\,(m-2\,s)+f\,(2\,k-v))}+g\,(2\,k-v)-\frac{i\,m\,\pi}{2}}\,(d\,i\,(m-2\,s)+f\,(2\,k-v))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,s)+f\,(2\,k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(2\,k-v))\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\right)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\right)\sqrt{\left(-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,s)+f\,(2\,k-v))\right)}\Bigg)+$$

$$e^{-\frac{(b\,i\,(2\,s-m)+c\,(v-2\,k))^2}{4\,(d\,i\,(2\,s-m)+f\,(v-2\,k))}+g\,(v-2\,k)+\frac{i\,m\,\pi}{2}}\,(d\,i\,(2\,s-m)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(2\,s-m)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,s-m)+f\,(v-2\,k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(2\,s-m)+c\,(v-2\,k))\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)\sqrt{\left(-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,s-m)+f\,(v-2\,k))\right)}\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}+g\,(v-2\,k)-\frac{i\,m\,\pi}{2}}\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(v-2k)))\right)+2\,(d\,i\,(m-2s)+f\,(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(v-2k)))\right)\sqrt{\left(-\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d\,i\,(m-2s)+f\,(v-2k))\right)}\Bigg) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \sin^m(b z^r + d z + e) \sinh^v(c z^r + f z + g)$

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$$\int z^n \sin^m(b z^2+d z+e)\sinh^v(c z^2+f z+g)\,dz = \frac{\left(i^v\,2^{-m-v}\,z^{n+1}\right)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{i(2k-m)d^2}{4b}+e\,i\,(2k-m)+\frac{i m\pi}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2k-m))^{n-j}\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^{j+1}\left(\frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{4\,b\,(2k-m)}\right)\right)\right.$$

$$(i\,b\,(2k-m))^{-n-1}+e^{-\frac{i(m-2k)d^2}{4b}+e\,i\,(m-2k)-\frac{i m\pi}{2}}\,(i\,b\,(m-2k))^{-n-1}$$

$$\left.\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right) - i^v\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{(2k-v)f^2}{4c}+g\,(2k-v)+\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2k-v))^{n-j}\,(f\,(2k-v)+2\,c\,z\,(2k-v))^{j+1}\left(-\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{c\,(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{4\,c\,(2k-v)}\right)\right)(c\,(2k-v))^{-n-1}+\right.$$

$$e^{-\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}+g\,(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^v 2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d\,i(2k-m)+f(2s-v))^2}{4(b\,i(2k-m)+c(2s-v))}+e\,i(2k-m)+g(2s-v)+\frac{1}{2}i\pi(m+v)}$$

$$\left(\sum_{j=0}^{n}2^{j-n}(-i\,d(2k-m)-f(2s-v))^{n-j}(d\,i(2k-m)+f(2s-v)+2(b\,i(2k-m)+c(2s-v))z)^{j+1}\right.$$

$$\left(-(d\,i(2k-m)+f(2s-v)+2(b\,i(2k-m)+c(2s-v))z)^2\big/(b\,i(2k-m)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(2k-m)+f(2s-v)+2(b\,i(2k-m)+c(2s-v))z)^2}{4(b\,i(2k-m)+c(2s-v))}\right)\right)$$

$$(b\,i(2k-m)+c(2s-v))^{-n-1}+e^{-\frac{(d\,i(m-2k)+f(2s-v))^2}{4(b\,i(m-2k)+c(2s-v))}+e\,i(m-2k)+g(2s-v)+\frac{1}{2}i\pi(v-m)}(b\,i(m-2k)+c(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k)-f(2s-v))^{n-j}(d\,i(m-2k)+f(2s-v)+2(b\,i(m-2k)+c(2s-v))z)^{j+1}$$

$$\left(-(d\,i(m-2k)+f(2s-v)+2(b\,i(m-2k)+c(2s-v))z)^2\big/(b\,i(m-2k)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(m-2k)+f(2s-v)+2(b\,i(m-2k)+c(2s-v))z)^2}{4(b\,i(m-2k)+c(2s-v))}\right)+$$

$$e^{-\frac{(d\,i(2k-m)+f(v-2s))^2}{4(b\,i(2k-m)+c(v-2s))}+e\,i(2k-m)+\frac{1}{2}i\pi(m-v)+g(v-2s)}(b\,i(2k-m)+c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(-i\,d(2k-m)-f(v-2s))^{n-j}(d\,i(2k-m)+f(v-2s)+2(b\,i(2k-m)+c(v-2s))z)^{j+1}$$

$$\left(-(d\,i(2k-m)+f(v-2s)+2(b\,i(2k-m)+c(v-2s))z)^2\big/(b\,i(2k-m)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(2k-m)+f(v-2s)+2(b\,i(2k-m)+c(v-2s))z)^2}{4(b\,i(2k-m)+c(v-2s))}\right)+$$

$$e^{-\frac{(d\,i(m-2k)+f(v-2s))^2}{4(b\,i(m-2k)+c(v-2s))}+e\,i(m-2k)+g(v-2s)-\frac{1}{2}i(m+v)\pi}(b\,i(m-2k)+c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k)-f(v-2s))^{n-j}(d\,i(m-2k)+f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^{j+1}$$

$$\left(-(d\,i(m-2k)+f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2\big/(b\,i(m-2k)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(m-2k)+f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2}{4(b\,i(m-2k)+c(v-2s))}\right)\Bigg)\Bigg)\Bigg/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n \sin^m\left(\sqrt{z}\, b + d\, z + e\right) \sinh^\nu\left(\sqrt{z}\, c + f\, z + g\right) dz = \frac{\left(i^\nu\, 2^{-m-\nu}\, z^{n+1}\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)}{n+1} + (-1)^{n-1}\, 2^{-m-2n-\nu-1}\, d^{-2n-2}\, i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$(2k-m)^{-2n-2} \left(e^{-\frac{i(2k-m)b^2}{4d} + e\, i\, (2k-m) + \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (2k-m))^{-h-j+2n} \left(b\, i\, (2k-m) + 2\, d\, i\, \sqrt{z}\, (2k-m)\right)^{h+j} \right.$$

$$\left(\frac{i\left(b\, i\, (2k-m) + 2\, d\, i\, \sqrt{z}\, (2k-m)\right)^2}{d\,(2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (2k-m) \left(b\, i\, (2k-m) + \right.\right.$$

$$\left. 2\, d\, i\, \sqrt{z}\, (2k-m)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\, (2k-m) + 2\, d\, i\, \sqrt{z}\, (2k-m)\right)^2}{4\, d\, (2k-m)} \right) + 2\, d\, i\, (2k-m)$$

$$\left.\left. \sqrt{\frac{i\left(b\, i\, (2k-m) + 2\, d\, i\, \sqrt{z}\, (2k-m)\right)^2}{d\,(2k-m)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\, (2k-m) + 2\, d\, i\, \sqrt{z}\, (2k-m)\right)^2}{4\, d\, (2k-m)} \right) \right) + \right.$$

$$e^{-\frac{i(m-2k)b^2}{4d} + e\, i\, (m-2k) - \frac{i m \pi}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2k))^{-h-j+2n} \left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b\, i\, (m-2k) \left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)} \right) + \right.$$

$$2\, d\, i\, (m-2k) \sqrt{\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \right.$$

$$\left.\left.\left. \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\, \sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)} \right) \right) \right) + 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}}$$

$$(1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} (f(2k-v))^{-2n-2} \Bigg((-1)^v e^{g(2k-v) - \frac{c^2 (2k-v)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-v))^{-h-j+2n}$$

$$\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right)^{h+j} \left(-\frac{\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right)^2}{f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg(c(2k-v)\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right)^2}{4f(2k-v)}\right) + 2f(2k-$$

$$v)\sqrt{-\frac{\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right)^2}{f(2k-v)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(2k-v) + 2f\sqrt{z}\,(2k-v)\right)^2}{4f(2k-v)}\right)\Bigg) +$$

$$e^{g(v-2k) - \frac{c^2 (v-2k)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(v-2k))^{-h-j+2n} \left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c(v-2k)\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\Bigg) + 2f(v-2k)$$

$$\sqrt{-\frac{\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\Bigg)\Bigg) +$$

$$2^{-m-2n-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \Bigg((-1)^v e^{-\frac{(b i (2s-m) + c(2k-v))^2}{4(d i (2s-m) + f(2k-v))} + e i (2s-m) + g(2k-v) + \frac{i m \pi}{2}}$$

$$\Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (b i (2s-m) + c(2k-v))^{-h-j+2n}$$

$$\left(b i (2s-m) + c(2k-v) + 2(d i (2s-m) + f(2k-v))\sqrt{z}\right)^{h+j} \Big(-\big(b i (2s-m) + c(2k-v) +$$

$$2(d i (2s-m) + f(2k-v))\sqrt{z}\big)^2 \Big/ (d i (2s-m) + f(2k-v))\Big)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Big((b i (2s-m) + c(2k-v))\left(b i (2s-m) + c(2k-v) + 2(d i (2s-m) + f(2k-v))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(2s-m)+f\,(2k-v)))\right)+2\,(d\,i\,(2s-m)+f\,(2k-v))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(2s-m)+f\,(2k-v)))\right)\sqrt{\left(-\left(b\,i\,(2s-m)+c\,(2k-v)+2\,(d\,i\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (d\,i\,(2s-m)+f\,(2k-v))\right)}\Bigg)$$

$$(d\,i\,(2s-m)+f\,(2k-v))^{-2n-2}+(-1)^v\,e^{-\frac{(b\,i\,(m-2s)+c\,(2k-v))^2}{4\,(d\,i\,(m-2s)+f\,(2k-v))}+e\,i\,(m-2s)+g\,(2k-v)-\frac{i\,m\,\pi}{2}}$$

$$(d\,i\,(m-2s)+f\,(2k-v))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(2k-v))^{-h-j+2n}$$

$$\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (d\,i\,(m-2s)+f\,(2k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2s)+c\,(2k-v))\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(2k-v)))\right)+2\,(d\,i\,(m-2s)+f\,(2k-v))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(2k-v)))\right)\sqrt{\left(-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2 \Big/ (d\,i\,(m-2s)+f\,(2k-v))\right)}\Bigg)+$$

$$e^{-\frac{(b\,i\,(2s-m)+c\,(v-2k))^2}{4\,(d\,i\,(2s-m)+f\,(v-2k))}+e\,i\,(2s-m)+g\,(v-2k)+\frac{i\,m\,\pi}{2}}\,(d\,i\,(2s-m)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(2s-m)+c\,(v-2k))^{-h-j+2n}\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d\,i\,(2s-m)+f\,(v-2k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(2s-m)+c\,(v-2k))\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(2s-m)+f\,(v-2k)))\right)+2\,(d\,i\,(2s-m)+f\,(v-2k))$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(2s-m)+f\,(v-2k)))\right)\sqrt{\left(-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d\,i\,(2s-m)+f\,(v-2k))\right)}\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2s)+c\,(v-2k))^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}+e\,i\,(m-2s)+g\,(v-2k)-\frac{i\,m\,\pi}{2}}\,(d\,i\,(m-2s)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(m-2s)+c\,(v-2k))^{-h-j+2n}\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d\,i\,(m-2s)+f\,(v-2k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2s)+c\,(v-2k))\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(v-2k)))\right)+2\,(d\,i\,(m-2s)+f\,(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2s)+f\,(v-2k)))\right)\sqrt{\left(-\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d\,i\,(m-2s)+f\,(v-2k))\right)}\Bigg)\Bigg) /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving cos and power

Involving $z^{\alpha-1}\cos(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.2962.01

$$\int z^{\alpha-1}\cos(c\,z)\sinh^{\nu}(a\,z)\,dz = -2^{-\nu-1}\,e^{\frac{i\pi\nu}{2}}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(\alpha,-i\,c\,z)\,(-i\,c\,z)^{-\alpha}+(i\,c\,z)^{-\alpha}\,\Gamma(\alpha,i\,c\,z)\right)(1-\nu \bmod 2)\,z^{\alpha}-$$

$$2^{-\nu-1}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{i\pi\nu}\,\Gamma(\alpha,(-i\,c-2\,a\,s+a\,\nu)\,z)\,((-i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha}+\right.\right.$$

$$e^{i\pi\nu}\,((i\,c-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,(i\,c-2\,a\,s+a\,\nu)\,z)+\left(\Gamma(\alpha,(-i\,c+2\,a\,s-a\,\nu)\,z)\,((-i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}+\right.$$

$$\left.\left.\left.((i\,c+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,(i\,c+2\,a\,s-a\,\nu)\,z)\right)\right)\right)z^{\alpha} /;\ \nu\in\mathbb{N}^+$$

01.19.21.2963.01

$$\int z^n \cos(c z) \sinh^\nu(a z)\, dz = \frac{1}{2}\left(1-e^{-2 a z}\right)^{-\nu} n!\, \sinh^\nu(a z) \left(e^{i c z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (i c + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{-i c - a\nu}{2a}, \ldots, \frac{-i c - a\nu}{2a}, -\nu; \frac{-i c - a\nu}{2a}+1, \ldots, \frac{-i c - a\nu}{2a}+1; e^{-2 a z}\right) + e^{-i c z} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (-i c + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{i c - a\nu}{2a}, \ldots, \frac{i c - a\nu}{2a}, -\nu; \frac{i c - a\nu}{2a}+1, \ldots, \frac{i c - a\nu}{2a}+1; e^{-2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(c z + d) \sinh^\nu(a z)$

01.19.21.2964.01

$$\int z^{\alpha-1} \cos(d + c z) \sinh^\nu(a z)\, dz = -2^{-\nu-1} e^{-i d + \frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d}\, \Gamma(\alpha, -i c z) (-i c z)^{-\alpha} + (i c z)^{-\alpha}\, \Gamma(\alpha, i c z)\right) (1 - \nu \bmod 2) z^\alpha - 2^{-\nu-1} e^{-i d} \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{2 i d + i \pi \nu}\, \Gamma(\alpha, (-i c - 2 a s + a \nu) z) ((-i c - 2 a s + a \nu) z)^{-\alpha} + e^{i \pi \nu} ((i c - 2 a s + a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c - 2 a s + a \nu) z) + \left(e^{2 i d}\, \Gamma(\alpha, (-i c + 2 a s - a \nu) z) ((-i c + 2 a s - a \nu) z)^{-\alpha} + ((i c + 2 a s - a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c + 2 a s - a \nu) z)\right)\right)\right) z^\alpha /; \nu \in \mathbb{N}^+$$

01.19.21.2965.01

$$\int z^n \cos(d + c z) \sinh^\nu(a z)\, dz = \frac{1}{2}\left(1-e^{-2 a z}\right)^{-\nu} n!\, \sinh^\nu(a z) \left(e^{i (d + c z)} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (i c + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{-i c - a\nu}{2a}, \ldots, \frac{-i c - a\nu}{2a}, -\nu; \frac{-i c - a\nu}{2a}+1, \ldots, \frac{-i c - a\nu}{2a}+1; e^{-2 a z}\right) + e^{-i (d + c z)} \sum_{j=0}^n \frac{(-1)^j z^{n-j} (-i c + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(\frac{i c - a\nu}{2a}, \ldots, \frac{i c - a\nu}{2a}, -\nu; \frac{i c - a\nu}{2a}+1, \ldots, \frac{i c - a\nu}{2a}+1; e^{-2 a z}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(c z) \sinh^\nu(a z + b)$

01.19.21.2966.01

$$\int z^{\alpha-1} \cos(c z) \sinh^\nu(b + a z)\, dz = -2^{-\nu-1} e^{\frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} (\Gamma(\alpha, -i c z) (-i c z)^{-\alpha} + (i c z)^{-\alpha}\, \Gamma(\alpha, i c z)) (1 - \nu \bmod 2) z^\alpha - 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \binom{\nu}{s} \left(e^{4 b s + i \pi \nu}\, \Gamma(\alpha, (-i c - 2 a s + a \nu) z) ((-i c - 2 a s + a \nu) z)^{-\alpha} + e^{4 b s + i \pi \nu} ((i c - 2 a s + a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c - 2 a s + a \nu) z) + e^{2 b \nu} (\Gamma(\alpha, (-i c + 2 a s - a \nu) z) ((-i c + 2 a s - a \nu) z)^{-\alpha} + ((i c + 2 a s - a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c + 2 a s - a \nu) z))\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2967.01

$$\int z^n \cos(c\, z) \sinh^\nu(b + a\, z)\, dz = \frac{1}{2} \left(1 - e^{-2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b + a\, z) \left(e^{-i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\, c + a\, \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{i\, c - a\, \nu}{2\, a}, \ldots, \frac{i\, c - a\, \nu}{2\, a}, -\nu; \frac{i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right) + e^{i c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\, c + a\, \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{-i\, c - a\, \nu}{2\, a}, \ldots, \frac{-i\, c - a\, \nu}{2\, a}, -\nu; \frac{-i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{-i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos(c\, z + d) \sinh^\nu(a\, z + b)$

01.19.21.2968.01

$$\int z^{\alpha-1} \cos(d + c\, z) \sinh^\nu(b + a\, z)\, dz = -2^{-\nu-1} e^{-i d + \frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d}\, \Gamma(\alpha, -i\, c\, z) (-i\, c\, z)^{-\alpha} + (i\, c\, z)^{-\alpha}\, \Gamma(\alpha, i\, c\, z)\right) (1 - \nu \bmod 2)\, z^\alpha - 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-i d - 2 b s - b \nu} \binom{\nu}{s} \left(e^{2 i d + 4 b s + i \pi \nu}\, \Gamma(\alpha, (-i\, c - 2\, a\, s + a\, \nu) z) ((-i\, c - 2\, a\, s + a\, \nu) z)^{-\alpha} + e^{4 b s + i \pi \nu} ((i\, c - 2\, a\, s + a\, \nu) z)^{-\alpha}\, \Gamma(\alpha, (i\, c - 2\, a\, s + a\, \nu) z) + e^{2 b \nu} \left(e^{2 i d}\, \Gamma(\alpha, (-i\, c + 2\, a\, s - a\, \nu) z) ((-i\, c + 2\, a\, s - a\, \nu) z)^{-\alpha} + ((i\, c + 2\, a\, s - a\, \nu) z)^{-\alpha}\, \Gamma(\alpha, (i\, c + 2\, a\, s - a\, \nu) z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.2969.01

$$\int z^n \cos(d + c\, z) \sinh^\nu(b + a\, z)\, dz = \frac{1}{2} \left(1 - e^{-2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b + a\, z) \left(e^{-i(d+c z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i\, c + a\, \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{i\, c - a\, \nu}{2\, a}, \ldots, \frac{i\, c - a\, \nu}{2\, a}, -\nu; \frac{i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right) + e^{i(d+c z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i\, c + a\, \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(\frac{-i\, c - a\, \nu}{2\, a}, \ldots, \frac{-i\, c - a\, \nu}{2\, a}, -\nu; \frac{-i\, c - a\, \nu}{2\, a} + 1, \ldots, \frac{-i\, c - a\, \nu}{2\, a} + 1; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n \cos\left(b\, z^r\right) \sinh^\nu(c\, z)$

01.19.21.2970.01

$$\int z^n \cos(b z^2) \sinh^\nu(c z)\, dz = 2^{-\nu-2} (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) (-i b z^2)^{\frac{1}{2}(-n-1)} + (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4b} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(-c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(\nu-2k)-2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{i c^2 (\nu-2k)^2}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b z)^{j+1} \left(-\frac{i(c(\nu-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(\nu-2k)-2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i c^2 (\nu-2k)^2}{4b} - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b z - c(\nu-2k))^{j+1} \left(\frac{i(2 i b z - c(\nu-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - c(\nu-2k))^2}{4b}\right) + (i b)^{-n-1} e^{\frac{c^2 i (\nu-2k)^2}{4b} + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) + 2 i b z)^{j+1} \left(\frac{i(c(\nu-2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c(\nu-2k)+2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2971.01

$$\int z^n \cos(b \sqrt{z}) \sinh^\nu(c z)\, dz = (-1)^n (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(2(n+1), -i b \sqrt{z}) + \Gamma(2(n+1), i b \sqrt{z})\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (c(\nu-2k))^{-2(n+1)} \binom{\nu}{k} \left((-1)^\nu e^{-\frac{b^2}{4c(\nu-2k)}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2c(\nu-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2 c(\nu-2k)\sqrt{z}\right)^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i b \left(-i b - 2 c(\nu-2k)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i b - 2c(\nu-2k)\sqrt{z}\right)^2}{4c(\nu-2k)}\right) - \right.\right.$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$(-1)^v\,e^{-\frac{b^2}{4\,c\,(v-2\,k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(i\,b\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,c\,(v-2\,k)\sqrt{-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-$$

$$i\,b\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+2\,c\,(v-2\,k)$$

$$\sqrt{-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos(b z^r + e) \sinh^v(c z)$

01.19.21.2972.01

$$\int z^n \cos(b z^2 + e) \sinh^v(c z)\, dz = 2^{-v-2} (-i^{-v}) \binom{v}{\frac{v}{2}} \left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, -i b z^2\right) (-i b z^2)^{\frac{1}{2}(-n-1)} + e^{-i e} (i b z^2)^{\frac{1}{2}(-n-1)}\, \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - v \bmod 2)\, z^{n+1} - i^{-v}\, 2^{-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{i c^2 (v-2k)^2}{4b} - i e - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(v-2k))^{n-j} (-c(v-2k) - 2 i b z)^{j+1} \left(-\frac{i(-c(v-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(v-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{-\frac{i c^2 (v-2k)^2}{4b} - i e + \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(v-2k))^{n-j} (c(v-2k) - 2 i b z)^{j+1} \left(-\frac{i(c(v-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(v-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{c^2 i (v-2k)^2}{4b} + i e - \frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n} (c(v-2k))^{n-j} (2 i b z - c(v-2k))^{j+1} \left(\frac{i(2 i b z - c(v-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - c(v-2k))^2}{4b}\right) + (i b)^{-n-1} e^{\frac{c^2 i (v-2k)^2}{4b} + i e + \frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n} (-c(v-2k))^{n-j} (c(v-2k) + 2 i b z)^{j+1} \left(\frac{i(c(v-2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c(v-2k) + 2 i b z)^2}{4b}\right)\right) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2973.01

$$\int z^n \cos(\sqrt{z}\, b + e) \sinh^v(c z)\, dz = (-1)^n (2 i)^{-v} \binom{v}{\frac{v}{2}} \left(e^{i e}\, \Gamma(2(n+1), -i b \sqrt{z}) + e^{-i e}\, \Gamma(2(n+1), i b \sqrt{z})\right) (1 - v \bmod 2)\, b^{-2(n+1)} + 2^{-2n-v-2}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k (c(v-2k))^{-2(n+1)} \binom{v}{k} \left(e^{-\frac{b^2}{4c(v-2k)} - i e - \frac{i \pi v}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j (-i b)^{-h-j+2n} \left(-i b - 2 c(v-2k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2 c(v-2k)\sqrt{z}\right)^2}{c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \right.$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\,\sqrt{\frac{\left(-i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{-\frac{b^2}{4\,c\,(v-2\,k)}+i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(i\,b\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\,\sqrt{\frac{\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}-i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{\frac{b^2}{4\,c\,(v-2\,k)}+i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+2\,c\,(v-2\,k)\right.$$

Involving $z^n \cos(b z^r + d z) \sinh^\nu(c z)$

01.19.21.2974.01

$$\int z^n \cos(b z^2 + d z) \sinh^\nu(c z)\, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i d^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i(-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i(i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(i d + 2 i b z)^2}{4 b} \right) \right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i \pi \nu}{2} - \frac{i(-i d + c(\nu - 2k))^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d - c(\nu - 2k))^{n-j} (-i d + c(\nu - 2k) - 2 i b z)^{j+1} \left(-\frac{i(-i d + c(\nu - 2k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d + c(\nu - 2k) - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + e^{-\frac{i(-i d - c(\nu-2k))^2}{4 b} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (i d + c(\nu - 2k))^{n-j} (-i d - c(\nu - 2k) - 2 i b z)^{j+1} \left(-\frac{i(-i d - c(\nu - 2k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d - c(\nu - 2k) - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i(i d + c(\nu-2k))^2}{4 b} + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-i d - c(\nu - 2k))^{n-j} (i d + c(\nu - 2k) + 2 i b z)^{j+1} \left(\frac{i(i d + c(\nu - 2k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(i d + c(\nu - 2k) + 2 i b z)^2}{4 b} \right) + (i b)^{-n-1} e^{\frac{i(i d - c(\nu-2k))^2}{4 b} - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-i d + c(\nu - 2k))^{n-j} (i d - c(\nu - 2k) + 2 i b z)^{j+1} \left(\frac{i(i d - c(\nu - 2k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(i d - c(\nu - 2k) + 2 i b z)^2}{4 b} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2975.01

$$\int z^n \cos\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu(c\, z)\, dz = (-1)^{n-1}\, 2^{-2n-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{-\frac{i b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d\, \sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(i\, b + 2\, i\, d\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right) + 2 \sqrt{\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right)\right) + e^{\frac{i b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b \left(-i\, b - 2\, i\, d\, \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right) - 2\, i\, d \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4d}\right)\right)\right) d^{-2(n+1)} + 2^{-2n-\nu-2}\, i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{b^2}{4(-i d + c(\nu-2k))} + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b + 2\,(-i\, d + c\,(\nu - 2k))\, \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i\, b + 2\,(-i\, d + c\,(\nu - 2k))\, \sqrt{z}\right)^2}{-i\, d + c\,(\nu - 2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2\,(-i\, d + c\,(\nu - 2k)) \sqrt{-\frac{\left(-i\, b + 2\,(-i\, d + c\,(\nu - 2k))\, \sqrt{z}\right)^2}{-i\, d + c\,(\nu - 2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\, b + 2\,(-i\, d + c\,(\nu - 2k))\, \sqrt{z}\right)^2}{4\,(-i\, d + c\,(\nu - 2k))}\right) - \right.\right.\right.$$

$$i\,b\left(-i\,b+2\,(-i\,d+c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b+2\,(-i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+c\,(v-2\,k))}\right)\Bigg)\Bigg)$$

$$(-i\,d+c\,(v-2\,k))^{-2\,(n+1)}+e^{\frac{b^2}{4\,(i\,d+c\,(v-2\,k))}+\frac{i\,\pi\,v}{2}}\,(i\,d+c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+c\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+c\,(v-2\,k)}}\,(i\,d+c\,(v-2\,k))\,\Gamma\Bigg($$

$$\left.\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+c\,(v-2\,k))}\right)\Bigg)+e^{\frac{b^2}{4\,(-i\,d-c\,(v-2\,k))}-\frac{i\,\pi\,v}{2}}$$

$$(-i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\,d-c\,(v-2\,k))$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-c\,(v-2\,k)}}\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-c\,(v-2\,k))}\right)-$$

$$i\,b\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-c\,(v-2\,k))}\right)\Bigg)+$$

$$e^{\frac{b^2}{4\,(i\,d-c\,(v-2\,k))}-\frac{i\,\pi\,v}{2}}\,(i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-c\,(v-2\,k))}\right)+2\sqrt{-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-c\,(v-2\,k)}}\,(i\,d-c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-c\,(v-2\,k))}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos\left(b\,z^r+d\,z+e\right)\sinh^v(c\,z)$

01.19.21.2976.01

$$\int z^n \cos\left(b z^2 + d z + e\right) \sinh^\nu(c z)\, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i d^2}{4 b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{i e - \frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right)\right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + c(\nu - 2k))^2}{4 b} - i e + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (i d - c(\nu - 2k))^{n-j} (-i d + c(\nu - 2k) - 2 i b z)^{j+1} \left(-\frac{i (-i d + c(\nu - 2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + c(\nu - 2k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + e^{-\frac{i (-i d - c(\nu - 2k))^2}{4 b} - i e - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (i d + c(\nu - 2k))^{n-j} (-i d - c(\nu - 2k) - 2 i b z)^{j+1} \left(-\frac{i (-i d - c(\nu - 2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - c(\nu - 2k) - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{i (i d + c(\nu - 2k))^2}{4 b} + i e + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-i d - c(\nu - 2k))^{n-j} (i d + c(\nu - 2k) + 2 i b z)^{j+1} \left(\frac{i (i d + c(\nu - 2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + c(\nu - 2k) + 2 i b z)^2}{4 b}\right) + (i b)^{-n-1} e^{\frac{i (i d - c(\nu - 2k))^2}{4 b} + i e - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-i d + c(\nu - 2k))^{n-j} (i d - c(\nu - 2k) + 2 i b z)^{j+1} \left(\frac{i (i d - c(\nu - 2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - c(\nu - 2k) + 2 i b z)^2}{4 b}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2977.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu(c z)\, dz = (-1)^{n-1} 2^{-2n-\nu-2} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{i e - \frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b + 2 i d \sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,b^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)d^{-2\,(n+1)}+$$

$$2^{-2\,n-\nu-2}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{b^2}{4(-i\,d+c\,(\nu-2\,k))}-i\,e+\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)^2}{-i\,d+c\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d+c\,(\nu-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)^2}{-i\,d+c\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+c\,(\nu-2\,k))}\right)-$$

$$\left.\left.i\,b\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d+c\,(\nu-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+c\,(\nu-2\,k))}\right)\right)\right)$$

$$(-i\,d+c\,(\nu-2\,k))^{-2\,(n+1)}+e^{\frac{b^2}{4\,(i\,d+c\,(\nu-2\,k))}+i\,e+\frac{i\,\pi\,\nu}{2}}\,(i\,d+c\,(\nu-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{i\,d+c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(i\,d+c\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{i\,d+c\,(v-2\,k)}}\,\,(i\,d+c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(i\,d+c\,(v-2\,k))}\right)\right)+e^{\frac{b^{2}}{4\,(-i\,d-c\,(v-2\,k))}-i\,e-\frac{i\,\pi\,v}{2}}$$

$$(-i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{-i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-c\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{-i\,d-c\,(v-2\,k)}}\,\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(-i\,d-c\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(-i\,d-c\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^{2}}{4\,(i\,d-c\,(v-2\,k))}+i\,e-\frac{i\,\pi\,v}{2}}\,(i\,d-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{i\,d-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(i\,d-c\,(v-2\,k))}\right)+2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d-c\,(v-2\,k))\,\sqrt{z}\right)^{2}}{i\,d-c\,(v-2\,k)}}$$

Involving $z^n \cos(b z^r) \sinh^v(f z + g)$

01.19.21.2978.01

$$\int z^n \cos(b z^2) \sinh^v(g + f z)\, dz = 2^{-v-2} (-i^{-v}) \binom{v}{\frac{v}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) (-i b z^2)^{\frac{1}{2}(-n-1)} + (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - v \bmod 2) z^{n+1} - i^{-v} 2^{-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{i f^2 (v-2k)^2}{4b} - g(v-2k) - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f(v-2k))^{n-j} (-f(v-2k) - 2 i b z)^{j+1} \left(-\frac{i(-f(v-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f(v-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + e^{-\frac{i f^2 (v-2k)^2}{4b} + g(v-2k) + \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-f(v-2k))^{n-j} (f(v-2k) - 2 i b z)^{j+1} \left(-\frac{i(f(v-2k) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f(v-2k) - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{\frac{f^2 i (v-2k)^2}{4b} - g(v-2k) - \frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n} (f(v-2k))^{n-j} (2 i b z - f(v-2k))^{j+1} \left(\frac{i(2 i b z - f(v-2k))^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b z - f(v-2k))^2}{4b}\right) + (i b)^{-n-1} e^{\frac{f^2 i (v-2k)^2}{4b} + g(v-2k) + \frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n} (-f(v-2k))^{n-j} (f(v-2k) + 2 i b z)^{j+1} \left(\frac{i(f(v-2k) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(f(v-2k) + 2 i b z)^2}{4b}\right)\right) /;\ n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2979.01

$$\int z^n \cos\left(b \sqrt{z}\right) \sinh^v(g + f z)\, dz = (-1)^n (2 i)^{-v} \binom{v}{\frac{v}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - v \bmod 2) b^{-2(n+1)} + 2^{-2n-v-2} i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{b^2}{4 f (v-2k)} - g(v-2k) - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2n} \left(-i b - 2 f (v-2k) \sqrt{z}\right)^{h+j} \left(\frac{\left(-i b - 2 f (v-2k) \sqrt{z}\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\right.$$

$$\left.\left.(v-2\,k)\,\sqrt{\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)$$

$$(-f\,(v-2\,k))^{-2\,(n+1)}+e^{-\frac{b^2}{4\,f\,(v-2\,k)}-g\,(v-2\,k)-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(i\,b\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)\right.$$

$$\left.\left.\sqrt{\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)(-f\,(v-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{b^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,f\,(v-2\,k)\,\sqrt{-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)+$$

$$e^{\frac{b^2}{4\,f\,(v-2\,k)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i b+2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\, i \left(i b+2 f (v-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i b+2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right)+2 f (v-2 k)\right.$$

$$\left.\left.\left.\sqrt{-\frac{\left(i b+2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i b+2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right)\right)\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + e\right) \sinh^v(f z + g)$

01.19.21.2980.01

$$\int z^n \cos\left(b z^2+e\right) \sinh^v(f z+g)\, dz ==$$

$$2^{-v-2}\left(-i^{-v}\right)\binom{v}{\frac{v}{2}}\left(e^{i e}\, \Gamma\left(\frac{n+1}{2}, -i b z^2\right)\left(-i b z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i e}\left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-v \bmod 2)\, z^{n+1}-$$

$$i^{-v}\, 2^{-v-2} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k}\left(e^{-\frac{i f^2 (v-2k)^2}{4 b}-g (v-2 k)-i e-\frac{i \pi v}{2}}\left(\sum_{j=0}^{n} 2^{j-n}\,(f (v-2 k))^{n-j}\,(-f (v-2 k)-2 i b z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{i (-f (v-2 k)-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i (-f (v-2 k)-2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1}+$$

$$e^{-\frac{i f^2 (v-2k)^2}{4 b}+g (v-2 k)-i e+\frac{i \pi v}{2}}\left(\sum_{j=0}^{n} 2^{j-n}\,(-f (v-2 k))^{n-j}\,(f (v-2 k)-2 i b z)^{j+1}\left(-\frac{i (f (v-2 k)-2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\right.$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{i (f (v-2 k)-2 i b z)^2}{4 b}\right)\right)(-i b)^{-n-1}+(i b)^{-n-1}\, e^{\frac{f^2 i (v-2k)^2}{4 b}-g (v-2 k)+i e-\frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n}\,(f (v-2 k))^{n-j}$$

$$(2 i b z-f (v-2 k))^{j+1}\left(\frac{i (2 i b z-f (v-2 k))^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i (2 i b z-f (v-2 k))^2}{4 b}\right)+$$

$$(i b)^{-n-1}\, e^{\frac{f^2 i (v-2k)^2}{4 b}+g (v-2 k)+i e+\frac{i \pi v}{2}} \sum_{j=0}^{n} 2^{j-n}\,(-f (v-2 k))^{n-j}\,(f (v-2 k)+2 i b z)^{j+1}$$

$$\left.\left(\frac{i (f (v-2 k)+2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i (f (v-2 k)+2 i b z)^2}{4 b}\right)\right) /; n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.19.21.2981.01

$$\int z^n \cos\left(\sqrt{z}\, b+e\right) \sinh^{\nu}(g+f\,z)\,dz = (-1)^n (2\,i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i\,e}\,\Gamma\left(2\,(n+1),\,-i\,b\sqrt{z}\right)+e^{-i\,e}\,\Gamma\left(2\,(n+1),\,i\,b\sqrt{z}\right)\right)(1-\nu \bmod 2)\, b^{-2\,(n+1)} + 2^{-2\,n-\nu-2}\, i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{b^2}{4\,f\,(\nu-2\,k)}-i\,e-g\,(\nu-2\,k)-\frac{i\,\pi\,\nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b)^{-h-j+2\,n} \left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\,b\left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\,f\,(\nu-2\,k)}\right) - 2\,f\,(\nu-2\,k)\sqrt{\frac{\left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\,f\,(\nu-2\,k)}\right)\right)\right) (-f\,(\nu-2\,k))^{-2\,(n+1)} + e^{-\frac{b^2}{4\,f\,(\nu-2\,k)}+i\,e-g\,(\nu-2\,k)-\frac{i\,\pi\,\nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b)^{-h-j+2\,n} \left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^{h+j} \left(\frac{\left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(i\,b\left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\,f\,(\nu-2\,k)}\right) - 2\,f\,(\nu-2\,k)\sqrt{\frac{\left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(i\,b-2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{4\,f\,(\nu-2\,k)}\right)\right)\right) (-f\,(\nu-2\,k))^{-2\,(n+1)} + e^{\frac{b^2}{4\,f\,(\nu-2\,k)}-i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,k)} (f\,(\nu-2\,k))^{-2\,(n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b)^{-h-j+2\,n} \left(-i\,b+2\,f\,(\nu-2\,k)\sqrt{z}\right)^{h+j} \left(-\frac{\left(-i\,b+2\,f\,(\nu-2\,k)\sqrt{z}\right)^2}{f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2 f (v-2k)\sqrt{-\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)-\right.$$

$$\left.i b\left(-i b+2 f (v-2k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(-i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)\right)+$$

$$e^{\frac{b^2}{4 f (v-2k)}+i e+\frac{i\pi v}{2}+g (v-2k)} (f (v-2k))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i b)^{-h-j+2n} \left(i b+2 f (v-2k)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(b\, i\left(i b+2 f (v-2k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)+2 f (v-2k)\right.$$

$$\left.\left.\sqrt{-\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{f (v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(i b+2 f (v-2k)\sqrt{z}\right)^2}{4 f (v-2k)}\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + d z\right) \sinh^v(f z + g)$

01.19.21.2982.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh^\nu(g + f z) \, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{\frac{i d^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} + \right.$$

$$\left. (i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b} \right) \right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + f (\nu - 2 k))^2}{4 b} + \frac{i \pi \nu}{2} + g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f (\nu - 2 k))^{n-j} (-i d + f (\nu - 2 k) - 2 i b z)^{j+1} \right. \right.$$

$$\left. \left(-\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + f (\nu - 2 k) - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} +$$

$$e^{-\frac{i (-i d - f (\nu - 2 k))^2}{4 b} - \frac{i \pi \nu}{2} - g (\nu - 2 k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f (\nu - 2 k))^{n-j} (-i d - f (\nu - 2 k) - 2 i b z)^{j+1} \right.$$

$$\left. \left(-\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - f (\nu - 2 k) - 2 i b z)^2}{4 b} \right) \right) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{i (i d + f (\nu - 2 k))^2}{4 b} + \frac{i \pi \nu}{2} + g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d - f (\nu - 2 k))^{n-j} (i d + f (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left(\frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + f (\nu - 2 k) + 2 i b z)^2}{4 b} \right) +$$

$$(i b)^{-n-1} e^{\frac{i (i d - f (\nu - 2 k))^2}{4 b} - \frac{i \pi \nu}{2} - g (\nu - 2 k)} \sum_{j=0}^{n} 2^{j-n} (-i d + f (\nu - 2 k))^{n-j} (i d - f (\nu - 2 k) + 2 i b z)^{j+1}$$

$$\left. \left(\frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - f (\nu - 2 k) + 2 i b z)^2}{4 b} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh^\nu(g + f z) \, dz =$$

$$(-1)^{n-1} 2^{-2 n-\nu-2} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{-\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2 n} \left(i b + 2 i d \sqrt{z} \right)^{h+j} \right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)d^{-2(n+1)}+$$

$$2^{-2\,n-\nu-2}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{b^2}{4(-i\,d+f(\nu-2\,k))}+\frac{i\,\pi\,\nu}{2}+g(\nu-2\,k)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)^2}{-i\,d+f\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d+f\,(\nu-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)^2}{-i\,d+f\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(\nu-2\,k))}\right)-$$

$$\left.\left.\left.i\,b\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d+f\,(\nu-2\,k))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(\nu-2\,k))}\right)\right)\right)\right)$$

$$(-i\,d+f\,(\nu-2\,k))^{-2(n+1)}+e^{\frac{b^2}{4(i\,d+f(\nu-2\,k))}+\frac{i\,\pi\,\nu}{2}+g(\nu-2\,k)}\,(i\,d+f\,(\nu-2\,k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+\right.$$

$$2\sqrt{-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\;(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)\right)+e^{\frac{b^2}{4(-i\,d-f\,(v-2\,k))}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}$$

$$(-i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2n}\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^2}{4(i\,d-f\,(v-2\,k))}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\,(i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\right($$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)+2\sqrt{-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}}$$

Involving $z^n \cos(b z^r + d z + e) \sinh^\nu(f z + g)$

01.19.21.2984.01

$$\int z^n \cos(b z^2 + d z + e) \sinh^\nu(g + f z)\, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{\frac{i d^2}{4b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4b} \right) \right) (-i b)^{-n-1} + \right.$$

$$\left. (i b)^{-n-1} e^{i e - \frac{i d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4b} \right) \right) -$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{i (-i d + f (\nu - 2k))^2}{4b} - i e + \frac{i \pi \nu}{2} + g (\nu - 2k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d - f (\nu - 2k))^{n-j} (-i d + f (\nu - 2k) - 2 i b z)^{j+1} \right. \right.$$

$$\left. \left(-\frac{i (-i d + f (\nu - 2k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d + f (\nu - 2k) - 2 i b z)^2}{4b} \right) \right) (-i b)^{-n-1} +$$

$$e^{-\frac{i (-i d - f (\nu - 2k))^2}{4b} - i e - \frac{i \pi \nu}{2} - g (\nu - 2k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f (\nu - 2k))^{n-j} (-i d - f (\nu - 2k) - 2 i b z)^{j+1} \right.$$

$$\left. \left(-\frac{i (-i d - f (\nu - 2k) - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - f (\nu - 2k) - 2 i b z)^2}{4b} \right) \right) (-i b)^{-n-1} +$$

$$(i b)^{-n-1} e^{\frac{i (i d + f (\nu - 2k))^2}{4b} + i e + \frac{i \pi \nu}{2} + g (\nu - 2k)} \sum_{j=0}^{n} 2^{j-n} (-i d - f (\nu - 2k))^{n-j} (i d + f (\nu - 2k) + 2 i b z)^{j+1}$$

$$\left(\frac{i (i d + f (\nu - 2k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + f (\nu - 2k) + 2 i b z)^2}{4b} \right) +$$

$$(i b)^{-n-1} e^{\frac{i (i d - f (\nu - 2k))^2}{4b} + i e - \frac{i \pi \nu}{2} - g (\nu - 2k)} \sum_{j=0}^{n} 2^{j-n} (-i d + f (\nu - 2k))^{n-j} (i d - f (\nu - 2k) + 2 i b z)^{j+1}$$

$$\left. \left(\frac{i (i d - f (\nu - 2k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d - f (\nu - 2k) + 2 i b z)^2}{4b} \right) \right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2985.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^\nu(g + f\, z)\, dz = $$

$$(-1)^{n-1}\, 2^{-2n-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(e^{i\, e - \frac{i\, b^2}{4\, d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d\, \sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(b\, i \left(i\, b + 2\, i\, d\, \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right) +$$

$$2\, \sqrt{\frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\!\left(\frac{1}{2}(h + j + 2),\, \frac{i\left(i\, b + 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right)\Bigg) +$$

$$e^{\frac{i\, b^2}{4\, d} - i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(-i\, b \left(-i\, b - 2\, i\, d\, \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h + j + 1),\, -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right) -$$

$$2\, i\, d\, \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{d}}\; \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{i\left(-i\, b - 2\, i\, d\, \sqrt{z}\right)^2}{4\, d}\right)\Bigg)\Bigg) d^{-2(n+1)} + 2^{-2n-\nu-2}\, i^{-\nu}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{\frac{b^2}{4(-i\, d + f(\nu - 2k))} - i\, e + \frac{i\, \pi\, \nu}{2} + g(\nu - 2k)} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b + 2(-i\, d + f(\nu - 2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + 2(-i\, d + f(\nu - 2k))\sqrt{z}\right)^2}{-i\, d + f(\nu - 2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(2(-i\, d + f(\nu - 2k))$$

$$\sqrt{-\frac{\left(-i\, b + 2(-i\, d + f(\nu - 2k))\sqrt{z}\right)^2}{-i\, d + f(\nu - 2k)}}\; \Gamma\!\left(\frac{1}{2}(h + j + 2),\, -\frac{\left(-i\, b + 2(-i\, d + f(\nu - 2k))\sqrt{z}\right)^2}{4(-i\, d + f(\nu - 2k))}\right) -$$

$$i\,b\left(-i\,b+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)\Bigg)\Bigg)$$

$$(-i\,d+f\,(v-2\,k))^{-2\,(n+1)}+e^{\frac{b^2}{4\,(i\,d+f\,(v-2\,k))}+i\,e+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(i\,d+f\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+\right.$$

$$2\,\sqrt{-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(i\,b+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)\right)+e^{\frac{b^2}{4\,(-i\,d-f\,(v-2\,k))}-i\,e-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}$$

$$(-i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,k))\right.$$

$$\sqrt{-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d-f\,(v-2\,k)}}\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)-$$

$$\left.i\,b\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+2\,(-i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d-f\,(v-2\,k))}\right)\right)+$$

$$e^{\frac{b^2}{4\,(i\,d-f\,(v-2\,k))}+i\,e-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\,(i\,d-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(i\,d-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)+2\sqrt{-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d-f\,(v-2\,k)}}\,(i\,d-f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2\,(i\,d-f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d-f\,(v-2\,k))}\right)\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos(b\,z)\sinh^v(c\,z^r)$

01.19.21.2986.01

$$\int z^n\cos(b\,z)\sinh^v\left(c\,z^2\right)dz = (-1)^n\,i^{-v}\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,b\,z)\,(-i\,b)^{-n-1}+(i\,b)^{-n-1}\,\Gamma(n+1,\,-i\,b\,z)\right)(1-v\bmod 2)-i^{-v}\,2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{b^2}{4\,c\,(v-2\,s)}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,b)^{n-j}\,(-i\,b-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-i\,b-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,b-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+e^{-\frac{b^2}{4\,c\,(v-2\,s)}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,b)^{n-j}\,(i\,b-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(i\,b-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,b-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+e^{\frac{b^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,b)^{n-j}\,(-i\,b+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(-i\,b+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,b+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+e^{\frac{b^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,b)^{n-j}\,(i\,b+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(i\,b+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,b+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\,/;\,n\in\mathbb{N}\land v\in\mathbb{N}^+$$

01.19.21.2987.01

$$\int z^n \cos(b\,z)\sinh^{\nu}\left(c\sqrt{z}\right)dz = (-1)^{n-1}\,2^{-2n-\nu-2}\,i^{-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{i c^2(\nu-2s)^2}{4b}-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,b\sqrt{\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)-c\,(\nu-2s)\right.$$

$$\left.\left.\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(-c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right)+e^{\frac{c^2 i(\nu-2s)^2}{4b}+\frac{i\pi\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(\nu-2s)\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)+2\right.$$

$$\left.\left.\sqrt{\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(c\,(\nu-2s)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right)+e^{-\frac{i c^2(\nu-2s)^2}{4b}-\frac{i\pi\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2s)\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-c\,(\nu-2s)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)-2\,i\,b\right.$$

$$\sqrt{-\frac{i\left(-c(v-2s)-2ib\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-c(v-2s)-2ib\sqrt{z}\right)^2}{4b}\right)\Bigg)+e^{\frac{i\pi v}{2}-\frac{ic^2(v-2s)^2}{4b}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2s))^{-h-j+2n}\left(c(v-2s)-2ib\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c(v-2s)-2ib\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c(v-2s)\left(c(v-2s)-2ib\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c(v-2s)-2ib\sqrt{z}\right)^2}{4b}\right)-2$$

$$ib\sqrt{-\frac{i\left(c(v-2s)-2ib\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c(v-2s)-2ib\sqrt{z}\right)^2}{4b}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$b^{-2(n+1)}+(-1)^n\,2^{-v-1}\,i^{-v}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,ibz)\,(-ib)^{-n-1}+(ib)^{-n-1}\,\Gamma(n+1,\,-ibz)\right)$$

$$(1-v\bmod 2)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z+e)\sinh^v\left(c\,z^r\right)$

01.19.21.2988.01

$$\int z^n \cos(e+d\,z)\sinh^\nu(c\,z^2)\,dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2}{4c(\nu-2s)}-i\,e-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{d^2}{4c(\nu-2s)}+i\,e-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{d^2}{4c(\nu-2s)}-i\,e+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{\frac{d^2}{4c(\nu-2s)}+i\,e+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\,/;\, n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.2989.01

$$\int z^n\cos(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c\right)dz = (-1)^{n-1}\,2^{-2\,n-\nu-2}\,i^{-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2\,i\,(\nu-2\,s)^2}{4\,d}+i\,e-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,s))^{-h-j+2\,n}\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\sqrt{\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-c\,(\nu-2\,s)\right.\right.\right.$$

$$\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2$$

$$\sqrt{\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,s)\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2$$

$$i\, d \sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{-2\,(n+1)} + (-1)^n\, 2^{-v-1}\, i^{-v} \binom{v}{\frac{v}{2}} \left(e^{-i\,e}\,\Gamma(n+1,\, i\,d\,z)\,(-i\,d)^{-n-1} + (i\,d)^{-n-1}\, e^{i\,e}\,\Gamma(n+1,\, -i\,d\,z)\right)$$
$$(1 - v \bmod 2) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos(b\, z^r) \sinh^v(c\, z^r)$

01.19.21.2990.01

$$\int z^{\alpha-1} \cos(b\,z^r)\,\sinh^v(c\,z^r)\,dz = -\frac{1}{r}\Bigg(i^{-v}\,2^{-v-1}\,z^\alpha \binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{\alpha}{r},\,-i\,b\,z^r\right)(-i\,b\,z^r)^{-\frac{\alpha}{r}} + (i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1 - v \bmod 2) + 2^{-v-1}\,z^\alpha$$
$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-2\,c\,s+c\,v)\,z^r\right)((-i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}} + (-1)^v\,((i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\right.$$
$$\left.(i\,b-2\,c\,s+c\,v)\,z^r\right) + ((-i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b+2\,c\,s-c\,v)\,z^r\right) +$$
$$((i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b+2\,c\,s-c\,v)\,z^r\right)\Bigg)\Bigg) \;/;\; v \in \mathbb{N}^+$$

01.19.21.2991.01

$$\int z^n \cos\!\left(b\,z^2\right)\sinh^v\!\left(c\,z^2\right)dz = 2^{-v-2}\,(-i^{-v})\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{n+1}{2},\,-i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1 - v \bmod 2)\,z^{n+1} -$$
$$2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-2\,c\,s+c\,v)\,z^2\right)\left((-i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)} +$$
$$(-1)^v\,\left((i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b-2\,c\,s+c\,v)\,z^2\right) + \left((-i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\!\left(\frac{n+1}{2},\,(-i\,b+2\,c\,s-c\,v)\,z^2\right) + \left((i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b+2\,c\,s-c\,v)\,z^2\right)\Bigg) \;/;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

01.19.21.2992.01

$$\int z^n \cos\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\;c\right)dz = i^{-\nu}(-1)^n 2^{-\nu} b^{-2(n+1)}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma\left(2(n+1), -i b\sqrt{z}\right)+\Gamma\left(2(n+1), i b\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu\Gamma\left(2(n+1), (-i b-2cs+c\nu)\sqrt{z}\right)(-i b-2cs+c\nu)^{-2(n+1)}+(-1)^\nu(i b-2cs+c\nu)^{-2(n+1)}\Gamma\left(2(n+1), (i b-2cs+c\nu)\sqrt{z}\right)+(-i b+2cs-c\nu)^{-2(n+1)}\Gamma\left(2(n+1), (-i b+2cs-c\nu)\sqrt{z}\right)+(i b+2cs-c\nu)^{-2(n+1)}\Gamma\left(2(n+1), (i b+2cs-c\nu)\sqrt{z}\right)\right)/;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos(b z^r + e)\sinh^\nu(c z^r)$

01.19.21.2993.01

$$\int z^{\alpha-1}\cos(b z^r+e)\sinh^\nu(c z^r)\,dz = -\frac{1}{r}\left(i^{-\nu}2^{-\nu-1}z^\alpha\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\,\Gamma\left(\frac{\alpha}{r}, -i b z^r\right)(-i b z^r)^{-\frac{\alpha}{r}}+e^{-i e}(i b z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, i b z^r\right)\right)(1-\nu \bmod 2) + 2^{-\nu-1}z^\alpha\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e}\,\Gamma\left(\frac{\alpha}{r}, (-i b-2cs+c\nu)z^r\right)((-i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}+(-1)^\nu e^{-i e}((i b-2cs+c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i b-2cs+c\nu)z^r\right)+e^{i e}((-i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (-i b+2cs-c\nu)z^r\right)+e^{-i e}((i b+2cs-c\nu)z^r)^{-\frac{\alpha}{r}}\Gamma\left(\frac{\alpha}{r}, (i b+2cs-c\nu)z^r\right)\right)\right)/;\, \nu\in\mathbb{N}^+$$

01.19.21.2994.01

$$\int z^n\cos\left(b z^2+e\right)\sinh^\nu\left(c z^2\right)dz = 2^{-\nu-2}(-i^{-\nu})\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\,\Gamma\left(\frac{n+1}{2}, -i b z^2\right)\left(-i b z^2\right)^{\frac{1}{2}(-n-1)}+e^{-i e}\left(i b z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-\nu \bmod 2)\,z^{n+1} - 2^{-\nu-2}\;z^{n+1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{i e}\,\Gamma\left(\frac{n+1}{2}, (-i b-2cs+c\nu)z^2\right)\left((-i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}+(-1)^\nu e^{-i e}\left((i b-2cs+c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i b-2cs+c\nu)z^2\right)+e^{i e}\left((-i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (-i b+2cs-c\nu)z^2\right)+e^{-i e}\left((i b+2cs-c\nu)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, (i b+2cs-c\nu)z^2\right)\right)/;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.2995.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(\sqrt{z}\, c\right) dz = i^{-\nu} (-1)^n 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) - 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{i e}\, \Gamma\left(2(n+1), (-i b - 2 c s + c \nu) \sqrt{z}\right) (-i b - 2 c s + c \nu)^{-2(n+1)} + (-1)^\nu e^{-i e} (i b - 2 c s + c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b - 2 c s + c \nu) \sqrt{z}\right) + e^{i e} (-i b + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (-i b + 2 c s - c \nu) \sqrt{z}\right) + e^{-i e} (i b + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b + 2 c s - c \nu) \sqrt{z}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + d z\right) \sinh^\nu\left(c z^r\right)$

01.19.21.2996.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh^\nu\left(c z^2\right) dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i d^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right)\right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi \nu\right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))}\right)\right) (-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 2 \pi \nu\right)} (i b + c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 2 \pi \nu\right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} - 2 \pi \nu\right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.2997.01

$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c\right) dz =$$

$$2^{-2 n-\nu-2} i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i d)^{-2 (n+1)} \left(e^{-\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2 n} \left(i b + 2 i d \sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$2^{-2\,n-\nu-2}\,i^{-\nu}\,(i\,d)^{-2\,(n+1)}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\,(i\,b+c\,(\nu-2\,k))^2}{4\,d}+\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(\nu-2\,k))^{-h-j+2\,n}\right.$$

$$\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(\nu-2\,k))\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,(i\,b-c\,(\nu-2\,k))^2}{4\,d}-\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(\nu-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(\nu-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b+c\,(v-2\,k))^2}{4\,d}+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b-c\,(v-2\,k))^2}{4\,d}-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(b z^r + d z + e) \sinh^\nu(c z^r)$

01.19.21.2998.01

$$\int z^n \cos(b z^2 + d z + e) \sinh^\nu(c z^2)\, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i d^2}{4b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i(-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d - 2 i b z)^2}{4b}\right)\right)(-i b)^{-n-1} + (i b)^{-n-1} e^{i e - \frac{i d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i(i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(i d + 2 i b z)^2}{4b}\right)\right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} + 4e - 2\pi\nu\right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-i b + c(\nu - 2k)) z)^{j+1} \left(-\frac{(-i d + 2(-i b + c(\nu - 2k)) z)^2}{-i b + c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-i b + c(\nu - 2k)) z)^2}{4(-i b + c(\nu - 2k))}\right)\right) (-i b + c(\nu - 2k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4e - 2\pi\nu\right)} (i b + c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b + c(\nu - 2k)) z)^{j+1} \left(-\frac{(i d + 2(i b + c(\nu - 2k)) z)^2}{i b + c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b + c(\nu - 2k)) z)^2}{4(i b + c(\nu - 2k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4e - 2\pi\nu\right)} (-i b - c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-i b - c(\nu - 2k)) z)^{j+1} \left(-\frac{(-i d + 2(-i b - c(\nu - 2k)) z)^2}{-i b - c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-i b - c(\nu - 2k)) z)^2}{4(-i b - c(\nu - 2k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} + 4e - 2\pi\nu\right)} (i b - c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c(\nu - 2k)) z)^{j+1} \left(-\frac{(i d + 2(i b - c(\nu - 2k)) z)^2}{i b - c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c(\nu - 2k)) z)^2}{4(i b - c(\nu - 2k))}\right)\right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.19.21.2999.01

$$\int z^n \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c\right) dz =$$

$$2^{-2n-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, (i\, d)^{-2(n+1)} \Bigg(e^{i e - \frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i \left(i\, b + 2\, i\, d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4 d}\right) +$$

$$2 \sqrt{\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}}\; d\, i\, \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4 d}\right)\Bigg) +$$

$$e^{\frac{i b^2}{4 d} - i e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(-i\, b \left(-i\, b - 2\, i\, d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4 d}\right) -$$

$$2\, i\, d \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4 d}\right)\Bigg)\Bigg) +$$

$$2^{-2n-\nu-2}\, i^{-\nu}\, (i\, d)^{-2(n+1)} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{\frac{i (i b + c(\nu - 2k))^2}{4 d} + i e + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b + c\,(\nu - 2\, k))^{-h-j+2n}$$

$$\left(i\, b + c\,(\nu - 2\, k) + 2\, i\, d\sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + c\,(\nu - 2\, k) + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\, b + c\,(\nu - 2\, k)) \left(i\, b + c\,(\nu - 2\, k) + 2\, i\, d\sqrt{z}\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(i\, b + c\,(\nu - 2\, k) + 2\, i\, d\sqrt{z}\right)^2}{4 d}\right) +$$

$$2\sqrt{\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b-c\,(v-2\,k))^2}{4\,d}+i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b-c\,(v-2\,k))^2}{4\,d}-i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z)\sinh^v\left(c\,z^r+g\right)$

01.19.21.3000.01

$$\int z^n\cos(d\,z)\sinh^v\left(c\,z^2+g\right)dz =$$

$$(-1)^n\,i^{-v}\,2^{-v-1}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-v\bmod 2)-i^{-v}\,2^{-v-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{d^2}{4\,c\,(v-2\,s)}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\right.\right.\right.$$

$$\left.\left.\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+e^{-\frac{d^2}{4\,c\,(v-2\,s)}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)$$

$$(-c\,(v-2\,s))^{-n-1}+e^{\frac{d^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left(-\frac{(-i\,d+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)+$$

$$e^{\frac{d^2}{4\,c\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}\,(c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(v-2\,s)\,z)^{j+1}$$

$$\left.\left(-\frac{(i\,d+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.3001.01

$$\int z^n \cos(d\,z)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = (-1)^{n-1}\,2^{-2n-\nu-2}\,i^{-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2 i(\nu-2s)^2}{4d}-g(\nu-2s)-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(\nu-2s))^{-h-j+2n}\right.\right.$$

$$\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,i\,d\sqrt{\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)-c(\nu-2s)\right.$$

$$\left.\left.\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\frac{i\left(-c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)\right)\right)+e^{\frac{c^2 i(\nu-2s)^2}{4d}+g(\nu-2s)+\frac{i\pi\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(\nu-2s))^{-h-j+2n}\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c(\nu-2s)\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)+2\right.$$

$$\left.\left.\sqrt{\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\frac{i\left(c(\nu-2s)+2\,i\,d\sqrt{z}\right)^2}{4d}\right)\right)\right)+$$

$$e^{-\frac{i c^2(\nu-2s)^2}{4d}-g(\nu-2s)-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(\nu-2s))^{-h-j+2n}\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c(\nu-2s)\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{i\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^2}{4d}\right)-2\,i\,d\sqrt{-\frac{i\left(-c(\nu-2s)-2\,i\,d\sqrt{z}\right)^2}{d}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(-c(v-2s)-2 i d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg) + e^{-\frac{i c^2 (v-2s)^2}{4d}+g(v-2s)+\frac{i\pi v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2s))^{-h-j+2n}\left(c(v-2s)-2 i d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c(v-2s)-2 i d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c(v-2s)\left(c(v-2s)-2 i d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(c(v-2s)-2 i d\sqrt{z}\right)^2}{4d}\right)-2$$

$$i d\sqrt{-\frac{i\left(c(v-2s)-2 i d\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(c(v-2s)-2 i d\sqrt{z}\right)^2}{4d}\right)\Bigg)\Bigg)\Bigg)\Bigg)$$

$$d^{-2(n+1)} + (-1)^n\, 2^{-v-1}\, i^{-v}\binom{v}{\frac{v}{2}}\left(\Gamma(n+1, i d z)(-i d)^{-n-1} + (i d)^{-n-1}\,\Gamma(n+1, -i d z)\right)$$

$$(1 - v \bmod 2)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(d z + e)\sinh^v(c z^r + g)$

01.19.21.3002.01

$$\int z^n \cos(e+d\,z)\sinh^\nu\left(c\,z^2+g\right)dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2}{4\,c\,(\nu-2\,s)}-i\,e-g\,(\nu-2\,s)-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{d^2}{4\,c\,(\nu-2\,s)}+i\,e-g\,(\nu-2\,s)-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{d^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{\frac{d^2}{4\,c\,(\nu-2\,s)}+i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) /;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.3003.01

$$\int z^n\cos(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g\right)dz = (-1)^{n-1}\,2^{-2\,n-\nu-2}\,i^{-\nu}\left(\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{c^2\,i\,(\nu-2\,s)^2}{4\,d}-g\,(\nu-2\,s)+i\,e-\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,s))^{-h-j+2\,n}\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(2\,i\,d\sqrt{\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(-c\,(\nu-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-c\,(\nu-2\,s)\right.\right.\right.$$

$$\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(-c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)+i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+2$$

$$\sqrt{\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(c\,(v-2\,s)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}-g\,(v-2\,s)-i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,s)\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d}+g\,(v-2\,s)-i\,e+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2$$

$$i\,d\,\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)$$

$$d^{-2\,(n+1)}+(-1)^n\,2^{-v-1}\,i^{-v}\binom{v}{\frac{v}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)$$

$$(1-v\bmod 2)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos(b\,z^r)\sinh^v(c\,z^r+g)$

01.19.21.3004.01

$$\int z^{\alpha-1}\cos(b\,z^r)\sinh^v(c\,z^r+g)\,dz = -\frac{1}{r}\Bigg(i^{-v}\,2^{-v-1}\,z^\alpha\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{\alpha}{r},-i\,b\,z^r\right)(-i\,b\,z^r)^{-\frac{\alpha}{r}}+(i\,b\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,i\,b\,z^r\right)\right)(1-v\bmod 2)+2^{-v-1}\,z^\alpha\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}$$
$$\Big((-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b-2\,c\,s+c\,v)\,z^r\right)((-i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}+(-1)^v\,e^{2\,g\,s-g\,v}\,((i\,b-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}$$
$$\Gamma\!\left(\frac{\alpha}{r},\,(i\,b-2\,c\,s+c\,v)\,z^r\right)+e^{g\,v-2\,g\,s}\,((-i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-i\,b+2\,c\,s-c\,v)\,z^r\right)+$$
$$e^{g\,v-2\,g\,s}\,((i\,b+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(i\,b+2\,c\,s-c\,v)\,z^r\right)\Big)\Bigg)\;/;\;v\in\mathbb{N}^+$$

01.19.21.3005.01

$$\int z^n\cos\left(b\,z^2\right)\sinh^v\left(c\,z^2+g\right)dz = 2^{-v-2}\,(-i^{-v})\binom{v}{\frac{v}{2}}\left(\Gamma\!\left(\frac{n+1}{2},-i\,b\,z^2\right)\left(-i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\,b\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,i\,b\,z^2\right)\right)(1-v\bmod 2)\,z^{n+1}-$$
$$2^{-v-2}\,z^{n+1}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Big((-1)^v\,e^{2\,g\,s-g\,v}\,\Gamma\!\left(\frac{n+1}{2},\,(-i\,b-2\,c\,s+c\,v)\,z^2\right)\left((-i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}+(-1)^v\,e^{2\,g\,s-g\,v}$$
$$\left((i\,b-2\,c\,s+c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b-2\,c\,s+c\,v)\,z^2\right)+e^{g\,v-2\,g\,s}\left((-i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\right.$$
$$\left.(-i\,b+2\,c\,s-c\,v)\,z^2\right)+e^{g\,v-2\,g\,s}\left((i\,b+2\,c\,s-c\,v)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\,(i\,b+2\,c\,s-c\,v)\,z^2\right)\Big)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.3006.01

$$\int z^n \cos\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\ c+g\right) dz = i^{-\nu} (-1)^n 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i b\sqrt{z}\right) + \Gamma\left(2(n+1), i b\sqrt{z}\right)\right)(1-\nu \bmod 2) - 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{2gs-g\nu}\,\Gamma\left(2(n+1), (-i b - 2cs + c\nu)\sqrt{z}\right)(-i b - 2cs + c\nu)^{-2(n+1)} + (-1)^\nu e^{2gs-g\nu} (i b - 2cs + c\nu)^{-2(n+1)} \Gamma\left(2(n+1), (i b - 2cs + c\nu)\sqrt{z}\right) + e^{g\nu-2gs}(-i b + 2cs - c\nu)^{-2(n+1)}\,\Gamma\left(2(n+1), (-i b + 2cs - c\nu)\sqrt{z}\right) + e^{g\nu-2gs}(i b + 2cs - c\nu)^{-2(n+1)}\,\Gamma\left(2(n+1), (i b + 2cs - c\nu)\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1}\cos\left(b z^r + e\right)\sinh^\nu\left(c z^r + g\right)$

01.19.21.3007.01

$$\int z^{\alpha-1}\cos(b z^r + e)\sinh^\nu(c z^r + g)\, dz = -\frac{1}{r}\left(i^{-\nu} 2^{-\nu-1} z^\alpha \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\,\Gamma\left(\frac{\alpha}{r}, -i b z^r\right)(-i b z^r)^{-\frac{\alpha}{r}} + e^{-i e}(i b z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, i b z^r\right)\right)(1-\nu \bmod 2) + 2^{-\nu-1} z^\alpha \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{i e + 2gs - g\nu}\,\Gamma\left(\frac{\alpha}{r}, (-i b - 2cs + c\nu) z^r\right)((-i b - 2cs + c\nu) z^r)^{-\frac{\alpha}{r}} + (-1)^\nu e^{-i e + 2gs - g\nu}((i b - 2cs + c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (i b - 2cs + c\nu) z^r\right) + e^{i e - 2gs + g\nu}((-i b + 2cs - c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (-i b + 2cs - c\nu) z^r\right) + e^{-i e - 2gs + g\nu}((i b + 2cs - c\nu) z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r}, (i b + 2cs - c\nu) z^r\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3008.01

$$\int z^n \cos\left(b z^2 + e\right)\sinh^\nu\left(c z^2 + g\right) dz = 2^{-\nu-2}\left(-i^{-\nu}\right)\binom{\nu}{\frac{\nu}{2}}\left(e^{i e}\,\Gamma\left(\frac{n+1}{2}, -i b z^2\right)\left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e}\left(i b z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, i b z^2\right)\right)(1-\nu \bmod 2)\, z^{n+1} - 2^{-\nu-2}\ z^{n+1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s}\left((-1)^\nu e^{i e + 2gs - g\nu}\,\Gamma\left(\frac{n+1}{2}, (-i b - 2cs + c\nu) z^2\right)\left((-i b - 2cs + c\nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu e^{-i e + 2gs - g\nu}\left((i b - 2cs + c\nu) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (i b - 2cs + c\nu) z^2\right) + e^{i e - 2gs + g\nu}\left((-i b + 2cs - c\nu) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (-i b + 2cs - c\nu) z^2\right) + e^{-i e - 2gs + g\nu}\left((i b + 2cs - c\nu) z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, (i b + 2cs - c\nu) z^2\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3009.01

$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = i^{-\nu} (-1)^n 2^{-\nu} b^{-2(n+1)} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e}\, \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e}\, \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) - 2^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Big((-1)^\nu e^{i e + 2 g s - g \nu}\, \Gamma\left(2(n+1), (-i b - 2 c s + c \nu) \sqrt{z}\right) (-i b - 2 c s + c \nu)^{-2(n+1)} + (-1)^\nu e^{-i e + 2 g s - g \nu} (i b - 2 c s + c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b - 2 c s + c \nu) \sqrt{z}\right) + e^{i e - 2 g s + g \nu} (-i b + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (-i b + 2 c s - c \nu) \sqrt{z}\right) + e^{-i e - 2 g s + g \nu} (i b + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (i b + 2 c s - c \nu) \sqrt{z}\right)\Big) \;/;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos\left(b z^r + d z\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.3010.01

$$\int z^n \cos\left(b z^2 + d z\right) \sinh^\nu\left(c z^2 + g\right) dz = -i^{-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{\frac{i d^2}{4 b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i (-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d - 2 i b z)^2}{4 b}\right)\right) (-i b)^{-n-1} +\right.$$

$$\left.(i b)^{-n-1} e^{-\frac{i d^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i (i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (i d + 2 i b z)^2}{4 b}\right)\right) -$$

$$i^{-\nu}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi \nu + 4 g i (\nu - 2 k)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b + c (\nu - 2 k)) z)^{j+1}\right.\right.$$

$$\left.\left(-\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{-i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b + c (\nu - 2 k)) z)^2}{4 (-i b + c (\nu - 2 k))}\right)\right)$$

$$(-i b + c (\nu - 2 k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b-2 i c k + i c \nu} - 2 \pi \nu + 4 g i (\nu - 2 k)\right)} (i b + c (\nu - 2 k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b + c (\nu - 2 k)) z)^{j+1} \left(-\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{i b + c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b + c (\nu - 2 k)) z)^2}{4 (i b + c (\nu - 2 k))}\right) +$$

$$e^{\frac{1}{4} i \left(-\frac{d^2}{-b-2 i c k + i c \nu} - 2 \pi \nu + 4 g i (\nu - 2 k)\right)} (-i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2 (-i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left(-\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{-i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2 (-i b - c (\nu - 2 k)) z)^2}{4 (-i b - c (\nu - 2 k))}\right) +$$

$$e^{\frac{1}{4} i \left(\frac{d^2}{-b+2 i c k - i c \nu} - 2 \pi \nu + 4 g i (\nu - 2 k)\right)} (i b - c (\nu - 2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 (i b - c (\nu - 2 k)) z)^{j+1}$$

$$\left.\left(-\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{i b - c (\nu - 2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2 (i b - c (\nu - 2 k)) z)^2}{4 (i b - c (\nu - 2 k))}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz =$$

$$2^{-2 n-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i d)^{-2 (n+1)} \left(e^{-\frac{i b^2}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b)^{-h-j+2 n} \left(i b + 2 i d \sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(-i\,b\left(-i\,b-2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{d}}\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right)+$$

$$2^{-2\,n-\nu-2}\,i^{-\nu}\,(i\,d)^{-2\,(n+1)}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\,(i\,b+c\,(\nu-2\,k))^2}{4\,d}+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(\nu-2\,k))^{-h-j+2\,n}\right.$$

$$\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^{h+j}\left(\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(\nu-2\,k))\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^2}{d}}\,d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{\frac{i\,(i\,b-c\,(\nu-2\,k))^2}{4\,d}-\frac{i\,\pi\,\nu}{2}-g\,(\nu-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(\nu-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(\nu-2\,k)+2\,i\,d\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b+c\,(v-2\,k))^2}{4\,d}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-\right.$$

$$\left.2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)+$$

$$e^{-\frac{i(-i\,b-c\,(v-2\,k))^2}{4\,d}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(b z^r + d z + e) \sinh^\nu(c z^r + g)$

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$$\int z^n \cos(b z^2 + d z + e) \sinh^\nu(c z^2 + g) \, dz = -i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(e^{\frac{i d^2}{4b} - i e} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d - 2 i b z)^{j+1} \left(-\frac{i(-i d - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d - 2 i b z)^2}{4b}\right)\right) (-i b)^{-n-1} + (i b)^{-n-1} e^{i e - \frac{i d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2 i b z)^{j+1} \left(\frac{i(i d + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(i d + 2 i b z)^2}{4b}\right)\right) - i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} + 4 e - 2 \pi \nu + 4 g i (\nu - 2k)\right)} \left(\sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-i b + c(\nu - 2k)) z)^{j+1} \left(-\frac{(-i d + 2(-i b + c(\nu - 2k)) z)^2}{-i b + c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-i b + c(\nu - 2k)) z)^2}{4(-i b + c(\nu - 2k))}\right)\right) (-i b + c(\nu - 2k))^{-n-1} + e^{-\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e - 2 \pi \nu + 4 g i (\nu - 2k)\right)} (i b + c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b + c(\nu - 2k)) z)^{j+1} \left(-\frac{(i d + 2(i b + c(\nu - 2k)) z)^2}{i b + c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b + c(\nu - 2k)) z)^2}{4(i b + c(\nu - 2k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2}{-b - 2 i c k + i c \nu} - 4 e - 2 \pi \nu + 4 g i (\nu - 2k)\right)} (-i b - c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d)^{n-j} (-i d + 2(-i b - c(\nu - 2k)) z)^{j+1} \left(-\frac{(-i d + 2(-i b - c(\nu - 2k)) z)^2}{-i b - c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + 2(-i b - c(\nu - 2k)) z)^2}{4(-i b - c(\nu - 2k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2}{-b + 2 i c k - i c \nu} + 4 e - 2 \pi \nu + 4 g i (\nu - 2k)\right)} (i b - c(\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d)^{n-j} (i d + 2(i b - c(\nu - 2k)) z)^{j+1} \left(-\frac{(i d + 2(i b - c(\nu - 2k)) z)^2}{i b - c(\nu - 2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + 2(i b - c(\nu - 2k)) z)^2}{4(i b - c(\nu - 2k))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + e + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = 2^{-2n-\nu-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, (i\, d)^{-2(n+1)} \left(e^{i\, e - \frac{i\, b^2}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2n} \left(i\, b + 2\, i\, d \sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\left(i\, b + 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4d}\right) + 2\sqrt{\frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{d}}\, d\, i\, \Gamma\left(\frac{1}{2}(h+j+2),\, \frac{i\left(i\, b + 2\, i\, d\sqrt{z}\right)^2}{4d}\right)\right) + e^{\frac{i\, b^2}{4d} - i\, e} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2n} \left(-i\, b - 2\, i\, d\sqrt{z}\right)^{h+j} \left(-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\left(-i\, b - 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4d}\right) - 2\, i\, d \sqrt{-\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{d}}\, \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{i\left(-i\, b - 2\, i\, d\sqrt{z}\right)^2}{4d}\right)\right)\right) + 2^{-2n-\nu-2}\, i^{-\nu}\, (i\, d)^{-2(n+1)} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i(i\, b + c(\nu-2k))^2}{4d} + i\, e + \frac{i\pi\nu}{2} + g(\nu-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b + c(\nu - 2k))^{-h-j+2n} \left(i\, b + c(\nu-2k) + 2\, i\, d\sqrt{z}\right)^{h+j} \left(\frac{i\left(i\, b + c(\nu-2k) + 2\, i\, d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((i\, b + c(\nu-2k)) \left(i\, b + c(\nu-2k) + 2\, i\, d\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1),\, \frac{i\left(i\, b + c(\nu-2k) + 2\, i\, d\sqrt{z}\right)^2}{4d}\right) + \right.\right.$$

$$2\sqrt{\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b+c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,(i\,b-c\,(v-2\,k))^2}{4\,d}+i\,e-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+$$

$$2\sqrt{\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(i\,b-c\,(v-2\,k)+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b+c\,(v-2\,k))^2}{4\,d}-i\,e+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b+c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b-c\,(v-2\,k))^2}{4\,d}-i\,e-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{d}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-c\,(v-2\,k)-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.3014.01

$$\int z^n \cos(d z) \sinh^\nu\left(c z^2 + f z\right) dz = (-1)^n i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1, i d z) (-i d)^{-n-1} + (i d)^{-n-1} \Gamma(n+1, -i d z)\right) (1 - \nu \bmod 2) - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(-i d - f(\nu-2s))^2}{4c(\nu-2s)} - \frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (i d + f(\nu-2s))^{n-j} (-i d - f(\nu-2s) - 2c(\nu-2s) z)^{j+1} \left(\frac{(-i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) (-c(\nu-2s))^{-n-1} + e^{\frac{(i d - f(\nu-2s))^2}{4c(\nu-2s)} - \frac{i\pi\nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d + f(\nu-2s))^{n-j} (i d - f(\nu-2s) - 2c(\nu-2s) z)^{j+1} \left(\frac{(i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(i d - f(\nu-2s) - 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) (-c(\nu-2s))^{-n-1} + e^{\frac{i\pi\nu}{2} - \frac{(-i d + f(\nu-2s))^2}{4c(\nu-2s)}} (c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d - f(\nu-2s))^{n-j} (-i d + f(\nu-2s) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(-i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right) + e^{\frac{i\pi\nu}{2} - \frac{(i d + f(\nu-2s))^2}{4c(\nu-2s)}} (c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d - f(\nu-2s))^{n-j} (i d + f(\nu-2s) + 2c(\nu-2s) z)^{j+1} \left(-\frac{(i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i d + f(\nu-2s) + 2c(\nu-2s) z)^2}{4c(\nu-2s)}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3015.01

$$\int z^n \cos(d z) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = (-1)^n i^{-\nu} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(n+1, i d z) (-i d)^{-n-1} + (i d)^{-n-1} \Gamma(n+1, -i d z)\right) (1 - \nu \bmod 2) + i^{-\nu} 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i\pi\nu}{2} - \frac{c^2(\nu-2s)^2}{4(-i d + f(\nu-2s))}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(\nu-2s))^{-h-j+2n} \left(c(\nu-2s) + 2(-i d + f(\nu-2s)) \sqrt{z}\right)^{h+j}\right.\right.$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,s)}}$$

$$\left.\left.(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)\right)\right)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{\frac{i\,\pi\,v}{2}-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d+f\,(v-2\,s))}}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)+2\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,s)}}$$

$$\left.(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d-f\,(v-2\,s))}-\frac{i\,\pi\,v}{2}}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\Bigg($$

$$\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d-f\,(v-2\,s))}-\frac{i\,\pi\,v}{2}}\,(i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\Bigg($$

$$\left.\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z+e)\sinh^v\left(c\,z^r+f\,z\right)$

01.19.21.3016.01

$$\int z^n \cos(e+d\,z)\sinh^\nu\left(c\,z^2+f\,z\right)dz = (-1)^n\,i^{-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+f\,(\nu-2\,s))^{n-j}\,(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{\frac{(i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+f\,(\nu-2\,s))^{n-j}\,(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{-\frac{(-i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{i\,\pi\,\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(\nu-2\,s))^{n-j}\,(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)+e^{-\frac{(i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e+\frac{i\,\pi\,\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(\nu-2\,s))^{n-j}\,(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\ /;\ n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.3017.01

$$\int z^n \cos(e+d\,z)\sinh^\nu\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^n\,i^{-\nu}\,2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) + i^{-\nu}\,2^{-2\,n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2\,(\nu-2\,s)^2}{4\,(-i\,d+f\,(\nu-2\,s))}-i\,e+\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)^2}{-i d+f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c(v-2s)\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)^2}{4(-i d+f(v-2s))}\Bigg)+2\sqrt{-\frac{\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)^2}{-i d+f(v-2s)}}$$

$$(-i d+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c(v-2s)+2(-i d+f(v-2s))\sqrt{z}\right)^2}{4(-i d+f(v-2s))}\right)\Bigg)\Bigg)$$

$$(-i d+f(v-2s))^{-2(n+1)}+e^{-\frac{c^2(v-2s)^2}{4(i d+f(v-2s))}+i e+\frac{i\pi v}{2}}(i d+f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(c(v-2s))^{-h-j+2n}$$

$$\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)^2}{i d+f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c(v-2s)\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)^2}{4(i d+f(v-2s))}\Bigg)+2\sqrt{-\frac{\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)^2}{i d+f(v-2s)}}$$

$$(i d+f(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(c(v-2s)+2(i d+f(v-2s))\sqrt{z}\right)^2}{4(i d+f(v-2s))}\right)\Bigg)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(-i d-f(v-2s))}-i e-\frac{i\pi v}{2}}(-i d-f(v-2s))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2s))^{-h-j+2n}$$

$$\left(2(-i d-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}\left(-\frac{\left(2(-i d-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-i d-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(-i d - f(v-2s))\sqrt{-\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{-i d - f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(-i d - f(v-2s))}\right) - c(v-2s)\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(-i d - f(v-2s))}\right)\right) +$$

$$e^{-\frac{c^2(v-2s)^2}{4(i d - f(v-2s))} + i e - \frac{i\pi v}{2}} (i d - f(v-2s))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2s))^{-h-j+2n}$$

$$\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^{h+j}\left(-\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d - f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(i d - f(v-2s))\sqrt{-\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{i d - f(v-2s)}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d - f(v-2s))}\right) - c(v-2s)\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(i d - f(v-2s))\sqrt{z} - c(v-2s)\right)^2}{4(i d - f(v-2s))}\right)\right)\Bigg)\Bigg) /; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^n \cos(b z^r) \sinh^v(c z^r + f z)$

01.19.21.3018.01

$$\int z^n \cos(b z^2) \sinh^\nu(c z^2 + f z) \, dz = 2^{-\nu-2} (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) (-i b z^2)^{\frac{1}{2}(-n-1)} + (i b z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2ics-ic\nu} - 2\pi\nu\right)} \left(\sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-ib + c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-ib + c(\nu-2s))z)^2}{-ib + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-ib+c(\nu-2s))z)^2}{4(-ib + c(\nu-2s))}\right)\right) (-ib + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{b+2ics-ic\nu} + 2\pi\nu\right)} (ib + c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(ib + c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(ib+c(\nu-2s))z)^2}{ib + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(ib + c(\nu-2s))z)^2}{4(ib + c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{b+2ics-ic\nu} + 2\pi\nu\right)} (-ib - c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (2(-ib - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(-ib - c(\nu-2s))z - f(\nu-2s))^2}{-ib - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-ib - c(\nu-2s))z - f(\nu-2s))^2}{4(-ib - c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-b+2ics-ic\nu} - 2\pi\nu\right)} (ib - c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (2(ib - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(ib - c(\nu-2s))z - f(\nu-2s))^2}{ib - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(ib - c(\nu-2s))z - f(\nu-2s))^2}{4(ib - c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3019.01

$$\int z^n \cos(b\sqrt{z}) \sinh^\nu(\sqrt{z}\, c + f z) \, dz = (-1)^n (2i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma(2(n+1), -ib\sqrt{z}) + \Gamma(2(n+1), ib\sqrt{z})\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-ib - c(\nu-2s))^2}{4f(\nu-2s)} - \frac{i\pi\nu}{2}} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-ib - c(\nu-2s))^{-h-j+2n} \right.$$

$$\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b - c\,(v-2\,s))\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2\,f\,(v-2\,s)\,\sqrt{\frac{\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(-i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right) +$$

$$e^{\frac{(i\,b - c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - \frac{i\,\pi\,v}{2}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b - c\,(v-2\,s))^{-h-j+2\,n} \left(i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\,b - c\,(v-2\,s))\left(i\,b - c\,(v-2\,s) -\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) - 2\,f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(i\,b - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right) +$$

$$e^{\frac{i\,\pi\,v}{2} - \frac{(-i\,b + c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b + c\,(v-2\,s))^{-h-j+2\,n} \left(-i\,b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-i\,b + c\,(v-2\,s))\right.$$

$$\left(-i\,b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(-i\,b + c\,(v-2\,s) + 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) +$$

$$2\,f\,(v-2\,s)\sqrt{-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{\frac{i\,\pi\,v}{2}-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+e\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n \cos\left(b z^2 + e\right) \sinh^\nu\left(c z^2 + f z\right) dz = 2^{-\nu-2} (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2)\, z^{n+1} - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2ics-ic\nu} + 4e - 2\pi\nu\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{-i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{4(-i b + c(\nu-2s))}\right)\right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2ics-ic\nu} + 4e + 2\pi\nu\right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{4(i b + c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2ics-ic\nu} + 4e + 2\pi\nu\right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{-i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b - c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2ics-ic\nu} + 4e - 2\pi\nu\right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(i b - c(\nu-2s))}\right)\right) /;\ n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b + e\right) \sinh^\nu\left(\sqrt{z}\, c + f z\right) dz = (-1)^n (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e} \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f (\nu-2s)} - i e - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n} \right.$$

$$\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,s))\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\,\sqrt{\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{\frac{(i\,b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e-\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b-c\,(v-2\,s))\left(i\,b-c\,(v-2\,s)-\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{(-i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b+c\,(v-2\,s))\right.$$

$$\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\, f\,(v-2\,s)\sqrt{-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\cos\left(b\,z^2+d\,z\right)\sinh^v\left(c\,z^2+f\,z\right)dz = -i^v\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(e^{\frac{i\,d^2}{4\,b}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+\right.$$

$$\left.(i\,b)^{-n-1}\,e^{-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\right)-$$

$$2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\,(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\right.\right.$$

$$\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{4\,(-i\,b+c\,(2\,s-v))}\right)\Bigg)(-i\,b+c\,(2\,s-v))^{-n-1} +$$

$$(-1)^v\, e^{-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}}\,(i\,b+c\,(2\,s-v))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d-f\,(2\,s-v))^{n-j}\,(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^{j+1}$$

$$\left(-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{4\,(i\,b+c\,(2\,s-v))}\right) +$$

$$e^{-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))}}\,(-i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(i\,d-f\,(v-2\,s))^{n-j}\,(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{-i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{4\,(-i\,b+c\,(v-2\,s))}\right) +$$

$$e^{-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))}}\,(i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d-f\,(v-2\,s))^{n-j}\,(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{4\,(i\,b+c\,(v-2\,s))}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\,b+d\,z\right) \sinh^v\left(\sqrt{z}\,c+f\,z\right) dz =$$

$$(-1)^{n-1}\,2^{-2\,n-v-2}\,i^v \binom{v}{\frac{v}{2}} (1-v \bmod 2) \Bigg(e^{-\frac{i\,b^2}{4\,d}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n} \left(i\,b+2\,i\,d\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1), \frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right) +$$

$$2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)d^{-2\,n-2}+$$

$$2^{-2\,n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}+$$

$$(-1)^{v}\, e^{-\frac{(i b+c (2 k-v))^2}{4 (i d+f (2 k-v))}} (i d+f (2 k-v))^{-2 n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^{j}\, (i b+c (2 k-v))^{-h-j+2 n}$$

$$\left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right)^{h+j} \left(-\frac{\left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right)^2}{i d+f (2 k-v)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((i b+c (2 k-v)) \left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right)^2}{4 (i d+f (2 k-v))}\right)+\right.$$

$$2 \sqrt{-\frac{\left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right)^2}{i d+f (2 k-v)}}\; (i d+f (2 k-v))\, \Gamma\left(\frac{1}{2} (h+j+2),\right.$$

$$\left.\left.-\frac{\left(i b+c (2 k-v)+2 (i d+f (2 k-v)) \sqrt{z}\right)^2}{4 (i d+f (2 k-v))}\right)\right)+e^{-\frac{(-i b+c (v-2 k))^2}{4 (-i d+f (v-2 k))}} (-i d+f (v-2 k))^{-2 n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^{j}\, (-i b+c (v-2 k))^{-h-j+2 n} \left(-i b+c (v-2 k)+2 (-i d+f (v-2 k)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i b+c (v-2 k)+2 (-i d+f (v-2 k)) \sqrt{z}\right)^2}{-i d+f (v-2 k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((-i b+c (v-2 k)) \left(-i b+c (v-2 k)+2 (-i d+f (v-2 k)) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(-i b+c (v-2 k)+2 (-i d+f (v-2 k)) \sqrt{z}\right)^2}{4 (-i d+f (v-2 k))}\right)+\right.$$

$$\left.2 (-i d+f (v-2 k))\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(-i b+c (v-2 k)+2 (-i d+f (v-2 k)) \sqrt{z}\right)^2}{4 (-i d+f (v-2 k))}\right)\right.$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\Bigg)+e^{-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\cos\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z\right)dz = -i^v\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\Bigg(e^{\frac{i\,d^2}{4\,b}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+$$

$$(i\,b)^{-n-1}\,e^{i\,e-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\Bigg)-$$

$$2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\,(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\right.\right.$$

$$\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d + f\,(2\,s-v) + 2\,(-i\,b + c\,(2\,s-v))\,z)^2}{4\,(-i\,b + c\,(2\,s-v))}\right)\Bigg)\,(-i\,b + c\,(2\,s-v))^{-n-1} +$$

$$(-1)^v\, e^{i\,e-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}}\,(i\,b + c\,(2\,s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,d - f\,(2\,s-v))^{n-j}$$

$$(i\,d + f\,(2\,s-v) + 2\,(i\,b + c\,(2\,s-v))\,z)^{j+1} \left(-\frac{(i\,d + f\,(2\,s-v) + 2\,(i\,b + c\,(2\,s-v))\,z)^2}{i\,b + c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d + f\,(2\,s-v) + 2\,(i\,b + c\,(2\,s-v))\,z)^2}{4\,(i\,b + c\,(2\,s-v))}\right) +$$

$$e^{-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))}-i\,e}\,(-i\,b + c\,(v-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\,d - f\,(v-2\,s))^{n-j}\,(-i\,d + f\,(v-2\,s) + 2\,(-i\,b + c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(-i\,d + f\,(v-2\,s) + 2\,(-i\,b + c\,(v-2\,s))\,z)^2}{-i\,b + c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d + f\,(v-2\,s) + 2\,(-i\,b + c\,(v-2\,s))\,z)^2}{4\,(-i\,b + c\,(v-2\,s))}\right) +$$

$$e^{i\,e-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))}}\,(i\,b + c\,(v-2\,s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,d - f\,(v-2\,s))^{n-j}\,(i\,d + f\,(v-2\,s) + 2\,(i\,b + c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(i\,d + f\,(v-2\,s) + 2\,(i\,b + c\,(v-2\,s))\,z)^2}{i\,b + c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d + f\,(v-2\,s) + 2\,(i\,b + c\,(v-2\,s))\,z)^2}{4\,(i\,b + c\,(v-2\,s))}\right)\Bigg)\Bigg) /;\, n \in \mathbb{N} \land v \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\;b + e + d\,z\right) \sinh^v\left(\sqrt{z}\;c + f\,z\right) dz =$$

$$(-1)^{n-1}\,2^{-2\,n-v-2}\,i^v \binom{v}{\frac{v}{2}}\,(1 - v \bmod 2)\left(e^{i\,e-\frac{i\,b^2}{4\,d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b + 2\,i\,d\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b + 2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b + 2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1), \frac{i\left(i\,b + 2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right) +\right.$$

$$2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)+$$

$$e^{\frac{i\,b^2}{4\,d}-i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)d^{-2\,n-2}+$$

$$2^{-2\,n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}-i\,e}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}+$$

$$(-1)^{v}\,e^{i e-\frac{(i b+c(2k-v))^2}{4(i d+f(2k-v))}}\,(i d+f(2k-v))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i b+c(2k-v))^{-h-j+2n}$$

$$\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^{h+j}\left(-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{i d+f(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i b+c(2k-v))\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{4(i d+f(2k-v))}\Bigg)+$$

$$2\sqrt{-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{i d+f(2k-v)}}\;(i d+f(2k-v))\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(i b+c(2k-v)+2(i d+f(2k-v))\sqrt{z}\right)^2}{4(i d+f(2k-v))}\Bigg)\Bigg)+e^{-\frac{(-i b+c(v-2k))^2}{4(-i d+f(v-2k))}-i e}\,(-i d+f(v-2k))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-i b+c(v-2k))^{-h-j+2n}\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{-i d+f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i b+c(v-2k))\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),-\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{4(-i d+f(v-2k))}\Bigg)+$$

$$2(-i d+f(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-i b+c(v-2k)+2(-i d+f(v-2k))\sqrt{z}\right)^2}{4(-i d+f(v-2k))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\Bigg)+e^{i\,e-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos(d\,z)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos(d\,z)\sinh^\nu(c\,z^2+f\,z+g)\,dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-\frac{i\,\pi\,\nu}{2}-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+f\,(\nu-2\,s))^{n-j}\,(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-\frac{i\,\pi\,\nu}{2}-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+f\,(\nu-2\,s))^{n-j}\,(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{(-i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(\nu-2\,s))^{n-j}\,(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{(i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(\nu-2\,s))^{n-j}\,(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) /;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.3027.01

$$\int z^n \cos(d\,z)\sinh^\nu\left(\sqrt{z}\;c+g+f\,z\right)dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) + i^{-\nu}\,2^{-2\,n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2\,(\nu-2\,s)^2}{4\,(-i\,d+f\,(\nu-2\,s))}+g\,(\nu-2\,s)+\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{-i\,d+f\,(v-2\,s)}}$$

$$\left.\left.(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(-i\,d+f\,(v-2\,s))}\right)\right)\right)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{i\,d+f\,(v-2\,s)}}$$

$$\left.(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(i\,d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d-f\,(v-2\,s))}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d-f\,(v-2\,s))}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}}\,(i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,(i\,d-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)-c\,(v-2\,s)\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(i\,d-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(i\,d-f\,(v-2\,s))}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.3028.01

$$\int z^n \cos(e+d\,z)\sinh^\nu\left(c\,z^2+f\,z+g\right)dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) - i^{-\nu}\, 2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{\frac{(-i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e-\frac{i\,\pi\,\nu}{2}-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d+f\,(\nu-2\,s))^{n-j}\,(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{\frac{(i\,d-f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e-\frac{i\,\pi\,\nu}{2}-g\,(\nu-2\,s)}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d+f\,(\nu-2\,s))^{n-j}\,(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d-f\,(\nu-2\,s)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1} + e^{-\frac{(-i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}-i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(\nu-2\,s))^{n-j}\,(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(-i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right) + e^{-\frac{(i\,d+f\,(\nu-2\,s))^2}{4\,c\,(\nu-2\,s)}+i\,e+\frac{i\,\pi\,\nu}{2}+g\,(\nu-2\,s)}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(\nu-2\,s))^{n-j}\,(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(i\,d+f\,(\nu-2\,s)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right) /;\, n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.3029.01

$$\int z^n \cos(e+d\,z)\sinh^\nu\left(\sqrt{z}\;c+g+f\,z\right)dz = (-1)^n\, i^{-\nu}\, 2^{-\nu-1}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e}\,\Gamma(n+1,\,i\,d\,z)\,(-i\,d)^{-n-1}+(i\,d)^{-n-1}\,e^{i\,e}\,\Gamma(n+1,\,-i\,d\,z)\right)(1-\nu \bmod 2) + i^{-\nu}\, 2^{-2\,n-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{c^2\,(\nu-2\,s)^2}{4\,(-i\,d+f\,(\nu-2\,s))}+g\,(\nu-2\,s)-i\,e+\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{-i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(-i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{-i\,d+f\,(v-2\,s)}}$$

$$\left.\left.(-i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(-i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(-i\,d+f\,(v-2\,s))}\right)\right)\right)$$

$$(-i\,d+f\,(v-2\,s))^{-2\,(n+1)}+e^{-\frac{c^{2}\,(v-2\,s)^{2}}{4\,(i\,d+f\,(v-2\,s))}+g\,(v-2\,s)+i\,e+\frac{i\,\pi\,v}{2}}\,(i\,d+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{i\,d+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(i\,d+f\,(v-2\,s))}\right)+2\,\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{i\,d+f\,(v-2\,s)}}$$

$$\left.(i\,d+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(i\,d+f\,(v-2\,s))\,\sqrt{z}\right)^{2}}{4\,(i\,d+f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^{2}\,(v-2\,s)^{2}}{4\,(-i\,d-f\,(v-2\,s))}-g\,(v-2\,s)-i\,e-\frac{i\,\pi\,v}{2}}\,(-i\,d-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d-f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\left(\right.$$

$$\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(-i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(-i\,d-f\,(v-2\,s)\right)}\right)\right)+$$

$$e^{-\frac{c^2(v-2\,s)^2}{4(i\,d-f\,(v-2\,s))}-g\,(v-2\,s)+i\,e-\frac{i\,\pi\,v}{2}}\left(i\,d-f\,(v-2\,s)\right)^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-c\,(v-2\,s)\right)^{-h-j+2\,n}$$

$$\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{i\,d-f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)-c\,(v-2\,s)\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+1),-\frac{\left(2\left(i\,d-f\,(v-2\,s)\right)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\left(i\,d-f\,(v-2\,s)\right)}\right)\right)\right)\;/;\;n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\cos(b\,z^r)\sinh^v(c\,z^r+f\,z+g)$

01.19.21.3030.01

$$\int z^n \cos\left(b z^2\right) \sinh^\nu\left(c z^2 + f z + g\right) dz = 2^{-\nu-2} \left(-i^{-\nu}\right) \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1 - \nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2ics-ic\nu} + 4 g i (\nu-2s) - 2\pi\nu\right)} \left(\sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{-i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(-i b + c(\nu-2s)) z)^2}{4(-i b + c(\nu-2s))}\right)\right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2ics-ic\nu} - 4 i g (\nu-2s) + 2\pi\nu\right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s) + 2(i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s) + 2(i b + c(\nu-2s)) z)^2}{4(i b + c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2 (\nu-2s)^2}{b+2ics-ic\nu} - 4 i g (\nu-2s) + 2\pi\nu\right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{-i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(-i b - c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2ics-ic\nu} + 4 g i (\nu-2s) - 2\pi\nu\right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^n 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s)) z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b - c(\nu-2s)) z - f(\nu-2s))^2}{4(i b - c(\nu-2s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3031.01

$$\int z^n \cos\left(b \sqrt{z}\right) \sinh^\nu\left(\sqrt{z}\, c + g + f z\right) dz = (-1)^n (2i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2(n+1), -i b \sqrt{z}\right) + \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1 - \nu \bmod 2) b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f(\nu-2s)} - \frac{i\pi\nu}{2} - g(\nu-2s)} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n}\right.$$

$$\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j} \left(\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\, b - c\,(v-2\,s))\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) - 2\, f\,(v-2\,s)\sqrt{\frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(-i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right) +$$

$$e^{\frac{(i\, b - c\,(v-2\,s))^2}{4\, f\,(v-2\,s)} - \frac{i\,\pi\, v}{2} - g\,(v-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b - c\,(v-2\,s))^{-h-j+2\,n} \left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\, b - c\,(v-2\,s))\left(i\, b - c\,(v-2\,s) - \right.\right.$$

$$\left.2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) - 2\, f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\ \Gamma\left(\frac{1}{2}\,(h+j+2),\, \frac{\left(i\, b - c\,(v-2\,s) - 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right)\right) +$$

$$e^{-\frac{(-i\, b + c\,(v-2\,s))^2}{4\, f\,(v-2\,s)} + \frac{i\,\pi\, v}{2} + g\,(v-2\,s)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b + c\,(v-2\,s))^{-h-j+2\,n} \left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((-i\, b + c\,(v-2\,s))\right.$$

$$\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(-i\, b + c\,(v-2\,s) + 2\, f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\, f\,(v-2\,s)}\right) +$$

$$2\, f\, (v - 2\, s) \sqrt{-\frac{\left(-i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{f\, (v - 2\, s)}}\; \Gamma\!\left(\frac{1}{2}\, (h + j + 2),\right.$$

$$\left.\left. -\frac{\left(-i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{4\, f\, (v - 2\, s)}\right)\right) +$$

$$e^{-\frac{(i\, b + c\, (v - 2\, s))^2}{4\, f\, (v - 2\, s)} + \frac{i\, \pi\, v}{2} + g\, (v - 2\, s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b + c\, (v - 2\, s))^{-h - j + 2\, n} \left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{f\, (v - 2\, s)}\right)^{\frac{1}{2}\, (-h - j - 1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i\, b + c\, (v - 2\, s)) \left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right) \Gamma\!\left(\frac{1}{2}\, (h + j + 1),\right.\right.$$

$$\left. -\frac{\left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{4\, f\, (v - 2\, s)}\right) + 2\, f\, (v - 2\, s) \sqrt{-\frac{\left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{f\, (v - 2\, s)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\, (h + j + 2),\, -\frac{\left(i\, b + c\, (v - 2\, s) + 2\, f\, (v - 2\, s) \sqrt{z}\right)^2}{4\, f\, (v - 2\, s)}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving $z^n \cos\left(b\, z^r + e\right) \sinh^v\left(c\, z^r + f\, z + g\right)$

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$$\int z^n \cos\left(b z^2+e\right) \sinh^\nu\left(c z^2+f z+g\right) dz = 2^{-\nu-2} \left(-i^{-\nu}\right) \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(\frac{n+1}{2}, -i b z^2\right) \left(-i b z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e} \left(i b z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b z^2\right)\right) (1-\nu \bmod 2)\, z^{n+1} - i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{4} i \left(-\frac{f^2 (\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i (\nu-2s) + 4 e - 2\pi\nu\right)} \left(\sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(-i b + c(\nu-2s)) z)^{j+1} \left(-\frac{(f(\nu-2s)+2(-i b+c(\nu-2s))z)^2}{-i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(-i b+c(\nu-2s))z)^2}{4(-i b+c(\nu-2s))}\right) \right) (-i b + c(\nu-2s))^{-n-1} + e^{\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g(\nu-2s) + 4 e + 2\pi\nu\right)} (i b + c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f(\nu-2s))^{n-j} (f(\nu-2s)+2(i b+c(\nu-2s))z)^{j+1} \left(-\frac{(f(\nu-2s)+2(i b+c(\nu-2s))z)^2}{i b + c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f(\nu-2s)+2(i b+c(\nu-2s))z)^2}{4(i b+c(\nu-2s))}\right) + e^{-\frac{1}{4} i \left(\frac{f^2(\nu-2s)^2}{b+2 i c s - i c \nu} - 4 i g(\nu-2s) + 4 e + 2\pi\nu\right)} (-i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(-i b - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(-i b-c(\nu-2s))z-f(\nu-2s))^2}{-i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(-i b-c(\nu-2s))z-f(\nu-2s))^2}{4(-i b-c(\nu-2s))}\right) + e^{\frac{1}{4} i \left(-\frac{f^2(\nu-2s)^2}{-b+2 i c s - i c \nu} + 4 g i(\nu-2s) + 4 e - 2\pi\nu\right)} (i b - c(\nu-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2s))^{n-j} (2(i b - c(\nu-2s))z - f(\nu-2s))^{j+1} \left(-\frac{(2(i b-c(\nu-2s))z-f(\nu-2s))^2}{i b - c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b-c(\nu-2s))z-f(\nu-2s))^2}{4(i b-c(\nu-2s))}\right) \right) /;\; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+f z+g\right) dz = (-1)^n (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e} \Gamma\left(2(n+1), -i b \sqrt{z}\right) + e^{-i e} \Gamma\left(2(n+1), i b \sqrt{z}\right)\right) (1-\nu \bmod 2)\, b^{-2(n+1)} + 2^{-2n-\nu-2} i^{-\nu} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s (f(\nu-2s))^{-2(n+1)} \binom{\nu}{s} \left(e^{\frac{(-i b - c(\nu-2s))^2}{4 f(\nu-2s)} - i e - \frac{i\pi\nu}{2} - g(\nu-2s)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b - c(\nu-2s))^{-h-j+2n} \right.$$

$$\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b-c\,(v-2\,s))\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)\,\sqrt{\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{\frac{(i\,b-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e-\frac{i\,\pi\,v}{2}-g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b-c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b-c\,(v-2\,s))\left(i\,b-c\,(v-2\,s)-\right.\right.$$

$$\left.2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-2\,f\,(v-2\,s)$$

$$\left.\sqrt{\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{(-i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,e+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((-i\,b+c\,(v-2\,s))\right.$$

$$\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\sqrt{-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+$$

$$e^{-\frac{(i\,b+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+i\,e+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,s))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+c\,(v-2\,s))\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+2\,f\,(v-2\,s)\sqrt{-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos\left(b\,z^r+d\,z\right)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n\cos\left(b\,z^2+d\,z\right)\sinh^v\left(c\,z^2+f\,z+g\right)dz=-i^v\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(e^{\frac{i\,d^2}{4\,b}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+\right.$$

$$\left.(i\,b)^{-n-1}\,e^{-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\right)-$$

$$2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{g\,(2\,s-v)-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\,(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\right.\right.$$

$$\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{4\,(-i\,b+c\,(2\,s-v))}\right)\Bigg)(-i\,b+c\,(2\,s-v))^{-n-1}+$$

$$(-1)^v\,e^{g\,(2\,s-v)-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}}\,(i\,b+c\,(2\,s-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(2\,s-v))^{n-j}$$

$$(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^{j+1}\left(-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{4\,(i\,b+c\,(2\,s-v))}\right)+$$

$$e^{g\,(v-2\,s)-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))}}\,(-i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(v-2\,s))^{n-j}$$

$$(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^{j+1}\left(-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{-i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d+f\,(v-2\,s)+2\,(-i\,b+c\,(v-2\,s))\,z)^2}{4\,(-i\,b+c\,(v-2\,s))}\right)+$$

$$e^{g\,(v-2\,s)-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))}}\,(i\,b+c\,(v-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(v-2\,s))^{n-j}\,(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{i\,b+c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(i\,d+f\,(v-2\,s)+2\,(i\,b+c\,(v-2\,s))\,z)^2}{4\,(i\,b+c\,(v-2\,s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\cos\left(\sqrt{z}\,b+d\,z\right)\sinh^v\left(\sqrt{z}\,c+g+f\,z\right)dz=$$

$$(-1)^{n-1}\,2^{-2\,n-v-2}\,i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,i\,d\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b+2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)+\right.$$

$$2\sqrt{\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(i\,b+2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(-i\,b\left(-i\,b-2\,i\,d\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)-$$

$$2\,i\,d\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\Bigg)d^{-2\,n-2}+$$

$$2^{-2\,n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{g\,(2\,k-\nu)-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)$$

$$(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}+(-1)^\nu\,e^{g\,(2\,k-\nu)-\frac{(i\,b+c\,(2\,k-\nu))^2}{4\,(i\,d+f\,(2\,k-\nu))}}\,(i\,d+f\,(2\,k-\nu))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b+c\,(2\,k-v))^{-h-j+2\,n}\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{2}}{i\,d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(2\,k-v))\left(i\,b+c\,(2\,k-v)+\right.$$

$$\left.2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{2}}{4\,(i\,d+f\,(2\,k-v))}\right)+$$

$$2\,\sqrt{-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{2}}{i\,d+f\,(2\,k-v)}}\;(i\,d+f\,(2\,k-v))\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^{2}}{4\,(i\,d+f\,(2\,k-v))}\Bigg)\Bigg)+e^{g\,(v-2\,k)-\frac{(-i\,b+c\,(v-2\,k))^{2}}{4\,(-i\,d+f\,(v-2\,k))}}\,(-i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{-i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(-i\,d+f\,(v-2\,k))}\Bigg)+$$

$$2\,(-i\,d+f\,(v-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{4\,(-i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{2}}{-i\,d+f\,(v-2\,k)}}\Bigg)+e^{g\,(v-2\,k)-\frac{(i\,b+c\,(v-2\,k))^{2}}{4\,(i\,d+f\,(v-2\,k))}}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+\right.\right.$$

$$\left.2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\right)\right)\text{/; } n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n \cos(b\,z^r + d\,z + e)\sinh^v(c\,z^r + f\,z + g)$

01.19.21.3036.01

$$\int z^n\cos\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z+g\right)dz = -i^v\,2^{-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(e^{\frac{i\,d^2}{4\,b}-i\,e}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d)^{n-j}\,(-i\,d-2\,i\,b\,z)^{j+1}\left(-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d-2\,i\,b\,z)^2}{4\,b}\right)\right)(-i\,b)^{-n-1}+\right.$$

$$\left.(i\,b)^{-n-1}\,e^{i\,e-\frac{i\,d^2}{4\,b}}\sum_{j=0}^{n}2^{j-n}\,(-i\,d)^{n-j}\,(i\,d+2\,i\,b\,z)^{j+1}\left(\frac{i\,(i\,d+2\,i\,b\,z)^2}{b}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(i\,d+2\,i\,b\,z)^2}{4\,b}\right)\right)-$$

$$2^{-v-2}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,d+f\,(2\,s-v))^2}{4\,(-i\,b+c\,(2\,s-v))}-i\,e+g\,(2\,s-v)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d-f\,(2\,s-v))^{n-j}\right.\right.$$

$$(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^{j+1}\left(-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{-i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i\,d+f\,(2\,s-v)+2\,(-i\,b+c\,(2\,s-v))\,z)^2}{4\,(-i\,b+c\,(2\,s-v))}\right)\right)(-i\,b+c\,(2\,s-v))^{-n-1}+$$

$$(-1)^v\,e^{-\frac{(i\,d+f\,(2\,s-v))^2}{4\,(i\,b+c\,(2\,s-v))}+i\,e+g\,(2\,s-v)}\,(i\,b+c\,(2\,s-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d-f\,(2\,s-v))^{n-j}$$

$$(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^{j+1}\left(-\frac{(i\,d+f\,(2\,s-v)+2\,(i\,b+c\,(2\,s-v))\,z)^2}{i\,b+c\,(2\,s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d + f\,(2\,s - v) + 2\,(i\,b + c\,(2\,s - v))\,z)^2}{4\,(i\,b + c\,(2\,s - v))}\right) +$$

$$e^{-\frac{(-i\,d+f\,(v-2\,s))^2}{4\,(-i\,b+c\,(v-2\,s))} - i\,e + g\,(v-2\,s)}\,(-i\,b + c\,(v - 2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(i\,d - f\,(v - 2\,s))^{n-j}$$

$$(-i\,d + f\,(v - 2\,s) + 2\,(-i\,b + c\,(v - 2\,s))\,z)^{j+1}\left(-\frac{(-i\,d + f\,(v - 2\,s) + 2\,(-i\,b + c\,(v - 2\,s))\,z)^2}{-i\,b + c\,(v - 2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d + f\,(v - 2\,s) + 2\,(-i\,b + c\,(v - 2\,s))\,z)^2}{4\,(-i\,b + c\,(v - 2\,s))}\right) +$$

$$e^{-\frac{(i\,d+f\,(v-2\,s))^2}{4\,(i\,b+c\,(v-2\,s))} + i\,e + g\,(v-2\,s)}\,(i\,b + c\,(v - 2\,s))^{-n-1}\sum_{j=0}^{n} 2^{j-n}\,(-i\,d - f\,(v - 2\,s))^{n-j}$$

$$(i\,d + f\,(v - 2\,s) + 2\,(i\,b + c\,(v - 2\,s))\,z)^{j+1}\left(-\frac{(i\,d + f\,(v - 2\,s) + 2\,(i\,b + c\,(v - 2\,s))\,z)^2}{i\,b + c\,(v - 2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(i\,d + f\,(v - 2\,s) + 2\,(i\,b + c\,(v - 2\,s))\,z)^2}{4\,(i\,b + c\,(v - 2\,s))}\right)\right)\right) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

01.19.21.3037.01

$$\int z^n \cos\left(\sqrt{z}\; b + e + d\,z\right) \sinh^v\left(\sqrt{z}\; c + g + f\,z\right) dz ==$$

$$(-1)^{n-1}\,2^{-2\,n-v-2}\,i^v\binom{v}{\frac{v}{2}}(1 - v \bmod 2)\left(e^{i\,e-\frac{i\,b^2}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b + 2\,i\,d\sqrt{z}\right)^{h+j}\right.$$

$$\left(\frac{i\left(i\,b + 2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\left(i\,b + 2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h + j + 1), \frac{i\left(i\,b + 2\,i\,d\sqrt{z}\right)^2}{4\,d}\right) +\right.$$

$$\left.\left.2\sqrt{\frac{i\left(i\,b + 2\,i\,d\sqrt{z}\right)^2}{d}}\;d\,i\,\Gamma\left(\frac{1}{2}(h + j + 2), \frac{i\left(i\,b + 2\,i\,d\sqrt{z}\right)^2}{4\,d}\right)\right)\right) +$$

$$e^{\frac{i\,b^2}{4\,d} - i\,e}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b - 2\,i\,d\sqrt{z}\right)^{h+j}\left(-\frac{i\left(-i\,b - 2\,i\,d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\left(-i\,b - 2\,i\,d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h + j + 1), -\frac{i\left(-i\,b - 2\,i\,d\sqrt{z}\right)^2}{4\,d}\right) -\right.$$

$$2\,i\,d\,\sqrt{-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{d}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b-2\,i\,d\,\sqrt{z}\right)^2}{4\,d}\right)\Bigg)\Bigg)\,d^{-2\,n-2}+$$

$$2^{-2\,n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg((-1)^\nu\,e^{-\frac{(-i\,b+c\,(2\,k-\nu))^2}{4\,(-i\,d+f\,(2\,k-\nu))}-i\,e+g\,(2\,k-\nu)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\Big(-i\,b+c\,(2\,k-\nu)+$$

$$2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\,b+c\,(2\,k-\nu))\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)+2$$

$$(-i\,d+f\,(2\,k-\nu))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(2\,k-\nu))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(2\,k-\nu)+2\,(-i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{-i\,d+f\,(2\,k-\nu)}}\Bigg)\Bigg)$$

$$(-i\,d+f\,(2\,k-\nu))^{-2\,n-2}+(-1)^\nu\,e^{-\frac{(i\,b+c\,(2\,k-\nu))^2}{4\,(i\,d+f\,(2\,k-\nu))}+i\,e+g\,(2\,k-\nu)}\,(i\,d+f\,(2\,k-\nu))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(2\,k-\nu))^{-h-j+2\,n}\left(i\,b+c\,(2\,k-\nu)+2\,(i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+c\,(2\,k-\nu)+2\,(i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(2\,k-\nu))\Big(i\,b+c\,(2\,k-\nu)+$$

$$2\,(i\,d+f\,(2\,k-\nu))\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+c\,(2\,k-\nu)+2\,(i\,d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-\nu))}\right)+$$

$$2\sqrt{-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{i\,d+f\,(2\,k-v)}}\;(i\,d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(i\,b+c\,(2\,k-v)+2\,(i\,d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(i\,d+f\,(2\,k-v))}\right)\Bigg)+$$

$$e^{-\frac{(-i\,b+c\,(v-2\,k))^2}{4\,(-i\,d+f\,(v-2\,k))}-i\,e+g\,(v-2\,k)}\,(-i\,d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+c\,(v-2\,k))\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)+$$

$$2\,(-i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(-i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(-i\,b+c\,(v-2\,k)+2\,(-i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{-i\,d+f\,(v-2\,k)}}\Bigg)+$$

$$e^{-\frac{(i\,b+c\,(v-2\,k))^2}{4\,(i\,d+f\,(v-2\,k))}+i\,e+g\,(v-2\,k)}\,(i\,d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\Bigg)+$$

$$2\,(i\,d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{4\,(i\,d+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,(i\,d+f\,(v-2\,k))\sqrt{z}\right)^2}{i\,d+f\,(v-2\,k)}}\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving powers of cos and power

Involving $z^{\alpha-1}\cos^{\mu}(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.3038.01

$$\int z^{\alpha-1}\cos^m(c\,z)\sinh^v(a\,z)\,dz = \frac{i^v\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{\alpha} - 2^{-m-v}\,i^v\,z^\alpha\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(\alpha, -i\,c\,(m-2\,k)\,z)\,(-i\,c\,(m-2\,k)\,z)^{-\alpha}+((i\,c\,m-2\,i\,c\,k)\,z)^{-\alpha}\,\Gamma(\alpha, (i\,c\,m-2\,i\,c\,k)\,z)\right)-2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}$$
$$(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(\Gamma(\alpha, -a\,(v-2\,s)\,z)\,(-a\,(v-2\,s)\,z)^{-\alpha}+e^{i\pi v}\,((a\,v-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha, (a\,v-2\,a\,s)\,z)\right)-$$
$$2^{-m-v}\,z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Big(e^{i\pi v}\,\Gamma(\alpha, (-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,v)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,v)\,z)^{-\alpha}+$$
$$e^{i\pi v}\,((2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,v)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,v)\,z)+$$
$$((-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,v)\,z)^{-\alpha}\,\Gamma(\alpha, (-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,v)\,z)+$$
$$((2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,v)\,z)^{-\alpha}\,\Gamma(\alpha, (2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,v)\,z)\Big)\,/;\, m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.3039.01

$$\int z^n \cos^\mu(c z) \sinh^\nu(a z)\, dz = 2^{-\nu} i^{-\nu} \left(1+e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n! \,(1-\nu \bmod 2) \cos^\mu(c z) \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (-i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{\mu}{2}, \ldots, -\frac{\mu}{2}, -\mu; 1-\frac{\mu}{2}, \ldots, 1-\frac{\mu}{2}; -e^{2 i c z}\right) + 2^{-\nu} i^{-\nu} \left(1+e^{2 i c z}\right)^{-\mu} n! \cos^\mu(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(i^{-\nu} e^{-a(\nu-2k) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (-a(\nu-2k) - i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(\frac{i a (\nu-2k) - c\mu}{2c}, \ldots, \frac{i a (\nu-2k) - c\mu}{2c}, -\mu; \frac{i a (\nu-2k) - c\mu}{2c} + 1, \ldots, \frac{i a (\nu-2k) - c\mu}{2c} + 1; -e^{2 i c z}\right) + i^\nu e^{a(\nu-2k) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (a(\nu-2k) - i c \mu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{i a (\nu-2k) + c\mu}{2c}, \ldots, -\frac{i a (\nu-2k) + c\mu}{2c}, -\mu; 1-\frac{i a (\nu-2k) + c\mu}{2c}, \ldots, 1-\frac{i a (\nu-2k) + c\mu}{2c}; -e^{2 i c z}\right)\right) /; \nu \in \mathbb{N} \land n \in \mathbb{N}$$

01.19.21.3040.01

$$\int z^n \cos^m(c z) \sinh^\nu(a z)\, dz = 2^{-m} \binom{m}{\frac{m}{2}} n! \,(1-m \bmod 2) \sinh^\nu(a z) \left(\sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (-a \nu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1-\frac{\nu}{2}, \ldots, 1-\frac{\nu}{2}; e^{2 a z}\right)\right) \left(1-e^{2 a z}\right)^{-\nu} + 2^{-m} n! \sinh^\nu(a z) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{i c (m-2k) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (i c (m-2k) - a\nu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(\frac{i c (m-2k) - a\nu}{2a}, \ldots, \frac{i c (m-2k) - a\nu}{2a}, -\nu; \frac{i c (m-2k) - a\nu}{2a} + 1, \ldots, \frac{i c (m-2k) - a\nu}{2a} + 1; e^{2 a z}\right) + e^{-i c (m-2k) z} \sum_{p=0}^{n} \frac{(-1)^p z^{n-p} (-i c (m-2k) - a\nu)^{-p-1}}{(n-p)!} \, {}_{p+2}F_{p+1}\left(-\frac{i c (m-2k) + a\nu}{2a}, \ldots, -\frac{i c (m-2k) + a\nu}{2a}, -\nu; 1-\frac{i c (m-2k) + a\nu}{2a}, \ldots, 1-\frac{i c (m-2k) + a\nu}{2a}; e^{2 a z}\right)\right)\right) \left(1-e^{2 a z}\right)^{-\nu} /; m \in \mathbb{N} \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} \cos^\mu(c z + d) \sinh^\nu(a z)$

01.19.21.3041.01

$$\int z^{\alpha-1}\cos^m(d+cz)\sinh^\nu(az)\,dz = \frac{i^\nu 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{-2dik-idm+\frac{i\pi\nu}{2}}\binom{m}{k}$$
$$\left(e^{2idm}\Gamma(\alpha, -ic(m-2k)z)(-ic(m-2k)z)^{-\alpha} + e^{4idk}((icm-2ick)z)^{-\alpha}\Gamma(\alpha, (icm-2ick)z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}$$
$$(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\Gamma(\alpha, -a(\nu-2s)z)(-a(\nu-2s)z)^{-\alpha} + e^{i\pi\nu}((a\nu-2as)z)^{-\alpha}\Gamma(\alpha, (a\nu-2as)z)\right) + 2^{-m-\nu}$$
$$z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2dik-idm}\binom{\nu}{s}\left(-e^{4idk+i\pi\nu}\Gamma(\alpha, (-2cik+icm-2as+a\nu)z)((-2cik+icm-2as+a\nu)z)^{-\alpha} -\right.$$
$$e^{2idm+i\pi\nu}((2ick-icm-2as+a\nu)z)^{-\alpha}\Gamma(\alpha, (2ick-icm-2as+a\nu)z) -$$
$$e^{4idk}((-2cik+icm+2as-a\nu)z)^{-\alpha}\Gamma(\alpha, (-2cik+icm+2as-a\nu)z) -$$
$$\left.e^{2idm}((2ick-icm+2as-a\nu)z)^{-\alpha}\Gamma(\alpha, (2ick-icm+2as-a\nu)z)\right) /; m\in\mathbb{N}^+ \bigwedge \nu\in\mathbb{N}^+$$

01.19.21.3042.01

$$\int z^n\cos^\mu(d+cz)\sinh^\nu(az)\,dz = 2^{-\nu} i^{-\nu}\left(1+e^{2i(d+cz)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)$$
$$\cos^\mu(d+cz)\sum_{j=0}^n\frac{(-1)^j z^{n-j}(-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{\mu}{2}, \ldots, -\frac{\mu}{2}, -\mu; 1-\frac{\mu}{2}, \ldots, 1-\frac{\mu}{2}; -e^{2i(d+cz)}\right) +$$
$$2^{-\nu} i^{-\nu}\left(1+e^{2i(d+cz)}\right)^{-\mu} n!\cos^\mu(d+cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(e^{-\frac{1}{2}i(-2iaz\nu+\pi\nu+4iakz)}\sum_{j=0}^n\frac{(-1)^j z^{n-j}(-a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\mu-ia(\nu-2k)}{2c}, \ldots, -\frac{c\mu-ia(\nu-2k)}{2c},\right.\right.$$
$$\left.-\mu; 1-\frac{c\mu-ia(\nu-2k)}{2c}, \ldots, 1-\frac{c\mu-ia(\nu-2k)}{2c}; -e^{2i(d+cz)}\right) + e^{\frac{1}{2}i(-2iaz\nu+\pi\nu+4iakz)}$$
$$\sum_{j=0}^n\frac{(-1)^j z^{n-j}(a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ia(\nu-2k)+c\mu}{2c}, \ldots, -\frac{ia(\nu-2k)+c\mu}{2c}, -\mu;\right.$$
$$\left.\left.1-\frac{ia(\nu-2k)+c\mu}{2c}, \ldots, 1-\frac{ia(\nu-2k)+c\mu}{2c}; -e^{2i(d+cz)}\right)\right) /; n\in\mathbb{N} \bigwedge \nu\in\mathbb{N}^+$$

01.19.21.3043.01

$$\int z^n \cos^m(d+c\,z)\sinh^\nu(a\,z)\,dz = 2^{-m}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^\nu(a\,z)\left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2},\ldots,-\frac{\nu}{2},-\nu;1-\frac{\nu}{2},\ldots,1-\frac{\nu}{2};e^{-2az}\right)\right) \left(1-e^{-2az}\right)^{-\nu} + 2^{-m}\,n!\,\sinh^\nu(a\,z)\left(\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\left(e^{-i(2dk+2czk-dm-cmz)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(c\,i\,(m-2k)+a\,\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(\frac{i(2ck-cm+i\,a\,\nu)}{2a},\ldots,\frac{i(2ck-cm+i\,a\,\nu)}{2a},-\nu;\frac{i(2ck-cm+i\,a\,\nu)}{2a}+1,\ldots,\frac{i(2ck-cm+i\,a\,\nu)}{2a}+1;e^{-2az}\right)+e^{i(2dk+2czk-dm-cmz)}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(a\,\nu-i\,c\,(m-2k))^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\!\left(\frac{i(c(m-2k)+i\,a\,\nu)}{2a},\ldots,\frac{i(c(m-2k)+i\,a\,\nu)}{2a},-\nu;\frac{i(c(m-2k)+i\,a\,\nu)}{2a}+1,\ldots,\frac{i(c(m-2k)+i\,a\,\nu)}{2a}+1;e^{-2az}\right)\right)\right)\left(1-e^{-2az}\right)^{-\nu} /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^\mu(c\,z)\sinh^\nu(a\,z+b)$

01.19.21.3044.01

$$\int z^{\alpha-1}\cos^m(c\,z)\sinh^\nu(b+a\,z)\,dz = \frac{i^\nu\,2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu}\,i^\nu z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\left(\Gamma(\alpha,-i\,c\,(m-2k)\,z)\,(-i\,c\,(m-2k)\,z)^{-\alpha}+((i\,c\,m-2\,i\,c\,k)\,z)^{-\alpha}\,\Gamma(\alpha,(i\,c\,m-2\,i\,c\,k)\,z)\right) - 2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(e^{2b\nu}\,\Gamma(\alpha,-a\,(\nu-2s)\,z)\,(-a\,(\nu-2s)\,z)^{-\alpha}+e^{4bs+i\pi\nu}\,((a\,\nu-2\,a\,s)\,z)^{-\alpha}\,\Gamma(\alpha,(a\,\nu-2\,a\,s)\,z)\right) + 2^{-m-\nu}z^\alpha\sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor}\binom{m}{k}\sum_{s=0}^{\lfloor\frac{\nu-1}{2}\rfloor}(-1)^s e^{-2bs-b\nu}\binom{\nu}{s}\left(-e^{4bs+i\pi\nu}\,\Gamma(\alpha,(-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha} - e^{4bs+i\pi\nu}\,((2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,(2\,i\,c\,k-i\,c\,m-2\,a\,s+a\,\nu)\,z) + e^{2b\nu}\left(-\Gamma(\alpha,(-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)\,((-2\,c\,i\,k+i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha} - ((2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)^{-\alpha}\,\Gamma(\alpha,(2\,i\,c\,k-i\,c\,m+2\,a\,s-a\,\nu)\,z)\right)\right) /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.3045.01

$$\int z^n \cos^\mu(c z) \sinh^\nu(b + a z)\, dz = 2^{-\nu} i^{-\nu} \left(1 + e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n!\, (1 - \nu \bmod 2) \cos^\mu(c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{\mu}{2}, \ldots, -\frac{\mu}{2}, -\mu; 1 - \frac{\mu}{2}, \ldots, 1 - \frac{\mu}{2}; -e^{2 i c z}\right) + 2^{-\nu} i^{-\nu} \left(1 + e^{2 i c z}\right)^{-\mu} n! \cos^\mu(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i (4 i b k + 4 i a z k - 2 i b \nu + \pi \nu - 2 i a \nu z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{c \mu - i a (\nu - 2 k)}{2 c}, \ldots, -\frac{c \mu - i a (\nu - 2 k)}{2 c}, -\mu; 1 - \frac{c \mu - i a (\nu - 2 k)}{2 c}, \ldots, 1 - \frac{c \mu - i a (\nu - 2 k)}{2 c}; -e^{2 i c z}\right) + e^{\frac{1}{2} i (4 i b k + 4 i a z k - 2 i b \nu + \pi \nu - 2 i a \nu z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{i a (\nu - 2 k) + c \mu}{2 c}, \ldots, -\frac{i a (\nu - 2 k) + c \mu}{2 c}, -\mu; 1 - \frac{i a (\nu - 2 k) + c \mu}{2 c}, \ldots, 1 - \frac{i a (\nu - 2 k) + c \mu}{2 c}; -e^{2 i c z}\right) \right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3046.01

$$\int z^n \cos^m(c z) \sinh^\nu(b + a z)\, dz = 2^{-m} \binom{m}{\frac{m}{2}} n!\, (1 - m \bmod 2) \sinh^\nu(b + a z) \left(\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}, \ldots, 1 - \frac{\nu}{2}; e^{-2 (b + a z)}\right) \right) \left(1 - e^{-2 (b + a z)}\right)^{-\nu} + 2^{-m} n! \sinh^\nu(b + a z) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{-i (2 k - m) c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2 k) + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(\frac{i (2 c k - c m + i a \nu)}{2 a}, \ldots, \frac{i (2 c k - c m + i a \nu)}{2 a}, -\nu; \frac{i (2 c k - c m + i a \nu)}{2 a} + 1, \ldots, \frac{i (2 c k - c m + i a \nu)}{2 a} + 1; e^{-2 (b + a z)}\right) + e^{i (2 k - m) c z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a \nu - i c (m - 2 k))^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(\frac{i (c (m - 2 k) + i a \nu)}{2 a}, \ldots, \frac{i (c (m - 2 k) + i a \nu)}{2 a}, -\nu; \frac{i (c (m - 2 k) + i a \nu)}{2 a} + 1, \ldots, \frac{i (c (m - 2 k) + i a \nu)}{2 a} + 1; e^{-2 (b + a z)}\right) \right) \right) \left(1 - e^{-2 (b + a z)}\right)^{-\nu} /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} \cos^\mu(c z + d) \sinh^\nu(a z + b)$

01.19.21.3047.01

$$\int z^{\alpha-1}\cos^m(d+c z)\sinh^\nu(b+a z)\,dz = \frac{i^\nu 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} e^{-2 d i k - i d m+\frac{i\pi\nu}{2}}\binom{m}{k}\Big(e^{2 i d m}\,\Gamma(\alpha, -i c(m-2k)z)(-i c(m-2k)z)^{-\alpha} + e^{4 i d k}((i c m-2 i c k)z)^{-\alpha}\,\Gamma(\alpha, (i c m-2 i c k)z)\Big) - 2^{-m-\nu} z^\alpha\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2 b s-b\nu}\binom{\nu}{s}\Big(e^{2 b\nu}\,\Gamma(\alpha, -a(\nu-2s)z)(-a(\nu-2s)z)^{-\alpha} + e^{4 b s+i\pi\nu}((a\nu-2 a s)z)^{-\alpha}\,\Gamma(\alpha, (a\nu-2 a s)z)\Big) + 2^{-m-\nu} z^\alpha\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{-2 d i k-i d m-2 b s-b\nu}\binom{\nu}{s}\Big(-e^{4 i d k+4 b s+i\pi\nu}\,\Gamma(\alpha, (-2 c i k+i c m-2 a s+a\nu)z)((-2 c i k+i c m-2 a s+a\nu)z)^{-\alpha} - e^{2 i d m+4 b s+i\pi\nu}((2 i c k-i c m-2 a s+a\nu)z)^{-\alpha}\,\Gamma(\alpha, (2 i c k-i c m-2 a s+a\nu)z) + e^{2 b\nu}\Big(-e^{4 i d k}\,\Gamma(\alpha, (-2 c i k+i c m+2 a s-a\nu)z)((-2 c i k+i c m+2 a s-a\nu)z)^{-\alpha} - e^{2 i d m}((2 i c k-i c m+2 a s-a\nu)z)^{-\alpha}\,\Gamma(\alpha, (2 i c k-i c m+2 a s-a\nu)z)\Big)\Big)\,/;\, m\in\mathbb{N}^+\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.3048.01

$$\int z^n\cos^\mu(d+c z)\sinh^\nu(b+a z)\,dz = 2^{-\nu} i^{-\nu}\left(1+e^{2 i(d+c z)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}}\cos^\mu(d+c z)\,n!\,(1-\nu \bmod 2)\sum_{j=0}^n\frac{(-1)^j z^{n-j}(-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{\mu}{2},\ldots,-\frac{\mu}{2},-\mu;1-\frac{\mu}{2},\ldots,1-\frac{\mu}{2};-e^{2 i(d+c z)}\right) + 2^{-\nu}\left(1+e^{2 i(d+c z)}\right)^{-\mu}\cos^\mu(d+c z)\,n!\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu e^{-\frac{1}{2} i(4 i b k+4 i a z k-2 i b\nu-2 i a\nu z)}\sum_{j=0}^n\frac{(-1)^j z^{n-j}(-a(\nu-2k)-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{c\mu-i a(\nu-2k)}{2c},\ldots,-\frac{c\mu-i a(\nu-2k)}{2c},-\mu;1-\frac{c\mu-i a(\nu-2k)}{2c},\ldots,1-\frac{c\mu-i a(\nu-2k)}{2c};-e^{2 i(d+c z)}\right) + e^{\frac{1}{2} i(4 i b k+4 i a z k-2 i b\nu-2 i a\nu z)}\sum_{j=0}^n\frac{(-1)^j z^{n-j}(a(\nu-2k)-i c\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{i a(\nu-2k)+c\mu}{2c},\ldots,-\frac{i a(\nu-2k)+c\mu}{2c},-\mu;1-\frac{i a(\nu-2k)+c\mu}{2c},\ldots,1-\frac{i a(\nu-2k)+c\mu}{2c};-e^{2 i(d+c z)}\right)\right)\,/;\, n\in\mathbb{N}\bigwedge \nu\in\mathbb{N}^+$$

01.19.21.3049.01

$$\int z^n \cos^m(d + c\,z) \sinh^\nu(b + a\,z)\,dz = 2^{-m} \binom{m}{\frac{m}{2}} n!\,(1 - m \bmod 2) \sinh^\nu(b + a\,z) \left(\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\,\nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(-\frac{\nu}{2}, \ldots, -\frac{\nu}{2}, -\nu; 1 - \frac{\nu}{2}, \ldots, 1 - \frac{\nu}{2}; e^{-2(b+a\,z)}\right)\right) \left(1 - e^{-2(b+a\,z)}\right)^{-\nu} + 2^{-m} n! \sinh^\nu(b + a\,z) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{-i(2\,d\,k + 2\,c\,z\,k - d\,m - c\,m\,z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c\,i\,(m - 2\,k) + a\,\nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(\frac{i(2\,c\,k - c\,m + i\,a\,\nu)}{2\,a}, \ldots, \frac{i(2\,c\,k - c\,m + i\,a\,\nu)}{2\,a}, -\nu; \frac{i(2\,c\,k - c\,m + i\,a\,\nu)}{2\,a} + 1, \ldots, \frac{i(2\,c\,k - c\,m + i\,a\,\nu)}{2\,a} + 1; e^{-2(b+a\,z)}\right) + e^{i(2\,d\,k + 2\,c\,z\,k - d\,m - c\,m\,z)} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (a\,\nu - i\,c\,(m - 2\,k))^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\!\left(\frac{i(c\,(m - 2\,k) + i\,a\,\nu)}{2\,a}, \ldots, \frac{i(c\,(m - 2\,k) + i\,a\,\nu)}{2\,a}, -\nu; \frac{i(c\,(m - 2\,k) + i\,a\,\nu)}{2\,a} + 1, \ldots, \frac{i(c\,(m - 2\,k) + i\,a\,\nu)}{2\,a} + 1; e^{-2(b+a\,z)}\right)\right)\right) \left(1 - e^{-2(b+a\,z)}\right)^{-\nu} /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r) \sinh^\nu(c\,z)$

01.19.21.3050.01

$$\int z^n \cos^m(b z^2) \sinh^\nu(c z)\, dz = -i^{-\nu}\, 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, -i\, b\, (m-2k)\, z^2\right) \left(-i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\, (m-2k)\, z^2\right)\right)\right)$$

$$z^{n+1} + \frac{i^{-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu}\, i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu}\, \Gamma(n+1, c\, (\nu-2k)\, z)\, (-c\, (\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2}}\, (c\, (\nu-2k))^{-n-1}\, \Gamma(n+1, -c\, (\nu-2k)\, z)\right) -$$

$$i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - \frac{i \pi \nu}{2}}\right.$$

$$\left(\sum_{j=0}^{n} 2^{j-n}\, (c\, (\nu-2k))^{n-j}\, (-c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^{j+1} \left(-\frac{i\, (-c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i\, (-c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) (-i\, b\, (m-2s))^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{i c^2 (\nu-2k)^2}{4 b (m-2s)}}$$

$$\left(\sum_{j=0}^{n} 2^{j-n}\, (-c\, (\nu-2k))^{n-j}\, (c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^{j+1} \left(-\frac{i\, (c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}\right.$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{i\, (c\, (\nu-2k) - 2\, i\, b\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) (-i\, b\, (m-2s))^{-n-1} + e^{\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - \frac{i \pi \nu}{2}}\, (i\, b\, (m-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\, (c\, (\nu-2k))^{n-j}\, (2\, i\, b\, (m-2s)\, z - c\, (\nu-2k))^{j+1} \left(\frac{i\, (2\, i\, b\, (m-2s)\, z - c\, (\nu-2k))^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\, (2\, i\, b\, (m-2s)\, z - c\, (\nu-2k))^2}{4\, b\, (m-2s)}\right) + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} + \frac{i \pi \nu}{2}}\, (i\, b\, (m-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\, (-c\, (\nu-2k))^{n-j}\, (c\, (\nu-2k) + 2\, b\, i\, (m-2s)\, z)^{j+1} \left(\frac{i\, (c\, (\nu-2k) + 2\, b\, i\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\, (c\, (\nu-2k) + 2\, b\, i\, (m-2s)\, z)^2}{4\, b\, (m-2s)}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3051.01

$$\int z^n \cos^m\left(b\sqrt{z}\right)\sinh^\nu(c\,z)\,dz = \frac{i^{-\nu}\,2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)}{n+1} + (-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2}i\pi\nu}\,\Gamma(n+1,\,c\,(\nu-2k)\,z)\,(-c\,(\nu-2k))^{-n-1} + e^{\frac{i\pi\nu}{2}}\,(c\,(\nu-2k))^{-n-1}\,\Gamma(n+1,\,-c\,(\nu-2k)\,z)\right) +$$
$$(-1)^n\,2^{-m-\nu+1}\,b^{-2n-2}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(\Gamma\left(2\,(n+1),\,-i\,b\,(m-2k)\sqrt{z}\right)+\Gamma\left(2\,(n+1),\,i\,b\,(m-2k)\sqrt{z}\right)\right) +$$
$$2^{-m-2n-\nu-1}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}(c\,(\nu-2k))^{-2(n+1)}$$
$$\left(e^{-\frac{b^2(m-2s)^2}{4c(\nu-2k)}-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^{h+j}\right.$$
$$\left(\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2s)\left(-i\,b\,(m-2s)-\right.\right.$$
$$\left.2\,c\,(\nu-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)-2\,c\,(\nu-2k)$$
$$\left.\left.\sqrt{\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)\right)\right) +$$
$$e^{-\frac{b^2(m-2s)^2}{4c(\nu-2k)}-\frac{i\pi\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s))^{-h-j+2n}\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^{h+j}$$
$$\left(\frac{\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,b\,(m-2s)\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b\,(m-2s)-2\,c\,(\nu-2k)\sqrt{z}\right)^2}{4\,c\,(\nu-2k)}\right)-2\,c\,(\nu-2k)$$

$$\sqrt{\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\;\frac{\left(i\, b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\;-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\;-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\;-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+$$

$$2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\;-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b z^r + e\right) \sinh^v(c z)$

01.19.21.3052.01

$$\int z^n \cos^m\left(b z^2 + e\right) \sinh^\nu(c z)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{i e (m-2k)} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right)\right)\right) z^{n+1} +$$

$$\frac{i^{-\nu} 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma(n+1, c(\nu-2k) z) (-c(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2}} (c(\nu-2k))^{-n-1} \Gamma(n+1, -c(\nu-2k) z)\right) -$$

$$i^{-\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - i e (m-2s) - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (-c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-c(\nu-2k) - 2 i b (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{-\frac{i c^2 (\nu-2k)^2}{4 b (m-2s)} - i e (m-2s) + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(c(\nu-2k) - 2 i b (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(c(\nu-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} + e i (m-2s) - \frac{i \pi \nu}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c(\nu-2k))^{n-j} (2 i b (m-2s) z - c(\nu-2k))^{j+1} \left(\frac{i(2 i b (m-2s) z - c(\nu-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(2 i b (m-2s) z - c(\nu-2k))^2}{4 b (m-2s)}\right) + e^{\frac{c^2 i (\nu-2k)^2}{4 b (m-2s)} + e i (m-2s) + \frac{i \pi \nu}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-c(\nu-2k))^{n-j} (c(\nu-2k) + 2 b i (m-2s) z)^{j+1} \left(\frac{i(c(\nu-2k) + 2 b i (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(c(\nu-2k) + 2 b i (m-2s) z)^2}{4 b (m-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3053.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + e\right) \sinh^\nu(c\, z)\, dz = \frac{i^{-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)}{n+1} + (-1)^n\, 2^{-m-\nu}\, i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu}\, \Gamma(n+1,\, c\, (\nu - 2\, k)\, z)\, (-c\, (\nu - 2\, k))^{-n-1} + e^{\frac{i \pi \nu}{2}}\, (c\, (\nu - 2\, k))^{-n-1}\, \Gamma(n+1,\, -c\, (\nu - 2\, k)\, z)\right) +$$

$$(-1)^n\, 2^{-m-\nu+1}\, b^{-2\, n-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (m - 2\, k)^{-2\, (n+1)} \binom{m}{k} \left(e^{i\, e\, (m-2\, k)}\, \Gamma\left(2\, (n+1),\, -i\, b\, (m - 2\, k) \sqrt{z}\right) + e^{-i\, e\, (m-2\, k)}\, \Gamma\left(2\, (n+1),\, i\, b\, (m - 2\, k) \sqrt{z}\right)\right) +$$

$$2^{-m-2\, n-\nu-1}\, i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (c\, (\nu - 2\, k))^{-2\, (n+1)}$$

$$\Bigg(e^{-\frac{b^2 (m-2\, s)^2}{4\, c\, (\nu-2\, k)} - i\, e\, (m-2\, s) - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m - 2\, s))^{-h-j+2\, n} \left(-i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{c\, (\nu - 2\, k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i\, b\, (m - 2\, s) \left(-i\, b\, (m - 2\, s) - \right.$$

$$\left. 2\, c\, (\nu - 2\, k) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h + j + 1),\, \frac{\left(-i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, k)}\right) - 2\, c\, (\nu - 2\, k)$$

$$\sqrt{\frac{\left(-i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{c\, (\nu - 2\, k)}}\; \Gamma\left(\frac{1}{2} (h + j + 2),\, \frac{\left(-i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, k)}\right)\Bigg) +$$

$$e^{-\frac{b^2 (m-2\, s)^2}{4\, c\, (\nu-2\, k)} + e\, i\, (m-2\, s) - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m - 2\, s))^{-h-j+2\, n} \left(i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{c\, (\nu - 2\, k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(i\, b\, (m - 2\, s) \left(i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2} (h + j + 1),\, \frac{\left(i\, b\, (m - 2\, s) - 2\, c\, (\nu - 2\, k) \sqrt{z}\right)^2}{4\, c\, (\nu - 2\, k)}\right) - 2\, c\, (\nu - 2\, k)$$

$$\sqrt{\frac{\left(i\,b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(i\,b\,(m-2\,s)-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}-i\,e\,(m-2\,s)+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)-i\,b\,(m-2\,s)$$

$$\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,c\,(v-2\,k)\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,c\,(v-2\,k)}+e\,i\,(m-2\,s)+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+$$

$$2\,c\,(v-2\,k)\,\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b z^r + d z) \sinh^v(c z)$

01.19.21.3054.01

$$\int z^n \cos^m(b z^2 + d z) \sinh^v(c z)\, dz = \frac{i^{-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \Gamma(n+1, c(v-2k) z) (-c(v-2k))^{-n-1} + e^{\frac{i \pi v}{2}} (c(v-2k))^{-n-1} \Gamma(n+1, -c(v-2k) z) \right) -$$
$$i^{-v} 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1} \right.\right.$$
$$\left.\left(-\frac{i (-i d (m-2k) - 2 i b z (m-2k))^2}{b (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2k) - 2 i b z (m-2k))^2}{4 b (m-2k)} \right) \right)$$
$$(-i b (m-2k))^{-n-1} + e^{-\frac{i d^2 (m-2k)}{4b}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 b i z (m-2k))^{j+1}$$
$$\left.\left(\frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{b (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{4 b (m-2k)} \right) \right) -$$
$$i^{-v} 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{\frac{i \pi v}{2} - \frac{i (c (v-2k) - i d (m-2s))^2}{4 b (m-2s)}} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - c (v-2k))^{n-j} (-i d (m-2s) - \right.\right.$$
$$2 i b z (m-2s) + c (v-2k))^{j+1} \left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) + c (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) + c (v-2k))^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} +$$
$$e^{-\frac{i (-i d (m-2s) - c (v-2k))^2}{4 b (m-2s)} - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (d i (m-2s) + c (v-2k))^{n-j} (-i d (m-2s) - 2 i b z (m-2s) - c (v-2k))^{j+1} \right.$$
$$\left(-\frac{i (-i d (m-2s) - 2 i b z (m-2s) - c (v-2k))^2}{b (m-2s)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$
$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{i (-i d (m-2s) - 2 i b z (m-2s) - c (v-2k))^2}{4 b (m-2s)} \right) \right) (-i b (m-2s))^{-n-1} +$$

$$e^{\frac{i (d i (m-2 s)+c (v-2 k))^2}{4 b (m-2 s)}+\frac{i \pi v}{2}} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2 s)-c (v-2 k))^{n-j}$$

$$(d i (m-2 s)+2 b i z (m-2 s)+c (v-2 k))^{j+1} \left(\frac{i (d i (m-2 s)+2 b i z (m-2 s)+c (v-2 k))^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2 s)+2 b i z (m-2 s)+c (v-2 k))^2}{4 b (m-2 s)}\right)+$$

$$e^{\frac{i (i d (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}-\frac{i \pi v}{2}} (i b (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (c (v-2 k)-i d (m-2 s))^{n-j}$$

$$(d i (m-2 s)+2 b i z (m-2 s)-c (v-2 k))^{j+1} \left(\frac{i (d i (m-2 s)+2 b i z (m-2 s)-c (v-2 k))^2}{b (m-2 s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2 s)+2 b i z (m-2 s)-c (v-2 k))^2}{4 b (m-2 s)}\right)\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.3055.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+d z\right) \sinh^v(c z)\, dz =$$

$$\frac{i^{-v} 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)}{n+1}+(-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \Gamma(n+1, c (v-2 k) z) (-c (v-2 k))^{-n-1}+e^{\frac{i \pi v}{2}} (c (v-2 k))^{-n-1} \Gamma(n+1, -c (v-2 k) z)\right)+$$

$$(-1)^{n-1} 2^{-m-2 n-v-1} d^{-2 n-2} i^{-v} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (m-2 k)^{-2 (n+1)} \binom{m}{k} \left(e^{-\frac{i b^2 (m-2 k)}{4 d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 k))^{-h-j+2 n} \left(b i (m-2 k)+2 d i \sqrt{z}\, (m-2 k)\right)^{h+j}\right.$$

$$\left(\frac{i \left(b i (m-2 k)+2 d i \sqrt{z}\, (m-2 k)\right)^2}{d (m-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b i (m-2 k) \left(b i (m-2 k)+\right.\right.$$

$$\left.2 d i \sqrt{z}\, (m-2 k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(b i (m-2 k)+2 d i \sqrt{z}\, (m-2 k)\right)^2}{4 d (m-2 k)}\right)+2 d i (m-2 k)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,b^2\,(m-2k)}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2k))^{-h-j+2n}\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2k)$$

$$\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\Bigg)\Bigg)\Bigg)\Bigg)+2^{-m-2n-v-1}\,i^{-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{\frac{b^2\,(m-2s)^2}{4\,(c\,(v-2k)-i\,d\,(m-2s))}+\frac{i\,\pi\,v}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\Big(2\,(c\,(v-2k)-i\,d\,(m-2s))$$

$$\sqrt{z}-i\,b\,(m-2s)\Big)^{h+j}\left(-\frac{\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{c\,(v-2k)-i\,d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(2\,(c\,(v-2k)-i\,d\,(m-2s))\sqrt{-\frac{\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{c\,(v-2k)-i\,d\,(m-2s)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\,(c\,(v-2k)-i\,d\,(m-2s))}\right)-$$

$$i\,b\,(m-2s)\left(2\,(c\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\,(c\,(v-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(v-2\,k)-i\,d\,(m-2\,s))}\right)\Bigg)\Bigg)$$

$$(c\,(v-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)} + e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}+\frac{i\,\pi\,v}{2}}\,(d\,i\,(m-2\,s)+c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)+$$

$$2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}}\Bigg)+$$

$$e^{\frac{b^2\,(m-2\,s)^2}{4\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))}-\frac{i\,\pi\,v}{2}}\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{-i\,d\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))$$

$$\sqrt{\left(-\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2\Big/(-i\,d\,(m-2\,s)-c\,(v-2\,k))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i\,d(m-2s)-c(v-2k))\sqrt{z}-i\,b(m-2s)\right)^2}{4(-i\,d(m-2s)-c(v-2k))}\right)-$$

$$i\,b(m-2s)\left(2(-i\,d(m-2s)-c(v-2k))\sqrt{z}-i\,b(m-2s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i\,d(m-2s)-c(v-2k))\sqrt{z}-i\,b(m-2s)\right)^2}{4(-i\,d(m-2s)-c(v-2k))}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4(i\,d(m-2s)-c(v-2k))}-\frac{i\pi v}{2}}(i\,d(m-2s)-c(v-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b(m-2s))^{-h-j+2n}$$

$$\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)^2}{i\,d(m-2s)-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(b\,i(m-2s)\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)^2}{4(i\,d(m-2s)-c(v-2k))}\right)+$$

$$2(i\,d(m-2s)-c(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)^2}{4(i\,d(m-2s)-c(v-2k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-c(v-2k))\sqrt{z}\right)^2}{i\,d(m-2s)-c(v-2k)}}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+d\,z+e\right)\sinh^v(c\,z)$

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$$\int z^n\cos^m\left(b\,z^2+d\,z+e\right)\sinh^v(c\,z)\,dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{1}{2}i\pi v}\,\Gamma(n+1,\,c(v-2k)z)(-c(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}}(c(v-2k))^{-n-1}\,\Gamma(n+1,\,-c(v-2k)z)\right)-$$

$$i^{-\nu}\,2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Bigg(e^{\frac{i\,d^2\,(m-2\,k)}{4\,b}-i\,e\,(m-2\,k)}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\right)(-i\,b\,(m-2\,k))^{-n-1}+$$

$$e^{i\,e\,(m-2\,k)-\frac{i\,d^2\,(m-2\,k)}{4\,b}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\Bigg)-$$

$$i^{-\nu}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{-\frac{i\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))^2}{4\,b\,(m-2\,s)}-i\,e\,(m-2\,s)+\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,s)-c\,(\nu-2\,k))^{n-j}\,(-i\,d\,(m-2\,s)-\right.$$

$$2\,i\,b\,z\,(m-2\,s)+c\,(\nu-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+c\,(\nu-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+c\,(\nu-2\,k))^2}{4\,b\,(m-2\,s)}\right)\right)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{-\frac{i\,(-i\,d\,(m-2\,s)-c\,(\nu-2\,k))^2}{4\,b\,(m-2\,s)}-i\,e\,(m-2\,s)-\frac{i\,\pi\,\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,s)+c\,(\nu-2\,k))^{n-j}\,(-i\,d\,(m-2\,s)-\right.$$

$$2\,i\,b\,z\,(m-2\,s)-c\,(\nu-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-c\,(\nu-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-c\,(\nu-2\,k))^2}{4\,b\,(m-2\,s)}\right)\right)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{\frac{i\,(d\,i\,(m-2\,s)+c\,(\nu-2\,k))^2}{4\,b\,(m-2\,s)}+e\,i\,(m-2\,s)+\frac{i\,\pi\,\nu}{2}}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,s)-c\,(\nu-2\,k))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(\nu-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(\nu-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)+$$

$$e^{\frac{i\,(i\,d\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}+e\,i\,(m-2\,s)-\frac{i\,\pi\,v}{2}}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(c\,(v-2\,k)-i\,d\,(m-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\right)\right)/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+e+d\,z\right)\sinh^v(c\,z)\,dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{1}{2}i\,\pi\,v}\,\Gamma(n+1,\,c\,(v-2\,k)\,z)\,(-c\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}}\,(c\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-c\,(v-2\,k)\,z)\right)+$$

$$(-1)^{n-1}\,2^{-m-2\,n-v-1}\,d^{-2\,n-2}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2\,k)^{-2\,(n+1)}\binom{m}{k}\left(e^{i\,e\,(m-2\,k)-\frac{i\,b^2\,(m-2\,k)}{4\,d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^{h+j}\right.$$

$$\left(\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+\right.\right.$$

$$\left.2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)+2\,d\,i\,(m-2\,k)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+$$

$$e^{\frac{i\,b^2\,(m-2\,k)}{4\,d}-i\,e\,(m-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2\,k)$$

$$\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\left.\left.\left.-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)+2^{-m-2\,n-\nu-1}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{\frac{b^2\,(m-2\,s)^2}{4\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))}-i\,e\,(m-2\,s)+\frac{i\,\pi\,\nu}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\,\Big(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))$$

$$\left.\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(\nu-2\,k)-i\,d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\sqrt{-\frac{\left(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{c\,(\nu-2\,k)-i\,d\,(m-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))\,\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,(c\,(\nu-2\,k)-i\,d\,(m-2\,s))}\right)\right)\right)\right)$$

$$(c\,(\nu-2\,k)-i\,d\,(m-2\,s))^{-2\,(n+1)}+e^{\frac{b^2\,(m-2\,s)^2}{4\,(d\,i\,(m-2\,s)+c\,(\nu-2\,k))}+e\,i\,(m-2\,s)+\frac{i\,\pi\,\nu}{2}}\,(d\,i\,(m-2\,s)+c\,(\nu-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(\nu-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)+$$

$$2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,s)+c\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(d\,i\,(m-2\,s)+c\,(v-2\,k))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,s)+c\,(v-2\,k)}}\Bigg)+$$

$$e^{\frac{b^2(m-2\,s)^2}{4\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))}-i\,e\,(m-2\,s)-\frac{i\,\pi\,v}{2}}\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{-i\,d\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))$$

$$\sqrt{\left(-\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2\Big/(-i\,d\,(m-2\,s)-c\,(v-2\,k))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))\,\sqrt{z}\,-i\,b\,(m-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,s)-c\,(v-2\,k))}\right)\Bigg)+$$

$$e^{\frac{b^2(m-2\,s)^2}{4\,(i\,d\,(m-2\,s)-c\,(v-2\,k))}+e\,i\,(m-2\,s)-\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,s)-c\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(i\, b\, (m-2\, s))^{-h-j+2\, n} \left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)^2}{i\, d\, (m-2\, s)-c\, (v-2\, k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left(b\, i\, (m-2\, s) \left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)^2}{4\, (i\, d\, (m-2\, s)-c\, (v-2\, k))}\right)+$$

$$2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \Gamma\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)^2}{4\, (i\, d\, (m-2\, s)-c\, (v-2\, k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\, i\, (m-2\, s)+2\, (i\, d\, (m-2\, s)-c\, (v-2\, k))\, \sqrt{z}\right)^2}{i\, d\, (m-2\, s)-c\, (v-2\, k)}}\right)\right) /;\, n\in \mathbb{N} \land m\in \mathbb{N}^+ \land v\in \mathbb{N}^+$$

Involving $z^n \cos^m\left(b\, z^r\right) \sinh^v(f\, z+g)$

01.19.21.3058.01

$$\int z^n \cos^m(b z^2) \sinh^\nu(g + f z)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, -i\, b\, (m-2k)\, z^2\right) \left(-i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} + \left(i\, b\, (m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i\, b\, (m-2k)\, z^2\right)\right)\right)$$
$$z^{n+1} + \frac{i^{-\nu} \left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)\right)}{n+1} + (-1)^n\, 2^{-m-\nu}\, i^{-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$
$$\left(e^{-\frac{1}{2} i \pi \nu - g(\nu-2k)}\, \Gamma(n+1, f(\nu-2k)\, z)\, (-f(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2} + g(\nu-2k)}\, (f(\nu-2k))^{-n-1}\, \Gamma(n+1, -f(\nu-2k)\, z)\right) -$$
$$i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (f(\nu-2k))^{n-j}\, (-f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^{j+1}\right.\right.$$
$$\left.\left(-\frac{i\, (-f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i\, (-f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^2}{4 b\, (m-2s)}\right)\right)$$
$$(-i\, b\, (m-2s))^{-n-1} + e^{-\frac{i f^2 (\nu-2k)^2}{4 b (m-2s)} + g(\nu-2k) + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (-f(\nu-2k))^{n-j}\, (f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^{j+1}\right.$$
$$\left.\left(-\frac{i\, (f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i\, (f(\nu-2k) - 2 i\, b\, (m-2s)\, z)^2}{4 b\, (m-2s)}\right)\right)$$
$$(-i\, b\, (m-2s))^{-n-1} + e^{\frac{f^2 i (\nu-2k)^2}{4 b (m-2s)} - g(\nu-2k) - \frac{i \pi \nu}{2}}\, (i\, b\, (m-2s))^{-n-1}$$
$$\sum_{j=0}^{n} 2^{j-n}\, (f(\nu-2k))^{n-j}\, (2 i\, b\, (m-2s)\, z - f(\nu-2k))^{j+1} \left(\frac{i\, (2 i\, b\, (m-2s)\, z - f(\nu-2k))^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\, (2 i\, b\, (m-2s)\, z - f(\nu-2k))^2}{4 b\, (m-2s)}\right) + e^{\frac{f^2 i (\nu-2k)^2}{4 b (m-2s)} + g(\nu-2k) + \frac{i \pi \nu}{2}}\, (i\, b\, (m-2s))^{-n-1}$$
$$\sum_{j=0}^{n} 2^{j-n}\, (-f(\nu-2k))^{n-j}\, (f(\nu-2k) + 2 b\, i\, (m-2s)\, z)^{j+1} \left(\frac{i\, (f(\nu-2k) + 2 b\, i\, (m-2s)\, z)^2}{b\, (m-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\, (f(\nu-2k) + 2 b\, i\, (m-2s)\, z)^2}{4 b\, (m-2s)}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int z^n \cos^m\left(b\sqrt{z}\right)\sinh^v(g+f\,z)\,dz = \frac{i^{-v}\left(2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-v} i^{-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$
$$\left(e^{-\frac{1}{2} i\pi v - g(v-2k)}\,\Gamma(n+1, f(v-2k)z)(-f(v-2k))^{-n-1} + e^{\frac{i\pi v}{2}+g(v-2k)}(f(v-2k))^{-n-1}\,\Gamma(n+1,-f(v-2k)z)\right) +$$
$$(-1)^n 2^{-m-v+1} b^{-2n-2} i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}$$
$$\left(\Gamma\left(2(n+1), -i\,b(m-2k)\sqrt{z}\right) + \Gamma\left(2(n+1), i\,b(m-2k)\sqrt{z}\right)\right) + 2^{-m-2n-v-1} i^{-v}$$
$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{b^2(m-2s)^2}{4f(v-2k)}-g(v-2k)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j(-i\,b(m-2s))^{-h-j+2n}\left(-i\,b(m-2s)-2f\right.\right.\right.$$
$$\left.(v-2k)\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b(m-2s)\right.$$
$$\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right) -$$
$$2f(v-2k)\sqrt{\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$
$$\left.\left.\left.\frac{\left(-i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{4f(v-2k)}\right)\right)\right)(-f(v-2k))^{-2(n+1)} +$$
$$e^{-\frac{b^2(m-2s)^2}{4f(v-2k)}-g(v-2k)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j(i\,b(m-2s))^{-h-j+2n}\left(i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^{h+j}\right.$$
$$\left(\frac{\left(i\,b(m-2s)-2f(v-2k)\sqrt{z}\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(i\,b(m-2s)\left(i\,b(m-2s)-\right.\right.$$

$$2\, f\, (v-2\, k)\, \sqrt{z}\Big)\, \Gamma\!\left(\frac{1}{2}\, (h+j+1),\, \frac{\left(i\, b\, (m-2\, s)-2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)-2\, f\, (v-2\, k)$$

$$\sqrt{\frac{\left(i\, b\, (m-2\, s)-2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{f\, (v-2\, k)}}\;\Gamma\!\left(\frac{1}{2}\, (h+j+2),\, \frac{\left(i\, b\, (m-2\, s)-2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)\Bigg)\Bigg)$$

$$(-f\, (v-2\, k))^{-2\, (n+1)}+e^{\frac{b^2\, (m-2\, s)^2}{4\, f\, (v-2\, k)}+\frac{i\, \pi\, v}{2}+g\, (v-2\, k)}\, (f\, (v-2\, k))^{-2\, (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2\, s))^{-h-j+2\, n}$$

$$\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)^{h+j} \left(-\frac{\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)^2}{f\, (v-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg(2\, f\, (v-2\, k)\, \sqrt{-\frac{\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)^2}{f\, (v-2\, k)}}$$

$$\Gamma\!\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)^2}{4\, f\, (v-2\, k)}\right)-i\, b\, (m-2\, s)$$

$$\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)\, \Gamma\!\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(2\, f\, (v-2\, k)\, \sqrt{z}-i\, b\, (m-2\, s)\right)^2}{4\, f\, (v-2\, k)}\right)\Bigg)+$$

$$e^{\frac{b^2\, (m-2\, s)^2}{4\, f\, (v-2\, k)}+\frac{i\, \pi\, v}{2}+g\, (v-2\, k)}\, (f\, (v-2\, k))^{-2\, (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2\, s))^{-h-j+2\, n}$$

$$\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)^{h+j} \left(-\frac{\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{f\, (v-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg(b\, i\, (m-2\, s)\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)+$$

$$2\, f\, (v-2\, k)\, \Gamma\!\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{4\, f\, (v-2\, k)}\right)$$

$$\sqrt{-\frac{\left(b\, i\, (m-2\, s)+2\, f\, (v-2\, k)\, \sqrt{z}\right)^2}{f\, (v-2\, k)}}\Bigg)\Bigg) /;\, n\in \mathbb{N} \land m\in \mathbb{N}^+ \land v\in \mathbb{N}^+$$

Involving $z^n \cos^m(b z^r + e) \sinh^v(f z + g)$

01.19.21.3060.01

$$\int z^n \cos^m(b z^2 + e) \sinh^v(g + f z)\, dz = -i^{-v} 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{i e (m-2k)} \Gamma\left(\frac{n+1}{2}, -i b (m-2k) z^2\right) \left(-i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-i e (m-2k)} \left(i b (m-2k) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, i b (m-2k) z^2\right) \right) \right) z^{n+1} + \frac{i^{-v} \left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2) \right)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v - g(v-2k)} \Gamma(n+1, f(v-2k) z) (-f(v-2k))^{-n-1} + e^{\frac{i \pi v}{2} + g(v-2k)} (f(v-2k))^{-n-1} \Gamma(n+1, -f(v-2k) z) \right) - i^{-v} 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{i f^2 (v-2k)^2}{4 b (m-2s)} - g(v-2k) - i e (m-2s) - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (f(v-2k))^{n-j} (-f(v-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(-f(v-2k) - 2 i b (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-f(v-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} + e^{-\frac{i f^2 (v-2k)^2}{4 b (m-2s)} + g(v-2k) - i e (m-2s) + \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} 2^{j-n} (-f(v-2k))^{n-j} (f(v-2k) - 2 i b (m-2s) z)^{j+1} \left(-\frac{i(f(v-2k) - 2 i b (m-2s) z)^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(f(v-2k) - 2 i b (m-2s) z)^2}{4 b (m-2s)}\right) \right) (-i b (m-2s))^{-n-1} + e^{\frac{f^2 i (v-2k)^2}{4 b (m-2s)} - g(v-2k) + e i (m-2s) - \frac{i \pi v}{2}} (i b (m-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(v-2k))^{n-j} (2 i b (m-2s) z - f(v-2k))^{j+1} \left(\frac{i(2 i b (m-2s) z - f(v-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i\,(2\,i\,b\,(m-2\,s)\,z-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)+e^{\frac{f^2\,i\,(v-2\,k)^2}{4\,b\,(m-2\,s)}+g\,(v-2\,k)+e\,i\,(m-2\,s)+\frac{i\,\pi\,v}{2}}\,(i\,b\,(m-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^{j+1}\left(\frac{i\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(f\,(v-2\,k)+2\,b\,i\,(m-2\,s)\,z)^2}{4\,b\,(m-2\,s)}\right)\right)\right)\text{/; } n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.3061.01

$$\int z^n\cos^m\left(\sqrt{z}\,b+e\right)\sinh^v(g+f\,z)\,dz ==$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\,\pi\,v-g\,(v-2\,k)}\,\Gamma(n+1,\,f\,(v-2\,k)\,z)\,(-f\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-f\,(v-2\,k)\,z)\right)+$$

$$(-1)^n\,2^{-m-v+1}\,b^{-2\,n-2}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2\,k)^{-2\,(n+1)}\binom{m}{k}$$

$$\left(e^{i\,e\,(m-2\,k)}\,\Gamma\left(2\,(n+1),\,-i\,b\,(m-2\,k)\,\sqrt{z}\right)+e^{-i\,e\,(m-2\,k)}\,\Gamma\left(2\,(n+1),\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{b^2\,(m-2\,s)^2}{4\,f\,(v-2\,k)}-i\,e\,(m-2\,s)-g\,(v-2\,k)-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\right.\right.$$

$$\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(-i\,b\,(m-2\,s)\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)\sqrt{\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}$$

$$\left.\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-i\,b\,(m-2\,s)-2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)\right)(-f\,(v-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}+e i (m-2 s)-g (v-2 k)-\frac{i \pi v}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n} \left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^{h+j} \right.$$

$$\left(\frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(i b (m-2 s) \left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2} (h+j+1), \frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right) - \right.$$

$$2 f (v-2 k) \sqrt{\frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{f (v-2 k)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2} (h+j+2), \frac{\left(i b (m-2 s)-2 f (v-2 k) \sqrt{z}\right)^2}{4 f (v-2 k)}\right)\right)\right) (-f (v-2 k))^{-2 (n+1)} +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}-i e (m-2 s)+\frac{i \pi v}{2}+g (v-2 k)} (f (v-2 k))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b (m-2 s))^{-h-j+2 n}$$

$$\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^{h+j} \left(-\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{f (v-2 k)}\right)^{\frac{1}{2} (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(2 f (v-2 k) \sqrt{-\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{f (v-2 k)}}\right.$$

$$\Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{4 f (v-2 k)}\right) - i b (m-2 s)$$

$$\left.\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right) \Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(2 f (v-2 k) \sqrt{z} - i b (m-2 s)\right)^2}{4 f (v-2 k)}\right)\right) +$$

$$e^{\frac{b^2 (m-2 s)^2}{4 f (v-2 k)}+e i (m-2 s)+\frac{i \pi v}{2}+g (v-2 k)} (f (v-2 k))^{-2 (n+1)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2 s))^{-h-j+2 n}$$

$$\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)+\right.$$

$$2\,f\,(v-2\,k)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,k)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,f\,(v-2\,k)\,\sqrt{z}\right)^2}{f\,(v-2\,k)}}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+d\,z\right)\sinh^v(f\,z+g)$

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$$\int z^n\cos^m\left(b\,z^2+d\,z\right)\sinh^v(g+f\,z)\,dz=$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\pi v-g(v-2k)}\,\Gamma(n+1,\,f\,(v-2\,k)\,z)\,(-f\,(v-2\,k))^{-n-1}+e^{\frac{i\pi v}{2}+g(v-2k)}\,(f\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-f\,(v-2\,k)\,z)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\,d^2\,(m-2k)}{4b}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^{j+1}\right.\right.$$

$$\left.\left(-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{i\,(-i\,d\,(m-2\,k)-2\,i\,b\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\right)$$

$$(-i\,b\,(m-2\,k))^{-n-1}+e^{-\frac{i\,d^2\,(m-2k)}{4b}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{i\,(f\,(v-2k)-i\,d\,(m-2s))^2}{4\,b\,(m-2s)}+\frac{i\pi v}{2}+g\,(v-2k)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,s)-f\,(v-2\,k))^{n-j}\,(-i\,d\,(m-2\,s)-\right.\right.$$

$$2\,i\,b\,z\,(m-2\,s)+f\,(v-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+f\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)+f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{-\frac{i\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\left(\sum_{j=0}^{n}2^{j-n}\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^{n-j}\,(-i\,d\,(m-2\,s)-\right.$$

$$2\,i\,b\,z\,(m-2\,s)-f\,(v-2\,k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-f\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{i\,(-i\,d\,(m-2\,s)-2\,i\,b\,z\,(m-2\,s)-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)(-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{\frac{i\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+f\,(v-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+f\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)+f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)+$$

$$e^{\frac{i\,(i\,d\,(m-2\,s)-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\,(i\,b\,(m-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k)-i\,d\,(m-2\,s))^{n-j}$$

$$(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-f\,(v-2\,k))^{j+1}\left(\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-f\,(v-2\,k))^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{i\,(d\,i\,(m-2\,s)+2\,b\,i\,z\,(m-2\,s)-f\,(v-2\,k))^2}{4\,b\,(m-2\,s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\;b+d\,z\right)\sinh^v(g+f\,z)\,dz=$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\,\pi\,v-g\,(v-2\,k)}\,\Gamma(n+1,\,f\,(v-2\,k)\,z)\,(-f\,(v-2\,k))^{-n-1}+e^{\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(f\,(v-2\,k))^{-n-1}\,\Gamma(n+1,\,-f\,(v-2\,k)\,z)\right)+$$

$$(-1)^{n-1}\, 2^{-m-2n-\nu-1}\, d^{-2n-2}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (m-2k)^{-2(n+1)} \binom{m}{k}$$

$$\Biggl(e^{-\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(m-2k))^{-h-j+2n} \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(\frac{i \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Biggl(b\, i\,(m-2k) \left(b\, i\,(m-2k) +\right.$$

$$\left. 2\, d\, i \sqrt{z}\, (m-2k)\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)} \right) + 2\, d\, i\,(m-2k)$$

$$\sqrt{\frac{i \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)} \right) \Biggr) +$$

$$e^{\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2k))^{-h-j+2n} \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(-\frac{i \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Biggl(-i\, b\,(m-2k)$$

$$\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{i \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)} \right) -$$

$$2\, i\, d\,(m-2k) \sqrt{-\frac{i \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left. -\frac{i \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)} \right) \Biggr) \Biggr) + 2^{-m-2n-\nu-1}\, i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Biggl(e^{\frac{b^2 (m-2s)^2}{4 (f(\nu-2k) - i\, d\,(m-2s))} + \frac{i \pi \nu}{2} + g(\nu-2k)} \Biggl(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2s))^{-h-j+2n} \left(2\,(f\,(\nu-2k) - i\, d\,(m-2s)) \sqrt{z}\, -\right.$$

$$i\, b\, (m-2\, s)\Big)^{h+j} \left(-\frac{\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{z}\, -i\, b\, (m-2\, s)\right)^2}{f\, (v-2\, k)-i\, d\, (m-2\, s)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{-\frac{\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{z}\, -i\, b\, (m-2\, s)\right)^2}{f\, (v-2\, k)-i\, d\, (m-2\, s)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{z}\, -i\, b\, (m-2\, s)\right)^2}{4\, (f\, (v-2\, k)-i\, d\, (m-2\, s))}\right)-$$

$$i\, b\, (m-2\, s)\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{z}\, -i\, b\, (m-2\, s)\right)$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(2\, (f\, (v-2\, k)-i\, d\, (m-2\, s))\, \sqrt{z}\, -i\, b\, (m-2\, s)\right)^2}{4\, (f\, (v-2\, k)-i\, d\, (m-2\, s))}\right)\right)\right)\right)$$

$$(f\, (v-2\, k)-i\, d\, (m-2\, s))^{-2\, (n+1)}+e^{\frac{b^2\, (m-2\, s)^2}{4\, (d\, i\, (m-2\, s)+f\, (v-2\, k))}+\frac{i\, \pi\, v}{2}+g\, (v-2\, k)}\, (d\, i\, (m-2\, s)+f\, (v-2\, k))^{-2\, (n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\, (i\, b\, (m-2\, s))^{-h-j+2\, n}\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)^2}{d\, i\, (m-2\, s)+f\, (v-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j}\left(b\, i\, (m-2\, s)\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)^2}{4\, (d\, i\, (m-2\, s)+f\, (v-2\, k))}\right)+$$

$$2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \Gamma\!\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)^2}{4\, (d\, i\, (m-2\, s)+f\, (v-2\, k))}\right)$$

$$\left.\sqrt{-\frac{\left(b\, i\, (m-2\, s)+2\, (d\, i\, (m-2\, s)+f\, (v-2\, k))\, \sqrt{z}\right)^2}{d\, i\, (m-2\, s)+f\, (v-2\, k)}}\right)+$$

$$e^{\frac{b^2\, (m-2\, s)^2}{4\, (-i\, d\, (m-2\, s)-f\, (v-2\, k))}-\frac{i\, \pi\, v}{2}-g\, (v-2\, k)}\, (-i\, d\, (m-2\, s)-f\, (v-2\, k))^{-2\, (n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{2}}{-i\,d\,(m-2\,s)-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))$$

$$\sqrt{\left(-\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{2}\Big/(-i\,d\,(m-2\,s)-f\,(v-2\,k))\right)}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{2}}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)-$$

$$i\,b\,(m-2\,s)\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\,-i\,b\,(m-2\,s)\right)^{2}}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)\Bigg)+$$

$$e^{\frac{b^{2}(m-2\,s)^{2}}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\,(i\,d\,(m-2\,s)-f\,(v-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}$$

$$(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{2}}{i\,d\,(m-2\,s)-f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i\,(m-2\,s)\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{2}}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)+$$

$$2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{2}}{4\,(i\,d\,(m-2\,s)-f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,s)+2\,(i\,d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^{2}}{i\,d\,(m-2\,s)-f\,(v-2\,k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^{+}\bigwedge v\in\mathbb{N}^{+}$$

Involving $z^n \cos^m(b z^r + d z + e) \sinh^v(f z + g)$

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$$\int z^n \cos^m\left(b z^2 + d z + e\right) \sinh^v(g + f z)\, dz = \frac{i^{-v}\left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k}$$
$$\left(e^{-\frac{1}{2} i \pi v - g(v-2k)} \Gamma(n+1, f(v-2k) z) (-f(v-2k))^{-n-1} + e^{\frac{i \pi v}{2} + g(v-2k)} (f(v-2k))^{-n-1} \Gamma(n+1, -f(v-2k) z)\right) -$$
$$i^{-v} 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)}{4b} - i e (m-2k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1}\right.\right.$$
$$\left.\left(-\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{4 b (m-2k)}\right)\right)$$
$$(-i b (m-2k))^{-n-1} + e^{i e (m-2k) - \frac{i d^2 (m-2k)}{4b}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j}$$
$$(d i (m-2k) + 2 b i z (m-2k))^{j+1} \left(\frac{i(d i (m-2k) + 2 b i z (m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(d i (m-2k) + 2 b i z (m-2k))^2}{4 b (m-2k)}\right)\right) - i^{-v} 2^{-m-v-1}$$
$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{i(f(v-2k) - i d (m-2s))^2}{4 b (m-2s)} - i e (m-2s) + \frac{i \pi v}{2} + g(v-2k)} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2s) - f(v-2k))^{n-j} (-i d (m-2s) -\right.\right.$$
$$2 i b z (m-2s) + f(v-2k))^{j+1} \left(-\frac{i(-i d (m-2s) - 2 i b z (m-2s) + f(v-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d (m-2s) - 2 i b z (m-2s) + f(v-2k))^2}{4 b (m-2s)}\right)\right) (-i b (m-2s))^{-n-1} +$$
$$e^{-\frac{i(-i d (m-2s) - f(v-2k))^2}{4 b (m-2s)} - i e (m-2s) - \frac{i \pi v}{2} - g(v-2k)} \left(\sum_{j=0}^{n} 2^{j-n} (d i (m-2s) + f(v-2k))^{n-j} (-i d (m-2s) -\right.$$
$$2 i b z (m-2s) - f(v-2k))^{j+1} \left(-\frac{i(-i d (m-2s) - 2 i b z (m-2s) - f(v-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(-i d(m-2s)-2 i b z(m-2s)-f(v-2k))^2}{4b(m-2s)}\right)\Bigg)(-i b(m-2s))^{-n-1}+$$

$$e^{\frac{i(d i(m-2s)+f(v-2k))^2}{4b(m-2s)}+e i(m-2s)+\frac{i\pi v}{2}+g(v-2k)}(i b(m-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i d(m-2s)-f(v-2k))^{n-j}$$

$$(d i(m-2s)+2 b i z(m-2s)+f(v-2k))^{j+1}\left(\frac{i(d i(m-2s)+2 b i z(m-2s)+f(v-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(d i(m-2s)+2 b i z(m-2s)+f(v-2k))^2}{4b(m-2s)}\right)+$$

$$e^{\frac{i(i d(m-2s)-f(v-2k))^2}{4b(m-2s)}+e i(m-2s)-\frac{i\pi v}{2}-g(v-2k)}(i b(m-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2k)-i d(m-2s))^{n-j}$$

$$(d i(m-2s)+2 b i z(m-2s)-f(v-2k))^{j+1}\left(\frac{i(d i(m-2s)+2 b i z(m-2s)-f(v-2k))^2}{b(m-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i(d i(m-2s)+2 b i z(m-2s)-f(v-2k))^2}{4b(m-2s)}\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+d z+e\right)\sinh^v(f z+g)\,dz =$$

$$\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+(-1)^n 2^{-m-v} i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{-\frac{1}{2}i\pi v-g(v-2k)}\Gamma(n+1, f(v-2k)z)(-f(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}+g(v-2k)}(f(v-2k))^{-n-1}\Gamma(n+1,-f(v-2k)z)\right)+$$

$$(-1)^{n-1}2^{-m-2n-v-1}d^{-2n-2}i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}$$

$$\Bigg(e^{i e(m-2k)-\frac{i b^2(m-2k)}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i b(m-2k))^{-h-j+2n}\left(b i(m-2k)+2 d i\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b i(m-2k)+2 d i\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b i(m-2k)\left(b i(m-2k)+\right.$$

$$\left.2 d i\sqrt{z}\,(m-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b i(m-2k)+2 d i\sqrt{z}\,(m-2k)\right)^2}{4d(m-2k)}\right)+2 d i(m-2k)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,b^2\,(m-2k)}{4d}-i\,e\,(m-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2k))^{-h-j+2n}\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2k)$$

$$\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)-$$

$$2\,i\,d\,(m-2k)\sqrt{-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2k)-2\,i\,d\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{\frac{b^2\,(m-2s)^2}{4\,(f\,(v-2k)-i\,d\,(m-2s))}-i\,e\,(m-2s)+\frac{i\,\pi\,v}{2}+g\,(v-2k)}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}\left(2\,(f\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(f\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{f\,(v-2k)-i\,d\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(2\,(f\,(v-2k)-i\,d\,(m-2s))\sqrt{-\frac{\left(2\,(f\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{f\,(v-2k)-i\,d\,(m-2s)}}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\,(f\,(v-2k)-i\,d\,(m-2s))\,\sqrt{z}-i\,b\,(m-2s)\right)^2}{4\,(f\,(v-2k)-i\,d\,(m-2s))}\right)-$$

$$i\, b\, (m-2\, s) \left(2\, (f\, (v-2\, k) - i\, d\, (m-2\, s)) \sqrt{z} - i\, b\, (m-2\, s)\right)$$

$$\Gamma\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(2\, (f\, (v-2\, k) - i\, d\, (m-2\, s)) \sqrt{z} - i\, b\, (m-2\, s)\right)^2}{4\, (f\, (v-2\, k) - i\, d\, (m-2\, s))}\right)\Bigg)\Bigg)\Bigg)$$

$$(f\, (v-2\, k) - i\, d\, (m-2\, s))^{-2\, (n+1)} + e^{\frac{b^2\, (m-2\, s)^2}{4\, (d\, i\, (m-2\, s) + f\, (v-2\, k))} + e\, i\, (m-2\, s) + \frac{i\, \pi\, v}{2} + g\, (v-2\, k)}\, (d\, i\, (m-2\, s) + f\, (v-2\, k))^{-2\, (n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2\, s))^{-h-j+2\, n} \left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)^2}{d\, i\, (m-2\, s) + f\, (v-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \Bigg(b\, i\, (m-2\, s) \left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\, (h+j+1),\, -\frac{\left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)^2}{4\, (d\, i\, (m-2\, s) + f\, (v-2\, k))}\right) +$$

$$2\, (d\, i\, (m-2\, s) + f\, (v-2\, k))\, \Gamma\left(\frac{1}{2}\, (h+j+2),\, -\frac{\left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)^2}{4\, (d\, i\, (m-2\, s) + f\, (v-2\, k))}\right)$$

$$\sqrt{-\frac{\left(b\, i\, (m-2\, s) + 2\, (d\, i\, (m-2\, s) + f\, (v-2\, k)) \sqrt{z}\right)^2}{d\, i\, (m-2\, s) + f\, (v-2\, k)}}\Bigg) +$$

$$e^{\frac{b^2\, (m-2\, s)^2}{4\, (-i\, d\, (m-2\, s) - f\, (v-2\, k))} - i\, e\, (m-2\, s) - \frac{i\, \pi\, v}{2} - g\, (v-2\, k)}\, (-i\, d\, (m-2\, s) - f\, (v-2\, k))^{-2\, (n+1)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2\, s))^{-h-j+2\, n} \left(2\, (-i\, d\, (m-2\, s) - f\, (v-2\, k)) \sqrt{z} - i\, b\, (m-2\, s)\right)^{h+j}$$

$$\left(-\frac{\left(2\, (-i\, d\, (m-2\, s) - f\, (v-2\, k)) \sqrt{z} - i\, b\, (m-2\, s)\right)^2}{-i\, d\, (m-2\, s) - f\, (v-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \Bigg(2\, (-i\, d\, (m-2\, s) - f\, (v-2\, k))$$

$$\sqrt{\left(-\left(2\, (-i\, d\, (m-2\, s) - f\, (v-2\, k)) \sqrt{z} - i\, b\, (m-2\, s)\right)^2 \Big/ (-i\, d\, (m-2\, s) - f\, (v-2\, k))\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i\,d(m-2s)-f(v-2k))\sqrt{z}-i\,b(m-2s)\right)^2}{4(-i\,d(m-2s)-f(v-2k))}\right)-$$

$$i\,b(m-2s)\left(2(-i\,d(m-2s)-f(v-2k))\sqrt{z}-i\,b(m-2s)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i\,d(m-2s)-f(v-2k))\sqrt{z}-i\,b(m-2s)\right)^2}{4(-i\,d(m-2s)-f(v-2k))}\right)\Bigg)\Bigg)+$$

$$e^{\frac{b^2(m-2s)^2}{4(i\,d(m-2s)-f(v-2k))}+e\,i(m-2s)-\frac{i\pi v}{2}-g(v-2k)}(i\,d(m-2s)-f(v-2k))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b(m-2s))^{-h-j+2n}\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)^2}{i\,d(m-2s)-f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(b\,i(m-2s)\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)^2}{4(i\,d(m-2s)-f(v-2k))}\right)+$$

$$2(i\,d(m-2s)-f(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)^2}{4(i\,d(m-2s)-f(v-2k))}\right)$$

$$\sqrt{-\frac{\left(b\,i(m-2s)+2(i\,d(m-2s)-f(v-2k))\sqrt{z}\right)^2}{i\,d(m-2s)-f(v-2k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z)\sinh^v(c\,z^r)$

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$$\int z^n \cos^m(b\,z)\sinh^\nu\!\left(c\,z^2\right) dz = -i^{-\nu}\,2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\right.$$

$$\left.\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\!\left(\frac{n+1}{2},-c\,(\nu-2\,k)\,z^2\right)\left(-c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-\frac{1}{2}i\pi\nu}\left(c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},c\,(\nu-2\,k)\,z^2\right)\right)\right)$$

$$z^{n+1}+\frac{i^{-\nu}\left(2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)\,(1-\nu \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\,i\,b\,(m-2\,k)\,z)\,(-i\,b\,(m-2\,k))^{-n-1}+(i\,b\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,b\,(m-2\,k)\,z)\right)-$$

$$i^{-\nu}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{b^2(m-2k)^2}{4c(\nu-2s)}-\frac{i\pi\nu}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,b\,(m-2\,k))^{n-j}\,(-i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(-i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{-\frac{b^2(m-2k)^2}{4c(\nu-2s)}-\frac{i\pi\nu}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,b\,(m-2\,k))^{n-j}\,(i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\frac{(i\,b\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{\frac{b^2(m-2k)^2}{4c(\nu-2s)}+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\,b\,(m-2\,k))^{n-j}\,(2\,c\,(\nu-2\,s)\,z-i\,b\,(m-2\,k))^{j+1}\left(-\frac{(2\,c\,(\nu-2\,s)\,z-i\,b\,(m-2\,k))^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2\,c\,(\nu-2\,s)\,z-i\,b\,(m-2\,k))^2}{4\,c\,(\nu-2\,s)}\right)+e^{\frac{b^2(m-2k)^2}{4c(\nu-2s)}+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,b\,(m-2\,k))^{n-j}\,(b\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(b\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(b\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

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$$\int z^n \cos^m(b\,z)\sinh^\nu\!\left(c\sqrt{z}\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\, i\,b\,(m-2k)\,z)\,(-i\,b\,(m-2k))^{-n-1} + (i\,b\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,b\,(m-2k)\,z)\right) +$$

$$2^{-m-\nu+1} i^{-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(\nu-2k))^{-2(n+1)}\binom{\nu}{k}$$

$$\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\!\left(2(n+1),\,-c\,(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2}i\pi\nu}\,\Gamma\!\left(2(n+1),\,c\,(\nu-2k)\sqrt{z}\right)\right) + 2^{-m-2n-\nu-1} i^{-\nu}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{i c^2(\nu-2s)^2}{4b(m-2k)}-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2s))^{-h-j+2n}\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2s)\right.$$

$$\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,b\,(m-2k)}\right)-$$

$$2\,i\,b\,(m-2k)\sqrt{-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{b\,(m-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-2\,i\,b\sqrt{z}\,(m-2k)-c\,(\nu-2s)\right)^2}{4\,b\,(m-2k)}\right)\right)\right)(-i\,b\,(m-2k))^{-2(n+1)} +$$

$$e^{\frac{i\pi\nu}{2}-\frac{i c^2(\nu-2s)^2}{4b(m-2k)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2s))^{-h-j+2n}\left(c\,(\nu-2s)-2\,i\,b\,(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(c\,(\nu-2s)-2\,i\,b\,(m-2k)\sqrt{z}\right)^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)-\right.$$

$$2\,i\,b\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{b\,(m-2\,k)}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,b\,(m-2\,k)\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\right)\right)\right)$$

$$(-i\,b\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{i\,c^2\,(v-2\,s)^2}{4\,b\,(m-2\,k)}-\frac{i\,\pi\,v}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,b\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,b\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,b\,(m-2\,k)}+\frac{i\,\pi\,v}{2}}\,(i\,b\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(2\,b\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}$$

$$\left(\frac{i\left(2\,b\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ \frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)+\right.$$

$$2\,b\,i\,(m-2\,k)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\ \frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{4\,b\,(m-2\,k)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(2\,b\,i\,\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{b\,(m-2\,k)}}\right)\right)\,/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z+e)\sinh^v\left(c\,z^r\right)$

01.19.21.3068.01

$$\int z^n \cos^m(e+d\,z)\sinh^\nu\left(c\,z^2\right)dz = -i^{-\nu}\,2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}}\,\Gamma\left(\frac{n+1}{2},-c\,(\nu-2\,k)\,z^2\right)\left(-c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+e^{-\frac{1}{2}i\pi\nu}\left(c\,(\nu-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2},c\,(\nu-2\,k)\,z^2\right)\right)\right)z^{n+1}+\frac{i^{-\nu}\left(2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,-i\,d\,(m-2\,k)\,z)\right)-i^{-\nu}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}-i\,e\,(m-2\,k)-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(-i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{-\frac{d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}+e\,i\,(m-2\,k)-\frac{i\pi\nu}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^{j+1}\left(\frac{(i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(i\,d\,(m-2\,k)-2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)(-c\,(\nu-2\,s))^{-n-1}+e^{\frac{d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}-i\,e\,(m-2\,k)+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,k))^{n-j}\,(2\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^{j+1}\left(-\frac{(2\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2\,c\,(\nu-2\,s)\,z-i\,d\,(m-2\,k))^2}{4\,c\,(\nu-2\,s)}\right)+e^{\frac{d^2\,(m-2\,k)^2}{4\,c\,(\nu-2\,s)}+e\,i\,(m-2\,k)+\frac{i\pi\nu}{2}}\,(c\,(\nu-2\,s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2\,k)+2\,c\,(\nu-2\,s)\,z)^2}{4\,c\,(\nu-2\,s)}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.3069.01

$$\int z^n \cos^m(e + d z) \sinh^v\left(c \sqrt{z}\right) dz = \frac{i^{-v} \left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2) (1 - v \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-v} i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$
$$\left(e^{-i e (m-2k)} \Gamma(n+1, i d (m-2k) z) (-i d (m-2k))^{-n-1} + e^{i e (m-2k)} (i d (m-2k))^{-n-1} \Gamma(n+1, -i d (m-2k) z)\right) +$$
$$2^{-m-v+1} i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+n} (i c (v-2k))^{-2(n+1)} \binom{v}{k}$$
$$\left(e^{\frac{i \pi v}{2}} \Gamma\left(2(n+1), -c (v-2k) \sqrt{z}\right) + e^{-\frac{1}{2} i \pi v} \Gamma\left(2(n+1), c (v-2k) \sqrt{z}\right)\right) + 2^{-m-2n-v-1} i^{-v}$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{-\frac{i c^2 (v-2s)^2}{4 d (m-2k)} - i e (m-2k) - \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c (v-2s))^{-h-j+2n} \left(-2 i d \sqrt{z} (m-2k) - \right.\right.\right.$$
$$\left. c (v-2s)\right)^{h+j} \left(-\frac{i \left(-2 i d \sqrt{z} (m-2k) - c (v-2s)\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c (v-2s)\right.$$
$$\left(-2 i d \sqrt{z} (m-2k) - c (v-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i \left(-2 i d \sqrt{z} (m-2k) - c (v-2s)\right)^2}{4 d (m-2k)}\right) -$$
$$2 i d (m-2k) \sqrt{-\frac{i \left(-2 i d \sqrt{z} (m-2k) - c (v-2s)\right)^2}{d (m-2k)}} \Gamma\left(\frac{1}{2}(h+j+2),\right.$$
$$\left.\left.\left.\left. -\frac{i \left(-2 i d \sqrt{z} (m-2k) - c (v-2s)\right)^2}{4 d (m-2k)}\right)\right)\right) (-i d (m-2k))^{-2(n+1)} +$$
$$e^{-\frac{i c^2 (v-2s)^2}{4 d (m-2k)} - i e (m-2k) + \frac{i \pi v}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c (v-2s))^{-h-j+2n} \left(c (v-2s) - 2 i d (m-2k) \sqrt{z}\right)^{h+j}\right.$$
$$\left(-\frac{i \left(c (v-2s) - 2 i d (m-2k) \sqrt{z}\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+e\,i\,(m-2\,k)-\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+e\,i\,(m-2\,k)+\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2s)\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)+\right.$$

$$2\,d\,i\,(m-2k)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b\,z^r)\sinh^v(c\,z^r)$

01.19.21.3070.01

$$\int z^{\alpha-1}\cos^m(b\,z^r)\sinh^v(c\,z^r)\,dz = \frac{i^{-v}(-1)^m\,2^{-m-v}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{\alpha}-\frac{i^{-v}\,2^{-m-v}\,z^\alpha}{r}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\!\left(\frac{\alpha}{r},\,(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-\frac{\alpha}{r}}+((2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)-$$

$$\frac{(-1)^{m+v}\,2^{-m-v}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(\Gamma\!\left(\frac{\alpha}{r},\,(c\,v-2\,c\,k)\,z^r\right)((c\,v-2\,c\,k)\,z^r)^{-\frac{\alpha}{r}}+(-1)^v\,((2\,c\,k-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(2\,c\,k-c\,v)\,z^r\right)\right)-$$

$$\frac{2^{-m-v}\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}+\right.$$

$$(-1)^v\,((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,v)\,z^r\right)+$$

$$((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,v)\,z^r\right)+$$

$$\left.((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\!\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,v)\,z^r\right)\right)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.3071.01

$$\int z^n \cos^m(b z^2) \sinh^\nu(c z^2)\, dz = -i^{-\nu}\, 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) - (-1)^{m+\nu}\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (c \nu - 2 c k) z^2\right) \left((c \nu - 2 c k) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu \left((2 c k - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - c \nu) z^2\right)\right) - 2^{-m-\nu-1}\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu\, \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) + \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) + \left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) + \frac{i^{-\nu} (-1)^m\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3072.01

$$\int z^n \cos^m(b \sqrt{z}) \sinh^\nu(c \sqrt{z})\, dz = \frac{i^{-\nu} (-1)^m\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} - i^{-\nu}\, 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2 i b k - i b m)^{-2(n+1)} \left(\Gamma\left(2(n+1), (i b m - 2 i b k) \sqrt{z}\right) + \Gamma\left(2(n+1), (2 i b k - i b m) \sqrt{z}\right)\right) - (-1)^{m+\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (2 c k - c \nu)^{-2(n+1)} \left(\Gamma\left(2(n+1), (c \nu - 2 c k) \sqrt{z}\right) + (-1)^\nu\, \Gamma\left(2(n+1), (2 c k - c \nu) \sqrt{z}\right)\right) - 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu\, \Gamma\left(2(n+1), (-2 b i k + i b m - 2 c s + c \nu) \sqrt{z}\right) (-2 b i k + i b m - 2 c s + c \nu)^{-2(n+1)} + (-1)^\nu (2 i b k - i b m - 2 c s + c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (2 i b k - i b m - 2 c s + c \nu) \sqrt{z}\right) + (-2 b i k + i b m + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (-2 b i k + i b m + 2 c s - c \nu) \sqrt{z}\right) + (2 i b k - i b m + 2 c s - c \nu)^{-2(n+1)}\, \Gamma\left(2(n+1), (2 i b k - i b m + 2 c s - c \nu) \sqrt{z}\right)\right) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b\,z^r+e)\sinh^\nu(c\,z^r)$

01.19.21.3073.01

$$\int z^{\alpha-1}\cos^m(b\,z^r+e)\sinh^\nu(c\,z^r)\,dz = \frac{i^{-\nu}\left((-1)^m\,2^{-m-\nu}\,z^\alpha\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)\,(1-\nu\bmod 2)\right)}{\alpha} - \frac{1}{r}\left(i^{-\nu}\,2^{-m-\nu}\,z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2iek-iem}\,\Gamma\left(\frac{\alpha}{r},\,(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-\frac{\alpha}{r}} + e^{iem-2iek}\,((2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)\right) - \frac{(-1)^{m+\nu}\,2^{-m-\nu}\,z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\Gamma\left(\frac{\alpha}{r},\,(c\,\nu-2\,c\,k)\,z^r\right)((c\,\nu-2\,c\,k)\,z^r)^{-\frac{\alpha}{r}} + (-1)^\nu\,((2\,c\,k-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,c\,k-c\,\nu)\,z^r\right)\right) - \frac{2^{-m-\nu}\,(-1)^\nu\,z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{2iek-iem}\,\Gamma\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}} + e^{iem-2iek}\,((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right) + (-1)^\nu\,e^{2iek-iem}\,((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right) + (-1)^\nu\,e^{iem-2iek}\,((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)\right) \;/;\; m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

01.19.21.3074.01

$$\int z^n \cos^m(b z^2 + e) \sinh^\nu(c z^2)\, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m - 2 i e k} \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) - (-1)^{m+\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\Gamma\left(\frac{n+1}{2}, (c \nu - 2 c k) z^2\right) \left((c \nu - 2 c k) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu \left((2 c k - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - c \nu) z^2\right)\right) - (-1)^\nu 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m - 2 i e k} \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) + (-1)^\nu e^{2 i e k - i e m} \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) + (-1)^\nu e^{i e m - 2 i e k} \left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) + \frac{i^{-\nu} (-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3075.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu} (-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)}{n+1} - i^{-\nu} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2 i b k - i b m)^{-2(n+1)} \left(e^{2 i e k - i e m} \Gamma\left(2(n+1), (i b m - 2 i b k)\sqrt{z}\right) + e^{i e m - 2 i e k} \Gamma\left(2(n+1), (2 i b k - i b m)\sqrt{z}\right)\right) - (-1)^{m+\nu} 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (2 c k - c \nu)^{-2(n+1)} \left(\Gamma\left(2(n+1), (c\nu - 2ck)\sqrt{z}\right) + (-1)^\nu \Gamma\left(2(n+1), (2ck - c\nu)\sqrt{z}\right)\right) - 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{2 i e k - i e m} \Gamma\left(2(n+1), (-2 b i k + i b m - 2 c s + c \nu)\sqrt{z}\right) (-2 b i k + i b m - 2 c s + c\nu)^{-2(n+1)} + (-1)^\nu e^{i e m - 2 i e k} (2 i b k - i b m - 2 c s + c \nu)^{-2(n+1)} \Gamma\left(2(n+1), (2 i b k - i b m - 2 c s + c\nu)\sqrt{z}\right) + e^{2 i e k - i e m} (-2 b i k + i b m + 2 c s - c\nu)^{-2(n+1)} \Gamma\left(2(n+1), (-2 b i k + i b m + 2 c s - c \nu)\sqrt{z}\right) + e^{i e m - 2 i e k} (2 i b k - i b m + 2 c s - c\nu)^{-2(n+1)} \Gamma\left(2(n+1), (2 i b k - i b m + 2 c s - c\nu)\sqrt{z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos^m\left(b z^r + d z\right) \sinh^\nu\left(c z^r\right)$

01.19.21.3076.01

$$\int z^n \cos^m\left(b z^2 + d z\right) \sinh^\nu\left(c z^2\right) dz = -i^{-\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, -c(\nu-2k) z^2\right) \left(-c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i \pi \nu} \left(c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, c(\nu-2k)z^2\right)\right)\right) z^{n+1} + \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{\frac{i d^2 (m-2k)}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1} \left(-\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i(-i d(m-2k) - 2 i b z(m-2k))^2}{4b(m-2k)}\right)\right) (-i b (m-2k))^{-n-1} + e^{-\frac{i d^2 (m-2k)}{4b}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 b i z (m-2k))^{j+1}\right.$$

$$\left(\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\Bigg) -$$

$$i^{-v}\,2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \Bigg(e^{-\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v} - 2\,\pi\,v\right)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\,(i\,d\,(m-2\,s))^{n-j}\,(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z -$$

$$i\,d\,(m-2\,s))^{j+1} \left(-\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z-i\,d\,(m-2\,s))^2}{c\,(v-2\,k)-i\,b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z-i\,d\,(m-2\,s))^2}{4\,(c\,(v-2\,k)-i\,b\,(m-2\,s))}\right)\Bigg)(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-n-1} +$$

$$e^{\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v} + 2\,\pi\,v\right)} (b\,i\,(m-2\,s)+c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2\,s))^{n-j}\,(d\,i\,(m-2\,s) +$$

$$2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^{j+1} \left(-\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{b\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{4\,(b\,i\,(m-2\,s)+c\,(v-2\,k))}\right) + e^{-\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v} + 2\,\pi\,v\right)}$$

$$(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(i\,d\,(m-2\,s))^{n-j}\,(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^2}{-i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^2}{4\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v} - 2\,\pi\,v\right)}$$

$$(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\,(-i\,d\,(m-2\,s))^{n-j}\,(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{4\,(i\,b\,(m-2\,s)-c\,(v-2\,k))}\right)\Bigg)\Bigg) /;\ n\in\mathbb{N} \bigwedge m\in\mathbb{N}^+ \bigwedge v\in\mathbb{N}^+$$

01.19.21.3077.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(c\sqrt{z}\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (\nu - 2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i\pi\nu}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right) c^{-2(n+1)} +$$

$$\frac{i^{-\nu}\, 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (i\, d(m-2k))^{-2(n+1)} \left(e^{-\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b(m-2k))^{-h-j+2n} \left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^{h+j} \right.$$

$$\left(\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(b\, i(m-2k)\left(b\, i(m-2k) + \right.\right.$$

$$\left. 2\, d\, i\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right) + 2\, d\, i(m-2k)$$

$$\left.\sqrt{\frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i(m-2k) + 2\, d\, i\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right)\right) +$$

$$e^{\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b(m-2k))^{-h-j+2n} \left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-i\, b(m-2k) \right.$$

$$\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{4\, d(m-2k)}\right) -$$

$$2\, i\, d(m-2k) \sqrt{-\frac{i\left(-i\, b(m-2k) - 2\, i\, d\sqrt{z}\,(m-2k)\right)^2}{d(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-\nu-1}\,i^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}(i\,d\,(m-2\,s))^{-2\,(n+1)}\Bigg(e^{\frac{i\,\pi\,\nu}{2}-\frac{i\,(c\,(\nu-2\,k)-i\,b\,(m-2\,s))^2}{4\,d\,(m-2\,s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(\nu-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)^2\right)\right)}\,\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(\nu-2\,k)\right)^2}{4\,d\,(m-2\,s)}\Bigg)\Bigg)+e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(\nu-2\,k))^2}{4\,d\,(m-2\,s)}-\frac{i\,\pi\,\nu}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(\nu-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(\nu-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(\nu-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,s)-c\,(\nu-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(\nu-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(\nu-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)\Bigg)+e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\,\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}}\Bigg)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r\right)$

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$$\int z^n \cos^m\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2\right)dz =$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}}\,\Gamma\left(\frac{n+1}{2}, -c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}-i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\,d^2\,(m-2k)}{4b}-i\,e\,(m-2k)}\right.$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)(-i\,b\,(m-2k))^{-n-1}+$$

$$e^{i\,e\,(m-2k)-\frac{i\,d^2\,(m-2k)}{4b}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{1}{4}i\left(\frac{d^2\,(m-2s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v}+4\,e\,(m-2s)-2\,\pi\,v\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2s))^{n-j}\,(2\,(c\,(v-2k)-i\,b\,(m-\right.\right.$$

$$2\,s))\,z - i\,d\,(m-2\,s))^{j+1} \left(-\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z - i\,d\,(m-2\,s))^2}{c\,(v-2\,k)-i\,b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2}, -\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z - i\,d\,(m-2\,s))^2}{4\,(c\,(v-2\,k)-i\,b\,(m-2\,s))}\right)\Bigg)(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-n-1} +$$

$$e^{-\frac{1}{4} i \left(-\frac{d^2 (m-2s)^2}{-2 c i k - b m + 2 b s + i c v} - 4 e (m-2 s) - 2 \pi v\right)} (b\,i\,(m-2\,s)+c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\,d\,(m-2\,s))^{n-j} (d\,i\,(m-2\,s) +$$

$$2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^{j+1} \left(-\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{b\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{4\,(b\,i\,(m-2\,s)+c\,(v-2\,k))}\right) + e^{\frac{1}{4} i \left(-\frac{d^2 (m-2s)^2}{-2 c i k - b m + 2 b s + i c v} - 4 e (m-2 s) - 2 \pi v\right)}$$

$$(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\,d\,(m-2\,s))^{n-j} (2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z - i\,d\,(m-2\,s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z - i\,d\,(m-2\,s))^2}{-i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z - i\,d\,(m-2\,s))^2}{4\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))}\right) + e^{\frac{1}{4} i \left(\frac{d^2 (m-2s)^2}{2 i c k - b m + 2 b s - i c v} + 4 e (m-2 s) - 2 \pi v\right)}$$

$$(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\,d\,(m-2\,s))^{n-j} (d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{4\,(i\,b\,(m-2\,s)-c\,(v-2\,k))}\right)\Bigg) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \cos^m\!\left(\sqrt{z}\ b + e + d\,z\right) \sinh^v\!\left(c\,\sqrt{z}\right) dz = -i^{-v}\, 2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k (v-2\,k)^{-2\,(n+1)} \binom{v}{k} \left(e^{\frac{i \pi v}{2}} \Gamma\!\left(2\,(n+1), -c\,(v-2\,k)\,\sqrt{z}\right) + e^{-\frac{1}{2} i \pi v} \Gamma\!\left(2\,(n+1), c\,(v-2\,k)\,\sqrt{z}\right)\right)\right) c^{-2\,(n+1)} +$$

$$\frac{i^{-v}\, 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2)}{n+1} + 2^{-m-2\,n-v-1}\, i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$

$$(i\, d\,(m-2\,k))^{-2\,(n+1)} \Bigg(e^{i\,e\,(m-2\,k)-\frac{i\,b^2\,(m-2\,k)}{4\,d}} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(i\,b\,(m-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2\,k)\left(b\,i\,(m-2\,k)+\right.$$

$$\left.2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)+2\,d\,i\,(m-2\,k)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(b\,i\,(m-2\,k)+2\,d\,i\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)+$$

$$e^{\frac{i\,b^2\,(m-2\,k)}{4\,d}-i\,e\,(m-2\,k)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\, 4^j\,(-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\Bigg(-i\,b\,(m-2\,k)$$

$$\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor \frac{m-1}{2}\right\rfloor}\binom{m}{s}(i\,d\,(m-2\,s))^{-2\,(n+1)}\Bigg(e^{-\frac{i\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^2}{4\,d\,(m-2\,s)}-i\,e\,(m-2\,s)+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-2\,i\,d\,(m-2\,s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2\right)\right)}\,\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\right)\Bigg)+e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-i\,e\,(m-2\,s)-\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,s)-c\,(v-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)+$$

$$e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)+\frac{i\,\pi\,v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\,\Big(b\,i\,(m-2\,s)+2\,d$$

$$i\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\Big)^{h+j}\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)-\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos^m(d\,z)\sinh^v\left(c\,z^r+g\right)$

01.19.21.3080.01

$$\int z^n \cos^m(d\,z)\sinh^\nu\left(c\,z^2+g\right)dz = -i^{-\nu}\,2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}+g(\nu-2k)}\,\Gamma\left(\frac{n+1}{2},\,-c(\nu-2k)z^2\right)\left(-c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi\nu-g(\nu-2k)}\left(c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,c(\nu-2k)z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-\nu}\left(2^{-m-\nu}z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-\nu}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\,i\,d(m-2k)z)\,(-i\,d(m-2k))^{-n-1}+(i\,d(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d(m-2k)z)\right)-$$

$$i^{-\nu}\,2^{-m-\nu-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}-g(\nu-2s)-\frac{i\pi\nu}{2}}\right.$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d(m-2k))^{n-j}\,(-i\,d(m-2k)-2c(\nu-2s)z)^{j+1}\left(\frac{(-i\,d(m-2k)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d(m-2k)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{-\frac{d^2(m-2k)^2}{4c(\nu-2s)}-g(\nu-2s)-\frac{i\pi\nu}{2}}$$

$$\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d(m-2k))^{n-j}\,(i\,d(m-2k)-2c(\nu-2s)z)^{j+1}\left(\frac{(i\,d(m-2k)-2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\right.$$

$$\left.\Gamma\left(\frac{j+1}{2},\,\frac{(i\,d(m-2k)-2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)(-c(\nu-2s))^{-n-1}+e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}+\frac{i\pi\nu}{2}+g(\nu-2s)}\,(c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\,d(m-2k))^{n-j}\,(2c(\nu-2s)z-i\,d(m-2k))^{j+1}\left(-\frac{(2c(\nu-2s)z-i\,d(m-2k))^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(2c(\nu-2s)z-i\,d(m-2k))^2}{4c(\nu-2s)}\right)+e^{\frac{d^2(m-2k)^2}{4c(\nu-2s)}+\frac{i\pi\nu}{2}+g(\nu-2s)}\,(c(\nu-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d(m-2k))^{n-j}\,(d\,i(m-2k)+2c(\nu-2s)z)^{j+1}\left(-\frac{(d\,i(m-2k)+2c(\nu-2s)z)^2}{c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(d\,i(m-2k)+2c(\nu-2s)z)^2}{4c(\nu-2s)}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.3081.01

$$\int z^n \cos^m(d z) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} + (-1)^n 2^{-m-\nu} i^{-\nu} \binom{\nu}{\frac{\nu}{2}}$$

$$(1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma(n+1,\, i\, d\,(m-2k)\, z)\,(-i\, d\,(m-2k))^{-n-1} + (i\, d\,(m-2k))^{-n-1}\, \Gamma(n+1,\, -i\, d\,(m-2k)\, z)\right) +$$

$$2^{-m-\nu+1} i^{-\nu} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+n} (i\, c\,(\nu-2k))^{-2(n+1)} \binom{\nu}{k}$$

$$\left(e^{\frac{i \pi \nu}{2}+g(\nu-2k)}\, \Gamma\left(2(n+1),\, -c\,(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i \pi \nu - g(\nu-2k)}\, \Gamma\left(2(n+1),\, c\,(\nu-2k)\sqrt{z}\right)\right) + 2^{-m-2n-\nu-1}\, i^{-\nu}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{i c^2 (\nu-2s)^2}{4 d (m-2k)} - g(\nu-2s) - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\,(\nu-2s))^{-h-j+2n} \left(-2\, i\, d \sqrt{z}\, (m-2k) -\right.\right.\right.$$

$$\left. c\,(\nu-2s)\right)^{h+j} \left(-\frac{i\left(-2\, i\, d\sqrt{z}\,(m-2k) - c\,(\nu-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c\,(\nu-2s)\right.$$

$$\left(-2\, i\, d\sqrt{z}\,(m-2k) - c\,(\nu-2s)\right) \Gamma\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-2\, i\, d\sqrt{z}\,(m-2k) - c\,(\nu-2s)\right)^2}{4\, d\,(m-2k)}\right) -$$

$$2\, i\, d\,(m-2k) \sqrt{-\frac{i\left(-2\, i\, d\sqrt{z}\,(m-2k) - c\,(\nu-2s)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left. -\frac{i\left(-2\, i\, d\sqrt{z}\,(m-2k) - c\,(\nu-2s)\right)^2}{4\, d\,(m-2k)}\right)\right)\right)(-i\, d\,(m-2k))^{-2(n+1)} +$$

$$e^{-\frac{i c^2 (\nu-2s)^2}{4 d (m-2k)} + g(\nu-2s) + \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(\nu-2s))^{-h-j+2n} \left(c\,(\nu-2s) - 2\, i\, d\,(m-2k)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(c\,(\nu-2s) - 2\, i\, d\,(m-2k)\sqrt{z}\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-g\,(v-2\,s)-\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left.\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2\,k)\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2\,k)+c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2s)\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\ \frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)+\right.$$

$$2\,d\,i\,(m-2k)\,\Gamma\!\left(\frac{1}{2}(h+j+2),\ \frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}}\right)\right)\ /;\ n\in\mathbb{N}\wedge m\in\mathbb{N}^+\wedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z+e)\sinh^v\left(c\,z^r+g\right)$

01.19.21.3082.01

$$\int z^n\cos^m(e+d\,z)\sinh^v\left(c\,z^2+g\right)dz =$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g(v-2k)}\,\Gamma\!\left(\frac{n+1}{2},\ -c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v-g(v-2k)}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\!\left(\frac{n+1}{2},\ c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1,\ i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+\right.$$

$$\left.e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\ -i\,d\,(m-2k)\,z)\right)-i^{-v}\,2^{-m-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{d^2(m-2k)^2}{4c(v-2s)}-i\,e\,(m-2k)-g\,(v-2s)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^{j+1}\right.\right.$$

$$\left.\left(\frac{(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\,\Gamma\!\left(\frac{j+1}{2},\ \frac{(-i\,d\,(m-2k)-2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)$$

$$(-c\,(v-2s))^{-n-1}+e^{-\frac{d^2(m-2k)^2}{4c(v-2s)}+e\,i\,(m-2k)-g\,(v-2s)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\right.$$

$$(i\, d\,(m-2\,k)-2\,c\,(v-2\,s)\,z)^{j+1}\left(\frac{(i\, d\,(m-2\,k)-2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\right.$$

$$\left.\left.\frac{(i\, d\,(m-2\,k)-2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)(-c\,(v-2\,s))^{-n-1}+e^{\frac{d^2(m-2k)^2}{4c(v-2s)}-i\,e\,(m-2\,k)+\frac{i\pi v}{2}+g\,(v-2\,s)}\,(c\,(v-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(i\, d\,(m-2\,k))^{n-j}\,(2\,c\,(v-2\,s)\,z-i\, d\,(m-2\,k))^{j+1}\left(-\frac{(2\,c\,(v-2\,s)\,z-i\, d\,(m-2\,k))^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2\,c\,(v-2\,s)\,z-i\, d\,(m-2\,k))^2}{4\,c\,(v-2\,s)}\right)+e^{\frac{d^2(m-2k)^2}{4c(v-2s)}+e\,i\,(m-2\,k)+\frac{i\pi v}{2}+g\,(v-2\,s)}\,(c\,(v-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\, d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2\,k)+2\,c\,(v-2\,s)\,z)^2}{4\,c\,(v-2\,s)}\right)\right)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.3083.01

$$\int z^n\cos^m(e+d\,z)\sinh^v\!\left(\sqrt{z}\;c+g\right)dz=$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2\,k)}\,\Gamma(n+1,\,i\,d\,(m-2\,k)\,z)\,(-i\,d\,(m-2\,k))^{-n-1}+e^{i\,e\,(m-2\,k)}\,(i\,d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2\,k)\,z)\right)+$$

$$2^{-m-v+1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n}\,(i\,c\,(v-2\,k))^{-2\,(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{i\pi v}{2}+g\,(v-2\,k)}\,\Gamma\!\left(2\,(n+1),\,-c\,(v-2\,k)\,\sqrt{z}\right)+e^{-\frac{1}{2}i\pi v-g\,(v-2\,k)}\,\Gamma\!\left(2\,(n+1),\,c\,(v-2\,k)\,\sqrt{z}\right)\right)+2^{-m-2\,n-v-1}\,i^{-v}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{i\,c^2(v-2s)^2}{4d(m-2k)}-g\,(v-2\,s)-i\,e\,(m-2\,k)-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-\right.\right.\right.$$

$$\left.c\,(v-2\,s)\right)^{h+j}\left(-\frac{i\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,s)$$

$$\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{i\left(-2\,i\,d\sqrt{z}\;(m-2\,k)-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.-\frac{i\left(-2\,i\,d\,\sqrt{z}\,(m-2\,k)-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{i\,c^2\,(v-2\,s)^2}{4\,d\,(m-2\,k)}+g\,(v-2\,s)-i\,e\,(m-2\,k)+\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(v-2\,s)\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)-\right.$$

$$2\,i\,d\,(m-2\,k)\sqrt{-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{d\,(m-2\,k)}}$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(c\,(v-2\,s)-2\,i\,d\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,d\,(m-2\,k)}\right)\right)\right)(-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{\frac{c^2\,i\,(v-2\,s)^2}{4\,d\,(m-2\,k)}-g\,(v-2\,s)+e\,i\,(m-2\,k)-\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}\left(\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,i\,d\,(m-2\,k)\sqrt{\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{d\,(m-2\,k)}}\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,i\,d\,(m-2\,k)\,\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,d\,(m-2\,k)}\right)-c\,(v-2\,s)$$

$$\left(2\,i\,d\,(m-2k)\sqrt{z}-c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,i\,d\,(m-2k)\sqrt{z}-c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)\Bigg)+$$

$$e^{\frac{c^2 i\,(v-2s)^2}{4\,d\,(m-2k)}+g\,(v-2s)+e\,i\,(m-2k)+\frac{i\pi v}{2}}\,(i\,d\,(m-2k))^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2s))^{-h-j+2n}$$

$$\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^{h+j}\left(\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(v-2s)\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)+$$

$$2\,d\,i\,(m-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{4\,d\,(m-2k)}\right)$$

$$\sqrt{\frac{i\left(2\,d\,i\sqrt{z}\,(m-2k)+c\,(v-2s)\right)^2}{d\,(m-2k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m(b\,z^r)\sinh^v(c\,z^r+g)$

01.19.21.3084.01

$$\int z^{\alpha-1}\cos^m(b\,z^r)\sinh^\nu(c\,z^r+g)\,dz = \frac{i^{-\nu}(-1)^m 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} - \frac{i^{-\nu} 2^{-m-\nu} z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{\alpha}{r},(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-\frac{\alpha}{r}} + ((2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right) -$$
$$\frac{(-1)^{m+\nu} 2^{-m-\nu} z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}$$
$$\left(e^{2gk-g\nu}\,\Gamma\left(\frac{\alpha}{r},(c\,\nu-2\,c\,k)\,z^r\right)((c\,\nu-2\,c\,k)\,z^r)^{-\frac{\alpha}{r}} + (-1)^\nu e^{g\nu-2gk}((2\,c\,k-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,c\,k-c\,\nu)\,z^r\right)\right) - \frac{2^{-m-\nu} z^\alpha}{r}$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{2gs-g\nu}\,\Gamma\left(\frac{\alpha}{r},(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}} +\right.$$
$$(-1)^\nu e^{2gs-g\nu}((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)+$$
$$e^{g\nu-2gs}((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)+$$
$$\left.e^{g\nu-2gs}((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)\right)\;/;\; m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.3085.01

$$\int z^n \cos^m\left(b z^2\right) \sinh^\nu\left(c z^2 + g\right) dz = -i^{-\nu}\, 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$
$$\left(\Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) -$$
$$(-1)^{m+\nu}\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\; z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2 g k - g \nu}\, \Gamma\left(\frac{n+1}{2}, (c \nu - 2 c k) z^2\right) \left((c \nu - 2 c k) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$\left.(-1)^\nu e^{g \nu - 2 g k} \left((2 c k - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - c \nu) z^2\right)\right) - 2^{-m-\nu-1}\, z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{2 g s - g \nu}\, \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} +\right.$$
$$(-1)^\nu e^{2 g s - g \nu} \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) +$$
$$e^{g \nu - 2 g s} \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) +$$
$$\left.e^{g \nu - 2 g s} \left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) +$$
$$\frac{i^{-\nu} \left((-1)^m\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\, (1 - \nu \bmod 2)\right)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3086.01

$$\int z^n \cos^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}(i\,b\,m-2\,i\,b\,k)^{-2(n+1)}\left(\Gamma\left(2(n+1),\,(i\,b\,m-2\,i\,b\,k)\sqrt{z}\right)+\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m)\sqrt{z}\right)\right)-$$
$$(-1)^{m+\nu}2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(2\,c\,k-c\,\nu)^{-2(n+1)}\left(e^{2\,g\,k-g\,\nu}\,\Gamma\left(2(n+1),\,(c\,\nu-2\,c\,k)\sqrt{z}\right)+(-1)^\nu e^{g\,\nu-2\,g\,k}\,\Gamma\left(2(n+1),\,(2\,c\,k-c\,\nu)\sqrt{z}\right)\right)-$$
$$2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{2\,g\,s-g\,\nu}\,\Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)\right.$$
$$(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}+(-1)^\nu e^{2\,g\,s-g\,\nu}\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)^{-2(n+1)}$$
$$\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\sqrt{z}\right)+e^{g\,\nu-2\,g\,s}\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}$$
$$\Gamma\left(2(n+1),\,(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)+e^{g\,\nu-2\,g\,s}\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1),\,(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\sqrt{z}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $z^{\alpha-1}\cos^m\left(b\,z^r+e\right)\sinh^\nu\left(c\,z^r+g\right)$

01.19.21.3087.01

$$\int z^{\alpha-1}\cos^m(b\,z^r+e)\sinh^\nu(c\,z^r+g)\,dz = \frac{i^{-\nu}(-1)^m 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)}{\alpha} -$$
$$\frac{i^{-\nu}2^{-m-\nu}z^\alpha}{r}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{2iek-iem}\,\Gamma\left(\frac{\alpha}{r},(i\,b\,m-2\,i\,b\,k)\,z^r\right)((i\,b\,m-2\,i\,b\,k)\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$\left.e^{iem-2iek}((2\,i\,b\,k-i\,b\,m)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m)\,z^r\right)\right)-$$
$$\frac{(-1)^{m+\nu}2^{-m-\nu}z^\alpha}{r}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{2gk-g\nu}\,\Gamma\left(\frac{\alpha}{r},(c\,\nu-2\,c\,k)\,z^r\right)((c\,\nu-2\,c\,k)\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$\left.(-1)^\nu e^{g\nu-2gk}((2\,c\,k-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,c\,k-c\,\nu)\,z^r\right)\right)-\frac{2^{-m-\nu}z^\alpha}{r}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{2iek-iem+2gs-g\nu}\,\Gamma\left(\frac{\alpha}{r},(-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)((-2\,b\,i\,k+i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}+\right.$$
$$(-1)^\nu e^{-2eik+iem+2gs-g\nu}((2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m-2\,c\,s+c\,\nu)\,z^r\right)+$$
$$e^{2iek-iem-2gs+g\nu}((-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}\,\Gamma\left(\frac{\alpha}{r},(-2\,b\,i\,k+i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)+$$
$$e^{-2eik+iem-2gs+g\nu}((2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r)^{-\frac{\alpha}{r}}$$
$$\left.\Gamma\left(\frac{\alpha}{r},(2\,i\,b\,k-i\,b\,m+2\,c\,s-c\,\nu)\,z^r\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.3088.01

$$\int z^n \cos^m(b z^2 + e) \sinh^\nu(c z^2 + g) \, dz = -i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{2 i e k - i e m} \Gamma\left(\frac{n+1}{2}, (i b m - 2 i b k) z^2\right) \left((i b m - 2 i b k) z^2\right)^{\frac{1}{2}(-n-1)} + e^{i e m - 2 i e k} \left((2 i b k - i b m) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m) z^2\right)\right) - (-1)^{m+\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{2 g k - g \nu} \Gamma\left(\frac{n+1}{2}, (c \nu - 2 c k) z^2\right) \left((c \nu - 2 c k) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu e^{g \nu - 2 g k} \left((2 c k - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - c \nu) z^2\right)\right) - 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{2 i e k - i e m + 2 g s - g \nu} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu e^{-2 e i k + i e m + 2 g s - g \nu} \left((2 i b k - i b m - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - 2 c s + c \nu) z^2\right) + e^{2 i e k - i e m - 2 g s + g \nu} \left((-2 b i k + i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m + 2 c s - c \nu) z^2\right) + e^{-2 e i k + i e m - 2 g s + g \nu} \left((2 i b k - i b m + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m + 2 c s - c \nu) z^2\right)\right) + \frac{i^{-\nu} (-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} \;/;\; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3089.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k} (2\, i\, b\, k - i\, b\, m)^{-2(n+1)}\left(e^{2 i e k - i e m}\,\Gamma\left(2(n+1), (i\, b\, m - 2\, i\, b\, k)\sqrt{z}\right) + e^{i e m - 2 i e k}\,\Gamma\left(2(n+1), (2\, i\, b\, k - i\, b\, m)\sqrt{z}\right)\right) - (-1)^{m+\nu} 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(2\, c\, k - c\, \nu)^{-2(n+1)} \left(e^{2 g k - g \nu}\,\Gamma\left(2(n+1), (c\, \nu - 2\, c\, k)\sqrt{z}\right) + (-1)^\nu e^{g \nu - 2 g k}\,\Gamma\left(2(n+1), (2\, c\, k - c\, \nu)\sqrt{z}\right)\right) - 2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^\nu e^{2 i e k - i e m + 2 g s - g \nu}\,\Gamma\left(2(n+1), (-2\, b\, i\, k + i\, b\, m - 2\, c\, s + c\, \nu)\sqrt{z}\right) (-2\, b\, i\, k + i\, b\, m - 2\, c\, s + c\, \nu)^{-2(n+1)} + (-1)^\nu e^{-2 e i k + i e m + 2 g s - g \nu}(2\, i\, b\, k - i\, b\, m - 2\, c\, s + c\, \nu)^{-2(n+1)} \Gamma\left(2(n+1), (2\, i\, b\, k - i\, b\, m - 2\, c\, s + c\, \nu)\sqrt{z}\right) + e^{2 i e k - i e m - 2 g s + g \nu}(-2\, b\, i\, k + i\, b\, m + 2\, c\, s - c\, \nu)^{-2(n+1)} \Gamma\left(2(n+1), (-2\, b\, i\, k + i\, b\, m + 2\, c\, s - c\, \nu)\sqrt{z}\right) + e^{-2 e i k + i e m - 2 g s + g \nu}(2\, i\, b\, k - i\, b\, m + 2\, c\, s - c\, \nu)^{-2(n+1)} \Gamma\left(2(n+1), (2\, i\, b\, k - i\, b\, m + 2\, c\, s - c\, \nu)\sqrt{z}\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $z^n \cos^m\left(b\, z^r + d\, z\right) \sinh^\nu\left(c\, z^r + g\right)$

01.19.21.3090.01

$$\int z^n \cos^m\left(b\, z^2 + d\, z\right) \sinh^\nu\left(c\, z^2 + g\right) dz = -i^{-\nu} 2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\pi\nu}{2}+g(\nu-2k)}\,\Gamma\left(\frac{n+1}{2}, -c(\nu-2k)z^2\right)\left(-c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i\pi\nu - g(\nu-2k)}\left(c(\nu-2k)z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, c(\nu-2k)z^2\right)\right)\right) z^{n+1} + \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i d^2 (m-2k)}{4b}}\left(\sum_{j=0}^{n} 2^{j-n}(i\, d\,(m-2k))^{n-j}(-i\, d\,(m-2k) - 2\, i\, b\, z\,(m-2k))^{j+1} \left(-\frac{i(-i\, d\,(m-2k) - 2\, i\, b\, z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{i(-i\, d\,(m-2k) - 2\, i\, b\, z\,(m-2k))^2}{4\, b\,(m-2k)}\right)\right)\right.$$

$$(-i\,b\,(m-2\,k))^{-n-1}+e^{-\frac{i\,d^2\,(m-2\,k)}{4\,b}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\Bigg)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{1}{4}i\left(\frac{d^2\,(m-2\,s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v}-2\,\pi\,v+4\,g\,i\,(v-2\,k)\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,s))^{n-j}\,(2\,(c\,(v-2\,k)-i\,b\,(m-\right.\right.$$

$$2\,s))\,z-i\,d\,(m-2\,s))^{j+1}\left(-\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z-i\,d\,(m-2\,s))^2}{c\,(v-2\,k)-i\,b\,(m-2\,s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(2\,(c\,(v-2\,k)-i\,b\,(m-2\,s))\,z-i\,d\,(m-2\,s))^2}{4\,(c\,(v-2\,k)-i\,b\,(m-2\,s))}\right)\Bigg)(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-n-1}+$$

$$e^{-\frac{1}{4}i\left(-\frac{d^2\,(m-2\,s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v}-2\,\pi\,v+4\,g\,i\,(v-2\,k)\right)}\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,s))^{n-j}\,(d\,i\,(m-2\,s)+$$

$$2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^{j+1}\left(-\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{b\,i\,(m-2\,s)+c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},\,-\frac{(d\,i\,(m-2\,s)+2\,(b\,i\,(m-2\,s)+c\,(v-2\,k))\,z)^2}{4\,(b\,i\,(m-2\,s)+c\,(v-2\,k))}\right)+e^{\frac{1}{4}i\left(-\frac{d^2\,(m-2\,s)^2}{-2\,c\,i\,k-b\,m+2\,b\,s+i\,c\,v}-2\,\pi\,v+4\,g\,i\,(v-2\,k)\right)}$$

$$(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2\,s))^{n-j}\,(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^{j+1}$$

$$\left(-\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^2}{-i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},\,-\frac{(2\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))\,z-i\,d\,(m-2\,s))^2}{4\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))}\right)+e^{\frac{1}{4}i\left(\frac{d^2\,(m-2\,s)^2}{2\,i\,c\,k-b\,m+2\,b\,s-i\,c\,v}-2\,\pi\,v+4\,g\,i\,(v-2\,k)\right)}$$

$$(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,s))^{n-j}\,(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{i\,b\,(m-2\,s)-c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},\,-\frac{(d\,i\,(m-2\,s)+2\,(i\,b\,(m-2\,s)-c\,(v-2\,k))\,z)^2}{4\,(i\,b\,(m-2\,s)-c\,(v-2\,k))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(\sqrt{z}\, b + d\, z\right) \sinh^\nu\left(\sqrt{z}\, c + g\right) dz = -i^{-\nu}\, 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k (\nu - 2k)^{-2(n+1)} \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2} + g(\nu-2k)}\, \Gamma\left(2(n+1), -c(\nu-2k)\sqrt{z}\right) + e^{-\frac{1}{2} i \pi \nu - g(\nu - 2k)}\, \Gamma\left(2(n+1), c(\nu-2k)\sqrt{z}\right)\right)\right)$$
$$c^{-2(n+1)} + \frac{i^{-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (i\, d\, (m-2k))^{-2(n+1)} \left(e^{-\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\, (m-2k))^{-h-j+2n} \left(b\, i\, (m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^{h+j}\right.$$
$$\left(\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\, (m-2k) \left(b\, i\, (m-2k) + \right.\right.$$
$$\left. 2\, d\, i \sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right) + 2\, d\, i\, (m-2k)$$
$$\left.\left.\sqrt{\frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\, i\, (m-2k) + 2\, d\, i\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right)\right)\right) +$$
$$e^{\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2k))^{-h-j+2n} \left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^{h+j}$$
$$\left(-\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\, (m-2k)\right.$$
$$\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{4\, d\, (m-2k)}\right) -$$
$$2\, i\, d\, (m-2k) \sqrt{-\frac{i\left(-i\, b\, (m-2k) - 2\, i\, d\sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$-\frac{i\left(-i\,b\,(m-2\,k)-2\,i\,d\,\sqrt{z}\,(m-2\,k)\right)^2}{4\,d\,(m-2\,k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}(i\,d\,(m-2\,s))^{-2\,(n+1)}\Bigg(e^{-\frac{i\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^2}{4\,d\,(m-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-2\,i\,d\,(m-2\,s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2\right)\right)}\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\Bigg)\Bigg)+e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,s)-c\,(v-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)+$$

$$e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\,\Big(b\,i\,(m-2\,s)+2\,d$$

$$i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\Big)^{h+j}\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)+$$

$$2\,d\,i\,(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{4\,d\,(m-2s)}\right)$$

$$\left.\left.\sqrt{\frac{i\left(b\,i\,(m-2s)+2\,d\,i\sqrt{z}\,(m-2s)-c\,(v-2k)\right)^2}{d\,(m-2s)}}\right)\right)\right) /;\, n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m\left(b\,z^r+d\,z+e\right)\sinh^v\left(c\,z^r+g\right)$

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$$\int z^n\cos^m\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+g\right)dz =$$

$$-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g\,(v-2k)}\,\Gamma\left(\frac{n+1}{2}, -c\,(v-2k)\,z^2\right)\left(-c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.\right.$$

$$\left.\left.e^{-\frac{1}{2}i\pi v-g\,(v-2k)}\left(c\,(v-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, c\,(v-2k)\,z^2\right)\right)\right)z^{n+1}+$$

$$\frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}-i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\,d^2\,(m-2k)}{4b}-i\,e\,(m-2k)}\left(\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k))^{n-j}\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^{j+1}\right.\right.$$

$$\left.\left(-\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, -\frac{i\,(-i\,d\,(m-2k)-2\,i\,b\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)$$

$$(-i\,b\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)-\frac{i\,d^2\,(m-2k)}{4b}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}$$

$$(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\,\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2ick-bm+2bs-icv}+4e(m-2s)-2\pi v+4gi(v-2k)\right)}\left(\sum_{j=0}^{n}2^{j-n}(i\,d(m-2s))^{n-j}(2(c(v-2k)-i\,b(m-2s))z-i\,d(m-2s))^{j+1}\left(-\frac{(2(c(v-2k)-i\,b(m-2s))z-i\,d(m-2s))^2}{c(v-2k)-i\,b(m-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(c(v-2k)-i\,b(m-2s))z-i\,d(m-2s))^2}{4(c(v-2k)-i\,b(m-2s))}\right)\right)(c(v-2k)-i\,b(m-2s))^{-n-1}+e^{-\frac{1}{4}i\left(-\frac{d^2(m-2s)^2}{-2cik-bm+2bs+icv}-4e(m-2s)-2\pi v+4gi(v-2k)\right)}(b\,i(m-2s)+c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2s))^{n-j}(d\,i(m-2s)+2(b\,i(m-2s)+c(v-2k))z)^{j+1}\left(-\frac{(d\,i(m-2s)+2(b\,i(m-2s)+c(v-2k))z)^2}{b\,i(m-2s)+c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(m-2s)+2(b\,i(m-2s)+c(v-2k))z)^2}{4(b\,i(m-2s)+c(v-2k))}\right)+e^{\frac{1}{4}i\left(-\frac{d^2(m-2s)^2}{-2cik-bm+2bs+icv}-4e(m-2s)-2\pi v+4gi(v-2k)\right)}(-i\,b(m-2s)-c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i\,d(m-2s))^{n-j}(2(-i\,b(m-2s)-c(v-2k))z-i\,d(m-2s))^{j+1}\left(-\frac{(2(-i\,b(m-2s)-c(v-2k))z-i\,d(m-2s))^2}{-i\,b(m-2s)-c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(-i\,b(m-2s)-c(v-2k))z-i\,d(m-2s))^2}{4(-i\,b(m-2s)-c(v-2k))}\right)+e^{\frac{1}{4}i\left(\frac{d^2(m-2s)^2}{2ick-bm+2bs-icv}+4e(m-2s)-2\pi v+4gi(v-2k)\right)}(i\,b(m-2s)-c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2s))^{n-j}(d\,i(m-2s)+2(i\,b(m-2s)-c(v-2k))z)^{j+1}\left(-\frac{(d\,i(m-2s)+2(i\,b(m-2s)-c(v-2k))z)^2}{i\,b(m-2s)-c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i(m-2s)+2(i\,b(m-2s)-c(v-2k))z)^2}{4(i\,b(m-2s)-c(v-2k))}\right)\right)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+e+d\,z\right)\sinh^v\left(\sqrt{z}\,c+g\right)dz=-i^{-v}\,2^{-m-v+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\left(\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k(v-2k)^{-2(n+1)}\binom{v}{k}\left(e^{\frac{i\pi v}{2}+g(v-2k)}\Gamma\left(2(n+1),-c(v-2k)\sqrt{z}\right)+e^{-\frac{1}{2}i\pi v-g(v-2k)}\Gamma\left(2(n+1),c(v-2k)\sqrt{z}\right)\right)\right)$$

$$c^{-2(n+1)} + \frac{i^{-\nu}\, 2^{-m-\nu}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2)}{n+1} + 2^{-m-2n-\nu-1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$

$$(i\, d\,(m-2k))^{-2(n+1)} \Bigg(e^{i\, e\,(m-2k) - \frac{i\, b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(m-2k))^{-h-j+2n} \left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i\,(m-2k) \Big(b\, i\,(m-2k) +$$

$$2\, d\, i \sqrt{z}\, (m-2k)\Big)\, \Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{i\left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right) + 2\, d\, i\,(m-2k)$$

$$\sqrt{\frac{i\left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\!\left(\frac{1}{2}(h+j+2),\, \frac{i\left(b\, i\,(m-2k) + 2\, d\, i \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right)\Bigg) +$$

$$e^{\frac{i\, b^2 (m-2k)}{4d} - i\, e\,(m-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\,(m-2k))^{-h-j+2n} \left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-i\, b\,(m-2k)$$

$$\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right) \Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\right) -$$

$$2\, i\, d\,(m-2k) \sqrt{-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{d\,(m-2k)}}\; \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(-i\, b\,(m-2k) - 2\, i\, d \sqrt{z}\, (m-2k)\right)^2}{4\, d\,(m-2k)}\Bigg)\Bigg)\Bigg) +$$

$$2^{-m-2n-\nu-1}\, i^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (i\, d\,(m-2s))^{-2(n+1)} \Bigg(e^{-\frac{i\,(c\,(\nu-2k) - i\, b\,(m-2s))^2}{4\, d\,(m-2s)} - i\, e\,(m-2s) + \frac{i\,\pi\,\nu}{2} + g\,(\nu-2k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k)-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-$$

$$2\,i\,d\,(m-2\,s)\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2\right)\right)}$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)+$$

$$e^{-\frac{i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}-i\,e\,(m-2\,s)-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,s)-c\,(v-2\,k))\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)-2\,i\,d\,(m-2\,s)$$

$$\sqrt{\left(-\frac{1}{d\,(m-2\,s)}\left(i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2\right)\right)}\,\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.-\frac{i\left(-i\,b\,(m-2\,s)-2\,i\,d\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)\Bigg)+e^{\frac{i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)+c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\;\Bigg)+e^{\frac{i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,d\,(m-2\,s)}+e\,i\,(m-2\,s)-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)+$$

$$2\,d\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,d\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(b\,i\,(m-2\,s)+2\,d\,i\,\sqrt{z}\,(m-2\,s)-c\,(v-2\,k)\right)^2}{d\,(m-2\,s)}}\;\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\, z) \sinh^\nu(c\, z^r + f\, z)$

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$$\int z^n \cos^m(d\, z) \sinh^\nu\left(c\, z^2 + f\, z\right) dz = \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2)\right)}{n+1} + (-1)^n\, 2^{-m-\nu}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma(n+1,\, i\, d\,(m-2k)\, z)\,(-i\, d\,(m-2k))^{-n-1} + (i\, d\,(m-2k))^{-n-1}\, \Gamma(n+1,\, -i\, d\,(m-2k)\, z)\right) -$$

$$i^{-\nu}\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{f^2 (\nu-2k)}{4c} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\,(\nu-2k))^{n-j}\, (-f\,(\nu-2k) - 2\, c\, z\,(\nu-2k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f\,(\nu-2k) - 2\, c\, z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2},\, \frac{(-f\,(\nu-2k) - 2\, c\, z\,(\nu-2k))^2}{4\, c\,(\nu-2k)}\right)\right)$$

$$(-c\,(\nu-2k))^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{f^2 (\nu-2k)}{4c}}\, (c\,(\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-f\,(\nu-2k))^{n-j}\, (f\,(\nu-2k) + 2\, c\, z\,(\nu-2k))^{j+1}$$

$$\left.\left(-\frac{(f\,(\nu-2k) + 2\, c\, z\,(\nu-2k))^2}{c\,(\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2},\, -\frac{(f\,(\nu-2k) + 2\, c\, z\,(\nu-2k))^2}{4\, c\,(\nu-2k)}\right)\right) -$$

$$i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{(-i\, d\,(m-2k) - f\,(\nu-2s))^2}{4\, c\,(\nu-2s)} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (d\, i\,(m-2k) + f\,(\nu-2s))^{n-j}\right.\right.$$

$$(-i\, d\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^{j+1} \left(\frac{(-i\, d\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j} \Gamma\left(\frac{j+1}{2},\, \frac{(-i\, d\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^2}{4\, c\,(\nu-2s)}\right)\right) (-c\,(\nu-2s))^{-n-1} +$$

$$e^{\frac{(i\, d\,(m-2k) - f\,(\nu-2s))^2}{4\, c\,(\nu-2s)} - \frac{i \pi \nu}{2}} \left(\sum_{j=0}^{n} 2^{j-n}\, (f\,(\nu-2s) - i\, d\,(m-2k))^{n-j}\, (d\, i\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^{j+1}\right.$$

$$\left(\frac{(d\, i\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^2}{c\,(\nu-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2},\, \frac{(d\, i\,(m-2k) - f\,(\nu-2s) - 2\, c\,(\nu-2s)\, z)^2}{4\, c\,(\nu-2s)}\right)\right) (-c\,(\nu-2s))^{-n-1} +$$

$$e^{\frac{i\pi v}{2}-\frac{(f(v-2s)-i d(m-2k))^2}{4c(v-2s)}}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(i d(m-2k)-f(v-2s))^{n-j}$$

$$(-i d(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(-i d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(-i d(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)+$$

$$e^{\frac{i\pi v}{2}-\frac{(d i(m-2k)+f(v-2s))^2}{4c(v-2s)}}(c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-i d(m-2k)-f(v-2s))^{n-j}$$

$$(d i(m-2k)+f(v-2s)+2c(v-2s)z)^{j+1}\left(-\frac{(d i(m-2k)+f(v-2s)+2c(v-2s)z)^2}{c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d i(m-2k)+f(v-2s)+2c(v-2s)z)^2}{4c(v-2s)}\right)\right)\right) /; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m(d z)\sinh^v\left(\sqrt{z}\;c+f z\right)dz=\frac{i^{-v}2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^n2^{-m-v}i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,i d(m-2k)z)(-i d(m-2k))^{-n-1}+(i d(m-2k))^{-n-1}\Gamma(n+1,-i d(m-2k)z)\right)+$$

$$2^{-m-2n-v-1}i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}(i f(v-2k))^{-2(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{c^2(v-2k)}{4f}-\frac{i\pi v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-c(v-2k))^{-h-j+2n}\left(-c(v-2k)-2f\sqrt{z}\;(v-2k)\right)^{h+j}\right.$$

$$\left(\frac{\left(-c(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c(v-2k)\left(-c(v-2k)-2f\sqrt{z}\;(v-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\frac{\left(-c(v-2k)-2f\sqrt{z}\;(v-2k)\right)^2}{4f(v-2k)}\right)-2f(v-2k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{i\,\pi\,v}{2}-\frac{c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{\frac{i\,\pi\,v}{2}-\frac{c^2\,(v-2\,s)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\,\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\,\right)\right)$$

$$(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{\frac{i\,\pi\,v}{2}-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\,\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\,\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-\frac{i\,\pi\,v}{2}}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}\,-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(-i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(-i\,d\,(m-2k)-f\,(v-2s)\right)}\right)-$$

$$c\,(v-2s)\left(2\left(-i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\left(-i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(-i\,d\,(m-2k)-f\,(v-2s)\right)}\right)\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(i\,d\,(m-2k)-f\,(v-2s))}-\frac{i\pi v}{2}}\left(i\,d\,(m-2k)-f\,(v-2s)\right)^{-2(n+1)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2s))^{-h-j+2n}$$

$$\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\,d\,(m-2k)-f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{-\frac{\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\,d\,(m-2k)-f\,(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\,d\,(m-2k)-f\,(v-2s)\right)}\right)-$$

$$c\,(v-2s)\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\left(i\,d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\,d\,(m-2k)-f\,(v-2s)\right)}\right)\right)\right)\right)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\cos^m(d\,z+e)\sinh^v\left(c\,z^r+f\,z\right)$

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$$\int z^n\cos^m(e+d\,z)\sinh^v\left(c\,z^2+f\,z\right)dz=$$

$$\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)-$$

$$i^{-\nu}\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{\frac{f^2 (\nu-2k)}{4c} - \frac{i \pi \nu}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (f (\nu - 2k))^{n-j} (-f (\nu - 2k) - 2 c z (\nu - 2k))^{j+1}$$

$$\left(\frac{(-f (\nu - 2k) - 2 c z (\nu - 2k))^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-f (\nu - 2k) - 2 c z (\nu - 2k))^2}{4 c (\nu - 2k)} \right) \Bigg)$$

$$(-c (\nu - 2k))^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{f^2 (\nu-2k)}{4c}} (c (\nu - 2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (\nu - 2k))^{n-j} (f (\nu - 2k) + 2 c z (\nu - 2k))^{j+1}$$

$$\left(-\frac{(f (\nu - 2k) + 2 c z (\nu - 2k))^2}{c (\nu - 2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (\nu - 2k) + 2 c z (\nu - 2k))^2}{4 c (\nu - 2k)} \right) \Bigg) -$$

$$i^{-\nu}\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{\frac{(-i d (m-2k) - f (\nu-2s))^2}{4 c (\nu-2s)} - i e (m-2k) - \frac{i \pi \nu}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (d\, i (m - 2k) + f (\nu - 2s))^{n-j}$$

$$(-i\, d (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^{j+1} \left(\frac{(-i\, d (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^2}{c (\nu - 2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(-i\, d (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^2}{4 c (\nu - 2s)} \right) \Bigg)$$

$$(-c (\nu - 2s))^{-n-1} + e^{\frac{(i d (m-2k) - f (\nu-2s))^2}{4 c (\nu-2s)} + e\, i (m-2k) - \frac{i \pi \nu}{2}} \Bigg(\sum_{j=0}^{n} 2^{j-n} (f (\nu - 2s) - i\, d (m - 2k))^{n-j}$$

$$(d\, i (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^{j+1} \left(\frac{(d\, i (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^2}{c (\nu - 2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{(d\, i (m - 2k) - f (\nu - 2s) - 2 c (\nu - 2s) z)^2}{4 c (\nu - 2s)} \right) \Bigg) (-c (\nu - 2s))^{-n-1} +$$

$$e^{-\frac{(f (\nu-2s) - i d (m-2k))^2}{4 c (\nu-2s)} - i e (m-2k) + \frac{i \pi \nu}{2}} (c (\nu - 2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\, d (m - 2k) - f (\nu - 2s))^{n-j}$$

$$(-i\, d (m - 2k) + f (\nu - 2s) + 2 c (\nu - 2s) z)^{j+1} \left(-\frac{(-i\, d (m - 2k) + f (\nu - 2s) + 2 c (\nu - 2s) z)^2}{c (\nu - 2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i\, d (m - 2k) + f (\nu - 2s) + 2 c (\nu - 2s) z)^2}{4 c (\nu - 2s)} \right) +$$

$$e^{-\frac{(d\,i\,(m-2k)+f\,(v-2s))^2}{4\,c\,(v-2s)}+e\,i\,(m-2k)+\frac{i\pi v}{2}}\,(c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k)-f\,(v-2s))^{n-j}$$

$$(d\,i\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)\right)/;\,n\in\mathbb{N}\wedge m\in\mathbb{N}^+\wedge v\in\mathbb{N}^+$$

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$$\int z^n\cos^m(e+d\,z)\sinh^v\!\left(\sqrt{z}\;c+f\,z\right)dz==$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)+$$

$$2^{-m-2n-v-1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(i\,f\,(v-2k))^{-2\,(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{c^2\,(v-2k)}{4f}-\frac{i\pi v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2k))^{-h-j+2n}\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)^{h+j}\right.$$

$$\left(\frac{\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2k)\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)\Gamma\!\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)-2\,f\,(v-2k)$$

$$\left.\left.\sqrt{\frac{\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2k)-2\,f\,\sqrt{z}\,(v-2k)\right)^2}{4\,f\,(v-2k)}\right)\right)\right)+$$

$$e^{\frac{i\pi v}{2}-\frac{c^2\,(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\left(c\,(v-2k)+2\,f\,\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2k)+2\,f\,\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2k)\left(c\,(v-2k)+2\,f\,\sqrt{z}\,(v-2k)\right)\Gamma\!\left(\right.\right.$$

$$\frac{1}{2}(h+j+1), -\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\Bigg)+2f(v-2k)$$

$$\sqrt{-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2(v-2s)^2}{4(f(v-2s)-i\,d(m-2k))}-i\,e(m-2k)+\frac{i\pi v}{2}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2s))^{-h-j+2n}$$

$$\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)^2}{f(v-2s)-i\,d(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c(v-2s)\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1), -\frac{\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)^2}{4(f(v-2s)-i\,d(m-2k))}\right)+$$

$$2(f(v-2s)-i\,d(m-2k))\,\Gamma\!\left(\frac{1}{2}(h+j+2), -\frac{\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)^2}{4(f(v-2s)-i\,d(m-2k))}\right)$$

$$\sqrt{-\frac{\left(c(v-2s)+2(f(v-2s)-i\,d(m-2k))\sqrt{z}\right)^2}{f(v-2s)-i\,d(m-2k)}}\Bigg)\Bigg)$$

$$(f(v-2s)-i\,d(m-2k))^{-2(n+1)}+e^{-\frac{c^2(v-2s)^2}{4(d\,i(m-2k)+f(v-2s))}+e\,i(m-2k)+\frac{i\pi v}{2}}\,(d\,i(m-2k)+f(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c(v-2s))^{-h-j+2n}\left(c(v-2s)+2(d\,i(m-2k)+f(v-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2s)+2(d\,i(m-2k)+f(v-2s))\sqrt{z}\right)^2}{d\,i(m-2k)+f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-i\,e\,(m-2\,k)-\frac{i\,\pi\,v}{2}}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)-$$

$$c\,(v-2\,s)\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}\right)\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(i\,d\,(m-2\,k)-f\,(v-2\,s))}+e\,i\,(m-2\,k)-\frac{i\,\pi\,v}{2}}\,(i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(i\,d\,(m-2\,k)-f\,(v-2\,s))\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\, d\,(m-2k)-f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\, d\,(m-2k)-f\,(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\, d\,(m-2k)-f\,(v-2s)\right)}\right)-$$

$$c\,(v-2s)\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\, d\,(m-2k)-f\,(v-2s)\right)}\right)\right)\right)\; /;\; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\, z^r)\sinh^v(c\, z^r+f\, z)$

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$$\int z^n\cos^m(b\, z^2)\sinh^v(c\, z^2+f\, z)\, dz = -i^{-v}\, 2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{n+1}{2},\, -i\, b\,(m-2k)\, z^2\right)\left(-i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\, b\,(m-2k)\, z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\, i\, b\,(m-2k)\, z^2\right)\right)\right)$$

$$z^{n+1}+\frac{i^{-v}\left(2^{-m-v}\, z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1}-$$

$$i^{-v}\, 2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{f^2 (v-2k)}{4c}-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\left(f\,(v-2k)\right)^{n-j}\left(-f\,(v-2k)-2\, c\, z\,(v-2k)\right)^{j+1}\right.\right.$$

$$\left(\frac{\left(-f\,(v-2k)-2\, c\, z\,(v-2k)\right)^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\, \frac{\left(-f\,(v-2k)-2\, c\, z\,(v-2k)\right)^2}{4\, c\,(v-2k)}\right)\Bigg)$$

$$\left(-c\,(v-2k)\right)^{-n-1}+e^{\frac{i\pi v}{2}-\frac{f^2 (v-2k)}{4c}}\left(c\,(v-2k)\right)^{-n-1}\sum_{j=0}^{n}2^{j-n}\left(-f\,(v-2k)\right)^{n-j}\left(f\,(v-2k)+2\, c\, z\,(v-2k)\right)^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^{-v}2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}-2\pi v\right)}\left(\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}\right.\right.$$

$$(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{c(v-2s)-ib(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{4(c(v-2s)-ib(m-2k))}\right)\right)(c(v-2s)-ib(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+2\pi v\right)}(bi(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{bi(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{4(bi(m-2k)+c(v-2s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+2\pi v\right)}$$

$$(-ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{-ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-ib(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}-2\pi v\right)}(ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(ib(m-2k)-c(v-2s))}\right)\right)/;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\left(b\sqrt{z}\right)\sinh^\nu\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^n\,2^{-m-\nu+1}\,i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(\Gamma\left(2(n+1),\,-i\,b\,(m-2k)\sqrt{z}\right)+\Gamma\left(2(n+1),\,i\,b\,(m-2k)\sqrt{z}\right)\right)\right)b^{-2(n+1)}+$$

$$\frac{i^{-\nu}\left(2^{-m-\nu}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1}+$$

$$2^{-m-2n-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}(f\,(\nu-2k))^{-2(n+1)}\left((-1)^\nu\,e^{\frac{c^2(\nu-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2k))^{-h-j+2n}\right.$$

$$\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^{h+j}\left(\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(\nu-2k)\right.$$

$$\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)-2f\,(\nu-2k)$$

$$\left.\left.\sqrt{\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}}\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-c\,(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)\right)+\right.$$

$$e^{-\frac{c^2(\nu-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(\nu-2k))^{-h-j+2n}\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(\nu-2k)\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),\,-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)+2f\,(\nu-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f\,(\nu-2k)}\right)\sqrt{-\frac{\left(c\,(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f\,(\nu-2k)}}\right)\right)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f(v-2s))^{-2(n+1)}\Bigg(e^{\frac{(-i b(m-2k)-c(v-2s))^2}{4f(v-2s)}-\frac{i\pi v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(-i b(m-2k)-c(v-2s))^{-h-j+2n}\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i b(m-2k)-c(v-2s))\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2f(v-2s)\sqrt{\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2),\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)\Bigg)+e^{\frac{(i b(m-2k)-c(v-2s))^2}{4f(v-2s)}-\frac{i\pi v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(i b(m-2k)-c(v-2s))^{-h-j+2n}\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i b(m-2k)-c(v-2s))\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\frac{\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2\, f\,(v-2\,s)\,\sqrt{\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}$$

$$\left.\left.\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)\right)+e^{\frac{i\,\pi\,v}{2}-\frac{(c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\right)+e^{\frac{i\,\pi\,v}{2}-\frac{(b\,i\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\right)\right)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+e)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n\cos^m(b\,z^2+e)\sinh^v(c\,z^2+f\,z)\,dz = \frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1}-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{i\,e\,(m-2k)}\,z^{n+1}\,\Gamma\left(\frac{n+1}{2}, -i\,b\,(m-2k)\,z^2\right)\left(-i\,b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{-i\,e\,(m-2k)}\,z^{n+1}\left(i\,b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\,\Gamma\left(\frac{n+1}{2}, i\,b\,(m-2k)\,z^2\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{f^2(v-2k)}{4c}-\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2k))^{n-j}\,(-f\,(v-2k)-2\,c\,z\,(v-2k))^{j+1}\right.\right.$$

$$\left.\left(\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)$$

$$(-c\,(v-2k))^{-n-1}+e^{\frac{i\pi v}{2}-\frac{f^2(v-2k)}{4c}}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left.\left.\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4\,e\,(m-2k)-2\pi v\right)}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2s))^{n-j}\right.\right.$$

$$(f\,(v-2s)+2\,(c\,(v-2s)-i\,b\,(m-2k))\,z)^{j+1}\left(-\frac{(f\,(v-2s)+2\,(c\,(v-2s)-i\,b\,(m-2k))\,z)^2}{c\,(v-2s)-i\,b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2s)+2(c(v-2s)-i\,b(m-2k))z)^2}{4(c(v-2s)-i\,b(m-2k))}\right)\Bigg)(c(v-2s)-i\,b(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+4e(m-2k)+2\pi v\right)}(b\,i(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2}{b\,i(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f(v-2s)+2(b\,i(m-2k)+c(v-2s))z)^2}{4(b\,i(m-2k)+c(v-2s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}+4e(m-2k)+2\pi v\right)}$$

$$(-i\,b(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{-i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(2(-i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-i\,b(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4e(m-2k)-2\pi v\right)}(i\,b(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{i\,b(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(2(i\,b(m-2k)-c(v-2s))z-f(v-2s))^2}{4(i\,b(m-2k)-c(v-2s))}\right)\Bigg)\Bigg)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+e\right)\sinh^v\left(\sqrt{z}\,c+f\,z\right)dz = (-1)^n\,2^{-m-v+1}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(m-2k)^{-2(n+1)}\binom{m}{k}\left(e^{i\,e(m-2k)}\,\Gamma\left(2(n+1), -i\,b(m-2k)\sqrt{z}\right)+e^{-i\,e(m-2k)}\,\Gamma\left(2(n+1), i\,b(m-2k)\sqrt{z}\right)\right)\right)$$

$$b^{-2(n+1)}+\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f(v-2k))^{-2(n+1)}\Bigg((-1)^v\,e^{\frac{c^2(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c(v-2k))^{-h-j+2n}$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}\left(\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(-c\,(v-2\,k)$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-2\,f\,(v-2\,k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f\,(v-2\,s))^{-2\,(n+1)}\Bigg(e^{\frac{(-i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}-i\,e\,(m-2\,k)-\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,k)-c\,(v-2\,s))\left(-i\,b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+e^{\frac{(i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+e\,i\,(m-2\,k)-\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b\,(m-2\,k)-c\,(v-2\,s))\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)\right)+e^{-\frac{(c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}-i\,e\,(m-2\,k)+\frac{i\,\pi\,v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((c(v-2s)-i\,b(m-2k))\left(-i\,b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(-i\,b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2f(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(-i\,b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\,b(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\right)+e^{-\frac{(b\,i(m-2k)+c(v-2s))^2}{4f(v-2s)}+e\,i(m-2k)+\frac{i\pi v}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i(m-2k)+c(v-2s))^{-h-j+2n}\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i(m-2k)+c(v-2s))\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)+$$

$$2f(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i(m-2k)+c(v-2s)+2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\cos^m(b\,z^r+d\,z)\sinh^v(c\,z^r+f\,z)$

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$$\int z^n \cos^m(b z^2 + d z) \sinh^\nu(c z^2 + f z)\, dz = \frac{i^\nu 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{n+1} - i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k}$$

$$\left(e^{-\frac{i d^2 (2k-m)}{4b}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m))^{n-j} (d i (2k-m) + 2 b i z (2k-m))^{j+1} \left(\frac{i (d i (2k-m) + 2 b i z (2k-m))^2}{b (2k-m)} \right)^{\frac{1}{2}(-j-1)} \right.\right.$$

$$\left.\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (2k-m) + 2 b i z (2k-m))^2}{4 b (2k-m)} \right) \right) (i b (2k-m))^{-n-1} + \right.$$

$$e^{-\frac{i d^2 (m-2k)}{4b}} (i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i d (m-2k))^{n-j} (d i (m-2k) + 2 b i z (m-2k))^{j+1}$$

$$\left. \left(\frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{b (m-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (d i (m-2k) + 2 b i z (m-2k))^2}{4 b (m-2k)} \right) \right) -$$

$$i^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{\frac{i \pi \nu}{2} - \frac{f^2 (2k-\nu)}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (-f (2k-\nu))^{n-j} (f (2k-\nu) + 2 c z (2k-\nu))^{j+1} \right.\right.$$

$$\left.\left. \left(-\frac{(f (2k-\nu) + 2 c z (2k-\nu))^2}{c (2k-\nu)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (2k-\nu) + 2 c z (2k-\nu))^2}{4 c (2k-\nu)} \right) \right) (c (2k-\nu))^{-n-1} + \right.$$

$$e^{-\frac{(\nu-2k) f^2}{4c} - \frac{i \pi \nu}{2}} (c (\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-f (\nu-2k))^{n-j} (f (\nu-2k) + 2 c z (\nu-2k))^{j+1}$$

$$\left. \left(-\frac{(f (\nu-2k) + 2 c z (\nu-2k))^2}{c (\nu-2k)} \right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(f (\nu-2k) + 2 c z (\nu-2k))^2}{4 c (\nu-2k)} \right) \right) -$$

$$i^\nu 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i \pi \nu}{2} - \frac{(d i (2k-m) + f (2s-\nu))^2}{4 (b i (2k-m) + c (2s-\nu))}} \left(\sum_{j=0}^{n} 2^{j-n} (-i d (2k-m) - f (2s-\nu))^{n-j} \right.\right.$$

$$(d i (2k-m) + f (2s-\nu) + 2 (b i (2k-m) + c (2s-\nu)) z)^{j+1}$$

$$\left(-(d i (2k-m) + f (2s-\nu) + 2 (b i (2k-m) + c (2s-\nu)) z)^2 / (b i (2k-m) + c (2s-\nu)) \right)^{\frac{1}{2}(-j-1)}$$

$$\left. \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d i (2k-m) + f (2s-\nu) + 2 (b i (2k-m) + c (2s-\nu)) z)^2}{4 (b i (2k-m) + c (2s-\nu))} \right) \right)$$

$$(b i (2k-m) + c (2s-\nu))^{-n-1} + e^{\frac{i \pi \nu}{2} - \frac{(d i (m-2k) + f (2s-\nu))^2}{4 (b i (m-2k) + c (2s-\nu))}} (b i (m-2k) + c (2s-\nu))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i\, d\,(m-2k) - f\,(2s-v))^{n-j} (d\, i\,(m-2k) + f\,(2s-v) + 2\,(b\, i\,(m-2k) + c\,(2s-v))\,z)^{j+1}$$
$$\left(-(d\, i\,(m-2k) + f\,(2s-v) + 2\,(b\, i\,(m-2k) + c\,(2s-v))\,z)^2 \big/ (b\, i\,(m-2k) + c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\,(m-2k) + f\,(2s-v) + 2\,(b\, i\,(m-2k) + c\,(2s-v))\,z)^2}{4\,(b\, i\,(m-2k) + c\,(2s-v))}\right) +$$
$$e^{-\frac{(d\, i\,(2k-m) + f\,(v-2s))^2}{4\,(b\, i\,(2k-m) + c\,(v-2s))} - \frac{i\pi v}{2}} (b\, i\,(2k-m) + c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, d\,(2k-m) - f\,(v-2s))^{n-j}$$
$$(d\, i\,(2k-m) + f\,(v-2s) + 2\,(b\, i\,(2k-m) + c\,(v-2s))\,z)^{j+1}$$
$$\left(-(d\, i\,(2k-m) + f\,(v-2s) + 2\,(b\, i\,(2k-m) + c\,(v-2s))\,z)^2 \big/ (b\, i\,(2k-m) + c\,(v-2s))\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\,(2k-m) + f\,(v-2s) + 2\,(b\, i\,(2k-m) + c\,(v-2s))\,z)^2}{4\,(b\, i\,(2k-m) + c\,(v-2s))}\right) +$$
$$e^{-\frac{(d\, i\,(m-2k) + f\,(v-2s))^2}{4\,(b\, i\,(m-2k) + c\,(v-2s))} - \frac{i\pi v}{2}} (b\, i\,(m-2k) + c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, d\,(m-2k) - f\,(v-2s))^{n-j}$$
$$(d\, i\,(m-2k) + f\,(v-2s) + 2\,(b\, i\,(m-2k) + c\,(v-2s))\,z)^{j+1}$$
$$\left(-(d\, i\,(m-2k) + f\,(v-2s) + 2\,(b\, i\,(m-2k) + c\,(v-2s))\,z)^2 \big/ (b\, i\,(m-2k) + c\,(v-2s))\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$
$$\left.\Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\,(m-2k) + f\,(v-2s) + 2\,(b\, i\,(m-2k) + c\,(v-2s))\,z)^2}{4\,(b\, i\,(m-2k) + c\,(v-2s))}\right)\right)\right) /;\ n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n \cos^m\!\left(\sqrt{z}\, b + d\, z\right) \sinh^v\!\left(\sqrt{z}\, c + f\, z\right) dz ==$$
$$\frac{i^v\, 2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2)}{n+1} + (-1)^{n-1}\, 2^{-m-2n-v-1}\, d^{-2n-2}\, i^v \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2k-m)^{-2n-2} \left(e^{-\frac{i b^2 (2k-m)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b\,(2k-m))^{-h-j+2n} \left(b\, i\,(2k-m) + 2\, d\, i \sqrt{z}\,(2k-m)\right)^{h+j} \right.$$
$$\left(\frac{i\left(b\, i\,(2k-m) + 2\, d\, i \sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i\,(2k-m) \left(b\, i\,(2k-m) + \right.\right.$$
$$\left. 2\, d\, i \sqrt{z}\,(2k-m)\right) \Gamma\!\left(\frac{1}{2}(h+j+1), \frac{i\left(b\, i\,(2k-m) + 2\, d\, i \sqrt{z}\,(2k-m)\right)^2}{4\, d\,(2k-m)}\right) + 2\, d\, i\,(2k-m)$$

$$\sqrt{\frac{i\left(b\,i\,(2k-m)+2\,d\,i\,\sqrt{z}\,(2k-m)\right)^2}{d\,(2k-m)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(2k-m)+2\,d\,i\,\sqrt{z}\,(2k-m)\right)^2}{4\,d\,(2k-m)}\right)\Bigg)+$$

$$e^{-\frac{i\,b^2\,(m-2k)}{4d}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2k))^{-h-j+2n}\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^{h+j}$$

$$\left(\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(b\,i\,(m-2k)\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\right)+$$

$$2\,d\,i\,(m-2k)\sqrt{\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{d\,(m-2k)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\,\frac{i\left(b\,i\,(m-2k)+2\,d\,i\,\sqrt{z}\,(m-2k)\right)^2}{4\,d\,(m-2k)}\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}(f\,(2k-v))^{-2n-2}\Bigg((-1)^v\,e^{-\frac{c^2\,(2k-v)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2k-v))^{-h-j+2n}$$

$$\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)^{h+j}\left(-\frac{\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)^2}{f\,(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(2k-v)\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)^2}{4\,f\,(2k-v)}\right)+2\,f\,(2k-$$

$$v)\sqrt{-\frac{\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)^2}{f\,(2k-v)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(c\,(2k-v)+2\,f\,\sqrt{z}\,(2k-v)\right)^2}{4\,f\,(2k-v)}\right)\Bigg)+$$

$$e^{-\frac{c^2\,(v-2k)}{4f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\left(c\,(v-2k)+2\,f\,\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c(v-2k)\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)\Gamma\Bigg(\frac{1}{2}(h+j+1),-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\Bigg)+2f(v-2k)\sqrt{-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),-\frac{\left(c(v-2k)+2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg((-1)^v e^{-\frac{(b\,i(2s-m)+c(2k-v))^2}{4(d\,i(2s-m)+f(2k-v))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b\,i(2s-m)+c(2k-v))^{-h-j+2n}$$

$$\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)^{h+j}\Big(-\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)^2\Big/(d\,i(2s-m)+f(2k-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i(2s-m)+c(2k-v))\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)\Gamma\Big(\frac{1}{2}(h+j+1),-\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)^2\Big/(4(d\,i(2s-m)+f(2k-v)))\Big)+2(d\,i(2s-m)+f(2k-v))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),-\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)^2\Big/(4(d\,i(2s-m)+f(2k-v)))\Big)\sqrt{\Big(-\left(b\,i(2s-m)+c(2k-v)+2(d\,i(2s-m)+f(2k-v))\sqrt{z}\right)^2\Big/(d\,i(2s-m)+f(2k-v))\Big)}\Big)\Bigg)$$

$$(d\,i(2s-m)+f(2k-v))^{-2n-2}+(-1)^v e^{-\frac{(b\,i(m-2s)+c(2k-v))^2}{4(d\,i(m-2s)+f(2k-v))}}(d\,i(m-2s)+f(2k-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b\,i(m-2s)+c(2k-v))^{-h-j+2n}$$

$$\left(b\,i(m-2s)+c(2k-v)+2(d\,i(m-2s)+f(2k-v))\sqrt{z}\right)^{h+j}\Big(-\left(b\,i(m-2s)+c(2k-v)+2(d\,i(m-2s)+f(2k-v))\sqrt{z}\right)^2\Big/(d\,i(m-2s)+f(2k-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i(m-2s)+c(2k-v))\left(b\,i(m-2s)+c(2k-v)+2(d\,i(m-2s)+f(2k-v))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),-\left(b\,i(m-2s)+c(2k-v)+2(d\,i(m-2s)+f(2k-v))\sqrt{z}\right)^2\Big/$$

$$\left.(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\right)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\right)\sqrt{\left(-\left(b\,i\,(m-2\,s)+c\,(2\,k-v)+\right.\right.}$$

$$\left.\left.\left.2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\right)^2\right/(d\,i\,(m-2\,s)+f\,(2\,k-v))\right)\Bigg)+$$

$$e^{-\frac{(b\,i\,(2\,s-m)+c\,(v-2\,k))^2}{4\,(d\,i\,(2\,s-m)+f\,(v-2\,k))}}\,(d\,i\,(2\,s-m)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(2\,s-m)+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+\right.\right.$$

$$\left.\left.2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,s-m)+f\,(v-2\,k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(2\,s-m)+c\,(v-2\,k))\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)\sqrt{\left(-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+\right.\right.}$$

$$\left.\left.\left.2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/(d\,i\,(2\,s-m)+f\,(v-2\,k))\right)\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}}\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+\right.\right.$$

$$\left.\left.2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(m-2\,s)+f\,(v-2\,k)))\right)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,s)+$$

$$\left.f\,(v-2\,k)))\right)\sqrt{\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/}$$

$$\left.\left.(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b z^r + d z + e) \sinh^\nu(c z^r + f z)$

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$$\int z^n \cos^m(b z^2 + d z + e) \sinh^\nu(c z^2 + f z)\, dz = \frac{i^{-\nu}\left((-1)^m 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{n+1} - i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \Bigg(e^{\frac{i d^2 (2k-m)}{4b} - i e (2k-m)}$$

$$\left(\sum_{j=0}^{n} 2^{j-n} (i d (2k-m))^{n-j} (-i d (2k-m) - 2 i b z (2k-m))^{j+1} \left(-\frac{i(-i d (2k-m) - 2 i b z (2k-m))^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)} \right.$$

$$\left. \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{i(-i d (2k-m) - 2 i b z (2k-m))^2}{4b(2k-m)}\right)\right) (-i b (2k-m))^{-n-1} +$$

$$e^{\frac{i d^2 (m-2k)}{4b} - i e (m-2k)} (-i b (m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i d (m-2k))^{n-j} (-i d (m-2k) - 2 i b z (m-2k))^{j+1}$$

$$\left(-\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{i(-i d (m-2k) - 2 i b z (m-2k))^2}{4b(m-2k)}\right)\Bigg) -$$

$$(-1)^{m+\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg((-1)^\nu e^{\frac{f^2 (2k-\nu)}{4c}} \left(\sum_{j=0}^{n} 2^{j-n} (f(2k-\nu))^{n-j} (-f(2k-\nu) - 2 c z (2k-\nu))^{j+1} \right.$$

$$\left. \left(\frac{(-f(2k-\nu) - 2 c z (2k-\nu))^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(-f(2k-\nu) - 2 c z (2k-\nu))^2}{4c(2k-\nu)}\right)\right)$$

$$(-c(2k-\nu))^{-n-1} + e^{\frac{f^2(\nu-2k)}{4c}} (-c(\nu-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(\nu-2k))^{n-j} (-f(\nu-2k) - 2 c z (\nu-2k))^{j+1}$$

$$\left(\frac{(-f(\nu-2k) - 2 c z (\nu-2k))^2}{c(\nu-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(-f(\nu-2k) - 2 c z (\nu-2k))^2}{4c(\nu-2k)}\right)\Bigg) -$$

$$(-1)^\nu 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg((-1)^\nu e^{-\frac{(-i d (2k-m) - f(2s-\nu))^2}{4(-i b (2k-m) - c(2s-\nu))} - i e (2k-m)} \Bigg(\sum_{j=0}^{n} 2^{j-n} (d\, i (2k-m) + f(2s-\nu))^{n-j}$$

$$(-i d (2k-m) - f(2s-\nu) + 2(-i b (2k-m) - c(2s-\nu)) z)^{j+1} \Big(-(-i d (2k-m) - f(2s-\nu) +$$

$$2(-i b (2k-m) - c(2s-\nu)) z)^2 \big/ (-i b (2k-m) - c(2s-\nu))\Big)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\Big(\frac{j+1}{2},$$

$$-(-i d (2k-m) - f(2s-\nu) + 2(-i b (2k-m) - c(2s-\nu)) z)^2 \big/ (4(-i b (2k-m) - c(2s-\nu)))\Big)\Bigg)$$

$$(-i\, b\,(2\,k-m)-c\,(2\,s-v))^{-n-1}+(-1)^{v}\, e^{-\frac{(-i\,d\,(m-2\,k)-f\,(2\,s-v))^2}{4\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))}-i\,e\,(m-2\,k)}\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(d\,i\,(m-2\,k)+f\,(2\,s-v))^{n-j}\,(-i\,d\,(m-2\,k)-f\,(2\,s-v)+2\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))\,z)^{j+1}$$

$$\left(-(-i\,d\,(m-2\,k)-f\,(2\,s-v)+2\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))\,z)^2\Big/(-i\,b\,(m-2\,k)-c\,(2\,s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-(-i\,d\,(m-2\,k)-f\,(2\,s-v)+2\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))\,z)^2\Big/\right.$$

$$\left.(4\,(-i\,b\,(m-2\,k)-c\,(2\,s-v)))\right)+e^{-\frac{(-i\,d\,(2\,k-m)-f\,(v-2\,s))^2}{4\,(-i\,b\,(2\,k-m)-c\,(v-2\,s))}-i\,e\,(2\,k-m)}\,(-i\,b\,(2\,k-m)-c\,(v-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(d\,i\,(2\,k-m)+f\,(v-2\,s))^{n-j}\,(-i\,d\,(2\,k-m)-f\,(v-2\,s)+2\,(-i\,b\,(2\,k-m)-c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-(-i\,d\,(2\,k-m)-f\,(v-2\,s)+2\,(-i\,b\,(2\,k-m)-c\,(v-2\,s))\,z)^2\Big/(-i\,b\,(2\,k-m)-c\,(v-2\,s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-(-i\,d\,(2\,k-m)-f\,(v-2\,s)+2\,(-i\,b\,(2\,k-m)-c\,(v-2\,s))\,z)^2\Big/\right.$$

$$\left.(4\,(-i\,b\,(2\,k-m)-c\,(v-2\,s)))\right)+e^{-\frac{(-i\,d\,(m-2\,k)-f\,(v-2\,s))^2}{4\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))}-i\,e\,(m-2\,k)}\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{n-j}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s)+2\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\,z)^{j+1}$$

$$\left(-(-i\,d\,(m-2\,k)-f\,(v-2\,s)+2\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\,z)^2\Big/(-i\,b\,(m-2\,k)-c\,(v-2\,s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-(-i\,d\,(m-2\,k)-f\,(v-2\,s)+2\,(-i\,b\,(m-2\,k)-c\,(v-2\,s))\,z)^2\Big/\right.$$

$$\left.\left.(4\,(-i\,b\,(m-2\,k)-c\,(v-2\,s)))\right)\right)\,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n \cos^m\!\left(\sqrt{z}\,b+e+d\,z\right)\sinh^v\!\left(\sqrt{z}\,c+f\,z\right)dz=$$

$$\frac{i^{-v}\left((-1)^m\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)\right)}{n+1}+2^{-m-2\,n-v-1}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{\frac{i\,b^2\,(2\,k-m)}{4\,d}-i\,e\,(2\,k-m)}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,k-m))^{-h-j+2\,n}\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\,(2\,k-m)\right)^{h+j}\right.\right.$$

$$\left(-\frac{i\left(-i\,b\,(2\,k-m)-2\,i\,d\,\sqrt{z}\,(2\,k-m)\right)^2}{d\,(2\,k-m)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-i\,b\,(2\,k-m)\right.$$

$$\left(-i\, b\, (2\, k-m)-2\, i\, d\, \sqrt{z}\, (2\, k-m)\right) \Gamma\left(\frac{1}{2}\, (h+j+1),\, -\frac{i\left(-i\, b\, (2\, k-m)-2\, i\, d\, \sqrt{z}\, (2\, k-m)\right)^2}{4\, d\, (2\, k-m)}\right)-$$

$$2\, i\, d\, (2\, k-m) \sqrt{-\frac{i\left(-i\, b\, (2\, k-m)-2\, i\, d\, \sqrt{z}\, (2\, k-m)\right)^2}{d\, (2\, k-m)}}\, \Gamma\left(\frac{1}{2}\, (h+j+2),\right.$$

$$\left.\left.\left.\left. -\frac{i\left(-i\, b\, (2\, k-m)-2\, i\, d\, \sqrt{z}\, (2\, k-m)\right)^2}{4\, d\, (2\, k-m)}\right)\right)\right)\right) (-i\, d\, (2\, k-m))^{-2\, n-2}+e^{\frac{i\, b^2\, (m-2\, k)}{4\, d}-i\, e\, (m-2\, k)}$$

$$(-i\, d\, (m-2\, k))^{-2\, n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b\, (m-2\, k))^{-h-j+2\, n} \left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right)^{h+j}$$

$$\left(-\frac{i\left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right)^2}{d\, (m-2\, k)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-i\, b\, (m-2\, k)\right.$$

$$\left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right) \Gamma\left(\frac{1}{2}\, (h+j+1),\, -\frac{i\left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right)^2}{4\, d\, (m-2\, k)}\right)-$$

$$2\, i\, d\, (m-2\, k) \sqrt{-\frac{i\left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right)^2}{d\, (m-2\, k)}}\, \Gamma\left(\frac{1}{2}\, (h+j+2),\right.$$

$$\left.\left.\left.\left. -\frac{i\left(-i\, b\, (m-2\, k)-2\, i\, d\, \sqrt{z}\, (m-2\, k)\right)^2}{4\, d\, (m-2\, k)}\right)\right)\right)\right)+(-1)^{m+v}\, 2^{-m-2\, n-v-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v\, e^{\frac{c^2\, (2\, k-v)}{4\, f}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\, (2\, k-v))^{-h-j+2\, n} \left(-c\, (2\, k-v)-2\, f\, \sqrt{z}\, (2\, k-v)\right)^{h+j}\right.\right.$$

$$\left(\frac{\left(-c\, (2\, k-v)-2\, f\, \sqrt{z}\, (2\, k-v)\right)^2}{f\, (2\, k-v)}\right)^{\frac{1}{2}\, (-h-j-1)} \binom{j}{h} \binom{n}{j} \left(-c\, (2\, k-v) \left(-c\, (2\, k-v)-2\, f\, \sqrt{z}\, (2\, k-v)\right)\right.$$

$$\Gamma\left(\frac{1}{2}\, (h+j+1),\, \frac{\left(-c\, (2\, k-v)-2\, f\, \sqrt{z}\, (2\, k-v)\right)^2}{4\, f\, (2\, k-v)}\right)-2\, f\, (2\, k-v)$$

$$\sqrt{\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{f\,(2\,k-v)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(2\,k-v)-2\,f\,\sqrt{z}\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)\Bigg)\Bigg)\Bigg)$$

$$(-f\,(2\,k-v))^{-2\,n-2}+e^{\frac{c^2\,(v-2\,k)}{4\,f}}\,(-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}\left(\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(-c\,(v-2\,k)\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)-$$

$$2\,f\,(v-2\,k)\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+(-1)^v\,2^{-m-2\,n-v-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg((-1)^v\,e^{-\frac{(-i\,b\,(2\,s-m)-c\,(2\,k-v))^2}{4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))}-i\,e\,(2\,s-m)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,s-m)-c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\Big(-\big(-i\,b\,(2\,s-m)-c\,(2\,k-v)+$$

$$2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\big)^2\Big/(-i\,d\,(2\,s-m)-f\,(2\,k-v))\Big)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Big((-i\,b\,(2\,s-m)-c\,(2\,k-v))\left(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\big(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v)))\Big)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+2),\,-\big(-i\,b\,(2\,s-m)-c\,(2\,k-v)+2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\big)^2\Big/$$

$$(4\,(-i\,d\,(2\,s-m)-f\,(2\,k-v)))\Big)\sqrt{\Big(-\big(-i\,b\,(2\,s-m)-c\,(2\,k-v)+}$$

$$\overline{2\,(-i\,d\,(2\,s-m)-f\,(2\,k-v))\,\sqrt{z}\big)^2\Big/(-i\,d\,(2\,s-m)-f\,(2\,k-v))\Big)}\Big)\Big)$$

$$(-i\,d\,(2\,s-m)-f\,(2\,k-v))^{-2\,n-2}+(-1)^v\,e^{-\frac{(-i\,b\,(m-2\,s)-c\,(2\,k-v))^2}{4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))}-i\,e\,(m-2\,s)}\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-c\,(2\,k-v))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+\right.\right.$$

$$\left.\left.2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(m-2\,s)-f\,(2\,k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left((-i\,b\,(m-2\,s)-c\,(2\,k-v))\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v)))\right)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(m-2\,s)-f\,(2\,k-v)))\right)\sqrt{\left(-\left(-i\,b\,(m-2\,s)-c\,(2\,k-v)+\right.\right.}$$

$$\left.\left.\left.2\,(-i\,d\,(m-2\,s)-f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(-i\,d\,(m-2\,s)-f\,(2\,k-v))\right)\right)+$$

$$e^{-\frac{(-i\,b\,(2\,s-m)-c\,(v-2\,k))^2}{4\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))}-i\,e\,(2\,s-m)}\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,s-m)-$$

$$c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(-i\,d\,(2\,s-m)-f\,(v-2\,k))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b\,(2\,s-m)-c\,(v-2\,k))\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(2\,s-m)-f\,(v-2\,k)))\right)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(-i\,d\,(2\,s-m)-f\,(v-2\,k)))\right)\sqrt{\left(-\left(-i\,b\,(2\,s-m)-c\,(v-2\,k)+\right.\right.}$$

$$\left.\left.\left.2\,(-i\,d\,(2\,s-m)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(-i\,d\,(2\,s-m)-f\,(v-2\,k))\right)\right)+$$

$$e^{-\frac{(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))}-i\,e\,(m-2\,s)}\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s)-$$

$$c\,(v-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(-i\,b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\,d\,(m-2\,s)-f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/\right.$$

$$(-i\, d\,(m-2\,s)-f\,(v-2\,k))^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\Big((-i\, b\,(m-2\,s)-c\,(v-2\,k))\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)$$
$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(-i\, d\,(m-2\,s)-f\,(v-2\,k)))\right)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))$$
$$\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(-i\, d\,(m-2\,s)-f\,(v-2\,k)))\right)$$
$$\sqrt{\left(-\left(-i\, b\,(m-2\,s)-c\,(v-2\,k)+2\,(-i\, d\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}\right)^2\Big/\right.}$$
$$\left.\left.(-i\, d\,(m-2\,s)-f\,(v-2\,k))\right)\Big)\Big)\ /;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\, z) \sinh^v(c\, z^r + f\, z + g)$

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$$\int z^n \cos^m(d\, z)\sinh^v(c\, z^2+f\, z+g)\, dz =$$
$$\frac{i^{-v}\left(2^{-m-v} z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)\right)}{n+1}+(-1)^n\, 2^{-m-v}\, i^{-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma(n+1,\, i\, d\,(m-2\,k)\,z)\,(-i\, d\,(m-2\,k))^{-n-1}+(i\, d\,(m-2\,k))^{-n-1}\,\Gamma(n+1,\,-i\, d\,(m-2\,k)\,z)\right)-i^{-v}$$
$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$
$$\left(e^{\frac{(v-2\,k)\,f^2}{4\,c}-\frac{i\,\pi\, v}{2}-g\,(v-2\,k)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k))^{n-j}\,(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^{j+1}\left(\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$
$$\left.\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)(-c\,(v-2\,k))^{-n-1}+$$
$$e^{-\frac{(v-2\,k)\,f^2}{4\,c}+\frac{i\,\pi\, v}{2}+g\,(v-2\,k)}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$
$$\left(-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\Bigg)-$$

$$i^{-v}\, 2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{\frac{(-i\, d\, (m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)} - \frac{i\,\pi\, v}{2} - g\,(v-2s)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\, (d\, i\, (m-2k) + f\,(v-2s))^{n-j}$$

$$(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^{j+1} \left(\frac{(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(-i\, d\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)} \right) \Bigg)$$

$$(-c\,(v-2s))^{-n-1} + e^{\frac{(i\, d\,(m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)} - \frac{i\,\pi\, v}{2} - g\,(v-2s)} \Bigg(\sum_{j=0}^{n} 2^{j-n}\, (f\,(v-2s) - i\, d\,(m-2k))^{n-j}$$

$$(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^{j+1} \left(\frac{(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, \frac{(d\, i\,(m-2k) - f\,(v-2s) - 2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)} \right) \Bigg) (-c\,(v-2s))^{-n-1} +$$

$$e^{-\frac{(f\,(v-2s)-i\, d\,(m-2k))^2}{4\,c\,(v-2s)} + \frac{i\,\pi\, v}{2} + g\,(v-2s)}\, (c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (i\, d\,(m-2k) - f\,(v-2s))^{n-j}$$

$$(-i\, d\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^{j+1} \left(-\frac{(-i\, d\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-i\, d\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)} \right) +$$

$$e^{-\frac{(d\, i\,(m-2k)+f\,(v-2s))^2}{4\,c\,(v-2s)} + \frac{i\,\pi\, v}{2} + g\,(v-2s)}\, (c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n}\, (-i\, d\,(m-2k) - f\,(v-2s))^{n-j}$$

$$(d\, i\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^{j+1} \left(-\frac{(d\, i\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^2}{c\,(v-2s)} \right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(d\, i\,(m-2k) + f\,(v-2s) + 2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)} \right) \Bigg) \Bigg) /;\; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

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$$\int z^n \cos^m(d\, z) \sinh^v\!\left(\sqrt{z}\; c + g + f\, z\right) dz =$$

$$\frac{i^{-v}\, 2^{-m-v}\, z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)\,(1 - v \bmod 2)}{n+1} + (-1)^n\, 2^{-m-v}\, i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\Gamma(n+1,\, i\, d\,(m-2k)\, z)\, (-i\, d\,(m-2k))^{-n-1} + (i\, d\,(m-2k))^{-n-1}\, \Gamma(n+1,\, -i\, d\,(m-2k)\, z) \right) +$$

$$2^{-m-2n-v-1}\, i^{-v} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+n-1}\, (i\, f\,(v-2k))^{-2(n+1)} \binom{v}{k}$$

$$\Bigg(e^{\frac{(v-2k)c^2}{4f} - \frac{i\pi v}{2} - g\,(v-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c\,(v-2k))^{-h-j+2n} \left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right)^{h+j}$$

$$\left(\frac{\left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{f\,(v-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(-c\,(v-2k) \left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\, \frac{\left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{4\, f\,(v-2k)} \Bigg) - 2\, f\,(v-2k)$$

$$\sqrt{\frac{\left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{f\,(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, \frac{\left(-c\,(v-2k) - 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{4\, f\,(v-2k)} \right) \Bigg) +$$

$$e^{-\frac{(v-2k)c^2}{4f} + \frac{i\pi v}{2} + g\,(v-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(v-2k))^{-h-j+2n} \left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{f\,(v-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(c\,(v-2k) \left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\, -\frac{\left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{4\, f\,(v-2k)} \Bigg) + 2\, f\,(v-2k)$$

$$\sqrt{-\frac{\left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{f\,(v-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2),\, -\frac{\left(c\,(v-2k) + 2\, f\, \sqrt{z}\, (v-2k) \right)^2}{4\, f\,(v-2k)} \right) \Bigg) \Bigg) +$$

$$2^{-m-2n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{-\frac{c^2\,(v-2s)^2}{4\,(f\,(v-2s) - i\, d\,(m-2k))} + g\,(v-2s) + \frac{i\pi v}{2}} \Bigg(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(v-2s))^{-h-j+2n}$$

$$\left(c\,(v-2s) + 2\,(f\,(v-2s) - i\, d\,(m-2k))\, \sqrt{z} \right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\right)\right)$$

$$(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+\frac{i\,\pi\,v}{2}}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{c^2 (v-2s)^2}{4(-i d (m-2k)-f(v-2s))}-g(v-2s)-\frac{i\pi v}{2}} (-i d (m-2k)-f(v-2s))^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j (-c(v-2s))^{-h-j+2n} \left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-i d(m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2(-i d(m-2k)-f(v-2s))\sqrt{-\frac{\left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{-i d(m-2k)-f(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-i d(m-2k)-f(v-2s))}\right)-$$

$$c(v-2s)\left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)$$

$$\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(-i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(-i d(m-2k)-f(v-2s))}\right)\right)+$$

$$e^{-\frac{c^2 (v-2s)^2}{4(i d (m-2k)-f(v-2s))}-g(v-2s)-\frac{i\pi v}{2}} (i d (m-2k)-f(v-2s))^{-2(n+1)} \sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h} 4^j$$

$$(-c(v-2s))^{-h-j+2n} \left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{i d(m-2k)-f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2(i d(m-2k)-f(v-2s))\sqrt{-\frac{\left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{i d(m-2k)-f(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(i d(m-2k)-f(v-2s))}\right)-$$

$$c(v-2s)\left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2(i d(m-2k)-f(v-2s))\sqrt{z}-c(v-2s)\right)^2}{4(i d(m-2k)-f(v-2s))}\right)\right)\right) /; n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(d\,z+e)\sinh^v\left(c\,z^r+f\,z+g\right)$

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$$\int z^n \cos^m(e+d\,z)\sinh^v\left(c\,z^2+f\,z+g\right)dz = \frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1} + (-1)^n 2^{-m-v} i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$
$$\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1} + e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right) -$$
$$i^{-v}2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}-g\,(v-2k)}\right.$$
$$\left(\sum_{j=0}^{n}2^{j-n}(f\,(v-2k))^{n-j}(-f\,(v-2k)-2\,c\,z\,(v-2k))^{j+1}\left(\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.$$
$$\left.\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-f\,(v-2k)-2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right)(-c\,(v-2k))^{-n-1} + \right.$$
$$e^{-\frac{(v-2k)f^2}{4c}+\frac{i\pi v}{2}+g\,(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f\,(v-2k))^{n-j}(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$
$$\left.\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\right) -$$
$$i^{-v}2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{(-i\,d\,(m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)}-i\,e\,(m-2k)-\frac{i\pi v}{2}-g\,(v-2s)}\left(\sum_{j=0}^{n}2^{j-n}(d\,i\,(m-2k)+f\,(v-2s))^{n-j}\right.\right.$$
$$(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-i\,d\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{4\,c\,(v-2s)}\right)\right)(-c\,(v-2s))^{-n-1} +$$
$$e^{\frac{(i\,d\,(m-2k)-f\,(v-2s))^2}{4\,c\,(v-2s)}+e\,i\,(m-2k)-\frac{i\pi v}{2}-g\,(v-2s)}\left(\sum_{j=0}^{n}2^{j-n}(f\,(v-2s)-i\,d\,(m-2k))^{n-j}\right.$$
$$(d\,i\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^{j+1}\left(\frac{(d\,i\,(m-2k)-f\,(v-2s)-2\,c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{(d\,i\,(m-2k)-f\,(v-2s)-2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)\Bigg)(-c\,(v-2s))^{-n-1}+$$

$$e^{-\frac{(f\,(v-2s)-i\,d\,(m-2k))^2}{4c\,(v-2s)}-i\,e\,(m-2k)+\frac{i\pi v}{2}+g\,(v-2s)}\,(c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(i\,d\,(m-2k)-f\,(v-2s))^{n-j}$$

$$(-i\,d\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^{j+1}\left(-\frac{(-i\,d\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(-i\,d\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)+$$

$$e^{-\frac{(d\,i\,(m-2k)+f\,(v-2s))^2}{4c\,(v-2s)}+e\,i\,(m-2k)+\frac{i\pi v}{2}+g\,(v-2s)}\,(c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k)-f\,(v-2s))^{n-j}$$

$$(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^{j+1}\left(-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(d\,i\,(m-2k)+f\,(v-2s)+2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

01.19.21.3109.01

$$\int z^n\cos^m(e+d\,z)\sinh^v\left(\sqrt{z}\;c+g+f\,z\right)dz=$$

$$\frac{i^{-v}\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)}{n+1}+(-1)^n\,2^{-m-v}\,i^{-v}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-i\,e\,(m-2k)}\,\Gamma(n+1,\,i\,d\,(m-2k)\,z)\,(-i\,d\,(m-2k))^{-n-1}+e^{i\,e\,(m-2k)}\,(i\,d\,(m-2k))^{-n-1}\,\Gamma(n+1,\,-i\,d\,(m-2k)\,z)\right)+$$

$$2^{-m-2n-v-1}\,i^{-v}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+n-1}\,(i\,f\,(v-2k))^{-2(n+1)}\binom{v}{k}$$

$$\left(e^{\frac{(v-2k)c^2}{4f}-\frac{i\pi v}{2}-g\,(v-2k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2k))^{-h-j+2n}\left(-c\,(v-2k)-2f\sqrt{z}\,(v-2k)\right)^{h+j}\right.$$

$$\left(\frac{\left(-c\,(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{f\,(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(-c\,(v-2k)\left(-c\,(v-2k)-2f\sqrt{z}\,(v-2k)\right)\Gamma\left(\right.\right.$$

$$\frac{1}{2}(h+j+1),\,\frac{\left(-c\,(v-2k)-2f\sqrt{z}\,(v-2k)\right)^2}{4f\,(v-2k)}\right)-2f\,(v-2k)$$

$$\sqrt{\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{\left(-c\,(v-2\,k)-2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)+$$

$$e^{-\frac{(v-2\,k)\,c^2}{4\,f}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\Bigg)+2\,f\,(v-2\,k)$$

$$\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{c^2\,(v-2\,s)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}+g\,(v-2\,s)-i\,e\,(m-2\,k)+\frac{i\,\pi\,v}{2}}$$

$$\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)+$$

$$2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{4\,(f\,(v-2\,s)-i\,d\,(m-2\,k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(f\,(v-2\,s)-i\,d\,(m-2\,k))\,\sqrt{z}\right)^2}{f\,(v-2\,s)-i\,d\,(m-2\,k)}}\right)\right)(f\,(v-2\,s)-i\,d\,(m-2\,k))^{-2\,(n+1)}+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}+g\,(v-2\,s)+e\,i\,(m-2\,k)+\frac{i\,\pi\,v}{2}}\,(d\,i\,(m-2\,k)+f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s))^{-h-j+2\,n}\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\left(c\,(v-2\,s)\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)+$$

$$2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d\,i\,(m-2\,k)+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(c\,(v-2\,s)+2\,(d\,i\,(m-2\,k)+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d\,i\,(m-2\,k)+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{c^2\,(v-2\,s)^2}{4\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))}-g\,(v-2\,s)-i\,e\,(m-2\,k)-\frac{i\,\pi\,v}{2}}\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))^{-2\,(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(v-2\,s))^{-h-j+2\,n}\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^{h+j}$$

$$\left(-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{-\frac{\left(2\,(-i\,d\,(m-2\,k)-f\,(v-2\,s))\,\sqrt{z}-c\,(v-2\,s)\right)^2}{-i\,d\,(m-2\,k)-f\,(v-2\,s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(-i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(-i\, d\,(m-2k)-f\,(v-2s)\right)}\right)-$$

$$c\,(v-2s)\left(2\left(-i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\left(-i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(-i\, d\,(m-2k)-f\,(v-2s)\right)}\right)\right)\right)+$$

$$e^{-\frac{c^2(v-2s)^2}{4(i\, d\,(m-2k)-f\,(v-2s))}-g\,(v-2s)+e\, i\,(m-2k)-\frac{i\pi v}{2}}\left(i\, d\,(m-2k)-f\,(v-2s)\right)^{-2(n+1)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\left(-c\,(v-2s)\right)^{-h-j+2n}\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^{h+j}$$

$$\left(-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\, d\,(m-2k)-f\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{i\, d\,(m-2k)-f\,(v-2s)}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\, d\,(m-2k)-f\,(v-2s)\right)}\right)-$$

$$c\,(v-2s)\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.$$

$$\left.\left.\left.-\frac{\left(2\left(i\, d\,(m-2k)-f\,(v-2s)\right)\sqrt{z}-c\,(v-2s)\right)^2}{4\left(i\, d\,(m-2k)-f\,(v-2s)\right)}\right)\right)\right)\right) /;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\, z^r)\sinh^v(c\, z^r + f\, z + g)$

01.19.21.3110.01

$$\int z^n \cos^m(b\, z^2)\sinh^v(c\, z^2+f\, z+g)\, dz = -i^{-v}\, 2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(\Gamma\left(\frac{n+1}{2}, -i\, b\,(m-2k)\,z^2\right)\left(-i\, b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\left(i\, b\,(m-2k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2}, i\, b\,(m-2k)\,z^2\right)\right)\right)$$

$$z^{n+1}+\frac{i^{-v}\left(2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)\right)}{n+1}-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}-g(v-2k)}\left(\sum_{j=0}^{n}2^{j-n}(f(v-2k))^{n-j}(-f(v-2k)-2cz(v-2k))^{j+1}\left(\frac{(-f(v-2k)-2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\frac{(-f(v-2k)-2cz(v-2k))^2}{4c(v-2k)}\right)\right)(-c(v-2k))^{-n-1}+$$

$$e^{-\frac{(v-2k)f^2}{4c}+\frac{i\pi v}{2}+g(v-2k)}(c(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2k))^{n-j}(f(v-2k)+2cz(v-2k))^{j+1}$$

$$\left.\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\right)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4gi(v-2s)-2\pi v\right)}\left(\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}\right.\right.$$

$$(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{c(v-2s)-ib(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{4(c(v-2s)-ib(m-2k))}\right)\right)(c(v-2s)-ib(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+2\pi v\right)}(bi(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{bi(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{4(bi(m-2k)+c(v-2s))}\right)+e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+2\pi v\right)}$$

$$(-ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{-ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-ib(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4} i \left(-\frac{f^2 (v-2s)^2}{2bk-bm+2ics-icv}+4 g i (v-2s)-2\pi v\right)} (i b (m-2k)-c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (f(v-2s))^{n-j}$$

$$(2(i b (m-2k)-c(v-2s)) z - f(v-2s))^{j+1} \left(-\frac{(2(i b (m-2k)-c(v-2s)) z - f(v-2s))^2}{i b (m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(i b (m-2k)-c(v-2s)) z - f(v-2s))^2}{4(i b (m-2k)-c(v-2s))}\right)\Bigg) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+ \wedge v \in \mathbb{N}^+$$

01.19.21.3111.01

$$\int z^n \cos^m\left(b\sqrt{z}\right) \sinh^v\left(\sqrt{z}\, c + g + f z\right) dz = (-1)^n 2^{-m-v+1} i^{-v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (m-2k)^{-2(n+1)} \binom{m}{k} \left(\Gamma\left(2(n+1), -i b (m-2k)\sqrt{z}\right) + \Gamma\left(2(n+1), i b (m-2k)\sqrt{z}\right)\right)\right) b^{-2(n+1)} +$$

$$\frac{i^{-v} \left(2^{-m-v} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1 - m \bmod 2)(1 - v \bmod 2)\right)}{n+1} + 2^{-m-2n-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} (f(v-2k))^{-2(n+1)} \left((-1)^v e^{\frac{c^2 (v-2k)}{4f} - g(v-2k)} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-c(v-2k))^{-h-j+2n}\right.$$

$$\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right)^{h+j} \left(\frac{\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(-c(v-2k)$$

$$\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right) - 2f(v-2k)$$

$$\left.\sqrt{\frac{\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c(v-2k) - 2f\sqrt{z}\,(v-2k)\right)^2}{4f(v-2k)}\right)\right) +$$

$$e^{g(v-2k) - \frac{c^2 (v-2k)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(v-2k))^{-h-j+2n} \left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right)^2}{f(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \Bigg(c(v-2k)\left(c(v-2k) + 2f\sqrt{z}\,(v-2k)\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\Bigg)+2f(v-2k)\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{4f(v-2k)}\Bigg)\sqrt{-\frac{\left(c(v-2k)+2f\sqrt{z}(v-2k)\right)^2}{f(v-2k)}}\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\,i^{-v}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}(f(v-2s))^{-2(n+1)}\Bigg(e^{\frac{(-i b(m-2k)-c(v-2s))^2}{4f(v-2s)}-\frac{i\pi v}{2}-g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i b(m-2k)-c(v-2s))^{-h-j+2n}\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i b(m-2k)-c(v-2s))\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\right)-$$

$$2f(v-2s)\sqrt{\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-i b(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{4f(v-2s)}\Bigg)\Bigg)+e^{\frac{(i b(m-2k)-c(v-2s))^2}{4f(v-2s)}-\frac{i\pi v}{2}-g(v-2s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i b(m-2k)-c(v-2s))^{-h-j+2n}\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i(m-2k)-c(v-2s)-2f(v-2s)\sqrt{z}\right)^2}{f(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((i\, b\,(m-2\,k)-c\,(v-2\,s))\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\, \frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)-$$

$$2\,f\,(v-2\,s)\sqrt{\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\;\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$\frac{\left(b\,i\,(m-2\,k)-c\,(v-2\,s)-2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg)+e^{-\frac{(c\,(v-2\,s)-i\,b\,(m-2\,k))^2}{4\,f\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,s)-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((c\,(v-2\,s)-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\, -\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(-i\,b\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)+e^{-\frac{(b\,i\,(m-2\,k)+c\,(v-2\,s))^2}{4\,f\,(v-2\,s)}+\frac{i\,\pi\,v}{2}+g\,(v-2\,s)}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,k)+c\,(v-2\,s))\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)+$$

$$2\,f\,(v-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,k)+c\,(v-2\,s)+2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\cos^m\left(b\,z^r+e\right)\sinh^v\left(c\,z^r+f\,z+g\right)$

01.19.21.3112.01

$$\int z^n\cos^m\left(b\,z^2+e\right)\sinh^v\left(c\,z^2+f\,z+g\right)dz = \frac{i^{-v}\left(2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)\,(1-v\bmod 2)\right)}{n+1}-$$

$$i^{-v}\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\left(e^{i\,e\,(m-2\,k)}\,z^{n+1}\,\Gamma\left(\frac{n+1}{2},\,-i\,b\,(m-2\,k)\,z^2\right)\left(-i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.e^{-i\,e\,(m-2\,k)}\,z^{n+1}\left(i\,b\,(m-2\,k)\,z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\left(\frac{n+1}{2},\,i\,b\,(m-2\,k)\,z^2\right)\right)-i^{-v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}$$

$$\left(e^{\frac{(v-2\,k)\,f^2}{4\,c}-\frac{i\,\pi\,v}{2}-g\,(v-2\,k)}\left(\sum_{j=0}^{n}2^{j-n}\,(f\,(v-2\,k))^{n-j}\,(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^{j+1}\left(\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{(-f\,(v-2\,k)-2\,c\,z\,(v-2\,k))^2}{4\,c\,(v-2\,k)}\right)\right)(-c\,(v-2\,k))^{-n-1}+$$

$$e^{-\frac{(v-2\,k)\,f^2}{4\,c}+\frac{i\,\pi\,v}{2}+g\,(v-2\,k)}\,(c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2\,k))^{n-j}\,(f\,(v-2\,k)+2\,c\,z\,(v-2\,k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^{-v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4gi(v-2s)+4e(m-2k)-2\pi v\right)}\Bigg(\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^{j+1}\left(-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{c(v-2s)-ib(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(c(v-2s)-ib(m-2k))z)^2}{4(c(v-2s)-ib(m-2k))}\right)\Bigg)(c(v-2s)-ib(m-2k))^{-n-1}+$$

$$e^{\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+4e(m-2k)+2\pi v\right)}(bi(m-2k)+c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-f(v-2s))^{n-j}$$

$$(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^{j+1}\left(-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{bi(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2s)+2(bi(m-2k)+c(v-2s))z)^2}{4(bi(m-2k)+c(v-2s))}\right)+$$

$$e^{-\frac{1}{4}i\left(\frac{f^2(v-2s)^2}{-2bk+bm+2ics-icv}-4ig(v-2s)+4e(m-2k)+2\pi v\right)}(-ib(m-2k)-c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}$$

$$\left(-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{-ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2},-\frac{(2(-ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(-ib(m-2k)-c(v-2s))}\right)+$$

$$e^{\frac{1}{4}i\left(-\frac{f^2(v-2s)^2}{2bk-bm+2ics-icv}+4gi(v-2s)+4e(m-2k)-2\pi v\right)}(ib(m-2k)-c(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(f(v-2s))^{n-j}$$

$$(2(ib(m-2k)-c(v-2s))z-f(v-2s))^{j+1}\left(-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{ib(m-2k)-c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(2(ib(m-2k)-c(v-2s))z-f(v-2s))^2}{4(ib(m-2k)-c(v-2s))}\right)\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.3113.01

$$\int z^n \cos^m\left(\sqrt{z}\, b+e\right) \sinh^\nu\left(\sqrt{z}\, c+f\, z+g\right) dz = (-1)^n\, 2^{-m-\nu+1}\, i^{-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)$$

$$\left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (m-2k)^{-2(n+1)} \binom{m}{k} \left(e^{i e(m-2k)}\, \Gamma\left(2(n+1), -i\, b\,(m-2k)\sqrt{z}\right) + e^{-i e(m-2k)}\, \Gamma\left(2(n+1), i\, b\,(m-2k)\sqrt{z}\right)\right)\right)$$

$$b^{-2(n+1)} + \frac{i^{-\nu}\left(2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\right)}{n+1} + 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} (f(\nu-2k))^{-2(n+1)} \left((-1)^\nu e^{\frac{c^2(\nu-2k)}{4f}-g(\nu-2k)} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-c(\nu-2k))^{-h-j+2n}\right.$$

$$\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^{h+j} \left(\frac{\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(-c(\nu-2k)\right.$$

$$\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right) - 2f(\nu-2k)$$

$$\left.\left.\sqrt{\frac{\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{\left(-c(\nu-2k)-2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right)\right)\right) +$$

$$e^{g(\nu-2k)-\frac{c^2(\nu-2k)}{4f}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c(\nu-2k))^{-h-j+2n} \left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^{h+j}$$

$$\left(-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j} \left(c(\nu-2k)\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1), -\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right) + 2f(\nu-2k)\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{4f(\nu-2k)}\right)\sqrt{-\frac{\left(c(\nu-2k)+2f\sqrt{z}\,(\nu-2k)\right)^2}{f(\nu-2k)}}\right)\right) +$$

$$2^{-m-2n-v-1}\, i^{-v} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} (f\,(v-2\,s))^{-2\,(n+1)} \Bigg(e^{\frac{(-i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} - i\,e\,(m-2\,k) - \frac{i\,\pi\,v}{2} - g\,(v-2\,s)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b\,(m-2\,k) - c\,(v-2\,s))^{-h-j+2\,n} \left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((-i\,b\,(m-2\,k) - c\,(v-2\,s)) \left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{\left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) -$$

$$2\,f\,(v-2\,s)\,\sqrt{\frac{\left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}}\; \Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$\frac{\left(-i\,b\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\Bigg)\Bigg) + e^{\frac{(i\,b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,f\,(v-2\,s)} + e\,i\,(m-2\,k) - \frac{i\,\pi\,v}{2} - g\,(v-2\,s)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b\,(m-2\,k) - c\,(v-2\,s))^{-h-j+2\,n} \left(b\,i\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Bigg((i\,b\,(m-2\,k) - c\,(v-2\,s)) \left(b\,i\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\, \frac{\left(b\,i\,(m-2\,k) - c\,(v-2\,s) - 2\,f\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,f\,(v-2\,s)}\right) -$$

$$2\, f\, (v-2\, s) \sqrt{\frac{\left(b\, i\, (m-2\, k) - c\, (v-2\, s) - 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{f\, (v-2\, s)}}\; \Gamma\left(\frac{1}{2} (h+j+2),\right.$$

$$\left.\left.\left.\frac{\left(b\, i\, (m-2\, k) - c\, (v-2\, s) - 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{4\, f\, (v-2\, s)}\right)\right)\right) + e^{-\frac{(c\, (v-2\, s) - i\, b\, (m-2\, k))^2}{4\, f\, (v-2\, s)} - i\, e\, (m-2\, k) + \frac{i\, \pi\, v}{2} + g\, (v-2\, s)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\, (v-2\, s) - i\, b\, (m-2\, k))^{-h-j+2\, n} \left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{f\, (v-2\, s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(\vphantom{\frac{1}{2}}(c\, (v-2\, s) - i\, b\, (m-2\, k)) \left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2} (h+j+1), -\frac{\left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{4\, f\, (v-2\, s)}\right) +$$

$$2\, f\, (v-2\, s)\, \Gamma\left(\frac{1}{2} (h+j+2), -\frac{\left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{4\, f\, (v-2\, s)}\right)$$

$$\left.\sqrt{-\frac{\left(-i\, b\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{f\, (v-2\, s)}}\right) + e^{-\frac{(b\, i\, (m-2\, k) + c\, (v-2\, s))^2}{4\, f\, (v-2\, s)} + e\, i\, (m-2\, k) + \frac{i\, \pi\, v}{2} + g\, (v-2\, s)}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b\, i\, (m-2\, k) + c\, (v-2\, s))^{-h-j+2\, n} \left(b\, i\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\, i\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)^2}{f\, (v-2\, s)}\right)^{\frac{1}{2} (-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(\vphantom{\frac{1}{2}}(b\, i\, (m-2\, k) + c\, (v-2\, s)) \left(b\, i\, (m-2\, k) + c\, (v-2\, s) + 2\, f\, (v-2\, s) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)+$$

$$2\,f\,(v-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{4\,f\,(v-2s)}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b\,i\,(m-2k)+c\,(v-2s)+2\,f\,(v-2s)\sqrt{z}\right)^2}{f\,(v-2s)}}\right)\right) /; n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r + d\,z) \sinh^v(c\,z^r + f\,z + g)$

01.19.21.3114.01

$$\int z^n \cos^m(b\,z^2+d\,z)\sinh^v(c\,z^2+f\,z+g)\,dz =$$

$$\frac{i^v\,2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}$$

$$\left(e^{-\frac{i\,d^2\,(2k-m)}{4b}}\left(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2k-m))^{n-j}\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^{j+1}\left(\frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{b\,(2k-m)}\right)^{\frac{1}{2}(-j-1)}\right.\right.$$

$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(2k-m)+2\,b\,i\,z\,(2k-m))^2}{4\,b\,(2k-m)}\right)\right)(i\,b\,(2k-m))^{-n-1}+$$

$$e^{-\frac{i\,d^2\,(m-2k)}{4b}}\,(i\,b\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k))^{n-j}\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^{j+1}$$

$$\left.\left(\frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{b\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, \frac{i\,(d\,i\,(m-2k)+2\,b\,i\,z\,(m-2k))^2}{4\,b\,(m-2k)}\right)\right)-i^v\,2^{-m-v-1}$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(e^{-\frac{(2k-v)\,f^2}{4c}+g\,(2k-v)+\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2k-v))^{n-j}\,(f\,(2k-v)+2\,c\,z\,(2k-v))^{j+1}\right.\right.$$

$$\left.\left(-\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{c\,(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2}, -\frac{(f\,(2k-v)+2\,c\,z\,(2k-v))^2}{4\,c\,(2k-v)}\right)\right)(c\,(2k-v))^{-n-1}+$$

$$e^{-\frac{(v-2k)\,f^2}{4c}-\frac{i\,\pi\,v}{2}+g\,(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left(-\frac{(f(v-2k)+2cz(v-2k))^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(f(v-2k)+2cz(v-2k))^2}{4c(v-2k)}\right)\Bigg)-$$

$$i^v 2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d\,i\,(2k-m)+f(2s-v))^2}{4(b\,i\,(2k-m)+c(2s-v))}+g(2s-v)+\frac{i\pi v}{2}}\left(\sum_{j=0}^{n}2^{j-n}(-i\,d(2k-m)-f(2s-v))^{n-j}\right.$$
$$(d\,i\,(2k-m)+f(2s-v)+2(b\,i\,(2k-m)+c(2s-v))z)^{j+1}$$
$$\left(-(d\,i\,(2k-m)+f(2s-v)+2(b\,i\,(2k-m)+c(2s-v))z)^2\big/(b\,i\,(2k-m)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$
$$\left.\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(2k-m)+f(2s-v)+2(b\,i\,(2k-m)+c(2s-v))z)^2}{4(b\,i\,(2k-m)+c(2s-v))}\right)\right)$$
$$(b\,i\,(2k-m)+c(2s-v))^{-n-1}+e^{-\frac{(d\,i\,(m-2k)+f(2s-v))^2}{4(b\,i\,(m-2k)+c(2s-v))}+g(2s-v)+\frac{i\pi v}{2}}(b\,i\,(m-2k)+c(2s-v))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k)-f(2s-v))^{n-j}(d\,i\,(m-2k)+f(2s-v)+2(b\,i\,(m-2k)+c(2s-v))z)^{j+1}$$
$$\left(-(d\,i\,(m-2k)+f(2s-v)+2(b\,i\,(m-2k)+c(2s-v))z)^2\big/(b\,i\,(m-2k)+c(2s-v))\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f(2s-v)+2(b\,i\,(m-2k)+c(2s-v))z)^2}{4(b\,i\,(m-2k)+c(2s-v))}\right)+$$
$$e^{-\frac{(d\,i\,(2k-m)+f(v-2s))^2}{4(b\,i\,(2k-m)+c(v-2s))}-\frac{i\pi v}{2}+g(v-2s)}(b\,i\,(2k-m)+c(v-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}(-i\,d(2k-m)-f(v-2s))^{n-j}(d\,i\,(2k-m)+f(v-2s)+2(b\,i\,(2k-m)+c(v-2s))z)^{j+1}$$
$$\left(-(d\,i\,(2k-m)+f(v-2s)+2(b\,i\,(2k-m)+c(v-2s))z)^2\big/(b\,i\,(2k-m)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}$$
$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(2k-m)+f(v-2s)+2(b\,i\,(2k-m)+c(v-2s))z)^2}{4(b\,i\,(2k-m)+c(v-2s))}\right)+$$
$$e^{-\frac{(d\,i\,(m-2k)+f(v-2s))^2}{4(b\,i\,(m-2k)+c(v-2s))}-\frac{i\pi v}{2}+g(v-2s)}(b\,i\,(m-2k)+c(v-2s))^{-n-1}$$
$$\sum_{j=0}^{n}2^{j-n}(-i\,d(m-2k)-f(v-2s))^{n-j}(d\,i\,(m-2k)+f(v-2s)+2(b\,i\,(m-2k)+c(v-2s))z)^{j+1}$$
$$\left(-(d\,i\,(m-2k)+f(v-2s)+2(b\,i\,(m-2k)+c(v-2s))z)^2\big/(b\,i\,(m-2k)+c(v-2s))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f(v-2s)+2(b\,i\,(m-2k)+c(v-2s))z)^2}{4(b\,i\,(m-2k)+c(v-2s))}\right)\Bigg)\Bigg)\Bigg/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\cos^m\left(\sqrt{z}\,b+d\,z\right)\sinh^v\left(\sqrt{z}\,c+g+f\,z\right)dz=$$
$$\frac{i^v 2^{-m-v}z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)(1-v\bmod 2)}{n+1}+(-1)^{n-1}2^{-m-2n-v-1}d^{-2n-2}\,i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2k-m)^{-2n-2} \left(e^{-\frac{i b^2 (2k-m)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2k-m))^{-h-j+2n} \left(b i (2k-m) + 2 d i \sqrt{z} (2k-m)\right)^{h+j} \right.$$

$$\left(\frac{i \left(b i (2k-m) + 2 d i \sqrt{z} (2k-m)\right)^2}{d (2k-m)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b i (2k-m) \left(b i (2k-m) + \right.\right.$$

$$\left. 2 d i \sqrt{z} (2k-m)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(b i (2k-m) + 2 d i \sqrt{z} (2k-m)\right)^2}{4 d (2k-m)} \right) + 2 d i (2k-m)$$

$$\left.\left. \sqrt{\frac{i \left(b i (2k-m) + 2 d i \sqrt{z} (2k-m)\right)^2}{d (2k-m)}} \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(b i (2k-m) + 2 d i \sqrt{z} (2k-m)\right)^2}{4 d (2k-m)} \right) \right) \right. +$$

$$e^{-\frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2k))^{-h-j+2n} \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right)^{h+j}$$

$$\left(\frac{i \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right)^2}{d (m-2k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b i (m-2k) \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right)^2}{4 d (m-2k)} \right) + \right.$$

$$2 d i (m-2k) \sqrt{\frac{i \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right)^2}{d (m-2k)}} \Gamma\left(\frac{1}{2}(h+j+2), \right.$$

$$\left.\left.\left. \frac{i \left(b i (m-2k) + 2 d i \sqrt{z} (m-2k)\right)^2}{4 d (m-2k)} \right) \right) \right) + 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}}$$

$$(1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (f(2k-\nu))^{-2n-2} \left((-1)^\nu e^{g(2k-\nu) - \frac{c^2 (2k-\nu)}{4f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (c(2k-\nu))^{-h-j+2n} \right.$$

$$\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^{h+j}\left(-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(c\,(2\,k-v)\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)+2\,f\,(2\,k-\right.$$

$$\left.\left.v)\sqrt{-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{f\,(2\,k-v)}}\,\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(2\,k-v)+2\,f\,\sqrt{z}\,\,(2\,k-v)\right)^2}{4\,f\,(2\,k-v)}\right)\right)\right)+$$

$$e^{g\,(v-2\,k)-\frac{c^2\,(v-2\,k)}{4\,f}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,k)\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)\Gamma\right($$

$$\left.\frac{1}{2}\,(h+j+1),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)+2\,f\,(v-2\,k)$$

$$\left.\left.\sqrt{-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{f\,(v-2\,k)}}\,\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(c\,(v-2\,k)+2\,f\,\sqrt{z}\,\,(v-2\,k)\right)^2}{4\,f\,(v-2\,k)}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left((-1)^v\,e^{g\,(2\,k-v)-\frac{(b\,i\,(2\,s-m)+c\,(2\,k-v))^2}{4\,(d\,i\,(2\,s-m)+f\,(2\,k-v))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(2\,s-m)+c\,(2\,k-v))^{-h-j+2\,n}\right.\right.$$

$$\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^{h+j}\left(-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+\right.\right.$$

$$\left.\left.2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/(d\,i\,(2\,s-m)+f\,(2\,k-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b\,i\,(2\,s-m)+c\,(2\,k-v))\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\right)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\right)\sqrt{\left(-\left(b\,i\,(2\,s-m)+c\,(2\,k-v)+\right.\right.}$$

$$2\left(d\,i\,(2s-m)+f\,(2k-v)\right)\sqrt{z}\Big)^2\Big/\left(d\,i\,(2s-m)+f\,(2k-v)\right)\Big)\Big)\Big)$$

$$(d\,i\,(2s-m)+f\,(2k-v))^{-2n-2}+(-1)^v\,e^{g\,(2k-v)-\frac{(b\,i\,(m-2s)+c\,(2k-v))^2}{4\,(d\,i\,(m-2s)+f\,(2k-v))}}\,(d\,i\,(m-2s)+f\,(2k-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(2k-v))^{-h-j+2n}$$

$$\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(m-2s)+c\,(2k-v)+$$

$$2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\Big)^2\Big/(d\,i\,(m-2s)+f\,(2k-v))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(m-2s)+c\,(2k-v))\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(m-2s)+f\,(2k-v)))\Big)+2\,(d\,i\,(m-2s)+f\,(2k-v))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(m-2s)+c\,(2k-v)+2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(m-2s)+f\,(2k-v)))\Big)\sqrt{\Big(-\Big(b\,i\,(m-2s)+c\,(2k-v)+}$$

$$2\,(d\,i\,(m-2s)+f\,(2k-v))\sqrt{z}\Big)^2\Big/(d\,i\,(m-2s)+f\,(2k-v))\Big)\Big)+$$

$$e^{g\,(v-2k)-\frac{(b\,i\,(2s-m)+c\,(v-2k))^2}{4\,(d\,i\,(2s-m)+f\,(v-2k))}}\,(d\,i\,(2s-m)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(2s-m)+c\,(v-2k))^{-h-j+2n}$$

$$\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(2s-m)+c\,(v-2k)+$$

$$2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\Big)^2\Big/(d\,i\,(2s-m)+f\,(v-2k))\Big)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(2s-m)+c\,(v-2k))\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2s-m)+f\,(v-2k)))\Big)+2\,(d\,i\,(2s-m)+f\,(v-2k))$$

$$\Gamma\Big(\frac{1}{2}(h+j+2),\,-\left(b\,i\,(2s-m)+c\,(v-2k)+2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2\Big/$$

$$(4\,(d\,i\,(2s-m)+f\,(v-2k)))\Big)\sqrt{\Big(-\Big(b\,i\,(2s-m)+c\,(v-2k)+}$$

$$2\,(d\,i\,(2s-m)+f\,(v-2k))\sqrt{z}\Big)^2\Big/(d\,i\,(2s-m)+f\,(v-2k))\Big)\Big)+$$

$$e^{g\,(v-2k)-\frac{(b\,i\,(m-2s)+c\,(v-2k))^2}{4\,(d\,i\,(m-2s)+f\,(v-2k))}}\,(d\,i\,(m-2s)+f\,(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2s)+c\,(v-2k))^{-h-j+2n}$$

$$\left(b\,i\,(m-2s)+c\,(v-2k)+2\,(d\,i\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^{h+j}\Big(-\Big(b\,i\,(m-2s)+c\,(v-2k)+$$

$$2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\Big)^2 \Big/ (d\,i\,(m-2\,s)+f\,(v-2\,k))\Big)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\Big(\frac{1}{2}(h+j+1),\,-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/$$

$$(4\,(d\,i\,(m-2\,s)+f\,(v-2\,k)))\Big)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\Gamma\Big(\frac{1}{2}(h+j+2),$$

$$-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/ (4\,(d\,i\,(m-2\,s)+$$

$$f\,(v-2\,k)))\Big)\sqrt{\Big(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2 \Big/}$$

$$(d\,i\,(m-2\,s)+f\,(v-2\,k))\Big)\Big)\Big) \,/;\, n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n \cos^m(b\,z^r+d\,z+e)\sinh^v(c\,z^r+f\,z+g)$

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$$\int z^n \cos^m\left(b\,z^2+d\,z+e\right)\sinh^v\left(c\,z^2+f\,z+g\right)dz = $$

$$\frac{\left(i^v\,2^{-m-v}\,z^{n+1}\right)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m \bmod 2)\,(1-v \bmod 2)}{n+1} - i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\Big(e^{i\,e\,(2\,k-m)-\frac{i\,d^2\,(2\,k-m)}{4\,b}}$$

$$\Big(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2\,k-m))^{n-j}\,(d\,i\,(2\,k-m)+2\,b\,i\,z\,(2\,k-m))^{j+1}\left(\frac{i\,(d\,i\,(2\,k-m)+2\,b\,i\,z\,(2\,k-m))^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(2\,k-m)+2\,b\,i\,z\,(2\,k-m))^2}{4\,b\,(2\,k-m)}\right)\Big)(i\,b\,(2\,k-m))^{-n-1}+$$

$$e^{i\,e\,(m-2\,k)-\frac{i\,d^2\,(m-2\,k)}{4\,b}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2\,k))^{n-j}\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^{j+1}$$

$$\left(\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(d\,i\,(m-2\,k)+2\,b\,i\,z\,(m-2\,k))^2}{4\,b\,(m-2\,k)}\right)\Big)-i^v\,2^{-m-v-1}$$

$$\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Big(e^{-\frac{(2\,k-v)\,f^2}{4\,c}+g\,(2\,k-v)+\frac{i\,\pi\,v}{2}}\Big(\sum_{j=0}^{n}2^{j-n}\,(-f\,(2\,k-v))^{n-j}\,(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^{j+1}$$

$$\left(-\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(f\,(2\,k-v)+2\,c\,z\,(2\,k-v))^2}{4\,c\,(2\,k-v)}\right)\Big)(c\,(2\,k-v))^{-n-1}+$$

$$e^{-\frac{(v-2k)f^2}{4c}-\frac{i\pi v}{2}+g(v-2k)}\,(c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-f\,(v-2k))^{n-j}\,(f\,(v-2k)+2\,c\,z\,(v-2k))^{j+1}$$

$$\left(-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(f\,(v-2k)+2\,c\,z\,(v-2k))^2}{4\,c\,(v-2k)}\right)\Bigg)-$$

$$i^v\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d\,i\,(2k-m)+f\,(2s-v))^2}{4\,(b\,i\,(2k-m)+c\,(2s-v))}+e\,i\,(2k-m)+g\,(2s-v)+\frac{i\pi v}{2}}$$

$$\Bigg(\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2k-m)-f\,(2s-v))^{n-j}\,(d\,i\,(2k-m)+f\,(2s-v)+2\,(b\,i\,(2k-m)+c\,(2s-v))\,z)^{j+1}$$

$$\left(-(d\,i\,(2k-m)+f\,(2s-v)+2\,(b\,i\,(2k-m)+c\,(2s-v))\,z)^2\big/(b\,i\,(2k-m)+c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(2k-m)+f\,(2s-v)+2\,(b\,i\,(2k-m)+c\,(2s-v))\,z)^2}{4\,(b\,i\,(2k-m)+c\,(2s-v))}\right)\Bigg)$$

$$(b\,i\,(2k-m)+c\,(2s-v))^{-n-1}+e^{-\frac{(d\,i\,(m-2k)+f\,(2s-v))^2}{4\,(b\,i\,(m-2k)+c\,(2s-v))}+e\,i\,(m-2k)+g\,(2s-v)+\frac{i\pi v}{2}}\,(b\,i\,(m-2k)+c\,(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k)-f\,(2s-v))^{n-j}\,(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^{j+1}$$

$$\left(-(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^2\big/(b\,i\,(m-2k)+c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f\,(2s-v)+2\,(b\,i\,(m-2k)+c\,(2s-v))\,z)^2}{4\,(b\,i\,(m-2k)+c\,(2s-v))}\right)+$$

$$e^{-\frac{(d\,i\,(2k-m)+f\,(v-2s))^2}{4\,(b\,i\,(2k-m)+c\,(v-2s))}+e\,i\,(2k-m)+g\,(v-2s)-\frac{i\,v\,\pi}{2}}\,(b\,i\,(2k-m)+c\,(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(2k-m)-f\,(v-2s))^{n-j}\,(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^{j+1}$$

$$\left(-(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^2\big/(b\,i\,(2k-m)+c\,(v-2s))\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(2k-m)+f\,(v-2s)+2\,(b\,i\,(2k-m)+c\,(v-2s))\,z)^2}{4\,(b\,i\,(2k-m)+c\,(v-2s))}\right)+$$

$$e^{-\frac{(d\,i\,(m-2k)+f\,(v-2s))^2}{4\,(b\,i\,(m-2k)+c\,(v-2s))}+e\,i\,(m-2k)+g\,(v-2s)-\frac{i\,v\,\pi}{2}}\,(b\,i\,(m-2k)+c\,(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-i\,d\,(m-2k)-f\,(v-2s))^{n-j}\,(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^{j+1}$$

$$\left(-(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2\big/(b\,i\,(m-2k)+c\,(v-2s))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(d\,i\,(m-2k)+f\,(v-2s)+2\,(b\,i\,(m-2k)+c\,(v-2s))\,z)^2}{4\,(b\,i\,(m-2k)+c\,(v-2s))}\right)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

01.19.21.3117.01

$$\int z^n \cos^m\left(\sqrt{z}\, b + e + d z\right) \sinh^\nu\left(\sqrt{z}\, c + g + f z\right) dz = \frac{\left(i^\nu\, 2^{-m-\nu} z^{n+1}\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)\,(1 - \nu \bmod 2)}{n+1} + (-1)^{n-1}\, 2^{-m-2n-\nu-1}\, d^{-2n-2}\, i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} (2k-m)^{-2n-2} \Bigg(e^{i e (2k-m) - \frac{i b^2 (2k-m)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (2k-m))^{-h-j+2n} \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right)^{h+j} \left(\frac{i \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right)^2}{d (2k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b i (2k-m) \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right)^2}{4d (2k-m)}\right) + 2 d i (2k-m) \sqrt{\frac{i \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right)^2}{d (2k-m)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(b i (2k-m) + 2 d i \sqrt{z}\, (2k-m)\right)^2}{4d (2k-m)}\right) \Bigg) + e^{i e (m-2k) - \frac{i b^2 (m-2k)}{4d}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i b (m-2k))^{-h-j+2n} \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right)^{h+j} \left(\frac{i \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right)^2}{d (m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b i (m-2k) \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right)^2}{4d (m-2k)}\right) + 2 d i (m-2k) \sqrt{\frac{i \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right)^2}{d (m-2k)}}\, \Gamma\left(\frac{1}{2}(h+j+2), \frac{i \left(b i (m-2k) + 2 d i \sqrt{z}\, (m-2k)\right)^2}{4d (m-2k)}\right) \Bigg) \Bigg) + 2^{-m-2n-\nu-1} \binom{m}{\frac{m}{2}}$$

$$(1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} (f\,(2\,k-\nu))^{-2\,n-2} \left((-1)^\nu\, e^{g\,(2\,k-\nu) - \frac{c^2\,(2\,k-\nu)}{4\,f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(2\,k-\nu))^{-h-j+2\,n} \right.$$

$$\left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right)^{h+j} \left(-\frac{\left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right)^2}{f\,(2\,k-\nu)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(c\,(2\,k-\nu) \left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right) \Gamma\!\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right)^2}{4\,f\,(2\,k-\nu)} \right) + 2\,f\,(2\,k - \right.$$

$$\left.\left. \nu) \sqrt{-\frac{\left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right)^2}{f\,(2\,k-\nu)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\, -\frac{\left(c\,(2\,k-\nu) + 2\,f\,\sqrt{z}\,\,(2\,k-\nu)\right)^2}{4\,f\,(2\,k-\nu)} \right) \right) \right) +$$

$$e^{g\,(\nu-2\,k) - \frac{c^2\,(\nu-2\,k)}{4\,f}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(\nu-2\,k))^{-h-j+2\,n} \left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(c\,(\nu-2\,k) \left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right) \Gamma\!\left(\frac{1}{2}\,(h+j+1),\, -\frac{\left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)} \right) + \right.$$

$$2\,f\,(\nu-2\,k) \sqrt{-\frac{\left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right)^2}{f\,(\nu-2\,k)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2), \right.$$

$$\left.\left.\left.\left. -\frac{\left(c\,(\nu-2\,k) + 2\,f\,\sqrt{z}\,\,(\nu-2\,k)\right)^2}{4\,f\,(\nu-2\,k)} \right) \right) \right) \right) + 2^{-m-2\,n-\nu-1}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left((-1)^\nu\, e^{-\frac{(b\,i\,(2\,s-m) + c\,(2\,k-\nu))^2}{4\,(d\,i\,(2\,s-m) + f\,(2\,k-\nu))} + e\,i\,(2\,s-m) + g\,(2\,k-\nu)} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (b\,i\,(2\,s-m) + c\,(2\,k-\nu))^{-h-j+2\,n} \right.\right.$$

$$\left(b\,i\,(2\,s-m) + c\,(2\,k-\nu) + 2\,(d\,i\,(2\,s-m) + f\,(2\,k-\nu))\,\sqrt{z}\right)^{h+j} \left(-\left(b\,i\,(2\,s-m) + c\,(2\,k-\nu) + \right.\right.$$

$$\left.\left. 2\,(d\,i\,(2\,s-m) + f\,(2\,k-\nu))\,\sqrt{z}\right)^2 \Big/ (d\,i\,(2\,s-m) + f\,(2\,k-\nu)) \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\Big((b\,i\,(2\,s-m)+c\,(2\,k-v))\,\big(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\,\big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\big(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/$$

$$(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\Big)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+2),\,-\big(b\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/$$

$$(4\,(d\,i\,(2\,s-m)+f\,(2\,k-v)))\Big)\sqrt{\Big(-\big(b\,i\,(2\,s-m)+c\,(2\,k-v)+}$$

$$\overline{2\,(d\,i\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/(d\,i\,(2\,s-m)+f\,(2\,k-v))\Big)}\Big)$$

$$(d\,i\,(2\,s-m)+f\,(2\,k-v))^{-2\,n-2}+(-1)^v\,e^{-\frac{(b\,i\,(m-2\,s)+c\,(2\,k-v))^2}{4\,(d\,i\,(m-2\,s)+f\,(2\,k-v))}+e\,i\,(m-2\,s)+g\,(2\,k-v)}$$

$$(d\,i\,(m-2\,s)+f\,(2\,k-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,s)+c\,(2\,k-v))^{-h-j+2\,n}$$

$$\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)^{h+j}\,\Big(-\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+$$

$$2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/(d\,i\,(m-2\,s)+f\,(2\,k-v))\Big)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(m-2\,s)+c\,(2\,k-v))\,\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/$$

$$(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\Big)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+2),\,-\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/$$

$$(4\,(d\,i\,(m-2\,s)+f\,(2\,k-v)))\Big)\sqrt{\Big(-\big(b\,i\,(m-2\,s)+c\,(2\,k-v)+}$$

$$\overline{2\,(d\,i\,(m-2\,s)+f\,(2\,k-v))\,\sqrt{z}\,\big)^2\Big/(d\,i\,(m-2\,s)+f\,(2\,k-v))\Big)}\Big)+$$

$$e^{-\frac{(b\,i\,(2\,s-m)+c\,(v-2\,k))^2}{4\,(d\,i\,(2\,s-m)+f\,(v-2\,k))}+e\,i\,(2\,s-m)+g\,(v-2\,k)}\,(d\,i\,(2\,s-m)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(2\,s-m)+c\,(v-2\,k))^{-h-j+2\,n}\,\big(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\,\big)^{h+j}$$

$$\Big(-\big(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\,\big)^2\Big/$$

$$(d\,i\,(2\,s-m)+f\,(v-2\,k))\Big)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Big((b\,i\,(2\,s-m)+c\,(v-2\,k))\,\big(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\,\big)$$

$$\Gamma\Big(\frac{1}{2}\,(h+j+1),\,-\big(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\,\big)^2\Big/$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))$$

$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(2\,s-m)+f\,(v-2\,k)))\right)\sqrt{\left(-\left(b\,i\,(2\,s-m)+c\,(v-2\,k)+\right.\right.}$$

$$\left.\left.\left.2\,(d\,i\,(2\,s-m)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/(d\,i\,(2\,s-m)+f\,(v-2\,k))\right)\Bigg)+$$

$$e^{-\frac{(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d\,i\,(m-2\,s)+f\,(v-2\,k))}+e\,i\,(m-2\,s)+g\,(v-2\,k)}\,(d\,i\,(m-2\,s)+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j$$

$$(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-j+2\,n}\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/$$

$$\left.(4\,(d\,i\,(m-2\,s)+f\,(v-2\,k)))\right)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\Big/(4\,(d\,i\,(m-2\,s)+$$

$$\left.f\,(v-2\,k)))\right)\sqrt{\left(-\left(b\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d\,i\,(m-2\,s)+f\,(v-2\,k))\,\sqrt{z}\right)^2\right/}$$

$$\left.\left.(d\,i\,(m-2\,s)+f\,(v-2\,k))\right)\right)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving functions of the direct function, trigonometric and exponential functions

Involving powers of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $e^{p\,z}\sin(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.3118.01

$$\int e^{p\,z}\sin(c\,z)\sinh^{\nu}(a\,z)\,dz = \frac{2^{-\nu-1}\,e^{(-i\,c+p)\,z}\,(-e^{-a\,z}+e^{a\,z})^{\nu}\left(1-e^{2\,a\,z}\right)^{-\nu}}{(i\,c+p-a\,\nu)\,(c+i\,(p-a\,\nu))}\left((-i\,c-p+a\,\nu)\,{}_2F_1\left(\frac{-i\,c+p-a\,\nu}{2\,a},\,-\nu;\,\frac{-\nu\,a+2\,a-i\,c+p}{2\,a};\,e^{2\,a\,z}\right)+\right.$$

$$\left.e^{2\,i\,c\,z}\,(-i\,c+p-a\,\nu)\,{}_2F_1\left(\frac{i\,c+p-a\,\nu}{2\,a},\,-\nu;\,\frac{-\nu\,a+2\,a+i\,c+p}{2\,a};\,e^{2\,a\,z}\right)\right)$$

01.19.21.3119.01

$$\int e^{pz}\sin(cz)\sinh^{\nu}(az)\,dz = i^{\nu}\,2^{-\nu-1}\left(\frac{e^{(ic+p)z}}{ip-c}-\frac{e^{-i(c+ip)z}}{c+ip}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)-2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{(ic-2ak+p+a\nu)z}}{c+i(2ak-p-a\nu)}+\frac{e^{i\pi\nu+(-ic+2ak+p-a\nu)z}}{c+i(2ak+p-a\nu)}+\frac{e^{i\pi\nu+(ic+2ak+p-a\nu)z}}{c-i(2ak+p-a\nu)}+\frac{e^{(-ic-2ak+p+a\nu)z}}{c-2iak+ip+ia\nu}\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sin(cz+d)\sinh^{\nu}(az)$

01.19.21.3120.01

$$\int e^{pz}\sin(d+cz)\sinh^{\nu}(az)\,dz = -\frac{1}{2}\,i\,e^{id}\left(1-e^{2az}\right)^{-\nu}\sinh^{\nu}(az)\left(-\frac{e^{-2id+(-ic+p)z}}{-ic+p-a\nu}\,{}_2F_1\!\left(\frac{-ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{-ic+p}{a}-\nu+2\right);e^{2az}\right)+\frac{e^{(ic+p)z}}{ic+p-a\nu}\,{}_2F_1\!\left(\frac{ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{ic+p}{a}-\nu+2\right);e^{2az}\right)\right)$$

01.19.21.3121.01

$$\int e^{pz}\sin(d+cz)\sinh^{\nu}(az)\,dz = i^{\nu}\,2^{-\nu-1}\left(\frac{e^{id+(ic+p)z}}{ip-c}-\frac{e^{-i(d+(c+ip)z)}}{c+ip}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)-2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{-id}\left(\frac{e^{2id+(ic-2ak+p+a\nu)z}}{c+i(2ak-p-a\nu)}+\frac{e^{i\pi\nu+(-ic+2ak+p-a\nu)z}}{c+i(2ak+p-a\nu)}+\frac{e^{2id+i\pi\nu+(ic+2ak+p-a\nu)z}}{c-i(2ak+p-a\nu)}+\frac{e^{(-ic-2ak+p+a\nu)z}}{c-2iak+ip+ia\nu}\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sin(cz)\sinh^{\nu}(az+b)$

01.19.21.3122.01

$$\int e^{pz}\sin(cz)\sinh^{\nu}(b+az)\,dz = -\frac{1}{2}\,i\left(1-e^{2(b+az)}\right)^{-\nu}\sinh^{\nu}(b+az)\left(-\frac{e^{(-ic+p)z}}{-ic+p-a\nu}\,{}_2F_1\!\left(\frac{-ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{-ic+p}{a}-\nu+2\right);e^{2(b+az)}\right)+\frac{e^{(ic+p)z}}{ic+p-a\nu}\,{}_2F_1\!\left(\frac{ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{ic+p}{a}-\nu+2\right);e^{2(b+az)}\right)\right)$$

01.19.21.3123.01

$$\int e^{pz}\sin(cz)\sinh^{\nu}(b+az)\,dz = i^{\nu}\,2^{-\nu-1}\left(\frac{e^{(ic+p)z}}{ip-c}-\frac{e^{-i(c+ip)z}}{c+ip}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)-2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{-2bk-b\nu}\left(\frac{e^{2b\nu+(ic-2ak+p+a\nu)z}}{c+i(2ak-p-a\nu)}+\frac{e^{4bk+i\pi\nu+(-ic+2ak+p-a\nu)z}}{c+i(2ak+p-a\nu)}+\frac{e^{4bk+i\pi\nu+(ic+2ak+p-a\nu)z}}{c-i(2ak+p-a\nu)}+\frac{e^{2b\nu+(-ic-2ak+p+a\nu)z}}{c-2iak+ip+ia\nu}\right)\,/;\,\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sin(cz+d)\sinh^{\nu}(az+b)$

01.19.21.3124.01

$$\int e^{p z} \sin(d + c z) \sinh^\nu(b + a z)\, dz = -\frac{1}{2} i\, e^{i d} \left(1 - e^{2(b+a z)}\right)^{-\nu} \sinh^\nu(b + a z) \left(\frac{e^{-2 i d + i \pi + (-i c + p) z}}{-i c + p - a \nu} {}_2F_1\left(\frac{-i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{-i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right) + \frac{e^{(i c + p) z}}{i c + p - a \nu} {}_2F_1\left(\frac{i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right)\right)$$

01.19.21.3125.01

$$\int e^{p z} \sin(c z + d) \sinh^\nu(a z + b)\, dz = i^\nu 2^{-\nu-1} \left(\frac{e^{i d + (i c + p) z}}{i p - c} - \frac{e^{-i (d + (c + i p) z)}}{c + i p} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} e^{-i d - 2 b k - b \nu} \left(\frac{e^{2 i d + 2 b \nu + (i c - 2 a k + p + a \nu) z}}{c + i (2 a k - p - a \nu)} + \frac{e^{4 b k + i \pi \nu + (-i c + 2 a k + p - a \nu) z}}{c + i (2 a k + p - a \nu)} + \frac{e^{2 i d + 4 b k + i \pi \nu + (i c + 2 a k + p - a \nu) z}}{c - i (2 a k + p - a \nu)} + \frac{e^{2 b \nu + (-i c - 2 a k + p + a \nu) z}}{c - 2 i a k + i p + i a \nu} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin(b z^r) \sinh^\nu(c z)$

01.19.21.3126.01

$$\int e^{p z^2} \sin(b z^2) \sinh^\nu(c z)\, dz = \sqrt[4]{-1}\, i^\nu 2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{\operatorname{erf}\left(\frac{(1+i)\sqrt{b + i p}\, z}{\sqrt{2}}\right)}{\sqrt{b + i p}} - \frac{\operatorname{erfi}\left(\sqrt[4]{-1} \sqrt{b - i p}\, z\right)}{\sqrt{b - i p}} \right) - 2^{-\nu-2} \sqrt[4]{-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{b - i p} \sqrt{b + i p}} \left((-1)^k \binom{\nu}{k} e^{-\frac{i (c^2 (\nu - 2k)^2)}{4 (b + i p)}} \left(i \sqrt{b - i p}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (-2 c i k + i c \nu + 2 b z + 2 i p z)}{2 \sqrt{b + i p}} \right) + e^{i \pi \nu} i \sqrt{b - i p}\, \operatorname{erfi}\left(\frac{(-1)^{3/4} (c i (2 k - \nu) + 2 (b + i p) z)}{2 \sqrt{b + i p}} \right) + e^{\frac{i b c^2 (\nu - 2 k)^2}{2 (b^2 + p^2)}} \sqrt{b + i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (c i (2 k - \nu) + 2 (b - i p) z)}{2 \sqrt{b - i p}} \right) + e^{\frac{i (2 \pi \nu b^2 + c^2 (\nu - 2 k)^2 b + 2 p^2 \pi \nu)}{2 (b^2 + p^2)}} \sqrt{b + i p}\, \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (-2 c i k + i c \nu + 2 b z - 2 i p z)}{2 \sqrt{b - i p}} \right) \right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3127.01

$$\int e^{p\sqrt{z}} \sin\left(b\sqrt{z}\right) \sinh^{\nu}(c\, z)\, dz = i^{\nu}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{2\, i}{c\,(\nu-2\,k)} \left(-e^{\sqrt{z}\,(-i\,b+p)+\frac{i\pi\nu}{2}-c\,(\nu-2\,k)\,z} + e^{\sqrt{z}\,(i\,b+p)+\frac{i\pi\nu}{2}-c\,(\nu-2\,k)\,z} + e^{\sqrt{z}\,(-i\,b+p)-\frac{i\pi\nu}{2}+c\,(\nu-2\,k)\,z} - e^{\sqrt{z}\,(i\,b+p)-\frac{i\pi\nu}{2}+c\,(\nu-2\,k)\,z} \right) + \frac{i\, e^{\frac{b^2+2\,i\,p\,b-p^2+2\,c\,i\,\pi\,(2\,k-\nu)\,\nu}{c\,(8\,k-4\,\nu)}}\,(b+i\,p)\sqrt{\pi}\, \mathrm{erfi}\left(\frac{b+i\left(p+2\,c\,(2\,k-\nu)\sqrt{z}\right)}{2\sqrt{c}\,\sqrt{\nu-2\,k}}\right)}{c^{3/2}\,(\nu-2\,k)^{3/2}} - \frac{i\, e^{\frac{-b^2+2\,i\,p\,b+p^2-2\,i\,c\,\pi\,(2\,k-\nu)\,\nu}{c\,(8\,k-4\,\nu)}}\,(b-i\,p)\sqrt{\pi}\, \mathrm{erf}\left(\frac{b-i\,p-i\,2\,c\,(\nu-2\,k)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2\,k}}\right)}{c^{3/2}\,(\nu-2\,k)^{3/2}} + \frac{i\, e^{\frac{b^2+2\,i\,p\,b-p^2-2\,i\,c\,\pi\,\nu^2+4\,\pi\,i\,c\,k\,\nu}{4\,c\,\nu-8\,c\,k}}\,(b+i\,p)\sqrt{\pi}\, \mathrm{erf}\left(\frac{b+i\,p-i\,2\,c\,(2\,k-\nu)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2\,k}}\right)}{c^{3/2}\,(\nu-2\,k)^{3/2}} - \frac{i\, e^{\frac{b^2-2\,i\,p\,b-p^2+2\,c\,i\,\pi\,(2\,k-\nu)\,\nu}{c\,(8\,k-4\,\nu)}}\,(b-i\,p)\sqrt{\pi}\, \mathrm{erfi}\left(\frac{b-i\,p+2\,c\,i\,(\nu-2\,k)\sqrt{z}}{2\sqrt{c}\,\sqrt{\nu-2\,k}}\right)}{c^{3/2}\,(\nu-2\,k)^{3/2}} \right) - i\left(\frac{i}{2}\right)^{\nu} e^{(-i\,b+p)\sqrt{z}} \left(e^{2\,i\,b\sqrt{z}} \left(\frac{\sqrt{z}}{i\,b+p} + \frac{1}{(b-i\,p)^2} \right) + \frac{(-i\,b+p)\sqrt{z}-1}{(b+i\,p)^2} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2)\; /;\; \nu \in \mathbb{N}^+$$

Involving $e^{p\,z^r} \sin(b\,z) \sinh^{\nu}(c\,z)$

01.19.21.3128.01

$$\int e^{p\,z^2} \sin(b\,z) \sinh^{\nu}(c\,z)\, dz = -\frac{1}{\sqrt{p}} \left(2^{-\nu-2}\, i\sqrt{\pi} \left(\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k\, e^{\frac{b^2+2\,c\,i\,(2\,k+\nu)\,b-c^2\,(\nu-2\,k)^2}{4\,p}} \binom{\nu}{k} \left(e^{-\frac{i\,b\,c\,\nu}{p}}\, \mathrm{erfi}\left(\frac{i\,b-2\,c\,k+c\,\nu+2\,p\,z}{2\sqrt{p}}\right) + (-1)^{\nu}\, e^{-\frac{2\,i\,b\,c\,k}{p}}\, \mathrm{erfi}\left(\frac{i\,b+2\,c\,k-c\,\nu+2\,p\,z}{2\sqrt{p}}\right) + (-1)^{\nu}\, e^{-\frac{i\,b\,c\,\nu}{p}}\, \mathrm{erfi}\left(\frac{i\,b-2\,c\,k+c\,\nu-2\,p\,z}{2\sqrt{p}}\right) + e^{-\frac{2\,i\,b\,c\,k}{p}}\, \mathrm{erfi}\left(\frac{i\,b+2\,c\,k-c\,\nu-2\,p\,z}{2\sqrt{p}}\right) \right) - i^{-\nu}\, e^{\frac{b^2}{4\,p}} \binom{\nu}{\frac{\nu}{2}} \left(\mathrm{erfi}\left(\frac{i\,b+2\,p\,z}{2\sqrt{p}}\right) + \mathrm{erfi}\left(\frac{i\,b-2\,p\,z}{2\sqrt{p}}\right) \right) (\nu \bmod 2 - 1) \right) \right) /;\; \nu \in \mathbb{N}^+$$

01.19.21.3129.01

$$\int e^{p\sqrt{z}}\sin(b\,z)\sinh^{\nu}(c\,z)\,dz = \binom{\nu}{\frac{\nu}{2}}\left(\frac{\sqrt[4]{-1}\,p\sqrt{\pi}}{4\,b^{3/2}}\,e^{-\frac{i p^2}{4b}}\left(e^{\frac{i p^2}{2b}}\,i\,\mathrm{erfi}\left(\frac{(-1)^{3/4}\left(p+2\,i\,b\sqrt{z}\right)}{2\sqrt{b}}\right)+\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\left(p-2\,i\,b\sqrt{z}\right)}{2\sqrt{b}}\right)\right)-\frac{e^{p\sqrt{z}}\cos(b\,z)}{b}\right)$$

$$(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}+2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(-\frac{2\,e^{p\sqrt{z}-(-i\,b+2\,c\,k-c\,\nu)\,z}\left(i+e^{\frac{i\pi\nu}{2}+(-i\,b+2\,c\,k-c\,\nu)\,z}\right)\left(-i+e^{\frac{i\pi\nu}{2}+(-i\,b+2\,c\,k-c\,\nu)\,z}\right)}{b+2\,i\,c\,k-i\,c\,\nu}-\right.$$

$$\frac{2\,e^{p\sqrt{z}-(i\,b+2\,c\,k-c\,\nu)\,z}\left(-i+e^{\frac{i\pi\nu}{2}+(i\,b+2\,c\,k-c\,\nu)\,z}\right)\left(i+e^{\frac{i\pi\nu}{2}+(i\,b+2\,c\,k-c\,\nu)\,z}\right)}{b-2\,i\,c\,k+i\,c\,\nu}+$$

$$p\sqrt{\pi}\left(\frac{\sqrt[4]{-1}\,e^{-\frac{i p^2}{4(b-2 i c k+i c \nu)}}\,\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\left(p-2\,i\,b\sqrt{z}-4\,c\,k\sqrt{z}+2\,c\,\nu\sqrt{z}\right)}{2\sqrt{b-2\,i\,c\,k+i\,c\,\nu}}\right)}{(b-2\,i\,c\,k+i\,c\,\nu)^{3/2}}+\right.$$

$$\frac{(-1)^{3/4}(-1)^{\nu}\,e^{\frac{i p^2}{4(b-2 i c k+i c \nu)}}\,\mathrm{erfi}\left(\frac{(-1)^{3/4}\left(p+2\,i\,b\sqrt{z}+4\,c\,k\sqrt{z}-2\,c\,\nu\sqrt{z}\right)}{2\sqrt{b-2\,i\,c\,k+i\,c\,\nu}}\right)}{(b-2\,i\,c\,k+i\,c\,\nu)^{3/2}}+$$

$$\frac{(-1)^{3/4}\,e^{\frac{i p^2}{4(b+2 i c k-i c \nu)}}\,\mathrm{erfi}\left(\frac{(-1)^{3/4}\left(p+2\,i\,b\sqrt{z}-4\,c\,k\sqrt{z}+2\,c\,\nu\sqrt{z}\right)}{2\sqrt{b+2\,i\,c\,k-i\,c\,\nu}}\right)}{(b+2\,i\,c\,k-i\,c\,\nu)^{3/2}}+$$

$$\left.\left.\frac{\sqrt[4]{-1}\,(-1)^{\nu}\,e^{-\frac{i p^2}{4(b+2 i c k-i c \nu)}}\,\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\left(p-2\,i\,b\sqrt{z}+4\,c\,k\sqrt{z}-2\,c\,\nu\sqrt{z}\right)}{2\sqrt{b+2\,i\,c\,k-i\,c\,\nu}}\right)}{(b+2\,i\,c\,k-i\,c\,\nu)^{3/2}}\right)\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving $e^{p\,z}\sin(b\,z^r)\sinh^{\nu}(c\,z)$

01.19.21.3130.01

$$\int e^{pz}\sin(bz^2)\sinh^{\nu}(cz)\,dz = -\frac{1}{\sqrt{b}}\left(\left(\sqrt[4]{-1}\; i^{\nu}\, 2^{-\nu-2}\sqrt{\pi}\right)e^{-\frac{i p^2}{4b}}\binom{\nu}{\frac{\nu}{2}}\left(e^{\frac{i p^2}{2b}}\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(2bz-ip)}{2\sqrt{b}}\right)+i\operatorname{erfi}\left(\frac{(-1)^{3/4}(ip+2bz)}{2\sqrt{b}}\right)\right)(1-\nu \bmod 2)\right)-\frac{1}{\sqrt{b}}\left(\left(\sqrt[4]{-1}\sqrt{\pi}\right)2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{-\frac{i\left(p^2+2c(2k+\nu)p+c^2(2k+\nu)^2\right)}{4b}}\left(e^{\frac{i\left(\left(4k^2+\nu^2\right)c^2+2p\nu c+p^2\right)}{2b}}\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-ip+ci(2k-\nu)+2bz)}{2\sqrt{b}}\right)+e^{\frac{2ick(p+c\nu)}{b}}\,i\operatorname{erfi}\left(\frac{(-1)^{3/4}(-2cik+ip+ic\nu+2bz)}{2\sqrt{b}}\right)-e^{\frac{i\left(\left(4k^2+\nu^2\right)c^2+4kpc+p^2+2b\pi\nu\right)}{2b}}\operatorname{erfi}\left(\frac{(-1)^{3/4}(2ck+p-c\nu+2ibz)}{2\sqrt{b}}\right)+e^{\frac{i\left(2kc^2+pc+b\pi\right)\nu}{b}}\,i\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-p+c(\nu-2k)+2ibz)}{2\sqrt{b}}\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.3131.01

$$\int e^{pz}\sin\left(b\sqrt{z}\right)\sinh^{\nu}(cz)\,dz = \left(\frac{b\sqrt{\pi}}{4p^{3/2}}e^{\frac{b^2}{4p}}\left(\operatorname{erfi}\left(\frac{ib-2p\sqrt{z}}{2\sqrt{p}}\right)-\operatorname{erfi}\left(\frac{ib+2p\sqrt{z}}{2\sqrt{p}}\right)\right)+\frac{e^{pz}\sin\left(b\sqrt{z}\right)}{p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu}+2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(b\sqrt{\pi}\left(\frac{e^{\frac{b^2}{4(-2ck+p+c\nu)}}\operatorname{erfi}\left(\frac{-ib+4ck\sqrt{z}-2p\sqrt{z}-2c\nu\sqrt{z}}{2\sqrt{-2ck+p+c\nu}}\right)}{(-2ck+p+c\nu)^{3/2}}+\frac{e^{\frac{b^2}{4(-2ck+p+c\nu)}}\operatorname{erfi}\left(\frac{ib+4ck\sqrt{z}-2p\sqrt{z}-2c\nu\sqrt{z}}{2\sqrt{-2ck+p+c\nu}}\right)}{(-2ck+p+c\nu)^{3/2}}+\frac{(-1)^{\nu}e^{\frac{b^2}{4(2ck+p-c\nu)}}\operatorname{erfi}\left(\frac{-ib-4ck\sqrt{z}-2p\sqrt{z}+2c\nu\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{(2ck+p-c\nu)^{3/2}}+\frac{(-1)^{\nu}e^{\frac{b^2}{4(2ck+p-c\nu)}}\operatorname{erfi}\left(\frac{ib-4ck\sqrt{z}-2p\sqrt{z}+2c\nu\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{(2ck+p-c\nu)^{3/2}}\right)+\frac{4(-1)^{\nu}e^{(2ck+p-c\nu)z}\sin\left(b\sqrt{z}\right)}{2ck+p-c\nu}+\frac{4e^{(-2ck+p+c\nu)z}\sin\left(b\sqrt{z}\right)}{p+c(\nu-2k)}\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sin(bz)\sinh^{\nu}(cz^r)$

01.19.21.3132.01

$$\int e^{p z} \sin(b z) \sinh^{\nu}(c z^2)\, dz = \left(\frac{e^{(i b+p) z}}{2 i p - 2 b} - \frac{e^{(-i b+p) z}}{2 (b + i p)}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{i}{2}\right)^{\nu} + \frac{2^{-\nu-2} \sqrt{\pi}}{\sqrt{c}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\sqrt{\nu - 2 k}} \binom{\nu}{k} \left(-i e^{-\frac{-b^2+2 i p b+p^2}{4 c (\nu-2 k)}} \operatorname{erfi}\left(\frac{i b + p - 4 c k z + 2 c \nu z}{2 \sqrt{c} \sqrt{\nu - 2 k}}\right) - (-1)^{\nu} e^{-\frac{b^2-2 i p b-p^2}{4 c (\nu-2 k)}} \operatorname{erfi}\left(\frac{b - i p - 4 i c k z + 2 i c \nu z}{2 \sqrt{c} \sqrt{\nu - 2 k}}\right) - i e^{-\frac{-b^2-2 i p b+p^2}{4 c (\nu-2 k)}} \operatorname{erfi}\left(\frac{i b - p + 4 c k z - 2 c \nu z}{2 \sqrt{c} \sqrt{\nu - 2 k}}\right) - (-1)^{\nu} e^{-\frac{b^2+2 i p b-p^2}{4 c (\nu-2 k)}} \operatorname{erfi}\left(\frac{b + i p + 4 i c k z - 2 i c \nu z}{2 \sqrt{c} \sqrt{\nu - 2 k}}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3133.01

$$\int e^{p z} \sin(b z) \sinh^{\nu}(c \sqrt{z})\, dz = \left(\frac{i}{2}\right)^{\nu+1} \left(\frac{e^{(-i b+p) z}}{-i b + p} - \frac{e^{(i b+p) z}}{i b + p}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + i^{\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{2} i \pi (1-\nu)} \left(-\frac{c\, e^{i \pi (1-\nu) - \frac{c^2 (\nu-2 s)^2}{4 (-i b+p)}} \sqrt{\pi}\, (\nu - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (-i b+p) + c (\nu-2 s)}{2 \sqrt{-i b+p}}\right)}{(-i b + p)^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu-2 s)^2}{4 (i b+p)}} \sqrt{\pi}\, (\nu - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (-i b-p) + c (\nu-2 s)}{2 \sqrt{i b+p}}\right)}{(i b + p)^{3/2}} + \frac{2 e^{i \pi (1-\nu) + (-i b+p) z + c (\nu-2 s) \sqrt{z}}}{-i b + p} + \frac{2 e^{(i b+p) z - c (\nu-2 s) \sqrt{z}}}{i b + p}\right) + e^{\frac{1}{2} i \pi (\nu+1)} \left(-\frac{c\, e^{-\frac{c^2 (\nu-2 s)^2}{4 (-i b+p)}} \sqrt{\pi}\, (\nu - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (i b-p) + c (\nu-2 s)}{2 \sqrt{-i b+p}}\right)}{(-i b + p)^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu-2 s)^2}{4 (i b+p)} - i \pi (\nu+1)} \sqrt{\pi}\, (\nu - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, (i b+p) + c (\nu-2 s)}{2 \sqrt{i b+p}}\right)}{(i b + p)^{3/2}} + \frac{2 e^{(-i b+p) z - c (\nu-2 s) \sqrt{z}}}{-i b + p} + \frac{2 e^{-i \pi (\nu+1) + (i b+p) z + c (\nu-2 s) \sqrt{z}}}{i b + p}\right)\right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin(b z) \sinh^{\nu}(c z^r)$

01.19.21.3134.01

$$\int e^{p z^2} \sin(b z) \sinh^{\nu}(c z^2) \, dz = \frac{i^{\nu} 2^{-\nu-2} \sqrt{\pi} \, (1 - \nu \bmod 2)}{\sqrt{p}} e^{\frac{b^2}{4 p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erf}\left(\frac{b + 2 i p z}{2 \sqrt{p}} \right) + \operatorname{erf}\left(\frac{b - 2 i p z}{2 \sqrt{p}} \right) \right) - 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{i e^{\frac{b^2}{4(-2 c k + p + c \nu)}} \operatorname{erfi}\left(\frac{i b + 4 c k z - 2 p z - 2 c \nu z}{2 \sqrt{-2 c k + p + c \nu}} \right)}{\sqrt{-2 c k + p + c \nu}} + \frac{(-1)^{\nu} e^{-\frac{b^2}{4(-2 c k - p + c \nu)}} \operatorname{erfi}\left(\frac{b + 4 i c k z + 2 i p z - 2 i c \nu z}{2 \sqrt{-2 c k - p + c \nu}} \right)}{\sqrt{-2 c k - p + c \nu}} + \frac{(-1)^{\nu} e^{-\frac{b^2}{4(-2 c k - p + c \nu)}} \operatorname{erfi}\left(\frac{b - 4 i c k z - 2 i p z + 2 i c \nu z}{2 \sqrt{-2 c k - p + c \nu}} \right)}{\sqrt{-2 c k - p + c \nu}} + \frac{i e^{\frac{b^2}{4(-2 c k + p + c \nu)}} \operatorname{erfi}\left(\frac{i b - 4 c k z + 2 p z + 2 c \nu z}{2 \sqrt{-2 c k + p + c \nu}} \right)}{\sqrt{-2 c k + p + c \nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3135.01

$$\int e^{p\sqrt{z}} \sin(b\,z) \sinh^{\nu}\left(c\sqrt{z}\right) dz = i^{1-\nu}\, 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4\, e^{p\sqrt{z}}\, i \cos(b\,z)}{b} + \frac{e^{\frac{i p^2}{4b}}\, p \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p+2\, i\, b\sqrt{z}}{2\sqrt{i\, b}}\right)}{(i\, b)^{3/2}} - \frac{e^{-\frac{i p^2}{4b}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{p-2\, i\, b\sqrt{z}}{2\sqrt{-i\, b}}\right)}{(-i\, b)^{3/2}} \right) (1 - \nu \bmod 2) +$$

$$i^{-\nu}\, 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{1}{2} i \pi (1-\nu)} \left(\frac{2\, i\, e^{i\pi(1-\nu) - i\, b\, z + (p - c(\nu-2s))\sqrt{z}}}{b} - \frac{2\, i\, e^{\sqrt{z}\,(p + c(\nu-2s)) + i\, b\, z}}{b} + \right.\right.$$

$$\frac{c\, e^{\frac{i(p+c(\nu-2s))^2}{4b}} \sqrt{\pi}\, (\nu-2s)\, \operatorname{erfi}\left(\frac{-p - c(\nu-2s) - 2\, i\, b\sqrt{z}}{2\sqrt{i\, b}}\right)}{(i\, b)^{3/2}} - \frac{e^{i\pi(1-\nu) - \frac{i(p-c(\nu-2s))^2}{4b}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{p - c(\nu-2s) - 2\, i\, b\sqrt{z}}{2\sqrt{-i\, b}}\right)}{(-i\, b)^{3/2}} +$$

$$\left. \frac{c\, e^{i\pi(1-\nu) - \frac{i(p-c(\nu-2s))^2}{4b}} \sqrt{\pi}\, (\nu-2s)\, \operatorname{erfi}\left(\frac{p - c(\nu-2s) - 2\, i\, b\sqrt{z}}{2\sqrt{-i\, b}}\right)}{(-i\, b)^{3/2}} - \frac{e^{\frac{i(p+c(\nu-2s))^2}{4b}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{p + c(\nu-2s) + 2\, i\, b\sqrt{z}}{2\sqrt{i\, b}}\right)}{(i\, b)^{3/2}} \right) +$$

$$e^{\frac{1}{2} i\pi(\nu+1)} \left(\frac{2\, i\, e^{(p + c(\nu-2s))\sqrt{z} - i\, b\, z}}{b} - \frac{2\, i\, e^{-i\pi(\nu+1) + i\, b\, z + (p - c(\nu-2s))\sqrt{z}}}{b} - \frac{e^{-\frac{i(p+c(\nu-2s))^2}{4b}}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{p + c(\nu-2s) - 2\, i\, b\sqrt{z}}{2\sqrt{-i\, b}}\right)}{(-i\, b)^{3/2}} + \right.$$

$$\frac{c\, e^{-\frac{i(p+c(\nu-2s))^2}{4b}} \sqrt{\pi}\, (\nu-2s)\, \operatorname{erfi}\left(\frac{-p - c(\nu-2s) + 2\, i\, b\sqrt{z}}{2\sqrt{-i\, b}}\right)}{(-i\, b)^{3/2}} - \frac{e^{\frac{i(p-c(\nu-2s))^2}{4b} - i\pi(\nu+1)}\, p\sqrt{\pi}\, \operatorname{erfi}\left(\frac{p - c(\nu-2s) + 2\, i\, b\sqrt{z}}{2\sqrt{i\, b}}\right)}{(i\, b)^{3/2}} +$$

$$\left.\left. \frac{c\, e^{\frac{i(p-c(\nu-2s))^2}{4b} - i\pi(\nu+1)} \sqrt{\pi}\, (\nu-2s)\, \operatorname{erfi}\left(\frac{p - c(\nu-2s) + 2\, i\, b\sqrt{z}}{2\sqrt{i\, b}}\right)}{(i\, b)^{3/2}} \right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin\left(b\, z^r\right) \sinh^{\nu}\left(c\, z^r\right)$

01.19.21.3136.01

$$\int e^{p z} \sin\left(b z^2\right) \sinh^{\nu}\left(c z^2\right) dz = -\frac{1}{\sqrt{b}} \left(\sqrt[4]{-1}\, i^{\nu}\, 2^{-\nu-2}\, e^{-\frac{i p^2}{4 b}} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{i p^2}{2 b}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (2 b z - i p)}{2 \sqrt{b}}\right) + i \operatorname{erfi}\left(\frac{(-1)^{3/4} (i p + 2 b z)}{2 \sqrt{b}}\right)\right) (1 - \nu \bmod 2)\right) + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{\frac{p^2}{4(-i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{i p - 2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{-i b - 2 c k + c \nu}}\right)}{\sqrt{-i b - 2 c k + c \nu}} + \frac{(-1)^{\nu} e^{\frac{p^2}{4(i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{-i p - 2 b z - 4 i c k z + 2 i c \nu z}{2 \sqrt{i b - 2 c k + c \nu}}\right)}{\sqrt{i b - 2 c k + c \nu}} + \frac{e^{-\frac{p^2}{4(i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{i p - 2 b z - 4 i c k z + 2 i c \nu z}{2 \sqrt{-i b + 2 c k - c \nu}}\right)}{\sqrt{-i b + 2 c k - c \nu}} + \frac{e^{-\frac{p^2}{4(-i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{-i p - 2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{i b + 2 c k - c \nu}}\right)}{\sqrt{i b + 2 c k - c \nu}}\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3137.01

$$\int e^{p z} \sin\left(b \sqrt{z}\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = i\, 2^{-\nu-2} e^{\frac{1}{2} i \pi (1-\nu)} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{b\, e^{\frac{b^2}{4p}} \sqrt{\pi}\ \mathrm{erfi}\left(\frac{-i b + 2 p \sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{b\, e^{\frac{b^2}{4p}} \sqrt{\pi}\ \mathrm{erfi}\left(\frac{i b + 2 p \sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{4 e^{p z} \sin\left(b\sqrt{z}\right)}{p} \right) +$$

$$i^{-\nu}\, 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi (\nu-1)} \left(\frac{4 e^{p z - \frac{1}{2} i \pi (1-\nu)} \cos\left(\frac{1}{2}\pi(\nu-1) + (b + 2 i c k - i c \nu)\sqrt{z}\right)}{p} + \right.\right.$$

$$\frac{e^{\frac{(b+2 i c k - i c \nu)^2}{4p}} \sqrt{\pi}\ (b + 2 i c k - i c \nu)\, \mathrm{erf}\left(\frac{b + c i (2k-\nu) + 2 i p \sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} +$$

$$\left. \frac{1}{p^{3/2}} \left(e^{\frac{(-b-2 i c k + i c \nu)^2}{4p} + i \pi (\nu-1)} \sqrt{\pi}\ (b + 2 i c k - i c \nu)\, \mathrm{erf}\left(\frac{b + c i (2k-\nu) - 2 i p \sqrt{z}}{2\sqrt{p}}\right)\right)\right) +$$

$$e^{\frac{1}{2} i \pi (\nu+1)} \left(\frac{4 e^{p z - \frac{1}{2} i \pi (\nu+1)} \cos\left(\frac{1}{2}\pi(\nu+1) + (-b + 2 i c k - i c \nu)\sqrt{z}\right)}{p} - \right.$$

$$\frac{e^{\frac{(b + c i (\nu - 2k))^2}{4p}} \sqrt{\pi}\ (b + c i (\nu - 2k))\, \mathrm{erf}\left(\frac{-b + c i (2k-\nu) - 2 i p \sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} -$$

$$\left.\left. \frac{1}{p^{3/2}} \left(i\, e^{\frac{(b + c i (\nu-2k))^2}{4p} - i \pi (\nu+1)} \sqrt{\pi}\ (b + c i (\nu - 2k))\, \mathrm{erfi}\left(\frac{i b - c(\nu - 2k) + 2 p \sqrt{z}}{2\sqrt{p}}\right)\right)\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin\left(b z^r\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.3138.01

$$\int e^{p z^r} \sin(b z^r) \sinh^{\nu}(c z^r)\, dz = \frac{2^{-\nu-1} z (1 - \nu \bmod 2)}{r} \binom{\nu}{\frac{\nu}{2}} e^{\frac{1}{2} i \pi (\nu-1)} \left(((i b - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - p) z^r\right) - ((-i b - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-i b - p) z^r\right) \right) + \frac{i 2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} \Gamma\left(\frac{1}{r}, (-i b - p - 2 c s + c \nu) z^r\right) ((-i b - p - 2 c s + c \nu) z^r)^{-1/r} + (-1)^{\nu+1} ((i b - p - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - p - 2 c s + c \nu) z^r\right) + ((-i b - p + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-i b - p + 2 c s - c \nu) z^r\right) - ((i b - p + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - p + 2 c s - c \nu) z^r\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3139.01

$$\int e^{p z^2} \sin(b z^2) \sinh^{\nu}(c z^2)\, dz = \frac{1}{(-i b + p)(i b + p)} \left(i^{\nu+1} 2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\sqrt{-i b + p}\, (i b + p) \operatorname{erfi}\left(\frac{2 p z - 2 i b z}{2 \sqrt{-i b + p}} \right) - (-i b + p) \sqrt{i b + p}\, \operatorname{erfi}\left(\sqrt{i b + p}\, z \right) \right) (1 - \nu \bmod 2) \right) + i^{\nu} 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\left(\left(e^{-\frac{1}{2} i \pi (\nu-1)} (i b + p + c (2 k - \nu)) \sqrt{-i b + p - c (2 k - \nu)}\, \operatorname{erfi}\left(\frac{2 p z - 2 (i b + c (2 k - \nu)) z}{2 \sqrt{-i b + p - c (2 k - \nu)}} \right) + e^{\frac{1}{2} i \pi (\nu-1)} \sqrt{i b + p + c (2 k - \nu)}\, (-i b + p - c (2 k - \nu)) \operatorname{erfi}\left(\sqrt{i b + p + c (2 k - \nu)}\, z \right) \right) \Big/ ((-i b + p - c (2 k - \nu)) (i b + p + c (2 k - \nu))) \right) + \left(e^{\frac{1}{2} i \pi (\nu+1)} (i b + p + c (\nu - 2 k)) \sqrt{-i b + p - c (\nu - 2 k)}\, \operatorname{erfi}\left(\frac{2 p z - 2 (i b + c (\nu - 2 k)) z}{2 \sqrt{-i b + p - c (\nu - 2 k)}} \right) + e^{-\frac{1}{2} i \pi (\nu+1)} \sqrt{i b + p + c (\nu - 2 k)}\, (-i b + p - c (\nu - 2 k)) \operatorname{erfi}\left(\sqrt{i b + p + c (\nu - 2 k)}\, z \right) \right) \Big/ ((-i b + p - c (\nu - 2 k)) (i b + p + c (\nu - 2 k))) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3140.01

$$\int e^{p\sqrt{z}} \sin\left(b\sqrt{z}\right) \sinh^{\nu}\left(c\sqrt{z}\right) dz = e^{\frac{i\pi}{2}+(-i b+p)\sqrt{z}} \left(\frac{e^{2\left(-\frac{1}{2}(i\pi)+i b\sqrt{z}\right)}\left(-1+i b\sqrt{z}+p\sqrt{z}\right)}{(i b+p)^2} + \frac{\sqrt{z}}{-i b+p} - \frac{1}{(i b-p)^2}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\frac{i}{2}\right)^{\nu} + \left(\frac{i}{2}\right)^{\nu} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{(-i b+p-c(2k-\nu))\sqrt{z}-\frac{1}{2} i\pi(\nu-1)} \left(\frac{e^{2\left(\sqrt{z}\,(i b+c(2k-\nu))+\frac{1}{2} i\pi(\nu-1)\right)}\left(\sqrt{z}\,p+(i b+c(2k-\nu))\sqrt{z}-1\right)}{(i b+p+c(2k-\nu))^2} + \frac{\sqrt{z}}{-i b+p-c(2k-\nu)} - \frac{1}{(i b-p+c(2k-\nu))^2}\right) + e^{\frac{1}{2} i\pi(\nu+1)+(-i b+p-c(\nu-2k))\sqrt{z}} \left(\frac{e^{2\left((i b+c(\nu-2k))\sqrt{z}-\frac{1}{2} i\pi(\nu+1)\right)}\left(\sqrt{z}\,p+(i b+c(\nu-2k))\sqrt{z}-1\right)}{(i b+p+c(\nu-2k))^2} + \frac{\sqrt{z}}{-i b+p-c(\nu-2k)} - \frac{1}{(i b-p+c(\nu-2k))^2}\right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+e} \sin\left(a z^r+q\right) \sinh^{\nu}\left(c z^r+g\right)$

01.19.21.3141.01

$$\int e^{b z^r+e} \sin(a z^r+q) \sinh^{\nu}(c z^r+g)\, dz = \frac{i\, 2^{-\nu-1} z}{r} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{\nu} e^{e+i q+2 g s-g\nu}\, \Gamma\left(\frac{1}{r}, (-b-i a-2 c s+c\nu) z^r\right) ((-b-i a-2 c s+c\nu) z^r)^{-1/r} + (-1)^{\nu+1} e^{e-i q+2 g s-g\nu} ((-b+i a-2 c s+c\nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-b+i a-2 c s+c\nu) z^r\right) + e^{e+i q-2 g s+g\nu} ((-b-i a+2 c s-c\nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-b-i a+2 c s-c\nu) z^r\right) - e^{e-i q-2 g s+g\nu} ((-b+i a+2 c s-c\nu) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (-b+i a+2 c s-c\nu) z^r\right)\right) - \frac{2^{-\nu-1} z}{r} \binom{\nu}{\frac{\nu}{2}} \left(e^{e+i q+\frac{1}{2} i\pi(\nu-1)}\, \Gamma\left(\frac{1}{r}, (-b-i a) z^r\right) ((-b-i a) z^r)^{-1/r} + e^{e-i q+\frac{1}{2} i\pi(\nu+1)} ((i a-b) z^r)^{-1/r}\, \Gamma\left(\frac{1}{r}, (i a-b) z^r\right)\right) (1-\nu \bmod 2) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3142.01

$$\int e^{b z^2+e} \sin\left(a z^2+q\right) \sinh^{\nu}\left(c z^2+g\right) dz = i^{-\nu-1} 2^{-\nu-2} e^{e+i q} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\frac{\text{erfi}\left(\sqrt{b+i a}\; z\right)}{\sqrt{b+i a}} - \frac{e^{-2 i q} \text{erfi}\left(\sqrt{b-i a}\; z\right)}{\sqrt{b-i a}}\right)(1-\nu \bmod 2) + i^{-\nu} 2^{-\nu-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{e+i q-\frac{1}{2} i \pi (\nu+1)-g (\nu-2 s)} \left(\frac{e^{2\left(-i q+\frac{1}{2} i \pi (\nu+1)+g (\nu-2 s)\right)} \text{erfi}\left(\sqrt{b-i a+c (\nu-2 s)}\; z\right)}{\sqrt{b-i a+c (\nu-2 s)}} + \frac{\text{erfi}\left(\sqrt{b+i a-c (\nu-2 s)}\; z\right)}{\sqrt{b+i a-c (\nu-2 s)}}\right) + e^{e-i q-\frac{1}{2} i \pi (\nu-1)-g (\nu-2 s)} \left(\frac{e^{2\left(i q+\frac{1}{2} i \pi (\nu-1)+g (\nu-2 s)\right)} \text{erfi}\left(\sqrt{b+i a+c (\nu-2 s)}\; z\right)}{\sqrt{b+i a+c (\nu-2 s)}} + \frac{\text{erfi}\left(\sqrt{b-i a-c (\nu-2 s)}\; z\right)}{\sqrt{b-i a-c (\nu-2 s)}}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3143.01

$$\int e^{\sqrt{z}\, b+e} \sin\left(\sqrt{z}\, a+q\right) \sinh^{\nu}\left(\sqrt{z}\, c+g\right) dz = \left(\frac{e^{\sqrt{z}\,(b-i a)+e-i q} \left(\sqrt{z}\, b-i a \sqrt{z}-1\right)}{(b-i a)^2} - \frac{e^{\sqrt{z}\,(b+i a)+e+i q} \left(\sqrt{z}\, b+i a \sqrt{z}-1\right)}{(-b-i a)^2}\right) i \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) (2 i)^{-\nu} + \left(\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \left(\frac{e^{e-i q+\frac{1}{2} i \pi (\nu+1)+g (\nu-2 s)+(b-i a+c (\nu-2 s)) \sqrt{z}} \left(\sqrt{z}\, b+(-i a+c (\nu-2 s)) \sqrt{z}-1\right)}{(b-i a+c (\nu-2 s))^2} + \frac{e^{e+i q+\frac{1}{2} i \pi (\nu-1)+g (\nu-2 s)+(b+i a+c (\nu-2 s)) \sqrt{z}} \left(\sqrt{z}\, b+(i a+c (\nu-2 s)) \sqrt{z}-1\right)}{(b+i a+c (\nu-2 s))^2} + \frac{e^{e+i q-\frac{1}{2} i \pi (\nu+1)-g (\nu-2 s)+(b+i a-c (\nu-2 s)) \sqrt{z}} \left(\sqrt{z}\, b-(-i a+c (\nu-2 s)) \sqrt{z}-1\right)}{(-b-i a+c (\nu-2 s))^2} + \frac{e^{e-i q-\frac{1}{2} i \pi (\nu-1)-g (\nu-2 s)+(b-i a-c (\nu-2 s)) \sqrt{z}} \left(\sqrt{z}\, b-(i a+c (\nu-2 s)) \sqrt{z}-1\right)}{(-b+i a+c (\nu-2 s))^2}\right) \binom{\nu}{s}\right) (2 i)^{-\nu} /; \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \sin\left(a z^r+p z+q\right) \sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.3144.01

$$\int e^{b z^2+d z+e} \sin\left(a z^2+p z+q\right) \sinh^{\nu}\left(c z^2+f z+g\right) dz = -i^{\nu}\, 2^{-\nu-2} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\frac{(-1)^{3/4} e^{e-i q-\frac{i\left(d^2-2 i p d-p^2\right)}{4(a+i b)}} \operatorname{erfi}\left(\frac{(-1)^{3/4} (i d+p+2 a z+2 i b z)}{2\sqrt{a+i b}}\right)}{\sqrt{a+i b}} + \frac{\sqrt[4]{-1}\, e^{e+\frac{i\left(d^2+2 i p d-p^2\right)}{4(a-i b)}+i q} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-i d+p+2 a z-2 i b z)}{2\sqrt{a-i b}}\right)}{\sqrt{a-i b}} \right)$$

$$(1-\nu \bmod 2) + 2^{-\nu-2}\sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu} \frac{e^{-\frac{(d+2 f k+i p-f \nu)^2}{4(b+i a+2 c k-c \nu)}+e+2 g k+i q-g \nu} \operatorname{erfi}\left(\frac{i d+2 i f k-p-i f \nu-2 a z+2 i b z+4 i c k z-2 i c \nu z}{2\sqrt{-b-i a-2 c k+c \nu}}\right)}{\sqrt{-b-i a-2 c k+c \nu}} + \right.$$

$$(-1)^{\nu} \frac{e^{-\frac{(d+2 f k-i p-f \nu)^2}{4(b-i a+2 c k-c \nu)}+e+2 g k-i q-g \nu} \operatorname{erfi}\left(\frac{-i d-2 i f k-p+i f \nu-2 a z-2 i b z-4 i c k z+2 i c \nu z}{2\sqrt{-b+i a-2 c k+c \nu}}\right)}{\sqrt{-b+i a-2 c k+c \nu}} +$$

$$i \frac{e^{\frac{(d-i p+f(\nu-2 k))^2}{4 i a-4(b+c(\nu-2 k))}+e-i q+g(\nu-2 k)} \operatorname{erfi}\left(\frac{d-2 f k-i p+f \nu-2 i a z+2 b z-4 c k z+2 c \nu z}{2\sqrt{b-i a-2 c k+c \nu}}\right)}{\sqrt{b-i a+c(\nu-2 k)}} +$$

$$\left. i \frac{e^{\frac{(d+i p+f(\nu-2 k))^2}{-4 i a-4(b+c(\nu-2 k))}+e-2 g k+i q+g \nu} \operatorname{erfi}\left(\frac{-d+2 f k-i p-f \nu-2 i a z-2 b z+4 c k z-2 c \nu z}{2\sqrt{b+i a-2 c k+c \nu}}\right)}{\sqrt{b+i a+c(\nu-2 k)}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3145.01

$$\int e^{\sqrt{z}\, b+e+d z} \sin\left(\sqrt{z}\, a+q+p z\right) \sinh^{\nu}\left(\sqrt{z}\, c+g+f z\right) dz =$$

$$\frac{1}{4} \left(-\frac{\sqrt{\pi}\,(b+i a)\, e^{\frac{a^2-2 i b a-b^2}{4(d+i p)}+e+i q} \operatorname{erf}\left(\frac{a-i b-2(i d-p)\sqrt{z}}{2\sqrt{d+i p}}\right)}{(d+i p)^{3/2}} + \frac{(i a-b)\, e^{\frac{a^2+2 i b a-b^2}{4(d-i p)}+e-i q} \sqrt{\pi} \operatorname{erf}\left(\frac{a+i b+2(i d+p)\sqrt{z}}{2\sqrt{d-i p}}\right)}{(d-i p)^{3/2}} + \right.$$

$$\left. \frac{2 e^{\sqrt{z}\,(b+i a)+e+i q+(d+i p) z}}{i d-p} - \frac{2 e^{\sqrt{z}\,(b-i a)+e-i q+(d-i p) z}}{i d+p} \right) \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(\frac{i}{2}\right)^{\nu} +$$

$$2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(i \sqrt{\pi} \left(-\frac{1}{(d+i p+f(\nu-2 k))^{3/2}} \left(e^{\frac{(a-i(b+c(\nu-2 k)))^2}{4(d+i p+f(\nu-2 k))}+e-2 g k+i q+g \nu} \right. \right. \right.$$

$$\left. \operatorname{erfi}\left(\frac{b+i a-2 c k+c \nu+2 d\sqrt{z}-4 f k\sqrt{z}+2 i p\sqrt{z}+2 f \nu\sqrt{z}}{2\sqrt{d+i p+f(\nu-2 k)}}\right)(-b-i a+2 c k-c \nu) \right) +$$

$$\frac{1}{(d+2fk+i p-fv)^{3/2}}\left((-1)^v e^{-\frac{(b+i a+2ck-cv)^2}{4(d+2fk+i p-fv)}+e+2gk+i q-gv}(b+i a+2ck-cv)\right.$$
$$\left.\operatorname{erfi}\left(\frac{b+i a+2ck-cv+2d\sqrt{z}+4fk\sqrt{z}+2i p\sqrt{z}-2fv\sqrt{z}}{2\sqrt{d+2fk+i p-fv}}\right)\right)+$$
$$\frac{1}{(d+2fk-i p-fv)^{3/2}}\left((-1)^v e^{\frac{(a+i(b+2ck-cv))^2}{4(d+2fk-i p-fv)}+e+2gk-i q-gv}(b-i a+2ck-cv)\right.$$
$$\left.\operatorname{erfi}\left(\frac{-b+i a-2ck+cv-2d\sqrt{z}-4fk\sqrt{z}+2i p\sqrt{z}+2fv\sqrt{z}}{2\sqrt{d+2fk-i p-fv}}\right)\right)+$$
$$\frac{1}{(d-i p+f(v-2k))^{3/2}}\left(e^{\frac{(a+i(b+c(v-2k)))^2}{4(d-i p+f(v-2k))}+e-i q+g(v-2k)}(b-i a+c(v-2k))\right.$$
$$\left.\operatorname{erfi}\left(\frac{-b+i a+2ck-cv-2d\sqrt{z}+4fk\sqrt{z}+2i p\sqrt{z}-2fv\sqrt{z}}{2\sqrt{d-i p+f(v-2k)}}\right)\right)\Bigg)+$$
$$\frac{2(-1)^v e^{\sqrt{z}(b-i a+2ck-cv)+\frac{1}{2}(2e+4gk-2i q-2gv)+(d+2fk-i p-fv)z}}{-i d-2i fk-p+i fv}+$$
$$\frac{2e^{\sqrt{z}(b+i a-2ck+cv)+\frac{1}{2}(2e-4gk+2i q+2gv)+(d-2fk+i p+fv)z}}{i d-2i fk-p+i fv}+\frac{2e^{\sqrt{z}(b-i a-2ck+cv)+\frac{1}{2}(2e-4gk-2i q+2gv)+(d-2fk-i p+fv)z}}{-i d+2i fk-p-i fv}+$$
$$\left.\frac{2(-1)^v e^{\sqrt{z}(b+i a+2ck-cv)+\frac{1}{2}(2e+4gk+2i q-2gv)+(d+2fk+i p-fv)z}}{i d+2i fk-p-i fv}\right)/;\ v\in\mathbb{N}^+$$

Involving sin and rational functions of exp

Involving $\sin(e z)\sin^v(c z)\left(a+b\,e^{d z}\right)^{-n}$

01.19.21.3146.01

$$\int \frac{\sin(e\,z)\sinh^{\nu}(c\,z)}{\left(a+b\,e^{d\,z}\right)^{n}}\,dz = i^{\nu}\,2^{-\nu-1}\,a^{-n}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{s}\binom{\nu}{s}\left(\frac{1}{-i\,e-2\,c\,s+c\,\nu}\cos\left(\frac{1}{2}\pi(1-\nu)\right)\left(e^{(-i\,e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e-2\,c\,s+c\,\nu}{d},\,n;\,\frac{d-i\,e-2\,c\,s+c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-\right.\right.$$

$$\left.e^{(i\,e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e+2\,c\,s-c\,\nu}{d},\,n;\,\frac{d+i\,e+2\,c\,s-c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)+$$

$$\frac{1}{-i\,e+2\,c\,s-c\,\nu}\cos\left(\frac{1}{2}\pi(\nu+1)\right)\left(e^{(-i\,e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e+2\,c\,s-c\,\nu}{d},\,n;\,\frac{d-i\,e+2\,c\,s-c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-\right.$$

$$\left.e^{(i\,e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e-2\,c\,s+c\,\nu}{d},\,n;\,\frac{d+i\,e-2\,c\,s+c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)+$$

$$\frac{i}{-i\,e-2\,c\,s+c\,\nu}\sin\left(\frac{1}{2}\pi(1-\nu)\right)\left(e^{(-i\,e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e-2\,c\,s+c\,\nu}{d},\,n;\,\frac{d-i\,e-2\,c\,s+c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+\right.$$

$$\left.e^{(i\,e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e+2\,c\,s-c\,\nu}{d},\,n;\,\frac{d+i\,e+2\,c\,s-c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)+$$

$$\frac{i}{-i\,e+2\,c\,s-c\,\nu}\sin\left(\frac{1}{2}\pi(\nu+1)\right)\left(e^{(i\,e-2\,c\,s+c\,\nu)\,z}\,{}_2F_1\left(\frac{i\,e-2\,c\,s+c\,\nu}{d},\,n;\,\frac{d+i\,e-2\,c\,s+c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+\right.$$

$$\left.\left.e^{(-i\,e+2\,c\,s-c\,\nu)\,z}\,{}_2F_1\left(\frac{-i\,e+2\,c\,s-c\,\nu}{d},\,n;\,\frac{d-i\,e+2\,c\,s-c\,\nu}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)-$$

$$\frac{1}{e}\,i^{\nu}\,2^{-\nu-1}\,a^{-n}\binom{\nu}{\frac{\nu}{2}}\left(e^{i\,e\,z}\,{}_2F_1\left(\frac{i\,e}{d},\,n;\,\frac{d+i\,e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+e^{-i\,e\,z}\,{}_2F_1\left(-\frac{i\,e}{d},\,n;\,\frac{d-i\,e}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)$$

$$(1-\nu \bmod 2)\;/;\;n\in\mathbb{N}^{+}\bigwedge\nu\in\mathbb{N}^{+}$$

Involving $e^{p\,z}\sin(e\,z)\sinh^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.3147.01

$$\int \frac{e^{p z} \sin(e z) \sinh^{\nu}(c z)}{\left(a + b e^{d z}\right)^{n}} \, dz = \frac{2^{-\nu-1} i^{\nu} a^{-n}}{(i e - p)(i e + p)} (1 - \nu \bmod 2) \binom{\nu}{\frac{\nu}{2}} \left(e^{-\frac{1}{2}(i \pi) + (i e + p) z} (i e - p) \, {}_2F_1\left(\frac{i e + p}{d}, n; \frac{d + i e + p}{d}; -\frac{b e^{d z}}{a}\right) - e^{\frac{i \pi}{2} + (-i e + p) z} (i e + p) \, {}_2F_1\left(\frac{-i e + p}{d}, n; \frac{d - i e + p}{d}; -\frac{b e^{d z}}{a}\right)\right) + 2^{-\nu-1} i^{\nu} a^{-n} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s} \binom{\nu}{s} \left(\cos\left(\frac{1}{2} \pi (1 - \nu)\right) \left(e^{(-i e + p - 2 c s + c \nu) z} (-i e - p - 2 c s + c \nu) \, {}_2F_1\left(\frac{-i e + p - 2 c s + c \nu}{d}, n; \frac{d - i e + p - 2 c s + c \nu}{d}; -\frac{b e^{d z}}{a}\right) - e^{(i e + p + 2 c s - c \nu) z} (-i e + p - 2 c s + c \nu) \, {}_2F_1\left(\frac{i e + p + 2 c s - c \nu}{d}, n; \frac{d + i e + p + 2 c s - c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) \Big/ ((-i e - p - 2 c s + c \nu)(-i e + p - 2 c s + c \nu)) + \cos\left(\frac{1}{2} \pi (\nu + 1)\right) \left(e^{(-i e + p + 2 c s - c \nu) z} (-i e - p + 2 c s - c \nu) \, {}_2F_1\left(\frac{-i e + p + 2 c s - c \nu}{d}, n; \frac{d - i e + p + 2 c s - c \nu}{d}; -\frac{b e^{d z}}{a}\right) - e^{(i e + p - 2 c s + c \nu) z} (-i e + p + 2 c s - c \nu) \, {}_2F_1\left(\frac{i e + p - 2 c s + c \nu}{d}, n; \frac{d + i e + p - 2 c s + c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) \Big/ ((-i e - p + 2 c s - c \nu)(-i e + p + 2 c s - c \nu)) + i \left(e^{(-i e + p - 2 c s + c \nu) z} (-i e - p - 2 c s + c \nu) \, {}_2F_1\left(\frac{-i e + p - 2 c s + c \nu}{d}, n; \frac{d - i e + p - 2 c s + c \nu}{d}; -\frac{b e^{d z}}{a}\right) + e^{(i e + p + 2 c s - c \nu) z} (-i e + p - 2 c s + c \nu) \, {}_2F_1\left(\frac{i e + p + 2 c s - c \nu}{d}, n; \frac{d + i e + p + 2 c s - c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) \sin\left(\frac{1}{2} \pi (1 - \nu)\right) \Big/ ((-i e - p - 2 c s + c \nu)(-i e + p - 2 c s + c \nu)) + i \left(e^{(i e + p - 2 c s + c \nu) z} (-i e + p + 2 c s - c \nu) \, {}_2F_1\left(\frac{i e + p - 2 c s + c \nu}{d}, n; \frac{d + i e + p - 2 c s + c \nu}{d}; -\frac{b e^{d z}}{a}\right) + e^{(-i e + p + 2 c s - c \nu) z} (-i e - p + 2 c s - c \nu) \, {}_2F_1\left(\frac{-i e + p + 2 c s - c \nu}{d}, n; \frac{d - i e + p + 2 c s - c \nu}{d}; -\frac{b e^{d z}}{a}\right)\right) \sin\left(\frac{1}{2} \pi (\nu + 1)\right) \Big/ ((-i e - p + 2 c s - c \nu)(-i e + p + 2 c s - c \nu)) \right) /; n \in \mathbb{N}^{+} \land \nu \in \mathbb{N}^{+}$$

Involving sin and algebraic functions of exp

Involving $\left(a + b e^{d z}\right)^{\beta} \sin(e z) \sinh^{\nu}(c z)$

01.19.21.3148.01

$$\int \left(a + b\, e^{d z}\right)^{\beta} \sin(e z) \sinh^{\nu}(c z)\, dz = -\frac{1}{e} i^{\nu}\, 2^{-\nu-1} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \binom{\nu}{\frac{\nu}{2}} \left(e^{i e z}\, {}_2F_1\!\left(\frac{i e}{d}, -\beta; \frac{d + i e}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{-i e z}\, {}_2F_1\!\left(-\frac{i e}{d}, -\beta; \frac{d - i e}{d}; -\frac{b\, e^{d z}}{a}\right)\right)$$
$$(1 - \nu \bmod 2) + i^{\nu}\, 2^{-\nu-1} \left(a + b\, e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1\right)^{-\beta} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{s} \binom{\nu}{s}$$
$$\left(\frac{1}{-i e - 2 c s + c \nu} \cos\!\left(\frac{1}{2} \pi (1 - \nu)\right) \left(e^{(-i e - 2 c s + c \nu) z}\, {}_2F_1\!\left(\frac{-i e - 2 c s + c \nu}{d}, -\beta; \frac{d - i e - 2 c s + c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - \right.\right.$$
$$\left. e^{(i e + 2 c s - c \nu) z}\, {}_2F_1\!\left(\frac{i e + 2 c s - c \nu}{d}, -\beta; \frac{d + i e + 2 c s - c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\right) +$$
$$\frac{1}{-i e + 2 c s - c \nu} \cos\!\left(\frac{1}{2} \pi (\nu + 1)\right) \left(e^{(-i e + 2 c s - c \nu) z}\, {}_2F_1\!\left(\frac{-i e + 2 c s - c \nu}{d}, -\beta; \frac{d - i e + 2 c s - c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - \right.$$
$$\left. e^{(i e - 2 c s + c \nu) z}\, {}_2F_1\!\left(\frac{i e - 2 c s + c \nu}{d}, -\beta; \frac{d + i e - 2 c s + c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\right) +$$
$$\frac{i}{-i e - 2 c s + c \nu} \sin\!\left(\frac{1}{2} \pi (1 - \nu)\right) \left(e^{(-i e - 2 c s + c \nu) z}\, {}_2F_1\!\left(\frac{-i e - 2 c s + c \nu}{d}, -\beta; \frac{d - i e - 2 c s + c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + \right.$$
$$\left. e^{(i e + 2 c s - c \nu) z}\, {}_2F_1\!\left(\frac{i e + 2 c s - c \nu}{d}, -\beta; \frac{d + i e + 2 c s - c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\right) +$$
$$\frac{i}{-i e + 2 c s - c \nu} \sin\!\left(\frac{1}{2} \pi (\nu + 1)\right) \left(e^{(i e - 2 c s + c \nu) z}\, {}_2F_1\!\left(\frac{i e - 2 c s + c \nu}{d}, -\beta; \frac{d + i e - 2 c s + c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + \right.$$
$$\left.\left. e^{(-i e + 2 c s - c \nu) z}\, {}_2F_1\!\left(\frac{-i e + 2 c s - c \nu}{d}, -\beta; \frac{d - i e + 2 c s - c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) /; \nu \in \mathbb{N}^{+}$$

Involving $e^{p z} \left(a + b\, e^{d z}\right)^{\beta} \sin(e z) \sinh^{\nu}(c z)$

01.19.21.3149.01

$$\int e^{p z}\left(a+b e^{d z}\right)^{\beta}\sin(e z)\sinh^{\nu}(c z)\,dz = \frac{1}{(i e-p)(i e+p)}(1-\nu\bmod 2)\, i^{\nu} 2^{-\nu-1}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{-\frac{1}{2}(i\pi)+(i e+p) z}(i e-p)\, {}_2F_1\left(\frac{i e+p}{d},-\beta;\frac{d+i e+p}{d};-\frac{b e^{d z}}{a}\right)-e^{\frac{i\pi}{2}+(-i e+p) z}(i e+p)\, {}_2F_1\left(\frac{-i e+p}{d},-\beta;\frac{d-i e+p}{d};-\frac{b e^{d z}}{a}\right)\right)+$$
$$i^{\nu} 2^{-\nu-1}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left(\cos\left(\frac{1}{2}\pi(1-\nu)\right)\right.$$
$$\left(e^{(-i e+p-2 c s+c\nu) z}(-i e-p-2 c s+c\nu)\, {}_2F_1\left(\frac{-i e+p-2 c s+c\nu}{d},-\beta;\frac{d-i e+p-2 c s+c\nu}{d};-\frac{b e^{d z}}{a}\right)-\right.$$
$$\left.e^{(i e+p+2 c s-c\nu) z}(-i e+p-2 c s+c\nu)\, {}_2F_1\left(\frac{i e+p+2 c s-c\nu}{d},-\beta;\frac{d+i e+p+2 c s-c\nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/$$
$$((-i e-p-2 c s+c\nu)(-i e+p-2 c s+c\nu))+\cos\left(\frac{1}{2}\pi(\nu+1)\right)$$
$$\left(e^{(-i e+p+2 c s-c\nu) z}(-i e-p+2 c s-c\nu)\, {}_2F_1\left(\frac{-i e+p+2 c s-c\nu}{d},-\beta;\frac{d-i e+p+2 c s-c\nu}{d};-\frac{b e^{d z}}{a}\right)-\right.$$
$$\left.e^{(i e+p-2 c s+c\nu) z}(-i e+p+2 c s-c\nu)\, {}_2F_1\left(\frac{i e+p-2 c s+c\nu}{d},-\beta;\frac{d+i e+p-2 c s+c\nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/$$
$$((-i e-p+2 c s-c\nu)(-i e+p+2 c s-c\nu))+i\sin\left(\frac{1}{2}\pi(1-\nu)\right)$$
$$\left(e^{(-i e+p-2 c s+c\nu) z}(-i e-p-2 c s+c\nu)\, {}_2F_1\left(\frac{-i e+p-2 c s+c\nu}{d},-\beta;\frac{d-i e+p-2 c s+c\nu}{d};-\frac{b e^{d z}}{a}\right)+\right.$$
$$\left.e^{(i e+p+2 c s-c\nu) z}(-i e+p-2 c s+c\nu)\, {}_2F_1\left(\frac{i e+p+2 c s-c\nu}{d},-\beta;\frac{d+i e+p+2 c s-c\nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/$$
$$((-i e-p-2 c s+c\nu)(-i e+p-2 c s+c\nu))+i\sin\left(\frac{1}{2}\pi(\nu+1)\right)$$
$$\left(e^{(i e+p-2 c s+c\nu) z}(-i e+p+2 c s-c\nu)\, {}_2F_1\left(\frac{i e+p-2 c s+c\nu}{d},-\beta;\frac{d+i e+p-2 c s+c\nu}{d};-\frac{b e^{d z}}{a}\right)+\right.$$
$$e^{(-i e+p+2 c s-c\nu) z}(-i e-p+2 c s-c\nu)\, {}_2F_1\left(\frac{-i e+p+2 c s-c\nu}{d},-\beta;\frac{d-i e+p+2 c s-c\nu}{d};\right.$$
$$\left.\left.\left.-\frac{b e^{d z}}{a}\right)\right)\Big/((-i e-p+2 c s-c\nu)(-i e+p+2 c s-c\nu))\right)/;\ \nu\in\mathbb{N}^+$$

Involving powers of sin and exp

Involving $e^{p z}\sin^{\mu}(c z)\sinh^{\nu}(a z)$

01.19.21.3150.01

$$\int e^{p z} \sin^{\mu}(c z) \sinh^{\nu}(a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{p z} \left(1-e^{2 i c z}\right)^{-\mu} (1-\nu \bmod 2) \sin^{\mu}(c z)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c} - \mu + 2\right); e^{2 i c z}\right) + 2^{-\nu} \left(1-e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{(p+a(\nu-2k)) z}}{p + a(\nu-2k) - i c \mu} {}_2F_1\left(-\frac{i (p + a(\nu-2k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p + a(\nu-2k))}{c} - \mu + 2\right); e^{2 i c z}\right) + \frac{e^{i \pi \nu + (p - a(\nu-2k)) z}}{p - a(\nu-2k) - i c \mu} {}_2F_1\left(-\frac{i (p - a(\nu-2k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p - a(\nu-2k))}{c} - \mu + 2\right); e^{2 i c z}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3151.01

$$\int e^{p z} \sin^{m}(c z) \sinh^{\nu}(a z)\, dz = \left(1-e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) (2 i)^{-m} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{i \pi m + (p - i c(m-2k)) z}}{-i c(m-2k) + p - a \nu} {}_2F_1\left(\frac{-i c(m-2k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p - i c(m-2k)}{a} - \nu + 2\right); e^{2 a z}\right) + \frac{e^{(c i (m-2k)+p) z}}{c i (m-2k) + p - a \nu} {}_2F_1\left(\frac{c i (m-2k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{c i (m-2k) + p}{a} - \nu + 2\right); e^{2 a z}\right)\right) + \frac{2^{-m} e^{p z} \left(1-e^{2 a z}\right)^{-\nu} (1 - m \bmod 2) \sinh^{\nu}(a z)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2 a z}\right) /; m \in \mathbb{N}^+$$

01.19.21.3152.01

$$\int e^{b z} \sin^{m}(c z) \sinh^{\nu}(a z)\, dz = \frac{i^{\nu} 2^{-m-\nu} e^{b z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{b} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - (2 i)^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{-(-b - i c(m-2k)) z}}{-b - i c(m-2k)} + \frac{(-1)^m e^{-(-b - 2 i c k + i c m) z}}{-b - 2 i c k + i c m}\right) \binom{m}{k} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \left(\frac{e^{-(-b - a(\nu-2s)) z}}{-b - a(\nu-2s)} + \frac{(-1)^{\nu} e^{-(-b - 2 a s + a \nu) z}}{-b - 2 a s + a \nu}\right) \binom{\nu}{s} - i^{-m} 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \left(\frac{(-1)^{\nu} e^{-(-b + 2 i c k - i c m - 2 a s + a \nu) z}}{-b + 2 i c k - i c m - 2 a s + a \nu} + \frac{(-1)^m e^{-(-b - 2 i c k + i c m + 2 a s - a \nu) z}}{-b - 2 i c k + i c m + 2 a s - a \nu} + \frac{e^{-(-b + 2 i c k - i c m + 2 a s - a \nu) z}}{-b + 2 i c k - i c m + 2 a s - a \nu} + \frac{(-1)^{m+\nu} e^{-(-b - 2 i c k + i c m - 2 a s + a \nu) z}}{-b - 2 i c k + i c m - 2 a s + a \nu}\right) \binom{\nu}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \sinh^{\nu}(a z)$

01.19.21.3153.01

$$\int e^{p z} \sin^{\mu}(d + c z) \sinh^{\nu}(a z)\, dz = \frac{\left(\frac{i}{2}\right)^{\nu} e^{p z} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu}}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right) (1 - \nu \bmod 2) \sin^{\mu}(d + c z) + 2^{-\nu} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{(p + a (\nu - 2 k)) z}}{p + a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p + a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p + a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right) + \frac{(-1)^{\nu} e^{(p - a (\nu - 2 k)) z}}{p - a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p - a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p - a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3154.01

$$\int e^{p z} \sin^{m}(d + c z) \sinh^{\nu}(a z)\, dz = \frac{2^{-m} e^{p z} \left(1 - e^{2 a z}\right)^{-\nu} (1 - m \bmod 2) \sinh^{\nu}(a z)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2 a z}\right) + 2^{-m} i^{-m} \left(1 - e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{i d (m - 2 k)} \binom{m}{k} \left(\frac{e^{i \pi m - 2 d i (m - 2 k) + (p - i c (m - 2 k)) z}}{-i c (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{-i c (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p - i c (m - 2 k)}{a} - \nu + 2\right); e^{2 a z}\right) + \frac{e^{(c i (m - 2 k) + p) z}}{c i (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{c i (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{c i (m - 2 k) + p}{a} - \nu + 2\right); e^{2 a z}\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.3155.01

$$\int e^{p z} \sin^{m}(d + c z) \sinh^{\nu}(a z)\, dz = \frac{\left(i^{\nu} 2^{-m-\nu}\right) e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2)}{p} - 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m + \frac{1}{2} i \pi (\nu - m)} \left(\frac{e^{2 i d m - (-i c (m - 2 k) - p) z}}{-i c (m - 2 k) - p} + \frac{e^{4 i d k - (-2 c i k + i c m - p) z + i m \pi}}{-2 c i k + i c m - p}\right) \binom{m}{k} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \left(\frac{e^{(p + a (\nu - 2 s)) z}}{-p - a (\nu - 2 s)} + \frac{e^{i \pi \nu + (p + 2 a s - a \nu) z}}{-p - 2 a s + a \nu}\right) \binom{\nu}{s} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 d i k - i d m - \frac{i m \pi}{2}} \left(\frac{e^{2 i d m + i \pi \nu - (2 i c k - i c m - p - 2 a s + a \nu) z}}{2 i c k - i c m - p - 2 a s + a \nu} + \frac{e^{4 i d k - (-2 c i k + i c m - p + 2 a s - a \nu) z + i m \pi}}{-2 c i k + i c m - p + 2 a s - a \nu} + \frac{e^{2 i d m - (2 i c k - i c m - p + 2 a s - a \nu) z}}{2 i c k - i c m - p + 2 a s - a \nu} + \frac{e^{4 i d k + i \pi \nu - (-2 c i k + i c m - p - 2 a s + a \nu) z + i m \pi}}{-2 c i k + i c m - p - 2 a s + a \nu}\right) \binom{\nu}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z) \sinh^{\nu}(a z + b)$

01.19.21.3156.01

$$\int e^{p z} \sin^{\mu}(c z) \sinh^{\nu}(b + a z) \, dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{p z} \left(1 - e^{2 i c z}\right)^{-\mu} (1 - \nu \bmod 2) \sin^{\mu}(c z)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c} - \mu + 2\right); e^{2 i c z}\right) + 2^{-\nu} \left(1 - e^{2 i c z}\right)^{-\mu} \sin^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b (\nu - 2 k)} \binom{\nu}{k} \left(\frac{e^{(p + a (\nu - 2 k)) z}}{p + a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p + a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p + a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 i c z}\right) + \frac{e^{2 i \left(\frac{\pi \nu}{2} + b i (\nu - 2 k)\right) + (p - a (\nu - 2 k)) z}}{p - a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p - a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p - a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 i c z}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3157.01

$$\int e^{p z} \sin^{m}(c z) \sinh^{\nu}(b + a z) \, dz = \frac{2^{-m} e^{p z} \left(1 - e^{2 (b + a z)}\right)^{-\nu} (1 - m \bmod 2) \sinh^{\nu}(b + a z)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2 (b + a z)}\right) + 2^{-m} i^{-m} \left(1 - e^{2 (b + a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(\frac{e^{i \pi m + (p - i c (m - 2 k)) z}}{-i c (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{-i c (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p - i c (m - 2 k)}{a} - \nu + 2\right); e^{2 (b + a z)}\right) + \frac{e^{(c i (m - 2 k) + p) z}}{c i (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{c i (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{c i (m - 2 k) + p}{a} - \nu + 2\right); e^{2 (b + a z)}\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.3158.01

$$\int e^{p z} \sin^{m}(c z) \sinh^{\nu}(b + a z) \, dz = \frac{\left(i^{\nu} 2^{-m-\nu}\right) e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2) (1 - \nu \bmod 2)}{p} - 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{\frac{1}{2} i \pi (\nu - m)} \left(\frac{e^{-(-i c (m - 2 k) - p) z}}{-i c (m - 2 k) - p} + \frac{e^{i m \pi - (-2 c i k + i c m - p) z}}{-2 c i k + i c m - p}\right) \binom{m}{k} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \left(\frac{e^{2 b \nu - (-p - a (\nu - 2 s)) z}}{-p - a (\nu - 2 s)} + \frac{e^{4 b s + i \pi \nu - (-p - 2 a s + a \nu) z}}{-p - 2 a s + a \nu}\right) \binom{\nu}{s} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-\frac{1}{2} i \pi m - 2 b s - b \nu} \left(e^{2 b \nu} \left(\frac{e^{-(2 i c k - i c m - p + 2 a s - a \nu) z}}{2 i c k - i c m - p + 2 a s - a \nu} + \frac{e^{i m \pi - (-2 c i k + i c m - p + 2 a s - a \nu) z}}{-2 c i k + i c m - p + 2 a s - a \nu}\right) + \frac{e^{i \pi m + 4 b s + i \pi \nu - (-2 c i k + i c m - p - 2 a s + a \nu) z}}{-2 c i k + i c m - p - 2 a s + a \nu} + \frac{e^{4 b s + i \pi \nu - (2 i c k - i c m - p - 2 a s + a \nu) z}}{2 i c k - i c m - p - 2 a s + a \nu}\right) \binom{\nu}{s} /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin^{\mu}(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.3159.01

$$\int e^{p z} \sin^{\mu}(d + c z) \sinh^{\nu}(b + a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \frac{e^{p z} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu} (1 - \nu \bmod 2) \sin^{\mu}(d + c z)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right) + 2^{-\nu} \left(1 - e^{2 (i d + i c z)}\right)^{-\mu} \sin^{\mu}(d + c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b (\nu - 2 k)} \binom{\nu}{k} \left(\frac{e^{(p + a (\nu - 2 k)) z}}{p + a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p + a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p + a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right) + \frac{e^{2 i \left(\frac{\pi \nu}{2} + b i (\nu - 2 k)\right) + (p - a (\nu - 2 k)) z}}{p - a (\nu - 2 k) - i c \mu} {}_2F_1\left(-\frac{i (p - a (\nu - 2 k) - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i (p - a (\nu - 2 k))}{c} - \mu + 2\right); e^{2 (i d + i c z)}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3160.01

$$\int e^{p z} \sin^{m}(d + c z) \sinh^{\nu}(b + a z)\, dz = \frac{2^{-m} e^{p z} \left(1 - e^{2 (b + a z)}\right)^{-\nu} (1 - m \bmod 2) \sinh^{\nu}(b + a z)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2 (b + a z)}\right) + 2^{-m} i^{-m} \left(1 - e^{2 (b + a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{i d (m - 2 k)} \binom{m}{k} \left(\frac{e^{i \pi m - 2 d i (m - 2 k) + (p - i c (m - 2 k)) z}}{-i c (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{-i c (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p - i c (m - 2 k)}{a} - \nu + 2\right); e^{2 (b + a z)}\right) + \frac{e^{(c i (m - 2 k) + p) z}}{c i (m - 2 k) + p - a \nu} {}_2F_1\left(\frac{c i (m - 2 k) + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{c i (m - 2 k) + p}{a} - \nu + 2\right); e^{2 (b + a z)}\right)\right) /; m \in \mathbb{N}^+$$

01.19.21.3161.01

$$\int e^{p z} \sin^{m}(c z + d) \sinh^{\nu}(a z + b)\, dz = \frac{i^{\nu} 2^{-m-\nu} e^{p z} (1 - m \bmod 2) (1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m + \frac{1}{2} i \pi (\nu - m)} \left(\frac{e^{2 i d m - (-i c (m - 2 k) - p) z}}{-i c (m - 2 k) - p} + \frac{e^{4 i d k - (-2 c i k + i c m - p) z + i m \pi}}{-2 c i k + i c m - p}\right) \binom{m}{k} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \left(\frac{e^{2 b \nu - (-p - a (\nu - 2 s)) z}}{-p - a (\nu - 2 s)} + \frac{e^{4 b s + i \pi \nu - (-p - 2 a s + a \nu) z}}{-p - 2 a s + a \nu}\right) \binom{\nu}{s} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 d i k - i d m - 2 b s - b \nu - \frac{i m \pi}{2}} \left(e^{2 b \nu} \left(\frac{e^{2 i d m - (2 i c k - i c m - p + 2 a s - a \nu) z}}{2 i c k - i c m - p + 2 a s - a \nu} + \frac{e^{4 i d k - (-2 c i k + i c m - p + 2 a s - a \nu) z + i m \pi}}{-2 c i k + i c m - p + 2 a s - a \nu}\right) + \frac{e^{4 i d k + 4 b s + i \pi \nu - (-2 c i k + i c m - p - 2 a s + a \nu) z + i m \pi}}{-2 c i k + i c m - p - 2 a s + a \nu} + \frac{e^{2 i d m + 4 b s + i \pi \nu - (2 i c k - i c m - p - 2 a s + a \nu) z}}{2 i c k - i c m - p - 2 a s + a \nu}\right) \binom{\nu}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m\left(b z^r\right) \sinh^{\nu}(c z)$

01.19.21.3162.01

$$\int e^{p z^2} \sin^m\left(b z^2\right) \sinh^\nu(c z)\, dz =$$

$$\frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}\, \text{erfi}\left(\sqrt{p}\, z\right) (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{-\frac{c^2 (\nu-2s)^2 - 2\pi i p \nu}{4p}} \text{erfi}\left(\frac{2pz - c(\nu - 2s)}{2\sqrt{p}} \right) + e^{-\frac{c^2 (\nu-2s)^2 + 2\pi i p \nu}{4p}} \text{erfi}\left(\frac{c(\nu-2s) + 2pz}{2\sqrt{p}} \right) \right) + i^\nu 2^{-m-\nu-1} \sqrt{\pi}$$

$$\binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \sqrt{p - i b(m-2k)}\, (b i (m-2k) + p)\, \text{erfi}\left(\frac{2pz - 2 i b (m-2k) z}{2\sqrt{p - i b(m-2k)}} \right) + e^{-\frac{1}{2} i m \pi} \right.\right.$$

$$\left.\left. (p - i b(m-2k)) \sqrt{b i (m-2k) + p}\, \text{erfi}\left(\sqrt{b i (m-2k) + p}\, z \right) \right) \Big/ ((p - i b(m-2k))(b i (m-2k) + p)) \right) +$$

$$i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+s} \binom{m}{k} \left(\left(e^{-\frac{c^2 (\nu-2s)^2 + 2 i (p - i b (2k-m)) \pi (m-\nu)}{4(p - i b (2k-m))}} \sqrt{p - i b(2k-m)}\, (b i (2k-m) + p) \right.\right.$$

$$\text{erfi}\left(\frac{-c(\nu-2s) - 2 i b (2k-m) z + 2pz}{2\sqrt{p - i b (2k-m)}} \right) + e^{-\frac{c^2 (\nu-2s)^2 - 2 i (b i (2k-m) + p) \pi (m-\nu)}{4(b i (2k-m) + p)}} (p - i b (2k-m))$$

$$\left. \sqrt{b i (2k-m) + p}\, \text{erfi}\left(\frac{c(\nu-2s) + 2(b i (2k-m) + p) z}{2\sqrt{b i (2k-m) + p}} \right) \right) \Big/ ((p - i b (2k-m))(b i (2k-m) + p)) +$$

$$\left(e^{-\frac{c^2 (\nu-2s)^2 - 2 i (p - i b (m-2k)) \pi (m+\nu)}{4(p - i b (m-2k))}} \sqrt{p - i b(m-2k)}\, (b i (m-2k) + p)\, \text{erfi}\left(\frac{-c(\nu-2s) - 2 i b (m-2k) z + 2pz}{2\sqrt{p - i b (m-2k)}} \right) + \right.$$

$$e^{-\frac{c^2 (\nu-2s)^2 + 2 i (b i (m-2k) + p) \pi (m+\nu)}{4(b i (m-2k) + p)}} (p - i b (m-2k)) \sqrt{b i (m-2k) + p}$$

$$\left.\left. \text{erfi}\left(\frac{c(\nu-2s) + 2(b i (m-2k) + p) z}{2\sqrt{b i (m-2k) + p}} \right) \right) \Big/ ((p - i b (m-2k))(b i (m-2k) + p)) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3163.01

$$\int e^{p \sqrt{z}} \sin^m\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz =$$

$$\frac{i^\nu 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p \sqrt{z} - 1\right) (1 - m \bmod 2)(1 - \nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + (-1)^m i^{\nu-m} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s$$

$$e^{(p - i b (m-2s))\sqrt{z}} \left(\frac{e^{2\left(i b (m-2s) \sqrt{z} - \frac{i m \pi}{2}\right)} \left(\sqrt{z}\, p + b i (m-2s) \sqrt{z} - 1\right)}{(p + b i (m-2s))^2} + \frac{\sqrt{z}}{p - i b (m-2s)} - \frac{1}{(i b (m-2s) - p)^2} \right) \binom{m}{s} +$$

$$(-1)^{v}\, 2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^{k} \binom{v}{k} \left(-\frac{e^{\frac{p^2}{4c(v-2k)}}\, p\, \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p-2c(v-2k)\sqrt{z}}{2\sqrt{-c(v-2k)}}\right)}{(-c(v-2k))^{3/2}} + \frac{2\, e^{\sqrt{z}\, p - i\pi v + c(v-2k)z}}{c(v-2k)} - \frac{2\, e^{p\sqrt{z} - c(v-2k)z}}{c(v-2k)} - \frac{e^{-\frac{p^2}{4c(v-2k)} - i\pi v}\, p\, \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p+2c(v-2k)\sqrt{z}}{2\sqrt{c(v-2k)}}\right)}{(c(v-2k))^{3/2}} \right) +$$

$$i^{v}\, 2^{-m-v-1} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^{k+s} \binom{v}{k} \left(e^{-\frac{1}{2} i\pi(v-m)} \left(\frac{2\, e^{\sqrt{z}\,(p+b\,i\,(m-2s)) + i\pi(v-m) + c(2k-v)z}}{c(2k-v)} - \frac{2\, e^{(p-i\,b\,(m-2s))\sqrt{z} - c(2k-v)z}}{c(2k-v)} - \frac{i\, b\, e^{\frac{(p-i\,b\,(m-2s))^2}{4c(2k-v)}}\, \sqrt{\pi}\, (m-2s)\, \operatorname{erfi}\left(\frac{-p+b\,i\,(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{-c(2k-v)}}\right)}{(-c(2k-v))^{3/2}} - \frac{e^{\frac{(p-i\,b\,(m-2s))^2}{4c(2k-v)}}\, p\, \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p-i\,b\,(m-2s)-2c(2k-v)\sqrt{z}}{2\sqrt{-c(2k-v)}}\right)}{(-c(2k-v))^{3/2}} - \frac{e^{i\pi(v-m) - \frac{(p+b\,i\,(m-2s))^2}{4c(2k-v)}}\, p\, \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{c(2k-v)}}\right)}{(c(2k-v))^{3/2}} - \frac{i\, b\, e^{i\pi(v-m) - \frac{(p+b\,i\,(m-2s))^2}{4c(2k-v)}}\, \sqrt{\pi}\, (m-2s)\, \operatorname{erfi}\left(\frac{p+b\,i\,(m-2s)+2c(2k-v)\sqrt{z}}{2\sqrt{c(2k-v)}}\right)}{(c(2k-v))^{3/2}} \right) +$$

$$e^{\frac{1}{2} i\pi(m+v)} \left(\frac{2\, e^{\sqrt{z}\,(p+b\,i\,(m-2s)) - i\pi(m+v) + c(v-2k)z}}{c(v-2k)} - \frac{2\, e^{(p-i\,b\,(m-2s))\sqrt{z} - c(v-2k)z}}{c(v-2k)} - \frac{i\, b\, e^{\frac{(p-i\,b\,(m-2s))^2}{4c(v-2k)}}\, \sqrt{\pi}\, (m-2s)\, \operatorname{erfi}\left(\frac{-p+b\,i\,(m-2s)+2c(v-2k)\sqrt{z}}{2\sqrt{-c(v-2k)}}\right)}{(-c(v-2k))^{3/2}} - \right.$$

$$\frac{e^{\frac{(p-i b (m-2 s))^2}{4 c (v-2 k)}}\, p \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p-i b (m-2 s)-2 c (v-2 k) \sqrt{z}}{2 \sqrt{-c (v-2 k)}}\right)}{(-c (v-2 k))^{3/2}} -$$

$$\frac{e^{-\frac{(p+b i (m-2 s))^2}{4 c (v-2 k)}-i \pi (m+v)}\, p \sqrt{\pi}\, \operatorname{erfi}\left(\frac{p+b i (m-2 s)+2 c (v-2 k) \sqrt{z}}{2 \sqrt{c (v-2 k)}}\right)}{(c (v-2 k))^{3/2}} -$$

$$\left.\left.\frac{i\, b\, e^{-\frac{(p+b i (m-2 s))^2}{4 c (v-2 k)}-i \pi (m+v)} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{p+b i (m-2 s)+2 c (v-2 k) \sqrt{z}}{2 \sqrt{c (v-2 k)}}\right)}{(c (v-2 k))^{3/2}}\right)\right) /; m \in \mathbb{N}^+ \wedge v \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \sinh^v(c z)$

01.19.21.3164.01

$$\int e^{p z^2} \sin^m(b z) \sinh^v(c z)\, dz = \frac{i^v 2^{-m-v-1} \sqrt{\pi}\, (1-m \bmod 2)(1-v \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + \frac{i^v 2^{-m-v-1} \sqrt{\pi}}{\sqrt{p}} \binom{v}{\frac{v}{2}}$$

$$(1-v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{-b^2 (m-2 s)^2-2 \pi i m p}{4 p}} \operatorname{erfi}\left(\frac{2 p z-i b (m-2 s)}{2 \sqrt{p}}\right) + e^{-\frac{2 \pi i m p-b^2 (m-2 s)^2}{4 p}} \operatorname{erfi}\left(\frac{b i (m-2 s)+2 p z}{2 \sqrt{p}}\right)\right) +$$

$$\frac{i^v 2^{-m-v-1} \sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1-m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{c^2 (v-2 k)^2-2 \pi i p v}{4 p}} \operatorname{erfi}\left(\frac{2 p z-c (v-2 k)}{2 \sqrt{p}}\right) + e^{-\frac{c^2 (v-2 k)^2+2 \pi i p v}{4 p}} \operatorname{erfi}\left(\frac{c (v-2 k)+2 p z}{2 \sqrt{p}}\right)\right) + \frac{i^v 2^{-m-v-1} \sqrt{\pi}}{\sqrt{p}}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{k} \left(e^{-\frac{(b i (m-2 s)+c (2 k-v))^2-2 i p \pi (v-m)}{4 p}} \operatorname{erfi}\left(\frac{b i (m-2 s)+c (2 k-v)+2 p z}{2 \sqrt{p}}\right) + e^{-\frac{(-i b (m-2 s)-c (2 k-v))^2+2 i p \pi (v-m)}{4 p}}\right.$$

$$\operatorname{erfi}\left(\frac{-i b (m-2 s)-c (2 k-v)+2 p z}{2 \sqrt{p}}\right) + e^{-\frac{(b i (m-2 s)+c (v-2 k))^2+2 i p \pi (m+v)}{4 p}} \operatorname{erfi}\left(\frac{b i (m-2 s)+c (v-2 k)+2 p z}{2 \sqrt{p}}\right) +$$

$$\left.e^{-\frac{(-i b (m-2 s)-c (v-2 k))^2-2 i p \pi (m+v)}{4 p}} \operatorname{erfi}\left(\frac{-i b (m-2 s)-c (v-2 k)+2 p z}{2 \sqrt{p}}\right)\right) /; m \in \mathbb{N}^+ \wedge v \in \mathbb{N}^+$$

01.19.21.3165.01

$$\int e^{p\sqrt{z}} \sin^m(b z) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z}-1\right)(1-m \bmod 2)(1-\nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$
$$i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s e^{\frac{i m \pi}{2}} \binom{m}{s} \left(\frac{2 i e^{p\sqrt{z} - i b (m-2s) z}}{b(m-2s)} - \frac{2 i e^{-i\pi m + b i (m-2s) z + p\sqrt{z}}}{b(m-2s)} - \right.$$
$$\left. \frac{e^{-\frac{i p^2}{4 b (m-2s)}} p \sqrt{\pi}\, \text{erfi}\left(\frac{p - 2 i b (m-2s)\sqrt{z}}{2\sqrt{-i b (m-2s)}}\right)}{(-i b (m-2s))^{3/2}} - \frac{e^{\frac{i p^2}{4 b (m-2s)} - i m \pi} p \sqrt{\pi}\, \text{erfi}\left(\frac{p + 2 b i (m-2s)\sqrt{z}}{2\sqrt{i b (m-2s)}}\right)}{(i b (m-2s))^{3/2}} \right) +$$
$$i^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{\frac{i\pi\nu}{2}} \binom{\nu}{k} \left(-\frac{e^{\frac{p^2}{4 c (\nu-2k)}} p \sqrt{\pi}\, \text{erfi}\left(\frac{p - 2 c (\nu-2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} + \right.$$
$$\left. \frac{2 e^{\sqrt{z}\, p - i\pi\nu + c(\nu-2k) z}}{c(\nu-2k)} - \frac{2 e^{p\sqrt{z} - c(\nu-2k) z}}{c(\nu-2k)} - \frac{e^{-\frac{p^2}{4 c(\nu-2k)} - i\pi\nu} p\sqrt{\pi}\, \text{erfi}\left(\frac{p + 2 c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} \right) +$$
$$i^\nu 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(e^{-\frac{1}{2} i\pi(\nu-m)} \left(\frac{2 e^{\sqrt{z}\, p + i\pi(\nu-m) + (b i (m-2s) + c(2k-\nu)) z}}{b i (m-2s) + c(2k-\nu)} - \left(e^{i\pi(\nu-m) - \frac{p^2}{4(b i (m-2s) + c(2k-\nu))}} \right.\right.\right.$$
$$\left. p\sqrt{\pi}\, \text{erfi}\left(\frac{p + 2(b i (m-2s) + c(2k-\nu))\sqrt{z}}{2\sqrt{b i (m-2s) + c(2k-\nu)}}\right)\right) \Big/ (b i (m-2s) + c(2k-\nu))^{3/2} +$$
$$\frac{2 e^{\sqrt{z}\, p + (-i b (m-2s) - c(2k-\nu)) z}}{-i b (m-2s) - c(2k-\nu)} - \left(e^{-\frac{p^2}{4(-i b (m-2s) - c(2k-\nu))}} p\sqrt{\pi}\, \text{erfi}\left(\frac{p + 2(-i b (m-2s) - c(2k-\nu))\sqrt{z}}{2\sqrt{-i b (m-2s) - c(2k-\nu)}}\right)\right) \Big/$$
$$\left.(-i b (m-2s) - c(2k-\nu))^{3/2}\right) + e^{\frac{1}{2} i\pi(m+\nu)} \left(\frac{2 e^{\sqrt{z}\, p - i\pi(m+\nu) + (b i (m-2s) + c(\nu-2k)) z}}{b i (m-2s) + c(\nu-2k)} - \right.$$
$$\left(e^{-\frac{p^2}{4(b i (m-2s) + c(\nu-2k))} - i\pi(m+\nu)} p\sqrt{\pi}\, \text{erfi}\left(\frac{p + 2(b i (m-2s) + c(\nu-2k))\sqrt{z}}{2\sqrt{b i (m-2s) + c(\nu-2k)}}\right)\right) \Big/$$
$$(b i (m-2s) + c(\nu-2k))^{3/2} + \frac{2 e^{\sqrt{z}\, p + (-i b (m-2s) - c(\nu-2k)) z}}{-i b (m-2s) - c(\nu-2k)} - \left(e^{-\frac{p^2}{4(-i b (m-2s) - c(\nu-2k))}} p\sqrt{\pi}\, \text{erfi}\left(\right.\right.$$
$$\left.\left.\left.\left. \frac{p + 2(-i b (m-2s) - c(\nu-2k))\sqrt{z}}{2\sqrt{-i b (m-2s) - c(\nu-2k)}}\right)\right) \Big/ (-i b (m-2s) - c(\nu-2k))^{3/2} \right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z^r) \sinh^\nu(c z)$

01.19.21.3166.01

$$\int e^{p z} \sin^m(b z^2) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} +$$
$$\frac{i^{\nu+1} 2^{-m-\nu-1} \sqrt{\pi}}{b} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^s}{m - 2 s} \binom{m}{s} \left(e^{-\frac{i \left(p^2 - 2 b m \pi (m-2 s)\right)}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)} \operatorname{erfi}\left(\frac{p - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) - \right.$$
$$\left. e^{\frac{i \left(p^2 - 2 b m \pi (m-2 s)\right)}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)} \operatorname{erfi}\left(\frac{p + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) \right) + i^\nu 2^{-m-\nu+1} e^{p z} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(\cosh(c (\nu - 2 k) z) \left(p \cos\left(\frac{\pi \nu}{2}\right) - i c (2 k - \nu) \sin\left(\frac{\pi \nu}{2}\right) \right) + \left(c (2 k - \nu) \cos\left(\frac{\pi \nu}{2}\right) - i p \sin\left(\frac{\pi \nu}{2}\right) \right) \right. \right.$$
$$\left. \left. \sinh(c (\nu - 2 k) z) \right) \right) \Big/ ((2 c k + p - c \nu)(p + c (\nu - 2 k))) + \frac{i^{\nu+1} 2^{-m-\nu-1} \sqrt{\pi}}{b}$$
$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^{k+s}}{m - 2 s} \binom{\nu}{k} \left(e^{-\frac{i \left((p - c (2 k - \nu))^2 + 2 b \pi (m-2 s)(\nu - m) \right)}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)} \operatorname{erfi}\left(\frac{p - c (2 k - \nu) - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) + \right.$$
$$e^{-\frac{i \left((p - c (\nu - 2 k))^2 - 2 b \pi (m-2 s)(m + \nu) \right)}{4 b (m-2 s)}} \sqrt{-i b (m - 2 s)} \operatorname{erfi}\left(\frac{p - c (\nu - 2 k) - 2 i b (m - 2 s) z}{2 \sqrt{-i b (m - 2 s)}} \right) -$$
$$e^{\frac{i \left((p + c (2 k - \nu))^2 + 2 b \pi (m-2 s)(\nu - m) \right)}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)} \operatorname{erfi}\left(\frac{p + c (2 k - \nu) + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) -$$
$$\left. e^{\frac{i \left((p + c (\nu - 2 k))^2 - 2 b \pi (m-2 s)(m + \nu) \right)}{4 b (m-2 s)}} \sqrt{i b (m - 2 s)} \operatorname{erfi}\left(\frac{p + c (\nu - 2 k) + 2 b i (m - 2 s) z}{2 \sqrt{i b (m - 2 s)}} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3167.01

$$\int e^{pz}\sin^m\left(b\sqrt{z}\right)\sinh^\nu(cz)\,dz = \frac{i^\nu 2^{-m-\nu} e^{pz}(1-m \bmod 2)(1-\nu \bmod 2)}{p}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} + (-1)^\nu 2^{-m-\nu}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{(p-c(\nu-2k))z}}{p-c(\nu-2k)}+\frac{e^{(p+c(\nu-2k))z-i\pi\nu}}{p+c(\nu-2k)}\right)\binom{\nu}{k} + i^{m+\nu}2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(-\frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4p}-i m\pi}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{2\sqrt{z}\,p+b\,i(m-2s)}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{2e^{pz-ib(m-2s)\sqrt{z}}}{p}+\frac{2e^{-i\pi m+pz+bi(m-2s)\sqrt{z}}}{p}-\frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4p}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{i\,b(m-2s)-2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}}\right) + i^\nu 2^{-m-\nu-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+s}\binom{\nu}{k}\left(e^{-\frac{1}{2}i\pi(\nu-m)}\left(\frac{2e^{bi\sqrt{z}\,(m-2s)+i\pi(\nu-m)+(p+c(2k-\nu))z}}{p+c(2k-\nu)} - \frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4(p+c(2k-\nu))}+i\pi(\nu-m)}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b\,i(m-2s)+2(p+c(2k-\nu))\sqrt{z}}{2\sqrt{p+c(2k-\nu)}}\right)}{(p+c(2k-\nu))^{3/2}} + \frac{2e^{(p-c(2k-\nu))z-ib(m-2s)\sqrt{z}}}{p-c(2k-\nu)} - \frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4(p-c(2k-\nu))}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b\,i(m-2s)+2(c(2k-\nu)-p)\sqrt{z}}{2\sqrt{p-c(2k-\nu)}}\right)}{(p-c(2k-\nu))^{3/2}}\right) + e^{\frac{1}{2}i\pi(m+\nu)}\left(\frac{2e^{bi\sqrt{z}\,(m-2s)-i\pi(m+\nu)+(p+c(\nu-2k))z}}{p+c(\nu-2k)} - \frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4(p+c(\nu-2k))}-i\pi(m+\nu)}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b\,i(m-2s)+2(p+c(\nu-2k))\sqrt{z}}{2\sqrt{p+c(\nu-2k)}}\right)}{(p+c(\nu-2k))^{3/2}} + \frac{2e^{(p-c(\nu-2k))z-ib(m-2s)\sqrt{z}}}{p-c(\nu-2k)} - \frac{i\,b\,e^{\frac{b^2(m-2s)^2}{4(p-c(\nu-2k))}}\sqrt{\pi}\,(m-2s)\operatorname{erfi}\left(\frac{b\,i(m-2s)+2(c(\nu-2k)-p)\sqrt{z}}{2\sqrt{p-c(\nu-2k)}}\right)}{(p-c(\nu-2k))^{3/2}}\right)\right) /;\ m\in\mathbb{N}^+\wedge\nu\in\mathbb{N}^+$$

Involving $e^{pz}\sin^m(bz)\sinh^\nu(cz^r)$

01.19.21.3168.01

$$\int e^{p z} \sin^m(b z) \sinh^\nu\left(c z^2\right) dz = \frac{2^{-m-\nu} i^\nu e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^s}{\nu - 2s} \binom{\nu}{s}$$

$$\left(e^{\frac{p^2 + 2 c i \pi \nu (\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{-c (\nu - 2s)} \operatorname{erfi}\left(\frac{p - 2c(\nu - 2s) z}{2\sqrt{-c(\nu - 2s)}} \right) - e^{-\frac{p^2 + 2 c i \pi \nu (\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{c (\nu - 2s)} \operatorname{erfi}\left(\frac{p + 2c(\nu - 2s) z}{2\sqrt{c(\nu - 2s)}} \right) \right) +$$

$$i^\nu 2^{-m-\nu+1} e^{p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^k \binom{m}{k} \left(\cos(b (m - 2k) z) \left(p \cos\left(\frac{m\pi}{2} \right) + b (2k - m) \sin\left(\frac{m\pi}{2} \right) \right) + \right.\right.$$

$$\left.\left. i \left(i b (2k - m) \cos\left(\frac{m\pi}{2} \right) - i p \sin\left(\frac{m\pi}{2} \right) \right) \sin(b (m - 2k) z) \right) \right) \Big/$$

$$((2 i b k - i b m + p)(b i (m - 2k) + p)) - \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{c}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^{k+s}}{\nu - 2s} \binom{m}{k} \left(e^{\frac{(p - i b (2k - m))^2 - 2 i c \pi (m - \nu)(\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{-c(\nu - 2s)} \operatorname{erfi}\left(\frac{-i b (2k - m) + p - 2c(\nu - 2s) z}{2\sqrt{-c(\nu - 2s)}} \right) + \right.$$

$$e^{\frac{(p - i b (m - 2k))^2 + 2 c i \pi (m + \nu)(\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{-c(\nu - 2s)} \operatorname{erfi}\left(\frac{-i b (m - 2k) + p - 2c(\nu - 2s) z}{2\sqrt{-c(\nu - 2s)}} \right) -$$

$$e^{-\frac{(b i (2k - m) + p)^2 - 2 i c \pi (m - \nu)(\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{c(\nu - 2s)} \operatorname{erfi}\left(\frac{b i (2k - m) + p + 2c(\nu - 2s) z}{2\sqrt{c(\nu - 2s)}} \right) -$$

$$\left. e^{-\frac{(b i (m - 2k) + p)^2 + 2 c i \pi (m + \nu)(\nu - 2s)}{4 c (\nu - 2s)}} \sqrt{c(\nu - 2s)} \operatorname{erfi}\left(\frac{b i (m - 2k) + p + 2c(\nu - 2s) z}{2\sqrt{c(\nu - 2s)}} \right) \right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3169.01

$$\int e^{p z} \sin^m(b z) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^\nu 2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} +$$
$$i^{m+\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(b i (m-2k)+p) z - i m \pi}}{b i (m-2k) + p} + \frac{e^{(p - i b (m-2k)) z}}{p - i b (m-2k)} \right) \binom{m}{k} + (-1)^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-\frac{c e^{-\frac{c^2 (\nu-2s)^2}{4p} - i \pi \nu} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2\sqrt{z}\, p + c(\nu-2s)}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{c e^{-\frac{c^2 (\nu-2s)^2}{4p}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{c(\nu-2s) - 2p\sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \right.$$
$$\left. \frac{2 e^{p z - c(\nu-2s)\sqrt{z}}}{p} + \frac{2 e^{-i \pi \nu + p z + c(\nu-2s)\sqrt{z}}}{p} \right) + i^\nu 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^{k+s} \binom{m}{k}$$
$$\left(e^{-\frac{1}{2} i \pi (m-\nu)} \left(\frac{2 e^{(p - i b (2k-m)) z - c(\nu-2s)\sqrt{z}}}{p - i b (2k-m)} - \frac{c e^{-\frac{c^2 (\nu-2s)^2}{4(p - i b (2k-m))}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2\sqrt{z}\, (i b (2k-m) - p) + c(\nu-2s)}{2\sqrt{p - i b (2k-m)}}\right)}{(p - i b (2k-m))^{3/2}} + \right.\right.$$
$$\frac{2 e^{i \pi (m-\nu) + (b i (2k-m) + p) z + c(\nu-2s)\sqrt{z}}}{b i (2k-m) + p} - \left(c e^{i \pi (m-\nu) - \frac{c^2 (\nu-2s)^2}{4(b i (2k-m)+p)}} \sqrt{\pi} (\nu - 2s) \right.$$
$$\left.\left. \operatorname{erfi}\left(\frac{2\sqrt{z}\, (b i (2k-m) + p) + c(\nu-2s)}{2\sqrt{b i (2k-m) + p}}\right)\right) \Big/ (b i (2k-m) + p)^{3/2} \right) +$$
$$e^{\frac{1}{2} i \pi (m+\nu)} \left(\frac{2 e^{(p - i b (m-2k)) z - c(\nu-2s)\sqrt{z}}}{p - i b (m-2k)} - \frac{c e^{-\frac{c^2 (\nu-2s)^2}{4(p - i b (m-2k))}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2\sqrt{z}\, (i b (m-2k) - p) + c(\nu-2s)}{2\sqrt{p - i b (m-2k)}}\right)}{(p - i b (m-2k))^{3/2}} + \right.$$
$$\frac{2 e^{-i \pi (m+\nu) + (b i (m-2k) + p) z + c(\nu-2s)\sqrt{z}}}{b i (m-2k) + p} - \left(c e^{-\frac{c^2 (\nu-2s)^2}{4(b i (m-2k)+p)} - i \pi (m+\nu)} \sqrt{\pi} (\nu - 2s) \right.$$
$$\left.\left.\left. \operatorname{erfi}\left(\frac{2\sqrt{z}\, (b i (m-2k) + p) + c(\nu-2s)}{2\sqrt{b i (m-2k) + p}}\right)\right) \Big/ (b i (m-2k) + p)^{3/2} \right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \sin^m(b z) \sinh^\nu(c z^r)$

01.19.21.3170.01

$$\int e^{p z^2} \sin^m(b z) \sinh^\nu(c z^2)\, dz = \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}\, (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{p^2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(e^{-\frac{-b^2 (m-2s)^2 - 2\pi i m p}{4p}} \operatorname{erfi}\left(\frac{2 p z - i b (m - 2s)}{2\sqrt{p}}\right) p^{3/2} + e^{-\frac{2\pi i m p - b^2 (m-2s)^2}{4p}} \operatorname{erfi}\left(\frac{b i (m - 2s) + 2 p z}{2\sqrt{p}}\right) p^{3/2}\right) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(e^{\frac{i\pi\nu}{2}} (p + c(\nu - 2k)) \sqrt{p - c(\nu - 2k)}\, \operatorname{erfi}\left(\frac{2 p z - 2 c (\nu - 2k) z}{2\sqrt{p - c(\nu - 2k)}}\right) + e^{-\frac{1}{2} i \pi \nu} \sqrt{p + c(\nu - 2k)}\, (p - c(\nu - 2k)) \operatorname{erfi}\left(\sqrt{p + c(\nu - 2k)}\, z\right)\right)\right) \Big/ ((p - c(\nu - 2k))(p + c(\nu - 2k))) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(\left(\left(e^{-\frac{-b^2 (m-2s)^2 - 2 i \pi (p + c(2k - \nu))(\nu - m)}{4(p + c(2k - \nu))}} \sqrt{p + c(2k - \nu)}\, (p - c(2k - \nu)) \operatorname{erfi}\left(\frac{b i (m - 2s) + 2 (p + c(2k - \nu)) z}{2\sqrt{p + c(2k - \nu)}}\right) + e^{-\frac{2 i \pi (p - c(2k - \nu))(\nu - m) - b^2 (m-2s)^2}{4(p - c(2k - \nu))}} (p + c(2k - \nu)) \sqrt{p - c(2k - \nu)}\, \operatorname{erfi}\left(\frac{-i b (m - 2s) + 2 p z - 2 c (2k - \nu) z}{2\sqrt{p - c(2k - \nu)}}\right)\right)\right) \Big/ ((p - c(2k - \nu))(p + c(2k - \nu))) + \left(e^{-\frac{2 i \pi (m + \nu)(p + c(\nu - 2k)) - b^2 (m-2s)^2}{4(p + c(\nu - 2k))}} \sqrt{p + c(\nu - 2k)}\, (p - c(\nu - 2k)) \operatorname{erfi}\left(\frac{b i (m - 2s) + 2 (p + c(\nu - 2k)) z}{2\sqrt{p + c(\nu - 2k)}}\right) + e^{-\frac{-b^2 (m-2s)^2 - 2 i \pi (m + \nu)(p - c(\nu - 2k))}{4(p - c(\nu - 2k))}} (p + c(\nu - 2k)) \sqrt{p - c(\nu - 2k)}\, \operatorname{erfi}\left(\frac{-i b (m - 2s) + 2 p z - 2 c (\nu - 2k) z}{2\sqrt{p - c(\nu - 2k)}}\right)\right) \Big/ ((p - c(\nu - 2k))(p + c(\nu - 2k)))\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3171.01

$$\int e^{p\sqrt{z}} \sin^m(b z) \sinh^\nu\left(c\sqrt{z}\right) dz = \frac{i^{-\nu}\left(2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z} - 1\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{p^2} + 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s e^{(p+c(\nu-2s))\sqrt{z}}\left(\frac{e^{2\left(-\frac{1}{2}i\pi\nu-c(\nu-2s)\sqrt{z}\right)}\left(\sqrt{z}\,p-c(\nu-2s)\sqrt{z}-1\right)}{(p-c(\nu-2s))^2}+\frac{\sqrt{z}}{p+c(\nu-2s)}-\frac{1}{(-p-c(\nu-2s))^2}\right)\binom{\nu}{s}+$$

$$i^{m-\nu}2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(\frac{2\,i\,e^{p\sqrt{z}-i\,b(m-2k)z}}{b(m-2k)}-\frac{2\,i\,e^{-i\pi m+b\,i(m-2k)z+p\sqrt{z}}}{b(m-2k)}-\right.$$

$$\left.\frac{e^{-\frac{i p^2}{4b(m-2k)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{p-2\,i\,b(m-2k)\sqrt{z}}{2\sqrt{-i\,b(m-2k)}}\right)}{(-i\,b(m-2k))^{3/2}}-\frac{e^{\frac{i p^2}{4b(m-2k)}-i\,m\pi}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\,b\,i\sqrt{z}\,(m-2k)+p}{2\sqrt{i\,b(m-2k)}}\right)}{(i\,b(m-2k))^{3/2}}\right)+$$

$$i^{-\nu}2^{-m-\nu-1}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\binom{\nu}{s}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k+s}\binom{m}{k}\left(e^{-\frac{1}{2}i\pi(m-\nu)}\left(\frac{2\,i\,e^{(p+c(\nu-2s))\sqrt{z}-i\,b(2k-m)z}}{b(2k-m)}-\right.\right.$$

$$\frac{2\,i\,e^{i\pi(m-\nu)+b\,i(2k-m)z+(p-c(\nu-2s))\sqrt{z}}}{b(2k-m)}-\frac{e^{-\frac{i(p+c(\nu-2s))^2}{4b(2k-m)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-2\,i\,b\sqrt{z}\,(2k-m)+p+c(\nu-2s)}{2\sqrt{-i\,b(2k-m)}}\right)}{(-i\,b(2k-m))^{3/2}}+$$

$$\frac{c\,e^{-\frac{i(p+c(\nu-2s))^2}{4b(2k-m)}}\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2\,b\,i\sqrt{z}\,(2k-m)-p-c(\nu-2s)}{2\sqrt{-i\,b(2k-m)}}\right)}{(-i\,b(2k-m))^{3/2}}-$$

$$\frac{e^{\frac{i(p-c(\nu-2s))^2}{4b(2k-m)}+i\pi(m-\nu)}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{2\,b\,i\sqrt{z}\,(2k-m)+p-c(\nu-2s)}{2\sqrt{i\,b(2k-m)}}\right)}{(i\,b(2k-m))^{3/2}}+$$

$$\left.\left(c\,e^{\frac{i(p-c(\nu-2s))^2}{4b(2k-m)}+i\pi(m-\nu)}\sqrt{\pi}\,(\nu-2s)\operatorname{erfi}\left(\frac{2\,b\,i\sqrt{z}\,(2k-m)+p-c(\nu-2s)}{2\sqrt{i\,b(2k-m)}}\right)\right)\Big/(i\,b(2k-m))^{3/2}\right)+$$

$$e^{\frac{1}{2}i\pi(m+\nu)}\left(\frac{2\,i\,e^{(p+c(\nu-2s))\sqrt{z}-i\,b(m-2k)z}}{b(m-2k)}-\frac{2\,i\,e^{-i\pi(m+\nu)+b\,i(m-2k)z+(p-c(\nu-2s))\sqrt{z}}}{b(m-2k)}-\right.$$

$$\frac{e^{-\frac{i(p+c(\nu-2s))^2}{4b(m-2k)}}\,p\sqrt{\pi}\,\operatorname{erfi}\left(\frac{-2\,i\,b\sqrt{z}\,(m-2k)+p+c(\nu-2s)}{2\sqrt{-i\,b(m-2k)}}\right)}{(-i\,b(m-2k))^{3/2}}+$$

$$\frac{c\, e^{-\frac{i (p+c (v-2 s))^2}{4 b (m-2 k)}} \sqrt{\pi}\, (v-2 s) \operatorname{erfi}\left(\frac{2 b i \sqrt{z}\, (m-2 k)-p-c (v-2 s)}{2 \sqrt{-i b (m-2 k)}}\right)}{(-i b (m-2 k))^{3/2}} -$$

$$\frac{e^{\frac{i (p-c (v-2 s))^2}{4 b (m-2 k)}-i \pi (m+v)}\, p \sqrt{\pi} \operatorname{erfi}\left(\frac{2 b i \sqrt{z}\, (m-2 k)+p-c (v-2 s)}{2 \sqrt{i b (m-2 k)}}\right)}{(i b (m-2 k))^{3/2}} + \left(c\, e^{\frac{i (p-c (v-2 s))^2}{4 b (m-2 k)}-i \pi (m+v)} \sqrt{\pi}\, (v-2 s)\right.$$

$$\left.\left.\left.\operatorname{erfi}\left(\frac{2 b i \sqrt{z}\, (m-2 k)+p-c (v-2 s)}{2 \sqrt{i b (m-2 k)}}\right)\right) \middle/ (i b (m-2 k))^{3/2}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

Involving $e^{p z} \sin^m(b z^r) \sinh^v(c z^r)$

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$$\int e^{p z} \sin^m(b z^2) \sinh^v(c z^2)\, dz = \frac{i^v\, 2^{-m-v}\, e^{p z} (1-m \bmod 2) (1-v \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} +$$

$$\frac{i^{v+1}\, 2^{-m-v-1} \sqrt{\pi}}{b} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{(-1)^s}{m-2 s} \binom{m}{s} \left(e^{-\frac{i\left(p^2-2 b m \pi (m-2 s)\right)}{4 b (m-2 s)}} \sqrt{-i b (m-2 s)} \operatorname{erfi}\left(\frac{p-2 i b (m-2 s) z}{2 \sqrt{-i b (m-2 s)}}\right) - \right.$$

$$\left. e^{\frac{i\left(p^2-2 b m \pi (m-2 s)\right)}{4 b (m-2 s)}} \sqrt{i b (m-2 s)} \operatorname{erfi}\left(\frac{p+2 b i (m-2 s) z}{2 \sqrt{i b (m-2 s)}}\right)\right) - \frac{i^v\, 2^{-m-v-1} \sqrt{\pi}}{c} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{(-1)^k}{v-2 k} \binom{v}{k}$$

$$\left(e^{\frac{p^2+2 c i \pi v (v-2 k)}{4 c (v-2 k)}} \sqrt{-c (v-2 k)} \operatorname{erfi}\left(\frac{p-2 c (v-2 k) z}{2 \sqrt{-c (v-2 k)}}\right) - e^{-\frac{p^2+2 c i \pi v (v-2 k)}{4 c (v-2 k)}} \sqrt{c (v-2 k)} \operatorname{erfi}\left(\frac{p+2 c (v-2 k) z}{2 \sqrt{c (v-2 k)}}\right)\right) +$$

$$i^v\, 2^{-m-v-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{k} \left(\frac{1}{b i (m-2 s)+c (2 k-v)}\right.$$

$$\left(e^{-\frac{p^2-2 i \pi (b i (m-2 s)+c (2 k-v)) (v-m)}{4 (b i (m-2 s)+c (2 k-v))}} \sqrt{b i (m-2 s)+c (2 k-v)} \operatorname{erfi}\left(\frac{p+2 (b i (m-2 s)+c (2 k-v)) z}{2 \sqrt{b i (m-2 s)+c (2 k-v)}}\right) - \right.$$

$$\left.\left. e^{-\frac{p^2+2 i \pi (-i b (m-2 s)-c (2 k-v)) (v-m)}{4 (-i b (m-2 s)-c (2 k-v))}} \sqrt{-i b (m-2 s)-c (2 k-v)} \operatorname{erfi}\left(\frac{p-2 (b i (m-2 s)+c (2 k-v)) z}{2 \sqrt{-i b (m-2 s)-c (2 k-v)}}\right)\right) + \right.$$

$$\frac{1}{b i (m-2 s)+c (v-2 k)} \left(e^{-\frac{p^2+2 i \pi (m+v) (b i (m-2 s)+c (v-2 k))}{4 (b i (m-2 s)+c (v-2 k))}} \sqrt{b i (m-2 s)+c (v-2 k)}\right.$$

$$\operatorname{erfi}\left(\frac{p+2 (b i (m-2 s)+c (v-2 k)) z}{2 \sqrt{b i (m-2 s)+c (v-2 k)}}\right) - e^{-\frac{p^2-2 i \pi (m+v) (-i b (m-2 s)-c (v-2 k))}{4 (-i b (m-2 s)-c (v-2 k))}} \sqrt{-i b (m-2 s)-c (v-2 k)}$$

$$\left.\left.\operatorname{erfi}\left(\frac{p-2 (b i (m-2 s)+c (v-2 k)) z}{2 \sqrt{-i b (m-2 s)-c (v-2 k)}}\right)\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int e^{p z} \sin^m\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz =$$

$$\frac{i^{-\nu} \left(2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{p} + 2^{-m-\nu-1} e^{\frac{1}{2} i (m-\nu) \pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s \binom{m}{s} \left(\frac{4 e^{p z - \frac{i m \pi}{2}} \cos\left(\frac{m \pi}{2} - b (m - 2 s) \sqrt{z}\right)}{p} + \frac{i b e^{-\frac{(2 i b s - i b m)^2}{4 p}} \sqrt{\pi} (m - 2 s) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - i b (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} - \right.$$

$$\left. \frac{i b e^{\frac{b^2 (m-2 s)^2}{4 p} - i m \pi} \sqrt{\pi} (m - 2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, p + b i (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) + 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{4 e^{p z - \frac{i \pi \nu}{2}} \cos\left(c i \sqrt{z} (2 k - \nu) + \frac{\pi \nu}{2}\right)}{p} - \frac{e^{-\frac{(c \nu - 2 c k)^2}{4 p}} \sqrt{\pi} (c \nu - 2 c k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (2 k - \nu)}{2 \sqrt{p}}\right)}{p^{3/2}} + \right.$$

$$\left. \frac{c e^{-\frac{c^2 (\nu - 2 k)^2}{4 p} - i \pi \nu} \sqrt{\pi} (\nu - 2 k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (\nu - 2 k)}{2 \sqrt{p}}\right)}{p^{3/2}} \right) + i^{-\nu} 2^{-m-\nu-1}$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi (\nu - m)} \left(\frac{1}{p} \left(4 e^{p z - \frac{1}{2} i \pi (m - \nu)} \cos\left(\frac{1}{2} \pi (\nu - m) + (2 i c k + b m - 2 b s - i c \nu) \sqrt{z}\right)\right) + \right.\right.$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(2 i c k + b m - 2 b s - i c \nu)^2}{4 p}} \sqrt{\pi} (2 i c k + b m - 2 b s - i c \nu) \operatorname{erf}\left(\frac{2 i \sqrt{z}\, p + b (m - 2 s) + c i (2 k - \nu)}{2 \sqrt{p}}\right)\right) +$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(-2 c i k - b m + 2 b s + i c \nu)^2}{4 p} + i \pi (\nu - m)} \sqrt{\pi} (2 i c k + b m - 2 b s - i c \nu) \right.$$

$$\left.\left. \operatorname{erf}\left(\frac{-2 i \sqrt{z}\, p + b (m - 2 s) + c i (2 k - \nu)}{2 \sqrt{p}}\right)\right)\right) +$$

$$e^{\frac{1}{2} i \pi (m + \nu)} \left(\frac{1}{p} \left(4 e^{p z - \frac{1}{2} i \pi (m + \nu)} \cos\left(\frac{1}{2} \pi (m + \nu) + (2 i c k - b m + 2 b s - i c \nu) \sqrt{z}\right)\right) - \right.$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(b (m - 2 s) + c i (\nu - 2 k))^2}{4 p}} \sqrt{\pi} (b (m - 2 s) + c i (\nu - 2 k)) \operatorname{erf}\left(\frac{-2 i \sqrt{z}\, p - b (m - 2 s) + c i (2 k - \nu)}{2 \sqrt{p}}\right)\right) -$$

$$\frac{1}{p^{3/2}} \left(i e^{\frac{(b (m - 2 s) + c i (\nu - 2 k))^2}{4 p} - i \pi (m + \nu)} \sqrt{\pi} (b (m - 2 s) + c i (\nu - 2 k)) \right.$$

Involving $e^{p z^r} \sin^m(b z^r) \sinh^\nu(c z^r)$

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$$\int e^{p z^r} \sin^m(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{i^\nu 2^{-m-\nu} z (-p z^r)^{-1/r} (1 - m \bmod 2)(1 - \nu \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -p z^r\right) - \frac{2^{-m-\nu} z}{r} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{1}{2} i \pi (m+\nu)} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p) z^r\right) ((-2 b i k + i b m - p) z^r)^{-1/r} + e^{\frac{1}{2} i \pi (\nu - m)} ((2 i b k - i b m - p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p) z^r\right)\right) - \frac{2^{-m-\nu} z}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-2 c k - p + c \nu) z^r\right) ((-2 c k - p + c \nu) z^r)^{-1/r} + ((2 c k - p - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - p - c \nu) z^r\right)\right) - \frac{i^{-m} 2^{-m-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p - 2 c s + c \nu) z^r\right) ((-2 b i k + i b m - p - 2 c s + c \nu) z^r)^{-1/r} + (-1)^\nu ((2 i b k - i b m - p - 2 c s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p - 2 c s + c \nu) z^r\right) + (-1)^m ((-2 b i k + i b m - p + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 b i k + i b m - p + 2 c s - c \nu) z^r\right) + ((2 i b k - i b m - p + 2 c s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 i b k - i b m - p + 2 c s - c \nu) z^r\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

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$$\int e^{p z^2} \sin^m(b z^2) \sinh^\nu(c z^2) \, dz = \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi} (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left((-1)^s \binom{m}{s} \left(e^{\frac{i m \pi}{2}} (p + b i (m - 2s)) \sqrt{p - i b (m - 2s)} \operatorname{erfi}\left(\frac{2 p z - 2 i b (m - 2s) z}{2 \sqrt{p - i b (m - 2s)}} \right) + e^{-\frac{1}{2} i m \pi} \sqrt{p + b i (m - 2s)} (p - i b (m - 2s)) \operatorname{erfi}\left(\sqrt{p + b i (m - 2s)}\, z \right) \right) \right) \Big/ ((p - i b (m - 2s))(p + b i (m - 2s))) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(e^{\frac{i \pi \nu}{2}} (p + c(\nu - 2k)) \sqrt{p - c(\nu - 2k)} \operatorname{erfi}\left(\frac{2 p z - 2 c (\nu - 2k) z}{2 \sqrt{p - c(\nu - 2k)}} \right) + e^{-\frac{1}{2} i \pi \nu} \sqrt{p + c(\nu - 2k)} (p - c(\nu - 2k)) \operatorname{erfi}\left(\sqrt{p + c(\nu - 2k)}\, z \right) \right) \right) \Big/ ((p - c(\nu - 2k))(p + c(\nu - 2k))) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k+s} \binom{\nu}{k} \left(\left(e^{-\frac{1}{2} i \pi (\nu - m)} (p + b i (m - 2s) + c(2k - \nu)) \sqrt{p - i b (m - 2s) - c(2k - \nu)} \operatorname{erfi}\left(\frac{2 p z - 2 (b i (m - 2s) + c(2k - \nu)) z}{2 \sqrt{p - i b (m - 2s) - c(2k - \nu)}} \right) + e^{\frac{1}{2} i \pi (\nu - m)} \sqrt{p + b i (m - 2s) + c(2k - \nu)} (p - i b (m - 2s) - c(2k - \nu)) \operatorname{erfi}\left(\sqrt{p + b i (m - 2s) + c(2k - \nu)}\, z \right) \right) \Big/ ((p - i b (m - 2s) - c(2k - \nu))(p + b i (m - 2s) + c(2k - \nu))) + \left(e^{\frac{1}{2} i \pi (m + \nu)} (p + b i (m - 2s) + c(\nu - 2k)) \sqrt{p - i b (m - 2s) - c(\nu - 2k)} \operatorname{erfi}\left(\frac{2 p z - 2 (b i (m - 2s) + c(\nu - 2k)) z}{2 \sqrt{p - i b (m - 2s) - c(\nu - 2k)}} \right) + e^{-\frac{1}{2} i \pi (m + \nu)} \sqrt{p + b i (m - 2s) + c(\nu - 2k)} (p - i b (m - 2s) - c(\nu - 2k)) \operatorname{erfi}\left(\sqrt{p + b i (m - 2s) + c(\nu - 2k)}\, z \right) \right) \Big/ ((p - i b (m - 2s) - c(\nu - 2k))(p + b i (m - 2s) + c(\nu - 2k))) \right) /; m \in \mathbb{N}^+ \wedge \nu \in \mathbb{N}^+$$

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$$\int e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right) dz = i^\nu 2^{-m-\nu} e^{p\sqrt{z}} \left(\frac{p\sqrt{z}-1}{p^2}+\frac{\sqrt{z}}{p}-\frac{1}{p^2}\right)\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2) +$$
$$i^\nu 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s e^{\frac{i\pi m}{2}+(p-i b(m-2s))\sqrt{z}}\binom{m}{s}$$
$$\left(\frac{e^{2\left(i b(m-2s)\sqrt{z}-\frac{i m\pi}{2}\right)}\left(\sqrt{z}\, p+b\, i(m-2s)\sqrt{z}-1\right)}{(p+b\, i(m-2s))^2}+\frac{\sqrt{z}}{p-i b(m-2s)}-\frac{1}{(i b(m-2s)-p)^2}\right)+$$
$$i^\nu 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{\frac{i\pi\nu}{2}+(p-c(\nu-2k))\sqrt{z}}\binom{\nu}{k}$$
$$\left(\frac{e^{2\left(c(\nu-2k)\sqrt{z}-\frac{i\pi\nu}{2}\right)}\left(\sqrt{z}\, p+c(\nu-2k)\sqrt{z}-1\right)}{(p+c(\nu-2k))^2}+\frac{\sqrt{z}}{p-c(\nu-2k)}-\frac{1}{(c(\nu-2k)-p)^2}\right)+$$
$$i^\nu 2^{-m-\nu+1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^{k+s}\binom{\nu}{k}\left(e^{(p-i b(m-2s)-c(2k-\nu))\sqrt{z}-\frac{1}{2}i\pi(\nu-m)}\right.$$
$$\left(\left(e^{2\left(\sqrt{z}\,(b\, i(m-2s)+c(2k-\nu))+\frac{1}{2}i\pi(\nu-m)\right)}\left(\sqrt{z}\, p+(b\, i(m-2s)+c(2k-\nu))\sqrt{z}-1\right)\right)\Big/\right.$$
$$\left.(p+b\, i(m-2s)+c(2k-\nu))^2+\frac{\sqrt{z}}{p-i b(m-2s)-c(2k-\nu)}-\frac{1}{(-p+b\, i(m-2s)+c(2k-\nu))^2}\right)+$$
$$e^{\frac{1}{2}i\pi(m+\nu)+(p-i b(m-2s)-c(\nu-2k))\sqrt{z}}\left(\left(e^{2\left((b\, i(m-2s)+c(\nu-2k))\sqrt{z}-\frac{1}{2}i\pi(m+\nu)\right)}\right.\right.$$
$$\left.\left(\sqrt{z}\, p+(b\, i(m-2s)+c(\nu-2k))\sqrt{z}-1\right)\right)\Big/(p+b\, i(m-2s)+c(\nu-2k))^2+$$
$$\left.\left.\frac{\sqrt{z}}{p-i b(m-2s)-c(\nu-2k)}-\frac{1}{(-p+b\, i(m-2s)+c(\nu-2k))^2}\right)\right)/;\, m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\sin^m\left(a z^r+q\right)\sinh^\nu\left(c z^r+g\right)$

01.19.21.3177.01

$$\int e^{b z^r+e} \sin^m(a z^r+q) \sinh^\nu(c z^r+g)\, dz = -\frac{i^\nu 2^{-m-\nu} e^e z (-b z^r)^{-1/r} (1-m \bmod 2)(1-\nu \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) - \frac{2^{-m-\nu} z}{r} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{e+2 i k q-i m q+\frac{1}{2} i \pi (m+\nu)} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m) z^r\right) ((-b-2 i a k+i a m) z^r)^{-1/r} + e^{e-2 i k q+i m q+\frac{1}{2} i \pi (\nu-m)} ((-b+2 i a k-i a m) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m) z^r\right)\right) - \frac{2^{-m-\nu} z}{r} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{e+2 g k-g \nu} \Gamma\left(\frac{1}{r}, (-b-2 c k+c \nu) z^r\right) ((-b-2 c k+c \nu) z^r)^{-1/r} + e^{e-2 g k+g \nu} ((-b+2 c k-c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 c k-c \nu) z^r\right)\right) - \frac{i^{-m} 2^{-m-\nu} z}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} e^{e+2 i k q-i m q+2 g s-g \nu} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m-2 c s+c \nu) z^r\right) ((-b-2 i a k+i a m-2 c s+c \nu) z^r)^{-1/r} + (-1)^\nu e^{e-2 i k q+i m q+2 g s-g \nu} ((-b+2 i a k-i a m-2 c s+c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m-2 c s+c \nu) z^r\right) + (-1)^m e^{e+2 i k q-i m q-2 g s+g \nu} ((-b-2 i a k+i a m+2 c s-c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-2 i a k+i a m+2 c s-c \nu) z^r\right) + e^{e-2 i k q+i m q-2 g s+g \nu} ((-b+2 i a k-i a m+2 c s-c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 i a k-i a m+2 c s-c \nu) z^r\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3178.01

$$\int e^{b z^2+e} \sin^m(a z^2+q) \sinh^v(c z^2+g)\, dz = \frac{i^{-v}\left(2^{-m-v-1} e^e \sqrt{\pi} \binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}} \operatorname{erfi}(\sqrt{b}\, z)(1-m \bmod 2)(1-v \bmod 2)\right)}{\sqrt{b}} + i^{-v} 2^{-m-v-1} \sqrt{\pi} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{e+i(m-2k)q-\frac{i m \pi}{2}} \binom{m}{k} \left(\frac{\operatorname{erfi}\left(\sqrt{b+a i(m-2k)}\, z\right)}{\sqrt{b+a i(m-2k)}} + \frac{e^{2\left(\frac{i m \pi}{2}-i(m-2k)q\right)} \operatorname{erfi}\left(\sqrt{b-i a(m-2k)}\, z\right)}{\sqrt{b-i a(m-2k)}}\right) + i^{-v} 2^{-m-v-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k e^{e-g(v-2k)-\frac{i\pi v}{2}} \binom{v}{k} \left(\frac{e^{2\left(\frac{i\pi v}{2}+g(v-2k)\right)} \operatorname{erfi}\left(\sqrt{b+c(v-2k)}\, z\right)}{\sqrt{b+c(v-2k)}} + \frac{\operatorname{erfi}\left(\sqrt{b-c(v-2k)}\, z\right)}{\sqrt{b-c(v-2k)}}\right) + i^{-v} 2^{-m-v-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{e-i(m-2k)q-\frac{1}{2} i\pi(v-m)-g(v-2s)} \left(\left(e^{2\left(i(m-2k)q+\frac{1}{2} i\pi(v-m)+g(v-2s)\right)} \operatorname{erfi}\left(\sqrt{b+a i(m-2k)+c(v-2s)}\, z\right)\right) \Big/ \left(\sqrt{b+a i(m-2k)+c(v-2s)}\right) + \frac{\operatorname{erfi}\left(\sqrt{b-i a(m-2k)-c(v-2s)}\, z\right)}{\sqrt{b-i a(m-2k)-c(v-2s)}}\right) + e^{e+i(m-2k)q-\frac{1}{2} i\pi(m+v)-g(v-2s)} \left(\left(e^{2\left(-i(m-2k)q+\frac{1}{2} i\pi(m+v)+g(v-2s)\right)} \operatorname{erfi}\left(\sqrt{b-i a(m-2k)+c(v-2s)}\, z\right)\right) \Big/ \left(\sqrt{b-i a(m-2k)+c(v-2s)}\right) + \frac{\operatorname{erfi}\left(\sqrt{b+a i(m-2k)-c(v-2s)}\, z\right)}{\sqrt{b+a i(m-2k)-c(v-2s)}}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.3179.01

$$\int e^{\sqrt{z}\,b+e}\sin^m\left(\sqrt{z}\,a+q\right)\sinh^\nu\left(\sqrt{z}\,c+g\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu+1}e^{\sqrt{z}\,b+e}\left(b\sqrt{z}-1\right)\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{b^2}+$$

$$i^{-\nu}2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{e+i(m-2k)q+(b+a\,i(m-2k))\sqrt{z}-\frac{i m\pi}{2}}\left(\sqrt{z}\,b+a\,i(m-2k)\sqrt{z}-1\right)}{(-b-i\,a(m-2k))^2}+\right.$$

$$\left.\frac{e^{e-i(m-2k)q+(b-i\,a(m-2k))\sqrt{z}+\frac{i m\pi}{2}}\left(\sqrt{z}\,b-i\,a(m-2k)\sqrt{z}-1\right)}{(b-i\,a(m-2k))^2}\right)\binom{m}{k}+$$

$$i^{-\nu}2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{e+\frac{i\pi\nu}{2}+g(\nu-2k)+(b+c(\nu-2k))\sqrt{z}}\left(\sqrt{z}\,b+c(\nu-2k)\sqrt{z}-1\right)}{(b+c(\nu-2k))^2}+\right.$$

$$\left.\frac{e^{e-g(\nu-2k)+(b-c(\nu-2k))\sqrt{z}-\frac{i\pi\nu}{2}}\left(\sqrt{z}\,b-c(\nu-2k)\sqrt{z}-1\right)}{(c(\nu-2k)-b)^2}\right)\binom{\nu}{k}+$$

$$i^{-\nu}2^{-m-\nu+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\left(\left(e^{e-i(m-2k)q+\frac{1}{2}i\pi(m+\nu)+g(\nu-2s)+(b-i\,a(m-2k)+c(\nu-2s))\sqrt{z}}\right.\right.$$

$$\left.\left(\sqrt{z}\,b+(c(\nu-2s)-i\,a(m-2k))\sqrt{z}-1\right)\right)\Big/(b-i\,a(m-2k)+c(\nu-2s))^2+$$

$$\left(e^{e+i(m-2k)q+\frac{1}{2}i\pi(\nu-m)+g(\nu-2s)+(b+a\,i(m-2k)+c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\,b+(a\,i(m-2k)+c(\nu-2s))\sqrt{z}-1\right)\right)\Big/$$

$$(b+a\,i(m-2k)+c(\nu-2s))^2+\left(e^{e+i(m-2k)q-\frac{1}{2}i\pi(m+\nu)-g(\nu-2s)+(b+a\,i(m-2k)-c(\nu-2s))\sqrt{z}}\right.$$

$$\left.\left(\sqrt{z}\,b-(c(\nu-2s)-i\,a(m-2k))\sqrt{z}-1\right)\right)\Big/(-b-i\,a(m-2k)+c(\nu-2s))^2+$$

$$\left(e^{e-i(m-2k)q-\frac{1}{2}i\pi(\nu-m)-g(\nu-2s)+(b-i\,a(m-2k)-c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\,b-(a\,i(m-2k)+c(\nu-2s))\sqrt{z}-1\right)\right)\Big/$$

$$\left.(-b+a\,i(m-2k)+c(\nu-2s))^2\right)\binom{\nu}{s}\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e}\sin^m\left(a z^r+p z+q\right)\sinh^\nu\left(c z^r+f z+g\right)$

01.19.21.3180.01

$$\int e^{b z^2+d z+e}\sin^m\left(a z^2+p z+q\right)\sinh^\nu\left(c z^2+f z+g\right)dz =$$

$$\frac{i^\nu 2^{-m-\nu-1}\sqrt{\pi}\,(1-m \bmod 2)(1-\nu \bmod 2)}{\sqrt{b}}e^{-\frac{d^2-4be}{4b}}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\operatorname{erfi}\left(\frac{d+2bz}{2\sqrt{b}}\right)+$$

$$i^\nu 2^{-m-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^s\binom{m}{s}\left(e^{-\frac{(d+i\,p(m-2s))^2-4(b+a\,i(m-2s))\left(e+i\,q(m-2s)-\frac{i m\pi}{2}\right)}{4(b+a\,i(m-2s))}}\sqrt{b+a\,i(m-2s)}\right.\right.$$

$$(b - i\, a\, (m-2s))\, \text{erfi}\left(\frac{d + i\, p\, (m-2s) + 2\, (b + a\, i\, (m-2s))\, z}{2\sqrt{b + a\, i\, (m-2s)}}\right) + e^{-\frac{(d - i\, p\, (m-2s))^2 - 4\, (b - i\, a\, (m-2s)) \left(e - i\, q\, (m-2s) + \frac{i\, m\, \pi}{2}\right)}{4\, (b - i\, a\, (m-2s))}}$$

$$(b + a\, i\, (m-2s))\sqrt{b - i\, a\, (m-2s)}\ \text{erfi}\left(\frac{d - i\, p\, (m-2s) + 2\, b\, z - 2\, i\, a\, (m-2s)\, z}{2\sqrt{b - i\, a\, (m-2s)}}\right)\Bigg)\Bigg)\Bigg) \Big/$$

$$((b - i\, a\, (m-2s))\, (b + a\, i\, (m-2s))) + i^{v}\, 2^{-m-v-1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left((-1)^{k}\binom{v}{k}\left(e^{-\frac{(d + f\, (v-2k))^2 - 4\, (b + c\, (v-2k)) \left(e + g\, (v-2k) - \frac{i\, \pi\, v}{2}\right)}{4\, (b + c\, (v-2k))}}\sqrt{b + c\, (v-2k)}\ (b - c\, (v-2k))\, \text{erfi}\left(\right.\right.\right.$$

$$\left.\frac{d + f\, (v-2k) + 2\, (b + c\, (v-2k))\, z}{2\sqrt{b + c\, (v-2k)}}\right) + e^{-\frac{(d - f\, (v-2k))^2 - 4\, (b - c\, (v-2k)) \left(e + \frac{i\, \pi\, v}{2} - g\, (v-2k)\right)}{4\, (b - c\, (v-2k))}}\, (b + c\, (v-2k))\sqrt{b - c\, (v-2k)}$$

$$\text{erfi}\left(\frac{d - f\, (v-2k) + 2\, b\, z - 2\, c\, (v-2k)\, z}{2\sqrt{b - c\, (v-2k)}}\right)\Bigg)\Bigg)\Bigg) \Big/ ((b - c\, (v-2k))\, (b + c\, (v-2k))) + i^{v}\, 2^{-m-v-1}\sqrt{\pi}$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}\left(\left(\left(e^{-\frac{(d + i\, p\, (m-2s) + f\, (2k-v))^2 - 4\, (b + a\, i\, (m-2s) + c\, (2k-v)) \left(e + i\, q\, (m-2s) + g\, (2k-v) + \frac{1}{2}\, i\, \pi\, (v-m)\right)}{4\, (b + a\, i\, (m-2s) + c\, (2k-v))}}\sqrt{b + a\, i\, (m-2s) + c\, (2k-v)}\right.\right.\right.$$

$$(b - i\, a\, (m-2s) - c\, (2k-v))\, \text{erfi}\left(\frac{d + i\, p\, (m-2s) + f\, (2k-v) + 2\, (b + a\, i\, (m-2s) + c\, (2k-v))\, z}{2\sqrt{b + a\, i\, (m-2s) + c\, (2k-v)}}\right) +$$

$$e^{-\frac{(d - i\, p\, (m-2s) - f\, (2k-v))^2 - 4\, (b - i\, a\, (m-2s) - c\, (2k-v)) \left(e - i\, q\, (m-2s) - g\, (2k-v) - \frac{1}{2}\, i\, \pi\, (v-m)\right)}{4\, (b - i\, a\, (m-2s) - c\, (2k-v))}}$$

$$(b + a\, i\, (m-2s) + c\, (2k-v))\sqrt{b - i\, a\, (m-2s) - c\, (2k-v)}$$

$$\text{erfi}\left(\frac{d - i\, p\, (m-2s) - f\, (2k-v) + 2\, b\, z - 2\, (a\, i\, (m-2s) + c\, (2k-v))\, z}{2\sqrt{b - i\, a\, (m-2s) - c\, (2k-v)}}\right)\Bigg)\Bigg) \Big/$$

$$((b - i\, a\, (m-2s) - c\, (2k-v))\, (b + a\, i\, (m-2s) + c\, (2k-v))) +$$

$$\left(e^{-\frac{(d + i\, p\, (m-2s) + f\, (v-2k))^2 - 4\, (b + a\, i\, (m-2s) + c\, (v-2k)) \left(e + i\, q\, (m-2s) + g\, (v-2k) - \frac{1}{2}\, i\, \pi\, (m+v)\right)}{4\, (b + a\, i\, (m-2s) + c\, (v-2k))}}\sqrt{b + a\, i\, (m-2s) + c\, (v-2k)}\right.$$

$$(b - i\, a\, (m-2s) - c\, (v-2k))\, \text{erfi}\left(\frac{d + i\, p\, (m-2s) + f\, (v-2k) + 2\, (b + a\, i\, (m-2s) + c\, (v-2k))\, z}{2\sqrt{b + a\, i\, (m-2s) + c\, (v-2k)}}\right) +$$

$$e^{-\frac{(d - i\, p\, (m-2s) - f\, (v-2k))^2 - 4\, (b - i\, a\, (m-2s) - c\, (v-2k)) \left(e - i\, q\, (m-2s) - g\, (v-2k) + \frac{1}{2}\, i\, \pi\, (m+v)\right)}{4\, (b - i\, a\, (m-2s) - c\, (v-2k))}}$$

$$(b + a\, i\, (m-2s) + c\, (v-2k))\sqrt{b - i\, a\, (m-2s) - c\, (v-2k)}$$

$$\text{erfi}\left(\frac{d - i\, p\, (m-2s) - f\, (v-2k) + 2\, b\, z - 2\, (a\, i\, (m-2s) + c\, (v-2k))\, z}{2\sqrt{b - i\, a\, (m-2s) - c\, (v-2k)}}\right)\Bigg)\Bigg) \Big/$$

$$\left.((b - i\, a\, (m-2s) - c\, (v-2k))\, (b + a\, i\, (m-2s) + c\, (v-2k)))\right) /;\ m \in \mathbb{N}^{+} \bigwedge v \in \mathbb{N}^{+}$$

01.19.21.3181.01

$$\int e^{\sqrt{z}\, b+d z+e} \sin^m\left(\sqrt{z}\, a+p z+q\right) \sinh^\nu\left(\sqrt{z}\, c+f z+g\right) dz ==$$

$$i^\nu 2^{-m-\nu-2} e^e \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4 e^{\sqrt{z}\, b+d z}}{d} - \frac{2 b e^{-\frac{b^2}{4 d}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}}\right)}{d^{3/2}}\right) (1-m \bmod 2)(1-\nu \bmod 2) +$$

$$i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^s e^{e-i q (m-2 s)+\frac{i m \pi}{2}} \binom{m}{s} \left(\frac{2 e^{\sqrt{z}\, (b+a i (m-2 s))+2\left(i q (m-2 s)-\frac{i m \pi}{2}\right)+(d+i p (m-2 s)) z}}{d+i p (m-2 s)} -\right.$$

$$\frac{b e^{2\left(i q (m-2 s)-\frac{i m \pi}{2}\right)-\frac{(b+a i (m-2 s))^2}{4 (d+i p (m-2 s))}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+a i (m-2 s)+2 (d+i p (m-2 s)) \sqrt{z}}{2 \sqrt{d+i p (m-2 s)}}\right)}{(d+i p (m-2 s))^{3/2}} - \frac{1}{(d+i p (m-2 s))^{3/2}}$$

$$\left(i a e^{2\left(i q (m-2 s)-\frac{i m \pi}{2}\right)-\frac{(b+a i (m-2 s))^2}{4 (d+i p (m-2 s))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{b+a i (m-2 s)+2 (d+i p (m-2 s)) \sqrt{z}}{2 \sqrt{d+i p (m-2 s)}}\right)\right) +$$

$$\frac{2 e^{\sqrt{z}\, (b-i a (m-2 s))+(d-i p (m-2 s)) z}}{d-i p (m-2 s)} - \frac{i a e^{-\frac{(b-i a (m-2 s))^2}{4 (d-i p (m-2 s))}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{-b+a i (m-2 s)+2 (i p (m-2 s)-d) \sqrt{z}}{2 \sqrt{d-i p (m-2 s)}}\right)}{(d-i p (m-2 s))^{3/2}} -$$

$$\left.\frac{b e^{-\frac{(b-i a (m-2 s))^2}{4 (d-i p (m-2 s))}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b-i a (m-2 s)+2 (d-i p (m-2 s)) \sqrt{z}}{2 \sqrt{d-i p (m-2 s)}}\right)}{(d-i p (m-2 s))^{3/2}}\right) +$$

$$i^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{e+\frac{i \pi \nu}{2}-g (\nu-2 k)} \binom{\nu}{k} \left(\frac{2 e^{\sqrt{z}\, (b+c (\nu-2 k))+2\left(g (\nu-2 k)-\frac{i \pi \nu}{2}\right)+(d+f (\nu-2 k)) z}}{d+f (\nu-2 k)} -\right.$$

$$\frac{b e^{2\left(g (\nu-2 k)-\frac{i \pi \nu}{2}\right)-\frac{(b+c (\nu-2 k))^2}{4 (d+f (\nu-2 k))}} \sqrt{\pi} \operatorname{erfi}\left(\frac{b+c (\nu-2 k)+2 (d+f (\nu-2 k)) \sqrt{z}}{2 \sqrt{d+f (\nu-2 k)}}\right)}{(d+f (\nu-2 k))^{3/2}} -$$

$$\frac{c e^{2\left(g (\nu-2 k)-\frac{i \pi \nu}{2}\right)-\frac{(b+c (\nu-2 k))^2}{4 (d+f (\nu-2 k))}} \sqrt{\pi}\, (\nu-2 k) \operatorname{erfi}\left(\frac{b+c (\nu-2 k)+2 (d+f (\nu-2 k)) \sqrt{z}}{2 \sqrt{d+f (\nu-2 k)}}\right)}{(d+f (\nu-2 k))^{3/2}} +$$

$$\frac{2 e^{\sqrt{z}\, (b-c (\nu-2 k))+(d-f (\nu-2 k)) z}}{d-f (\nu-2 k)} - \frac{c e^{-\frac{(b-c (\nu-2 k))^2}{4 (d-f (\nu-2 k))}} \sqrt{\pi}\, (\nu-2 k) \operatorname{erfi}\left(\frac{-b+c (\nu-2 k)+2 (f (\nu-2 k)-d) \sqrt{z}}{2 \sqrt{d-f (\nu-2 k)}}\right)}{(d-f (\nu-2 k))^{3/2}} -$$

$$\left.\frac{b\,e^{-\frac{(b-c(v-2k))^2}{4(d-f(v-2k))}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-c(v-2k)+2(d-f(v-2k))\sqrt{z}}{2\sqrt{d-f(v-2k)}}\right)}{(d-f(v-2k))^{3/2}}\right)+i^v\,2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{k}$$

$$\left(e^{e-i q(m-2s)-g(2k-v)-\frac{1}{2}i\pi(v-m)}\left(\left(2\,e^{\sqrt{z}\,(b+a i(m-2s)+c(2k-v))+2\left(i q(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)+(d+i p(m-2s)+f(2k-v))z}\right)\right/\right.\right.$$

$$(d+i p(m-2s)+f(2k-v))-\left(b\,e^{2\left(i q(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)-\frac{(b+a i(m-2s)+c(2k-v))^2}{4(d+i p(m-2s)+f(2k-v))}}\sqrt{\pi}\right.$$

$$\left.\left.\operatorname{erfi}\left(\frac{b+a i(m-2s)+c(2k-v)+2(d+i p(m-2s)+f(2k-v))\sqrt{z}}{2\sqrt{d+i p(m-2s)+f(2k-v)}}\right)\right)\right/(d+i p(m-2s)+$$

$$f(2k-v))^{3/2}-\left(e^{2\left(i q(m-2s)+g(2k-v)+\frac{1}{2}i\pi(v-m)\right)-\frac{(b+a i(m-2s)+c(2k-v))^2}{4(d+i p(m-2s)+f(2k-v))}}\sqrt{\pi}\,(a i(m-2s)+c(2k-v))\right.$$

$$\left.\left.\operatorname{erfi}\left(\frac{b+a i(m-2s)+c(2k-v)+2(d+i p(m-2s)+f(2k-v))\sqrt{z}}{2\sqrt{d+i p(m-2s)+f(2k-v)}}\right)\right)\right/(d+i p(m-2s)+$$

$$f(2k-v))^{3/2}+\frac{2\,e^{\sqrt{z}\,(b-i a(m-2s)-c(2k-v))+(d-i p(m-2s)-f(2k-v))z}}{d-i p(m-2s)-f(2k-v)}-\left(e^{-\frac{(b-i a(m-2s)-c(2k-v))^2}{4(d-i p(m-2s)-f(2k-v))}}\sqrt{\pi}\right.$$

$$(a i(m-2s)+c(2k-v))\operatorname{erfi}\left((-b+a i(m-2s)+c(2k-v)+2(-d+i p(m-2s)+f(2k-v))\right.$$

$$\left.\left.\left.\sqrt{z}\right)\right/\left(2\sqrt{d-i p(m-2s)-f(2k-v)}\right)\right)\right/(d-i p(m-2s)-f(2k-v))^{3/2}-$$

$$\left(b\,e^{-\frac{(b-i a(m-2s)-c(2k-v))^2}{4(d-i p(m-2s)-f(2k-v))}}\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b-i a(m-2s)-c(2k-v)+2(d-i p(m-2s)-f(2k-v))\sqrt{z}}{2\sqrt{d-i p(m-2s)-f(2k-v)}}\right)\right)\Big/$$

$$\left.(d-i p(m-2s)-f(2k-v))^{3/2}\right)+e^{e-i q(m-2s)-g(v-2k)+\frac{1}{2}i\pi(m+v)}$$

$$\left(\left(2\,e^{\sqrt{z}\,(b+a i(m-2s)+c(v-2k))+2\left(i q(m-2s)+g(v-2k)-\frac{1}{2}i\pi(m+v)\right)+(d+i p(m-2s)+f(v-2k))z}\right)\right/$$

$$(d+i p(m-2s)+f(v-2k))-\left(b\,e^{2\left(i q(m-2s)+g(v-2k)-\frac{1}{2}i\pi(m+v)\right)-\frac{(b+a i(m-2s)+c(v-2k))^2}{4(d+i p(m-2s)+f(v-2k))}}\right.$$

$$\left.\sqrt{\pi}\,\operatorname{erfi}\left(\frac{b+a i(m-2s)+c(v-2k)+2(d+i p(m-2s)+f(v-2k))\sqrt{z}}{2\sqrt{d+i p(m-2s)+f(v-2k)}}\right)\right)\Big/$$

$$(d+i\,p\,(m-2\,s)+f\,(v-2\,k))^{3/2}-\left(e^{2\left(i\,q\,(m-2\,s)+g\,(v-2\,k)-\frac{1}{2}\,i\,\pi\,(m+v)\right)-\frac{(b+a\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,(d+i\,p\,(m-2\,s)+f\,(v-2\,k))}}\sqrt{\pi}\,(a\,i\,(m-2\,s)+\right.$$

$$\left.c\,(v-2\,k))\,\mathrm{erfi}\left(\frac{b+a\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(d+i\,p\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}}{2\sqrt{d+i\,p\,(m-2\,s)+f\,(v-2\,k)}}\right)\right)\Bigg/$$

$$(d+i\,p\,(m-2\,s)+f\,(v-2\,k))^{3/2}+\frac{2\,e^{\sqrt{z}\,(b-i\,a\,(m-2\,s)-c\,(v-2\,k))+(d-i\,p\,(m-2\,s)-f\,(v-2\,k))\,z}}{d-i\,p\,(m-2\,s)-f\,(v-2\,k)}-$$

$$\left(e^{-\frac{(b-i\,a\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(d-i\,p\,(m-2\,s)-f\,(v-2\,k))}}\sqrt{\pi}\,(a\,i\,(m-2\,s)+c\,(v-2\,k))\right.$$

$$\mathrm{erfi}\left(\left(-b+a\,i\,(m-2\,s)+c\,(v-2\,k)+2\,(-d+i\,p\,(m-2\,s)+f\,(v-2\,k))\sqrt{z}\right)\Big/\right.$$

$$\left.\left.\left(2\sqrt{d-i\,p\,(m-2\,s)-f\,(v-2\,k)}\right)\right)\right)\Big/(d-i\,p\,(m-2\,s)-f\,(v-2\,k))^{3/2}-$$

$$\left(b\,e^{-\frac{(b-i\,a\,(m-2\,s)-c\,(v-2\,k))^2}{4\,(d-i\,p\,(m-2\,s)-f\,(v-2\,k))}}\sqrt{\pi}\,\mathrm{erfi}\left(\frac{b-i\,a\,(m-2\,s)-c\,(v-2\,k)+2\,(d-i\,p\,(m-2\,s)-f\,(v-2\,k))\sqrt{z}}{2\sqrt{d-i\,p\,(m-2\,s)-f\,(v-2\,k)}}\right)\right)\Bigg/$$

$$\left.\left.(d-i\,p\,(m-2\,s)-f\,(v-2\,k))^{3/2}\right)\right)\Bigg/;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving powers of sin and rational functions of exp

Involving $\sin^m(e\,z)\sinh^v(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.3182.01

$$\int\frac{\sin^m(e\,z)\sinh^v(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz=$$

$$-\frac{i^v\,2^{-m-v}\,b^{-n}\,e^{-d\,n\,z}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\!\left(n,n;n+1;-\frac{a\,e^{-d\,z}}{b}\right)(m\bmod 2-1)\,(v\bmod 2-1)}{d\,n}-\frac{1}{e}\left(i^{v+1}\,2^{-m-v}\,a^{-n}\binom{v}{\frac{v}{2}}\right.$$

$$(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2\,k}\left((-1)^k\binom{m}{k}\left(e^{i\,e\,(m-2\,k)\,z-\frac{i\,m\,\pi}{2}}\,{}_2F_1\!\left(\frac{i\,e\,(m-2\,k)}{d},n;\frac{d+e\,i\,(m-2\,k)}{d};-\frac{b\,e^{d\,z}}{a}\right)-\right.\right.$$

$$\left.\left.\left.e^{\frac{i\,m\,\pi}{2}-i\,e\,(m-2\,k)\,z}\,{}_2F_1\!\left(-\frac{i\,e\,(m-2\,k)}{d},n;\frac{d-i\,e\,(m-2\,k)}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\right)+$$

$$\frac{1}{c}\left(i^v\,2^{-m-v}\,a^{-n}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{v-2\,s}\left((-1)^s\binom{v}{s}\left(e^{c\,(v-2\,s)\,z-\frac{i\,\pi\,v}{2}}\,{}_2F_1\!\left(\frac{c\,(v-2\,s)}{d},n;\frac{d+c\,(v-2\,s)}{d};-\frac{b\,e^{d\,z}}{a}\right)-\right.\right.\right.$$

$$e^{\frac{i\pi v}{2}-c(v-2s)z}\,{}_2F_1\left(-\frac{c(v-2s)}{d},n;\frac{d-c(v-2s)}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$i^v\,2^{-m-v}\,a^{-n}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k+s}\binom{v}{s}\Bigg(\frac{1}{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}\left(\cos\left(\frac{1}{2}\pi(m+v)\right)\right)\Bigg(e^{(2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v)z}$$

$${}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d},n;\frac{d+2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v)z}$$

$${}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v}{d},n;\frac{d-2\,i\,e\,k+i\,e\,m-2\,c\,s+c\,v}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}\left(\cos\left(\frac{1}{2}\pi(m-v)\right)\right)\Bigg(e^{(2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v)z}\,{}_2F_1\Bigg(\frac{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d},$$

$$n;\frac{d+2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d};-\frac{b\,e^{dz}}{a}\Bigg)-e^{(-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v)z}$$

$${}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v}{d},n;\frac{d-2\,i\,e\,k+i\,e\,m+2\,c\,s-c\,v}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}\Bigg(i\Bigg(e^{(2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v)z}\,{}_2F_1\Bigg(\frac{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d},n;$$

$$\frac{d+2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d};-\frac{b\,e^{dz}}{a}\Bigg)+e^{(-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v)z}$$

$${}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v}{d},n;\frac{d-2\,i\,e\,k+i\,e\,m+2\,c\,s-c\,v}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\sin\left(\frac{1}{2}\pi(m-v)\right)\Bigg)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}\Bigg(i\Bigg(e^{(-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v)z}\,{}_2F_1\Bigg(\frac{-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v}{d},n;$$

$$\frac{d-2\,i\,e\,k+i\,e\,m-2\,c\,s+c\,v}{d};-\frac{b\,e^{dz}}{a}\Bigg)+e^{(2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v)z}\,{}_2F_1\Bigg(\frac{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d},$$

$$n;\frac{d+2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d};-\frac{b\,e^{dz}}{a}\Bigg)\Bigg)\sin\left(\frac{1}{2}\pi(m+v)\right)\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}^+\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $e^{pz}\sin^m(e\,z)\sinh^v(c\,z)\left(a+b\,e^{dz}\right)^{-n}$

01.19.21.3183.01

$$\int\frac{e^{pz}\sin^m(e\,z)\sinh^v(c\,z)}{\left(a+b\,e^{dz}\right)^n}\,dz=2^{-m-v}\,i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)\,a^{-n}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\Bigg((-1)^k\binom{m}{k}\Bigg(e^{(e\,i(m-2k)+p)z-\frac{i\,m\,\pi}{2}}(i\,e(m-2k)-p)\,{}_2F_1\left(\frac{e\,i(m-2k)+p}{d},n;\frac{d+e\,i(m-2k)+p}{d};-\frac{b\,e^{dz}}{a}\right)-$$

$$e^{\frac{i\pi m}{2}+(p-i\,e(m-2k))z}(e\,i(m-2k)+p)\,{}_2F_1\left(\frac{p-i\,e(m-2k)}{d},n;\frac{d-i\,e(m-2k)+p}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg/$$

$$((i\, e\, (m-2k)-p)\,(e\, i\, (m-2k)+p)) + 2^{-m-v}\, i^v \binom{m}{\frac{m}{2}} (1 - m \bmod 2)\, a^{-n}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left((-1)^s \binom{v}{s} \left(e^{(p+c\,(v-2s))\,z - \frac{i\pi v}{2}} (c\,(v-2s)-p)\, {}_2F_1\!\left(\frac{p+c\,(v-2s)}{d}, n; \frac{d+p+c\,(v-2s)}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{\frac{i\pi v}{2}+(p-c\,(v-2s))\,z} (p+c\,(v-2s))\, {}_2F_1\!\left(\frac{p-c\,(v-2s)}{d}, n; \frac{d+p-c\,(v-2s)}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) \Big/ ((c\,(v-2s)-p)\,(p+c\,(v-2s))) +$$

$$2^{-m-v}\, i^v\, a^{-n} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{s} \left(\left(\cos\!\left(\frac{1}{2}\pi\,(m+v)\right) \left(e^{(2iek-iem+p+2cs-cv)\,z} (2iek-iem-p+2cs-cv)\, {}_2F_1\!\left(\frac{2iek-iem+p+2cs-cv}{d}, n; \frac{d+2iek-iem+p+2cs-cv}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-2eik+iem+p-2cs+cv)\,z} (2iek-iem+p+2cs-cv)\, {}_2F_1\!\left(\frac{-2eik+iem+p-2cs+cv}{d}, n; \frac{d-2iek+iem+p-2cs+cv}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) \Big/ \right.$$

$$((2iek-iem-p+2cs-cv)\,(2iek-iem+p+2cs-cv)) +$$

$$\left(\cos\!\left(\frac{1}{2}\pi\,(m-v)\right)\right) \left(e^{(2iek-iem+p-2cs+cv)\,z} (2iek-iem-p-2cs+cv)\, {}_2F_1\!\left(\frac{2iek-iem+p-2cs+cv}{d}, n; \frac{d+2iek-iem+p-2cs+cv}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-2eik+iem+p+2cs-cv)\,z} (2iek-iem+p-2cs+cv)\, {}_2F_1\!\left(\frac{-2eik+iem+p+2cs-cv}{d}, n; \frac{d-2iek+iem+p+2cs-cv}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right) \Big/$$

$$((2iek-iem-p-2cs+cv)\,(2iek-iem+p-2cs+cv)) + \left(i \left(e^{(2iek-iem+p-2cs+cv)\,z} (2iek-iem-p-2cs+cv)\, {}_2F_1\!\left(\frac{2iek-iem+p-2cs+cv}{d}, n; \frac{d+2iek-iem+p-2cs+cv}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-2eik+iem+p+2cs-cv)\,z} (2iek-iem+p-2cs+cv)\, {}_2F_1\!\left(\frac{-2eik+iem+p+2cs-cv}{d}, n; \frac{d-2iek+iem+p+2cs-cv}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right.$$

$$\left.\sin\!\left(\frac{1}{2}\pi\,(m-v)\right)\right) \Big/ ((2iek-iem-p-2cs+cv)\,(2iek-iem+p-2cs+cv)) +$$

$$\left(i \left(e^{(-2eik+iem+p-2cs+cv)\,z} (2iek-iem+p+2cs-cv)\, {}_2F_1\!\left(\frac{-2eik+iem+p-2cs+cv}{d}, n; \frac{d-2iek+iem+p-2cs+cv}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(2iek-iem+p+2cs-cv)\,z} (2iek-iem-p+2cs-cv)\, {}_2F_1\!\left(\frac{2iek-iem+p+2cs-cv}{d}, n; \frac{d+2iek-iem+p+2cs-cv}{d}; -\frac{b\, e^{d z}}{a}\right)\right)\right.$$

$$\sin\left(\frac{1}{2}\pi(m+v)\right)\Bigg) \Big/ ((2\,i\,e\,k - i\,e\,m - p + 2\,c\,s - c\,v)(2\,i\,e\,k - i\,e\,m + p + 2\,c\,s - c\,v))\Bigg) +$$

$$\frac{i^v\, 2^{-m-v}\, a^{-n}\, e^{p\,z}\,(1 - m \bmod 2)(1 - v \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}}$$

$$ {}_2F_1\left(\frac{p}{d}, n; \frac{d+p}{d}; -\frac{b\, e^{d\,z}}{a}\right) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving powers of sin and algebraic functions of exp

Involving $\left(a + b\, e^{d\,z}\right)^{\beta} \sin^m(e\,z) \sinh^v(c\,z)$

01.19.21.3184.01

$$\int \left(a + b\, e^{d\,z}\right)^{\beta} \sin^m(e\,z) \sinh^v(c\,z)\, dz =$$

$$\frac{1}{d\,\beta}\left(i^v\, 2^{-m-v}\left(\frac{e^{-d\,z}\,a}{b} + 1\right)^{-\beta} \left(a + b\, e^{d\,z}\right)^{\beta} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} {}_2F_1\left(-\beta, -\beta; 1-\beta; -\frac{a\, e^{-d\,z}}{b}\right)(m \bmod 2 - 1)(v \bmod 2 - 1)\right) -$$

$$\frac{1}{e}\Bigg(i^{v+1}\, 2^{-m-v} \left(a + b\, e^{d\,z}\right)^{\beta} \left(\frac{e^{d\,z}\,b}{a} + 1\right)^{-\beta} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{m-2\,k}\left((-1)^k \binom{m}{k}\left(e^{i\,e\,(m-2\,k)\,z - \frac{i\,m\,\pi}{2}}\, {}_2F_1\left(\frac{i\,e\,(m-2\,k)}{d}, -\beta; \frac{d + e\,i\,(m-2\,k)}{d}; -\frac{b\, e^{d\,z}}{a}\right) - e^{\frac{i\,m\,\pi}{2} - i\,e\,(m-2\,k)\,z}\right.\right.$$

$$\left.\left. {}_2F_1\left(-\frac{i\,e\,(m-2\,k)}{d}, -\beta; \frac{d - i\,e\,(m-2\,k)}{d}; -\frac{b\, e^{d\,z}}{a}\right)\right)\right)\Bigg) + \frac{1}{c}\Bigg(i^v\, 2^{-m-v}\left(a + b\, e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a} + 1\right)^{-\beta} \binom{m}{\frac{m}{2}}$$

$$(1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \frac{1}{v - 2\,s}\left((-1)^s \binom{v}{s}\left(e^{c\,(v-2\,s)\,z - \frac{i\,\pi\,v}{2}}\, {}_2F_1\left(\frac{c\,(v-2\,s)}{d}, -\beta; \frac{d + c\,(v-2\,s)}{d}; -\frac{b\, e^{d\,z}}{a}\right) - \right.\right.$$

$$\left.\left. e^{\frac{i\,\pi\,v}{2} - c\,(v-2\,s)\,z}\, {}_2F_1\left(-\frac{c\,(v-2\,s)}{d}, -\beta; \frac{d - c\,(v-2\,s)}{d}; -\frac{b\, e^{d\,z}}{a}\right)\right)\right)\Bigg) + i^v\, 2^{-m-v}\left(a + b\, e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a} + 1\right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{s}\left(\frac{1}{2\,i\,e\,k - i\,e\,m + 2\,c\,s - c\,v}\left(\cos\left(\frac{1}{2}\pi(m+v)\right)\left(e^{(2\,i\,e\,k - i\,e\,m + 2\,c\,s - c\,v)\,z}\, {}_2F_1\right.\right.\right.$$

$$\left(\frac{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d},\,-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v)\,z}$$

$$\left.\left.\left.{}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v}{d},\,-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m-2\,c\,s+c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\right)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}\left(\cos\left(\frac{1}{2}\,\pi\,(m-v)\right)\left(e^{(2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v)\,z}\,{}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d},\right.\right.\right.$$

$$\left.-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{(-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v)\,z}$$

$$\left.\left.\left.{}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v}{d},\,-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+2\,c\,s-c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\right)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}\left(i\left(e^{(2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v)\,z}\,{}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d},\,-\beta;\right.\right.\right.$$

$$\left.\frac{d+2\,i\,e\,k-i\,e\,m-2\,c\,s+c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+e^{(-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v)\,z}\,{}_2F_1$$

$$\left.\left.\left(\frac{-2\,e\,i\,k+i\,e\,m+2\,c\,s-c\,v}{d},\,-\beta;\,\frac{d-2\,i\,e\,k+i\,e\,m+2\,c\,s-c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\sin\left(\frac{1}{2}\,\pi\,(m-v)\right)\right)+$$

$$\frac{1}{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}\left(i\left(e^{(-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v)\,z}\,{}_2F_1\left(\frac{-2\,e\,i\,k+i\,e\,m-2\,c\,s+c\,v}{d},\,-\beta;\right.\right.\right.$$

$$\left.\frac{d-2\,i\,e\,k+i\,e\,m-2\,c\,s+c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+e^{(2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v)\,z}\,{}_2F_1\left(\frac{2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d},\right.$$

$$\left.\left.\left.\left.-\beta;\,\frac{d+2\,i\,e\,k-i\,e\,m+2\,c\,s-c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\sin\left(\frac{1}{2}\,\pi\,(m+v)\right)\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sin^m(e\,z)\sinh^v(c\,z)$

01.19.21.3185.01

$$\int e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\sin^m(e\,z)\sinh^v(c\,z)\,dz=$$

$$\frac{1}{p}\left(i^v\,2^{-m-v}\,e^{p\,z}\left(a+b\,e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\left(\frac{p}{d},\,-\beta;\,\frac{d+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)(1-m\bmod 2)\,(1-v\bmod 2)\right)+$$

$$i^v\,2^{-m-v}\left(a+b\,e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left((-1)^k\binom{m}{k}\left(e^{(e\,i\,(m-2\,k)+p)\,z-\frac{i\,m\,\pi}{2}}\,(i\,e\,(m-2\,k)-p)\,{}_2F_1\left(\frac{e\,i\,(m-2\,k)+p}{d},\,-\beta;\,\frac{d+e\,i\,(m-2\,k)+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-\right.\right.$$

$$\left.\left.e^{\frac{i\,\pi\,m}{2}+(p-i\,e\,(m-2\,k))\,z}\,(e\,i\,(m-2\,k)+p)\,{}_2F_1\left(\frac{p-i\,e\,(m-2\,k)}{d},\,-\beta;\,\frac{d-i\,e\,(m-2\,k)+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\Big/$$

$$((i\,e\,(m-2\,k)-p)\,(e\,i\,(m-2\,k)+p))+i^v\,2^{-m-v}\left(a+b\,e^{d\,z}\right)^{\beta}\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left((-1)^s \binom{v}{s} \left(e^{(p+c\,(v-2\,s))\,z-\frac{i\,\pi\,v}{2}} \,(c\,(v-2\,s)-p)\, {}_2F_1\!\left(\frac{p+c\,(v-2\,s)}{d}, -\beta;\, \frac{d+p+c\,(v-2\,s)}{d};\, -\frac{b\,e^{d\,z}}{a} \right) - \right.\right.$$

$$\left.\left. e^{\frac{i\,\pi\,v}{2}+(p-c\,(v-2\,s))\,z} \,(p+c\,(v-2\,s))\, {}_2F_1\!\left(\frac{p-c\,(v-2\,s)}{d}, -\beta;\, \frac{d+p-c\,(v-2\,s)}{d};\, -\frac{b\,e^{d\,z}}{a} \right) \right) \right) \Big/$$

$$((c\,(v-2\,s)-p)\,(p+c\,(v-2\,s))) + i^v\, 2^{-m-v} \left(a+b\,e^{d\,z}\right)^{\beta} \left(\frac{e^{d\,z}\,b}{a}+1 \right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^{k+s} \binom{v}{s} \left(\left(\left(\cos\!\left(\frac{1}{2}\,\pi\,(m+v) \right) \left(e^{(2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p+2\,c\,s-c\,v) \right.\right.\right.\right.$$

$${}_2F_1\!\left(\frac{2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v}{d}, -\beta;\, \frac{d+2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v}{d};\, -\frac{b\,e^{d\,z}}{a} \right) -$$

$$e^{(-2\,e\,i\,k+i\,e\,m+p-2\,c\,s+c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v)$$

$$\left.\left. {}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,c\,s+c\,v}{d}, -\beta;\, \frac{d-2\,i\,e\,k+i\,e\,m+p-2\,c\,s+c\,v}{d};\, -\frac{b\,e^{d\,z}}{a} \right) \right) \right) \Big/$$

$$((2\,i\,e\,k-i\,e\,m-p+2\,c\,s-c\,v)\,(2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v)) + \left(\cos\!\left(\frac{1}{2}\,\pi\,(m-v) \right) \right.$$

$$\left(e^{(2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p-2\,c\,s+c\,v)\, {}_2F_1\!\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v}{d}, -\beta; \right.\right.$$

$$\left. \frac{d+2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v}{d};\, -\frac{b\,e^{d\,z}}{a} \right) - e^{(-2\,e\,i\,k+i\,e\,m+p+2\,c\,s-c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p-$$

$$2\,c\,s+c\,v)\, {}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,c\,s-c\,v}{d}, -\beta;\, \frac{d-2\,i\,e\,k+i\,e\,m+p+2\,c\,s-c\,v}{d}; \right.$$

$$\left.\left.\left. -\frac{b\,e^{d\,z}}{a} \right) \right) \right) \Big/ ((2\,i\,e\,k-i\,e\,m-p-2\,c\,s+c\,v)\,(2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v)) +$$

$$\left(i \left(e^{(2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m-p-2\,c\,s+c\,v)\, {}_2F_1\!\left(\frac{2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v}{d}, \right.\right.\right.$$

$$\left. -\beta;\, \frac{d+2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v}{d};\, -\frac{b\,e^{d\,z}}{a} \right) + e^{(-2\,e\,i\,k+i\,e\,m+p+2\,c\,s-c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+$$

$$p-2\,c\,s+c\,v)\, {}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p+2\,c\,s-c\,v}{d}, -\beta;\, \frac{d-2\,i\,e\,k+i\,e\,m+p+2\,c\,s-c\,v}{d}; \right.$$

$$\left.\left.\left. -\frac{b\,e^{d\,z}}{a} \right) \right) \sin\!\left(\frac{1}{2}\,\pi\,(m-v) \right) \right) \Big/ ((2\,i\,e\,k-i\,e\,m-p-2\,c\,s+c\,v)$$

$$(2\,i\,e\,k-i\,e\,m+p-2\,c\,s+c\,v)) + \left(i \left(e^{(-2\,e\,i\,k+i\,e\,m+p-2\,c\,s+c\,v)\,z}\,(2\,i\,e\,k-i\,e\,m+p+2\,c\,s-c\,v) \right.\right.$$

$${}_2F_1\!\left(\frac{-2\,e\,i\,k+i\,e\,m+p-2\,c\,s+c\,v}{d}, -\beta;\, \frac{d-2\,i\,e\,k+i\,e\,m+p-2\,c\,s+c\,v}{d};\, -\frac{b\,e^{d\,z}}{a} \right) +$$

$$e^{(2iek-iem+p+2cs-cv)z}(2iek-iem-p+2cs-cv)\,{}_2F_1\left(\frac{2iek-iem+p+2cs-cv}{d},\right.$$
$$\left.\left.\left.-\beta;\frac{d+2iek-iem+p+2cs-cv}{d};-\frac{b\,e^{dz}}{a}\right)\right)\sin\left(\frac{1}{2}\pi(m+v)\right)\right)\Big/$$
$$((2iek-iem-p+2cs-cv)(2iek-iem+p+2cs-cv))\Big)\text{ /; } m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving cos and exp

Involving $e^{pz}\cos(cz)\sinh^{\nu}(az)$

01.19.21.3186.01

$$\int e^{pz}\cos(cz)\sinh^{\nu}(az)\,dz = -\frac{2^{-\nu-1}e^{(-ic+p)z}\left(-e^{-az}+e^{az}\right)^{\nu}\left(1-e^{2az}\right)^{-\nu}}{c^2+(p-a\nu)^2}\left((-ic-p+a\nu)\,{}_2F_1\left(\frac{-ic+p-a\nu}{2a},-\nu;\frac{-\nu a+2a-ic+p}{2a};e^{2az}\right)+\right.$$
$$\left.e^{2icz}(ic-p+a\nu)\,{}_2F_1\left(\frac{ic+p-a\nu}{2a},-\nu;\frac{-\nu a+2a+ic+p}{2a};e^{2az}\right)\right)$$

01.19.21.3187.01

$$\int e^{pz}\cos(cz)\sinh^{\nu}(az)\,dz = -i^{\nu}2^{-\nu-1}\left(\frac{e^{(-ic+p)z}}{ic-p}+\frac{e^{(ic+p)z}}{-ic-p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)-$$
$$2^{-\nu-1}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{i\pi\nu-(ic-2ak-p+a\nu)z}}{ic-2ak-p+a\nu}+\frac{e^{-(-ic+2ak-p-a\nu)z}}{-ic+2ak-p-a\nu}+\frac{e^{-(ic+2ak-p-a\nu)z}}{ic+2ak-p-a\nu}+\frac{e^{i\pi\nu-(-ic-2ak-p+a\nu)z}}{-ic-2ak-p+a\nu}\right)\binom{\nu}{k}\text{ /; }\nu\in\mathbb{N}^+$$

Involving $e^{pz}\cos(cz+d)\sinh^{\nu}(az)$

01.19.21.3188.01

$$\int e^{pz}\cos(d+cz)\sinh^{\nu}(az)\,dz =$$
$$\frac{1}{2}e^{-id}\left(1-e^{2az}\right)^{-\nu}\sinh^{\nu}(az)\left(\frac{e^{(-ic+p)z}}{-ic+p-a\nu}\,{}_2F_1\left(\frac{-ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{-ic+p}{a}-\nu+2\right);e^{2az}\right)+\right.$$
$$\left.\frac{e^{2id+(ic+p)z}}{ic+p-a\nu}\,{}_2F_1\left(\frac{ic+p-a\nu}{2a},-\nu;\frac{1}{2}\left(\frac{ic+p}{a}-\nu+2\right);e^{2az}\right)\right)$$

01.19.21.3189.01

$$\int e^{pz}\cos(d+cz)\sinh^{\nu}(az)\,dz = -i^{\nu}2^{-\nu-1}e^{-id}\left(\frac{e^{(-ic+p)z}}{ic-p}+\frac{e^{2id-(-ic-p)z}}{-ic-p}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)-2^{-\nu-1}e^{-id}$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{i\pi\nu-(ic-2ak-p+a\nu)z}}{ic-2ak-p+a\nu}+\frac{e^{2id-(-ic+2ak-p-a\nu)z}}{-ic+2ak-p-a\nu}+\frac{e^{-(ic+2ak-p-a\nu)z}}{ic+2ak-p-a\nu}+\frac{e^{2id+i\pi\nu-(-ic-2ak-p+a\nu)z}}{-ic-2ak-p+a\nu}\right)\binom{\nu}{k}\text{ /; }\nu\in\mathbb{N}^+$$

Involving $e^{pz}\cos(cz)\sinh^{\nu}(az+b)$

01.19.21.3190.01

$$\int e^{p z} \cos(c z) \sinh^{\nu}(b + a z)\, dz = \frac{1}{2} \left(1 - e^{2(b+a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \left(\frac{e^{(-i c+p) z}}{-i c + p - a \nu}\, {}_2F_1\!\left(\frac{-i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{-i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right) + \frac{e^{(i c+p) z}}{i c + p - a \nu}\, {}_2F_1\!\left(\frac{i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right)\right)$$

01.19.21.3191.01

$$\int e^{p z} \cos(c z) \sinh^{\nu}(b + a z)\, dz = -i^{\nu}\, 2^{-\nu-1} \left(\frac{e^{(-i c+p) z}}{i c - p} + \frac{e^{(i c+p) z}}{-i c - p}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \left(e^{2 b \nu} \left(\frac{e^{-(i c+2 a k-p-a \nu) z}}{i c + 2 a k - p - a \nu} + \frac{e^{-(-i c+2 a k-p-a \nu) z}}{-i c + 2 a k - p - a \nu}\right) + \frac{e^{4 b k+i \pi \nu-(-i c-2 a k-p+a \nu) z}}{-i c - 2 a k - p + a \nu} + \frac{e^{4 b k+i \pi \nu-(i c-2 a k-p+a \nu) z}}{i c - 2 a k - p + a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.3192.01

$$\int e^{p z} \cos(d + c z) \sinh^{\nu}(b + a z)\, dz = \frac{1}{2} e^{-i d} \left(1 - e^{2(b+a z)}\right)^{-\nu} \sinh^{\nu}(b + a z) \left(\frac{e^{(-i c+p) z}}{-i c + p - a \nu}\, {}_2F_1\!\left(\frac{-i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{-i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right) + \frac{e^{2 i d+(i c+p) z}}{i c + p - a \nu}\, {}_2F_1\!\left(\frac{i c + p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c + p}{a} - \nu + 2\right); e^{2(b+a z)}\right)\right)$$

01.19.21.3193.01

$$\int e^{p z} \cos(d + c z) \sinh^{\nu}(b + a z)\, dz = -i^{\nu}\, 2^{-\nu-1} e^{-i d} \left(\frac{e^{(-i c+p) z}}{i c - p} + \frac{e^{2 i d-(-i c-p) z}}{-i c - p}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) - 2^{-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-i d - 2 b k - b \nu} \left(e^{2 b \nu} \left(\frac{e^{-(i c+2 a k-p-a \nu) z}}{i c + 2 a k - p - a \nu} + \frac{e^{2 i d-(-i c+2 a k-p-a \nu) z}}{-i c + 2 a k - p - a \nu}\right) + \frac{e^{2 i d+4 b k+i \pi \nu-(-i c-2 a k-p+a \nu) z}}{-i c - 2 a k - p + a \nu} + \frac{e^{4 b k+i \pi \nu-(i c-2 a k-p+a \nu) z}}{i c - 2 a k - p + a \nu}\right) \binom{\nu}{k} /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos\left(b z^r\right) \sinh^{\nu}(c z)$

01.19.21.3194.01

$$\int e^{p z^2} \cos(b z^2) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-\nu-2}\sqrt{\pi}}{b^2+p^2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\sqrt{-i b+p}\,(i b+p)\operatorname{erfi}\left(\sqrt{-i b+p}\, z\right)+(-i b+p)\sqrt{i b+p}\operatorname{erfi}\left(\sqrt{i b+p}\, z\right)\right)+$$

$$i^\nu \sqrt[4]{-1}\, 2^{-2-\nu}\sqrt{\pi}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\sqrt{b-i p}\sqrt{b+i p}}\binom{\nu}{k} e^{-\frac{2 i \pi \nu b^2+c^2 i (2k+\nu)^2 b+p\left(c^2(\nu-2k)^2+2\pi i p \nu\right)}{4\left(b^2+p^2\right)}}$$

$$\left(e^{\frac{2 i b c^2 k \nu}{b^2+p^2}}\sqrt{b-i p}\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-2 c k+c \nu-2 i b z+2 p z)}{2\sqrt{b+i p}}\right)-e^{\frac{i\left(\pi b^2+2 c^2 k b+p^2 \pi\right)\nu}{b^2+p^2}}\sqrt{b-i p}\right.$$

$$\operatorname{erfi}\left(\frac{\sqrt[4]{-1}\,(-2 c k+c \nu+2 i b z-2 p z)}{2\sqrt{b+i p}}\right)+e^{\frac{i b c^2\left(4k^2+\nu^2\right)}{2\left(b^2+p^2\right)}}\, i\sqrt{b+i p}\operatorname{erfi}\left(\frac{(-1)^{3/4}(-2 c k+c \nu+2 i b z+2 p z)}{2\sqrt{b-i p}}\right)-$$

$$\left.i\, e^{\frac{i\left(2\pi \nu b^2+c^2\left(4k^2+\nu^2\right)b+2 p^2 \pi \nu\right)}{2\left(b^2+p^2\right)}}\sqrt{b+i p}\operatorname{erfi}\left(\frac{(-1)^{3/4}(c(\nu-2k)-2 i b z-2 p z)}{2\sqrt{b-i p}}\right)\right)\ /;\ \nu \in \mathbb{N}^+$$

01.19.21.3195.01

$$\int e^{p\sqrt{z}} \cos\left(b\sqrt{z}\right)\sinh^\nu(c z)\, dz = \frac{i^\nu (1-\nu \bmod 2)\, 2^{1-\nu}}{\left(b^2+p^2\right)^2}\binom{\nu}{\frac{\nu}{2}} e^{p\sqrt{z}}\left(\left(b^2-p^2+p\left(b^2+p^2\right)\sqrt{z}\right)\cos\left(b\sqrt{z}\right)+b\left(\left(b^2+p^2\right)\sqrt{z}-2p\right)\sin\left(b\sqrt{z}\right)\right)+$$

$$i^\nu 2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{2}{c(\nu-2k)}\left(-e^{\sqrt{z}\,(-i b+p)+\frac{i\pi\nu}{2}-c(\nu-2k)z}-e^{\sqrt{z}\,(i b+p)+\frac{i\pi\nu}{2}-c(\nu-2k)z}+e^{\sqrt{z}\,(-i b+p)-\frac{i\pi\nu}{2}+c(\nu-2k)z}+\right.\right.$$

$$\left.e^{\sqrt{z}\,(i b+p)-\frac{i\pi\nu}{2}+c(\nu-2k)z}\right)-\sqrt{\pi}\left(e^{\frac{b^2+4\pi i c k \nu}{4ck-2c\nu}}\left(-p\operatorname{erf}\left(\frac{-i b-p+2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\sqrt{\nu-2k}}\right)-e^{\frac{i b p}{2ck-c\nu}}\right.\right.$$

$$\left.(b+i p)\operatorname{erfi}\left(\frac{b+i\left(p+2c(2k-\nu)\sqrt{z}\right)}{2\sqrt{c}\sqrt{\nu-2k}}\right)-b\operatorname{erfi}\left(\frac{b-i\left(p+2c(2k-\nu)\sqrt{z}\right)}{2\sqrt{c}\sqrt{\nu-2k}}\right)\right)+$$

$$e^{\frac{p^2+2ci\pi\nu^2}{4ck-2c\nu}}\left(b\, i\operatorname{erfi}\left(\frac{i b-p+2c(2k-\nu)\sqrt{z}}{2\sqrt{c}\sqrt{\nu-2k}}\right)+p\operatorname{erfi}\left(\frac{-i b+p+2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\sqrt{\nu-2k}}\right)+e^{\frac{i b p}{2ck-c\nu}}\right.$$

$$\left.\left.\left.(i b+p)\operatorname{erfi}\left(\frac{i b+p+2c(\nu-2k)\sqrt{z}}{2\sqrt{c}\sqrt{\nu-2k}}\right)\right)\right)\Big/\left(c^{3/2}(\nu-2k)^{3/2} e^{\frac{b^2+2 i p b+p^2+2ci\pi\nu(2k+\nu)}{c(8k-4\nu)}}\right)\right)\ /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z^r}\cos(b z)\sinh^\nu(c z)$

01.19.21.3196.01

$$\int e^{p z^2} \cos(b z) \sinh^{\nu}(c z)\, dz = \frac{i^{\nu} (1 - \nu \bmod 2)\, 2^{-\nu-2} \sqrt{\pi}}{\sqrt{p}} \binom{\nu}{\frac{\nu}{2}} e^{\frac{b^2}{4p}} \left(\operatorname{erfi}\left(\frac{-i b + 2 p z}{2\sqrt{p}}\right) + \operatorname{erfi}\left(\frac{i b + 2 p z}{2\sqrt{p}}\right)\right) + \frac{i^{\nu} 2^{-\nu-2} \sqrt{\pi}}{\sqrt{p}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} e^{\frac{b^2 - 2 i c (2k+\nu) b - c^2 (\nu - 2k)^2 - 2 \pi i p \nu}{4p}} \left(e^{\frac{i b c \nu}{p}} \operatorname{erfi}\left(\frac{-i b - 2 c k + c \nu + 2 p z}{2\sqrt{p}}\right) + e^{\frac{2 i b c k}{p}} \operatorname{erfi}\left(\frac{i b - 2 c k + c \nu + 2 p z}{2\sqrt{p}}\right) + e^{i\left(\frac{2 b c k}{p} + \pi \nu\right)} \operatorname{erfi}\left(\frac{-i b + 2 c k - c \nu + 2 p z}{2\sqrt{p}}\right) + e^{\frac{i (b c + p \pi) \nu}{p}} \operatorname{erfi}\left(\frac{i b + 2 c k - c \nu + 2 p z}{2\sqrt{p}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3197.01

$$\int e^{p \sqrt{z}} \cos(b z) \sinh^{\nu}(c z)\, dz = \frac{1}{b^{3/2}} \left(i^{\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, 2^{-\nu-2} \left(e^{-i b z} \left(-2 i \sqrt{b}\, e^{p \sqrt{z}} \left(-1 + e^{2 i b z}\right) - \sqrt[4]{-1}\, e^{\frac{i p^2}{4b} + i b z} p \sqrt{\pi} \operatorname{erfi}\left(\frac{(-1)^{3/4} \left(p + 2 i b \sqrt{z}\right)}{2\sqrt{b}}\right)\right) - (-1)^{3/4} e^{-\frac{i p^2}{4b}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \left(p - 2 i b \sqrt{z}\right)}{2\sqrt{b}}\right)\right)\right) + i^{\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(p \sqrt{\pi} \left(\frac{\sqrt[4]{-1}\, e^{\frac{i p^2}{4(b - 2 i c k + i c \nu)} + \frac{i \pi \nu}{2}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \left(2\sqrt{z}\, b - i p - 4 i c k \sqrt{z} + 2 i c \nu \sqrt{z}\right)}{2\sqrt{b - 2 i c k + i c \nu}}\right)}{(b - 2 i c k + i c \nu)^{3/2}} + \frac{(-1)^{3/4} e^{-\frac{i p^2}{4(b - 2 i c k + i c \nu)} - \frac{i \pi \nu}{2}} \operatorname{erfi}\left(\frac{(-1)^{3/4} \left(2\sqrt{z}\, b + i p - 4 i c k \sqrt{z} + 2 i c \nu \sqrt{z}\right)}{2\sqrt{b - 2 i c k + i c \nu}}\right)}{(b - 2 i c k + i c \nu)^{3/2}} + \frac{\sqrt[4]{-1}\, e^{\frac{i p^2}{4(b + 2 i c k - i c \nu)} - \frac{i \pi \nu}{2}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1} \left(2\sqrt{z}\, b - i p + 4 i c k \sqrt{z} - 2 i c \nu \sqrt{z}\right)}{2\sqrt{b + 2 i c k - i c \nu}}\right)}{(b + 2 i c k - i c \nu)^{3/2}} + \frac{(-1)^{3/4} e^{\frac{i \pi \nu}{2} - \frac{i p^2}{4(b + 2 i c k - i c \nu)}} \operatorname{erfi}\left(\frac{(-1)^{3/4} \left(2\sqrt{z}\, b + i p + 4 i c k \sqrt{z} - 2 i c \nu \sqrt{z}\right)}{2\sqrt{b + 2 i c k - i c \nu}}\right)}{(b + 2 i c k - i c \nu)^{3/2}} \right) + \frac{2 e^{\sqrt{z}\, p - \frac{i \pi \nu}{2} + (-i b - 2 c k + c \nu) z}}{-i b - 2 c k + c \nu} + \frac{2 e^{\sqrt{z}\, p - \frac{i \pi \nu}{2} + (i b - 2 c k + c \nu) z}}{i b - 2 c k + c \nu} + \frac{2 e^{\sqrt{z}\, p + \frac{i \pi \nu}{2} + (-i b + 2 c k - c \nu) z}}{-i b + 2 c k - c \nu} + \frac{2 e^{\sqrt{z}\, p + \frac{i \pi \nu}{2} + (i b + 2 c k - c \nu) z}}{i b + 2 c k - c \nu} \right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos\left(b z^r\right) \sinh^{\nu}(c z)$

01.19.21.3198.01

$$\int e^{pz}\cos(bz^2)\sinh^\nu(cz)\,dz = -\frac{i^\nu(1-\nu\bmod 2)\sqrt[4]{-1}\sqrt{\pi}}{2^{\nu+2}\sqrt{b}}\binom{\nu}{\frac{\nu}{2}}e^{-\frac{ip^2}{4b}}\left(e^{\frac{ip^2}{2b}}\,i\,\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,(2bz-ip)}{2\sqrt{b}}\right)+\mathrm{erfi}\left(\frac{(-1)^{3/4}(ip+2bz)}{2\sqrt{b}}\right)\right)+$$
$$\frac{i^\nu\sqrt[4]{-1}\,2^{-\nu-2}\sqrt{\pi}}{\sqrt{b}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{-\frac{i\left(p^2+2c(2k+\nu)p+c^2(2k+\nu)^2+2b\pi\nu\right)}{4b}}$$
$$\left(e^{\frac{i\left(\left(4k^2+\nu^2\right)c^2+p^2\right)}{2b}}\,i\left(e^{\frac{icp\nu}{b}}\,\mathrm{erfi}\left(\frac{(-1)^{3/4}(-2ck+p+c\nu+2ibz)}{2\sqrt{b}}\right)+e^{i\left(\frac{2ckp}{b}+\pi\nu\right)}\mathrm{erfi}\left(\frac{(-1)^{3/4}(2ck+p-c\nu+2ibz)}{2\sqrt{b}}\right)\right)+\right.$$
$$\left.e^{\frac{i\left(2kc^2+pc+b\pi\right)\nu}{b}}\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,(2ck+p-c\nu-2ibz)}{2\sqrt{b}}\right)+e^{\frac{2ick(p+c\nu)}{b}}\mathrm{erfi}\left(\frac{\sqrt[4]{-1}\,(p+c(\nu-2k)-2ibz)}{2\sqrt{b}}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.3199.01

$$\int e^{pz}\cos\left(b\sqrt{z}\right)\sinh^\nu(cz)\,dz = \frac{i^\nu 2^{-\nu-2}(1-\nu\bmod 2)}{p^{3/2}}\binom{\nu}{\frac{\nu}{2}}\left(4\sqrt{p}\,e^{pz}\cos\left(b\sqrt{z}\right)-ib\,e^{\frac{b^2}{4p}}\sqrt{\pi}\left(\mathrm{erfi}\left(\frac{ib+2p\sqrt{z}}{2\sqrt{p}}\right)+\mathrm{erfi}\left(\frac{ib-2p\sqrt{z}}{2\sqrt{p}}\right)\right)\right)+$$
$$2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\frac{e^{-ib\sqrt{z}+(-2ck+p+c\nu)z}+e^{b\sqrt{z}\,(+i)+(-2ck+p+c\nu)z}}{4(-2ck+p+c\nu)}+\frac{(-1)^\nu\left(e^{-ib\sqrt{z}+(2ck+p-c\nu)z}+e^{b\sqrt{z}\,(+i)+(2ck+p-c\nu)z}\right)}{4(2ck+p-c\nu)}-\right.$$
$$\frac{1}{8}ib\sqrt{\pi}\left(\frac{e^{\frac{b^2}{-8ck+4p+4c\nu}}\mathrm{erfi}\left(\frac{ib+2(-2ck+p+c\nu)\sqrt{z}}{2\sqrt{-2ck+p+c\nu}}\right)}{(-2ck+p+c\nu)^{3/2}}+\frac{e^{\frac{b^2}{8ck+4p-4c\nu}+i\pi\nu}\mathrm{erfi}\left(\frac{ib+2(2ck+p-c\nu)\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{(2ck+p-c\nu)^{3/2}}+\right.$$
$$\left.\left.\frac{e^{\frac{b^2}{8ck+4p-4c\nu}+i\pi\nu}\mathrm{erfi}\left(\frac{ib-2(2ck+p-c\nu)\sqrt{z}}{2\sqrt{2ck+p-c\nu}}\right)}{(2ck+p-c\nu)^{3/2}}+\frac{e^{\frac{b^2}{-8ck+4p+4c\nu}}\mathrm{erfi}\left(\frac{ib+2(2ck-p-c\nu)\sqrt{z}}{2\sqrt{p+c(\nu-2k)}}\right)}{(p+c(\nu-2k))^{3/2}}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{pz}\cos(bz)\sinh^\nu\left(cz^r\right)$

01.19.21.3200.01

$$\int e^{p z} \cos(b z) \sinh^{\nu}(c z^2) \, dz = \frac{e^{p z} (p \cos(b z) + b \sin(b z)) (1 - \nu \bmod 2)}{b^2 + p^2} \left(\frac{i}{2}\right)^{\nu} \binom{\nu}{\frac{\nu}{2}} + \frac{2^{-\nu-2} \sqrt{\pi}}{\sqrt{c}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{(-1)^{\nu} e^{-\frac{b^2 - 2 i p b - p^2}{4 c (\nu - 2k)}} \operatorname{erf}\left(\frac{-i b - p - 4 c k z + 2 c \nu z}{2 \sqrt{c} \sqrt{\nu - 2k}}\right)}{\sqrt{\nu - 2k}} + \frac{e^{-\frac{-b^2 - 2 i p b + p^2}{4 c (\nu - 2k)}} \operatorname{erfi}\left(\frac{-i b + p - 4 c k z + 2 c \nu z}{2 \sqrt{c} \sqrt{\nu - 2k}}\right)}{\sqrt{\nu - 2k}} + \frac{e^{-\frac{-b^2 + 2 i p b + p^2}{4 c (\nu - 2k)}} \operatorname{erfi}\left(\frac{i b + p - 4 c k z + 2 c \nu z}{2 \sqrt{c} \sqrt{\nu - 2k}}\right)}{\sqrt{\nu - 2k}} + \frac{(-1)^{\nu} e^{-\frac{b^2 + 2 i p b - p^2}{4 c (\nu - 2k)}} i \operatorname{erfi}\left(\frac{b + i p + 4 i c k z - 2 i c \nu z}{2 \sqrt{c} \sqrt{\nu - 2k}}\right)}{\sqrt{\nu - 2k}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3201.01

$$\int e^{p z} \cos(b z) \sinh^{\nu}(c \sqrt{z}) \, dz = i^{\nu} 2^{-\nu-1} \left(\frac{e^{(i b + p) z}}{i b + p} + \frac{e^{(-i b + p) z}}{-i b + p} \right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) + i^{\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i \pi \nu}{2}} \left(-\frac{c\, e^{-\frac{c^2 (\nu - 2s)^2}{4(-i b + p)} - i \pi \nu} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (-i b + p) + c (\nu - 2s)}{2 \sqrt{-i b + p}}\right)}{(-i b + p)^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu - 2s)^2}{4(i b + p)}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (-i b - p) + c (\nu - 2s)}{2 \sqrt{i b + p}}\right)}{(i b + p)^{3/2}} + \frac{2 e^{-i \pi \nu + (-i b + p) z + c (\nu - 2s) \sqrt{z}}}{-i b + p} + \frac{2 e^{(i b + p) z - c (\nu - 2s) \sqrt{z}}}{i b + p} \right) + e^{\frac{i \pi \nu}{2}} \left(-\frac{c\, e^{-\frac{c^2 (\nu - 2s)^2}{4(-i b + p)}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (i b - p) + c (\nu - 2s)}{2 \sqrt{-i b + p}}\right)}{(-i b + p)^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu - 2s)^2}{4(i b + p)} - i \pi \nu} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (i b + p) + c (\nu - 2s)}{2 \sqrt{i b + p}}\right)}{(i b + p)^{3/2}} + \frac{2 e^{(-i b + p) z - c (\nu - 2s) \sqrt{z}}}{-i b + p} + \frac{2 e^{-i \pi \nu + (i b + p) z + c (\nu - 2s) \sqrt{z}}}{i b + p} \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos(b z) \sinh^{\nu}(c z^r)$

01.19.21.3202.01

$$\int e^{p z^2} \cos(b z) \sinh^{\nu}(c z^2)\, dz = \frac{\left(i^{\nu} 2^{-\nu-2} \sqrt{\pi}\right) e^{\frac{b^2}{4 p}} \binom{\nu}{\frac{\nu}{2}} \left(\operatorname{erfi}\left(\frac{-i b+2 p z}{2 \sqrt{p}}\right) + \operatorname{erfi}\left(\frac{i b+2 p z}{2 \sqrt{p}}\right)\right) (1 - \nu \bmod 2)}{\sqrt{p}} + 2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{(-1)^{\nu} e^{-\frac{b^2}{4(-2 c k - p + c \nu)}} \operatorname{erf}\left(\frac{i b + 4 c k z + 2 p z - 2 c \nu z}{2 \sqrt{-2 c k - p + c \nu}}\right)}{\sqrt{-2 c k - p + c \nu}} + \frac{(-1)^{\nu} i\, e^{-\frac{b^2}{4(-2 c k - p + c \nu)}} \operatorname{erfi}\left(\frac{b + 4 i c k z + 2 i p z - 2 i c \nu z}{2 \sqrt{-2 c k - p + c \nu}}\right)}{\sqrt{-2 c k - p + c \nu}} + \frac{e^{\frac{b^2}{4(-2 c k + p + c \nu)}} \operatorname{erfi}\left(\frac{-i b - 4 c k z + 2 p z + 2 c \nu z}{2 \sqrt{-2 c k + p + c \nu}}\right)}{\sqrt{-2 c k + p + c \nu}} + \frac{e^{\frac{b^2}{4(-2 c k + p + c \nu)}} \operatorname{erfi}\left(\frac{i b - 4 c k z + 2 p z + 2 c \nu z}{2 \sqrt{-2 c k + p + c \nu}}\right)}{\sqrt{-2 c k + p + c \nu}} \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3203.01

$$\int e^{p\sqrt{z}} \cos(b z) \sinh^{\nu}\left(c\sqrt{z}\right) dz = i^{-\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} \left(\frac{2 i e^{p\sqrt{z} - i b z}}{b} - \frac{2 i e^{\sqrt{z}\, p + i b z}}{b} - \frac{e^{-\frac{i p^2}{4b}} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - 2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} - \frac{e^{\frac{i p^2}{4b}} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} \right) (1 - \nu \bmod 2) +$$

$$i^{-\nu} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{\frac{i\pi\nu}{2}} \left(\frac{2 i e^{-i\pi\nu - i b z + (p - c(\nu - 2s))\sqrt{z}}}{b} - \frac{2 i e^{\sqrt{z}\,(p + c(\nu-2s)) + i b z}}{b} + \right.\right.$$

$$\frac{c\, e^{\frac{i(p + c(\nu-2s))^2}{4b}} \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{-p - c(\nu-2s) - 2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} - \frac{e^{-\frac{i(p - c(\nu-2s))^2}{4b} - i\pi\nu} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - c(\nu-2s) - 2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} +$$

$$\left. \frac{c\, e^{-\frac{i(p - c(\nu-2s))^2}{4b} - i\pi\nu} \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{p - c(\nu-2s) - 2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} - \frac{e^{\frac{i(p + c(\nu-2s))^2}{4b}} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + c(\nu-2s) + 2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} \right) +$$

$$e^{\frac{i\pi\nu}{2}} \left(\frac{2 i e^{(p + c(\nu-2s))\sqrt{z} - i b z}}{b} - \frac{2 i e^{-i\pi\nu + i b z + (p - c(\nu-2s))\sqrt{z}}}{b} - \frac{e^{-\frac{i(p + c(\nu-2s))^2}{4b}} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + c(\nu-2s) - 2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} + \right.$$

$$\frac{c\, e^{-\frac{i(p + c(\nu-2s))^2}{4b}} \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{-p - c(\nu-2s) + 2 i b \sqrt{z}}{2\sqrt{-i b}}\right)}{(-i b)^{3/2}} - \frac{e^{\frac{i(p - c(\nu-2s))^2}{4b} - i\pi\nu} p \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - c(\nu-2s) + 2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} +$$

$$\left.\left. \frac{c\, e^{\frac{i(p - c(\nu-2s))^2}{4b} - i\pi\nu} \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{p - c(\nu-2s) + 2 i b \sqrt{z}}{2\sqrt{i b}}\right)}{(i b)^{3/2}} \right)\right) /;\ \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos\left(b z^r\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.3204.01

$$\int e^{p z} \cos\left(b z^2\right) \sinh^{\nu}\left(c z^2\right) dz = -\frac{1}{\sqrt{b}} \left(\left(i^{\nu}\, 2^{-\nu-2} \sqrt[4]{-1} \sqrt{\pi} \right) \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{i p^2}{4 b}}\, i \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (2 b z - i p)}{2 \sqrt{b}} \right) + e^{-\frac{i p^2}{4 b}} \operatorname{erfi}\left(\frac{(-1)^{3/4}\, (i p + 2 b z)}{2 \sqrt{b}} \right) \right) (1 - \nu \bmod 2) \right) +$$

$$2^{-\nu-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{i (-1)^{\nu} e^{\frac{p^2}{4 (-i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{i p - 2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{-i b - 2 c k + c \nu}} \right)}{\sqrt{-i b - 2 c k + c \nu}} + \frac{i (-1)^{\nu} e^{\frac{p^2}{4 (i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{i p + 2 b z + 4 i c k z - 2 i c \nu z}{2 \sqrt{i b - 2 c k + c \nu}} \right)}{\sqrt{i b + c (\nu - 2 k)}} + \right.$$

$$\left. \frac{e^{-\frac{p^2}{4 (-i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{p - 2 i b z - 4 c k z + 2 c \nu z}{2 \sqrt{-i b - 2 c k + c \nu}} \right)}{\sqrt{-i b - 2 c k + c \nu}} + \frac{e^{-\frac{p^2}{4 (i b - 2 c k + c \nu)}} \operatorname{erfi}\left(\frac{p + 2 i b z - 4 c k z + 2 c \nu z}{2 \sqrt{i b - 2 c k + c \nu}} \right)}{\sqrt{i b - 2 c k + c \nu}} \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3205.01

$$\int e^{p z} \cos\left(b \sqrt{z}\right) \sinh^{\nu}\left(c \sqrt{z}\right) dz = 2^{-\nu-2} e^{-\frac{1}{2} i \pi \nu} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4 e^{p z} \cos\left(b \sqrt{z}\right)}{p} + \frac{b e^{\frac{b^2}{4 p}} i \sqrt{\pi} \operatorname{erfi}\left(\frac{-i b + 2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i b e^{\frac{b^2}{4 p}} \sqrt{\pi} \operatorname{erfi}\left(\frac{i b + 2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} \right) (1 - \nu \bmod 2) +$$

$$i^{-\nu} 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\left(e^{-\frac{1}{2} i \pi \nu} \left(\frac{4 e^{\frac{i \pi \nu}{2} + p z} \cos\left(\frac{\pi \nu}{2} + (b + 2 i c k - i c \nu) \sqrt{z}\right)}{p} + \frac{e^{\frac{(b + 2 i c k - i c \nu)^2}{4 p}} \sqrt{\pi} (b + 2 i c k - i c \nu) \operatorname{erf}\left(\frac{b + c i (2 k - \nu) + 2 i p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} + \right.\right.$$

$$\left. \frac{1}{p^{3/2}} \left(e^{\frac{(-b - 2 i c k + i c \nu)^2}{4 p} + i \pi \nu} \sqrt{\pi} (b + 2 i c k - i c \nu) \operatorname{erf}\left(\frac{b + c i (2 k - \nu) - 2 i p \sqrt{z}}{2 \sqrt{p}}\right) \right) \right) +$$

$$e^{\frac{i \pi \nu}{2}} \left(\frac{4 e^{p z - \frac{i \pi \nu}{2}} \cos\left(\frac{\pi \nu}{2} + (-b + 2 i c k - i c \nu) \sqrt{z}\right)}{p} - \frac{e^{\frac{(b + c i (\nu - 2 k))^2}{4 p}} \sqrt{\pi} (b + c i (\nu - 2 k)) \operatorname{erf}\left(\frac{-b + c i (2 k - \nu) - 2 i p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} - \right.$$

$$\left.\left. \frac{i e^{\frac{(b + c i (\nu - 2 k))^2}{4 p} - i \pi \nu} \sqrt{\pi} (b + c i (\nu - 2 k)) \operatorname{erfi}\left(\frac{i b - c (\nu - 2 k) + 2 p \sqrt{z}}{2 \sqrt{p}}\right)}{p^{3/2}} \right) \right) /; \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos\left(b z^r\right) \sinh^{\nu}\left(c z^r\right)$

01.19.21.3206.01

$$\int e^{p z^r} \cos(b z^r) \sinh^v(c z^r) \, dz = -\frac{i^v 2^{-v-1} z (1 - v \bmod 2)}{r} \binom{v}{\frac{v}{2}} \left(\Gamma\left(\frac{1}{r}, (-i b - p) z^r\right) ((-i b - p) z^r)^{-1/r} + (i (b + i p) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, i (b + i p) z^r\right)\right) - \frac{2^{-v-1} z}{r} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v \Gamma\left(\frac{1}{r}, (-i b - 2 c k - p + c v) z^r\right) ((-i b - 2 c k - p + c v) z^r)^{-1/r} + (-1)^v ((i b - 2 c k - p + c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b - 2 c k - p + c v) z^r\right) + ((-i b + 2 c k - p - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-i b + 2 c k - p - c v) z^r\right) + ((i b + 2 c k - p - c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b + 2 c k - p - c v) z^r\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.3207.01

$$\int e^{p z^2} \cos(b z^2) \sinh^v(c z^2) \, dz = i^v 2^{-v-2} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\frac{\operatorname{erfi}\left(\sqrt{-i b + p} \; z\right)}{\sqrt{-i b + p}} + \frac{\operatorname{erfi}\left(\sqrt{i b + p} \; z\right)}{\sqrt{i b + p}}\right) (1 - v \bmod 2) + i^v 2^{-v-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\left(\frac{\operatorname{erfi}\left(\sqrt{-i b - 2 c k + p + c v} \; z\right)}{\sqrt{-i b - 2 c k + p + c v}} + \frac{\operatorname{erfi}\left(\sqrt{i b - 2 c k + p + c v} \; z\right)}{\sqrt{i b - 2 c k + p + c v}} + \frac{\operatorname{erfi}\left(\sqrt{-i b + 2 c k + p - c v} \; z\right)}{\sqrt{-i b + 2 c k + p - c v}} + \frac{\operatorname{erfi}\left(\sqrt{i b + 2 c k + p - c v} \; z\right)}{\sqrt{i b + 2 c k + p - c v}}\right) \cos\left(\frac{\pi v}{2}\right) + i \left(-\frac{\operatorname{erfi}\left(\sqrt{-i b - 2 c k + p + c v} \; z\right)}{\sqrt{-i b - 2 c k + p + c v}} + \frac{\operatorname{erfi}\left(\sqrt{-i b + 2 c k + p - c v} \; z\right)}{\sqrt{-i b + 2 c k + p - c v}} + \frac{\operatorname{erfi}\left(\sqrt{i b + 2 c k + p - c v} \; z\right)}{\sqrt{i b + 2 c k + p - c v}} - \frac{\operatorname{erfi}\left(\sqrt{i b - 2 c k + p + c v} \; z\right)}{\sqrt{i b - 2 c k + p + c v}}\right) \sin\left(\frac{\pi v}{2}\right)\right) /; v \in \mathbb{N}^+$$

01.19.21.3208.01

$$\int e^{p\sqrt{z}}\cos\left(b\sqrt{z}\right)\sinh^{\nu}\left(c\sqrt{z}\right)dz = \frac{i^{\nu}\,2^{1-\nu}\,e^{p\sqrt{z}}}{\left(b^2+p^2\right)^2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\left(\left(\left(\sqrt{z}\,p+1\right)b^2+p^2\left(p\sqrt{z}-1\right)\right)\cos\left(b\sqrt{z}\right)+b\left(\sqrt{z}\,b^2-2p+p^2\sqrt{z}\right)\sin\left(b\sqrt{z}\right)\right)+ i^{\nu}\,2^{1-\nu}\,e^{p\sqrt{z}}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\left(\left(\left(p^2\left(p\sqrt{z}-1\right)-(-i\,b+2ck-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\cosh\left((-i\,b+2ck-c\nu)\sqrt{z}\right)- (-i\,b+2ck-c\nu)\left(\sqrt{z}\,p^2-2p-(-i\,b+2ck-c\nu)^2\sqrt{z}\right)\sinh\left((-i\,b+2ck-c\nu)\sqrt{z}\right)\right)\Big/ \left(p^2-(-i\,b+2ck-c\nu)^2\right)^2+\left(\left(p^2\left(p\sqrt{z}-1\right)-(i\,b+2ck-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\cosh\left((i\,b+2ck-c\nu)\sqrt{z}\right)-(i\,b+2ck-c\nu)\left(\sqrt{z}\,p^2-2p-(i\,b+2ck-c\nu)^2\sqrt{z}\right)\sinh\left((i\,b+2ck-c\nu)\sqrt{z}\right)\right)\Big/\left(p^2-(i\,b+2ck-c\nu)^2\right)^2\right)\cos\left(\frac{\pi\nu}{2}\right)+ i\left(\left(\left(p^2\left(p\sqrt{z}-1\right)-(-i\,b+2ck-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\sinh\left((-i\,b+2ck-c\nu)\sqrt{z}\right)- (-i\,b+2ck-c\nu)\left(\sqrt{z}\,p^2-2p-(-i\,b+2ck-c\nu)^2\sqrt{z}\right)\cosh\left((-i\,b+2ck-c\nu)\sqrt{z}\right)\right)\Big/ \left(p^2-(-i\,b+2ck-c\nu)^2\right)^2+\left(\left(p^2\left(p\sqrt{z}-1\right)-(i\,b+2ck-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\sinh\left((i\,b+2ck-c\nu)\sqrt{z}\right)-(i\,b+2ck-c\nu)\left(\sqrt{z}\,p^2-2p-(i\,b+2ck-c\nu)^2\sqrt{z}\right)\cosh\left((i\,b+2ck-c\nu)\sqrt{z}\right)\right)\Big/\left(p^2-(i\,b+2ck-c\nu)^2\right)^2\right)\sin\left(\frac{\pi\nu}{2}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{b z^r+e}\cos\left(a z^r+q\right)\sinh^{\nu}\left(c z^r+g\right)$

01.19.21.3209.01

$$\int e^{b z^r+e}\cos(a z^r+q)\sinh^{\nu}(c z^r+g)\,dz = -\frac{i^{\nu}\,2^{-\nu-1}\,z}{r}\left(\binom{\nu}{\frac{\nu}{2}}\left(e^{e+i q}\,\Gamma\left(\frac{1}{r},(-b-i\,a)z^r\right)((-b-i\,a)z^r)^{-1/r}+e^{e-i q}\,((i\,a-b)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(i\,a-b)z^r\right)\right)(1-\nu \bmod 2)+ \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{e+2gk+i q-g\nu+\frac{i\pi\nu}{2}}\,\Gamma\left(\frac{1}{r},(-b-i\,a-2ck+c\nu)z^r\right)((-b-i\,a-2ck+c\nu)z^r)^{-1/r}+ e^{e+2gk-i q-g\nu+\frac{i\pi\nu}{2}}\,((-b+i\,a-2ck+c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-b+i\,a-2ck+c\nu)z^r\right)+ e^{e-2gk+i q+g\nu-\frac{i\pi\nu}{2}}\,((-b-i\,a+2ck-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-b-i\,a+2ck-c\nu)z^r\right)+ e^{e-2gk-i q+g\nu-\frac{i\pi\nu}{2}}\,((-b+i\,a+2ck-c\nu)z^r)^{-1/r}\,\Gamma\left(\frac{1}{r},(-b+i\,a+2ck-c\nu)z^r\right)\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

01.19.21.3210.01

$$\int e^{b z^2+e} \cos\left(a z^2+q\right) \sinh^\nu\left(c z^2+g\right) dz = i^{-\nu} 2^{-\nu-2} e^{e+i q} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} \left(\frac{e^{-2 i q} \operatorname{erfi}\left(\sqrt{b-i a}\, z\right)}{\sqrt{b-i a}}+\frac{\operatorname{erfi}\left(\sqrt{b+i a}\, z\right)}{\sqrt{b+i a}}\right)(1-\nu \bmod 2)+i^{-\nu} 2^{-\nu-2} \sqrt{\pi} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s \binom{\nu}{s}\left(e^{e+i q-g(\nu-2 s)-\frac{i \pi \nu}{2}}\left(\frac{e^{2\left(-i q+\frac{i \pi \nu}{2}+g(\nu-2 s)\right)} \operatorname{erfi}\left(\sqrt{b-i a+c(\nu-2 s)}\, z\right)}{\sqrt{b-i a+c(\nu-2 s)}}+\frac{\operatorname{erfi}\left(\sqrt{b+i a-c(\nu-2 s)}\, z\right)}{\sqrt{b+i a-c(\nu-2 s)}}\right)+e^{e-i q-g(\nu-2 s)-\frac{i \pi \nu}{2}}\left(\frac{e^{2\left(i q+\frac{i \pi \nu}{2}+g(\nu-2 s)\right)} \operatorname{erfi}\left(\sqrt{b+i a+c(\nu-2 s)}\, z\right)}{\sqrt{b+i a+c(\nu-2 s)}}+\frac{\operatorname{erfi}\left(\sqrt{b-i a-c(\nu-2 s)}\, z\right)}{\sqrt{b-i a-c(\nu-2 s)}}\right)\right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3211.01

$$\int e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, a+q\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = \left(\frac{e^{\sqrt{z}\,(b+i a)+e+i q}\left(\sqrt{z}\, b+i a \sqrt{z}-1\right)}{(-b-i a)^2}+\frac{e^{\sqrt{z}\,(b-i a)+e-i q}\left(\sqrt{z}\, b-i a \sqrt{z}-1\right)}{(b-i a)^2}\right)\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)(2 i)^{-\nu}+(2 i)^{-\nu} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\left(\left(e^{e-i q+\frac{i \pi \nu}{2}+g(\nu-2 s)+(b-i a+c(\nu-2 s)) \sqrt{z}}\left(\sqrt{z}\, b+(-i a+c(\nu-2 s)) \sqrt{z}-1\right)\right) \Big/ (b-i a+c(\nu-2 s))^2+\frac{e^{e+i q+\frac{i \pi \nu}{2}+g(\nu-2 s)+(b+i a+c(\nu-2 s)) \sqrt{z}}\left(\sqrt{z}\, b+(i a+c(\nu-2 s)) \sqrt{z}-1\right)}{(b+i a+c(\nu-2 s))^2}+\left(e^{e+i q-g(\nu-2 s)+(b+i a-c(\nu-2 s)) \sqrt{z}-\frac{i \pi \nu}{2}}\left(\sqrt{z}\, b-(-i a+c(\nu-2 s)) \sqrt{z}-1\right)\right) \Big/ (-b-i a+c(\nu-2 s))^2+\left(e^{e-i q-g(\nu-2 s)+(b-i a-c(\nu-2 s)) \sqrt{z}-\frac{i \pi \nu}{2}}\left(\sqrt{z}\, b-(i a+c(\nu-2 s)) \sqrt{z}-1\right)\right) \Big/ (-b+i a+c(\nu-2 s))^2\right)\binom{\nu}{s} /;\ \nu \in \mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos\left(a z^r+p z+q\right) \sinh^\nu\left(c z^r+f z+g\right)$

01.19.21.3212.01

$$\int e^{b z^2+d z+e} \cos\left(a z^2 + p z + q\right) \sinh^{v}\left(c z^2 + f z + g\right) dz ==$$

$$\sqrt[4]{-1}\, i^{v}\, 2^{-v-2}\, e^{e-i q} \sqrt{\pi} \binom{v}{\frac{v}{2}} \left(\frac{e^{-\frac{i (d-i p)^2}{4 (a+i b)}} \operatorname{erfi}\left(\frac{\sqrt[4]{-1}\, (d-i (p+2 a z+2 i b z))}{2 \sqrt{a+i b}}\right)}{\sqrt{a+i b}} + \frac{e^{\frac{1}{4} i \left(\frac{(d+i p)^2}{a-i b}+8 q\right)} i \operatorname{erfi}\left(\frac{(-1)^{3/4} (d+i p+2 b z+2 i a z)}{2 \sqrt{a-i b}}\right)}{\sqrt{a-i b}} \right)$$

$$(1 - v \bmod 2) + 2^{-v-2} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\left(i (-1)^{v} e^{-\frac{(d+2 f k+i p-f v)^2}{4 (b+i a+2 c k-c v)}+e+2 g k+i q-g v} \right.\right.$$

$$\left.\left. \operatorname{erfi}\left(\frac{i d + 2 i f k - p - i f v - 2 a z + 2 i b z + 4 i c k z - 2 i c v z}{2 \sqrt{-b - i a - 2 c k + c v}}\right)\right) \Big/ \left(\sqrt{-b - i a - 2 c k + c v}\right) + \right.$$

$$\left(i (-1)^{v} e^{-\frac{(d+2 f k-i p-f v)^2}{4 (b-i a+2 c k-c v)}+e+2 g k-i q-g v} \operatorname{erfi}\left(\frac{i d + 2 i f k + p - i f v + 2 a z + 2 i b z + 4 i c k z - 2 i c v z}{2 \sqrt{-b + i a - 2 c k + c v}}\right)\right) \Big/$$

$$\left(\sqrt{-b + i a + c (v - 2 k)}\right) + \frac{e^{\frac{(d-i p+f (v-2 k))^2}{4 i a-4 (b+c (v-2 k))}+e-i q+g (v-2 k)} \operatorname{erfi}\left(\frac{d-2 f k-i p+f v-2 i a z+2 b z-4 c k z+2 c v z}{2 \sqrt{b-i a-2 c k+c v}}\right)}{\sqrt{b - i a - 2 c k + c v}} +$$

$$\left. \frac{e^{\frac{(d+i p+f (v-2 k))^2}{-4 i a-4 (b+c (v-2 k))}+e-2 g k+i q+g v} \operatorname{erfi}\left(\frac{d-2 f k+i p+f v+2 b z+2 i a z-4 c k z+2 c v z}{2 \sqrt{b+i a-2 c k+c v}}\right)}{\sqrt{b + i a - 2 c k + c v}} \right) /;\ v \in \mathbb{N}^{+}$$

01.19.21.3213.01

$$\int e^{\sqrt{z}\, b+d z+e} \cos\left(\sqrt{z}\, a + p z + q\right) \sinh^{v}\left(\sqrt{z}\, c + f z + g\right) dz ==$$

$$\frac{1}{4} \left(\frac{i}{2}\right)^{v} \binom{v}{\frac{v}{2}} \left(\frac{e^{\frac{a^2-2 i b a-b^2+4 (d+i p) (e+i q)}{4 (d+i p)}} \left((a - i b) \sqrt{\pi}\right) \operatorname{erf}\left(\frac{a-i b+2 (-i d+p) \sqrt{z}}{2 \sqrt{d+i p}}\right)}{(d + i p)^{3/2}} + \right.$$

$$\left. \frac{e^{\frac{a^2+2 i b a-b^2+4 (d-i p) (e-i q)}{4 (d-i p)}} \left((a + i b) \sqrt{\pi}\right) \operatorname{erf}\left(\frac{a+i b+2 (i d+p) \sqrt{z}}{2 \sqrt{d-i p}}\right)}{(d - i p)^{3/2}} + \frac{2 e^{\sqrt{z}\, (b+i a)+e+i q+(d+i p) z}}{d + i p} + \frac{2 e^{\sqrt{z}\, (b-i a)+e-i q+(d-i p) z}}{d - i p} \right)$$

$$(1 - v \bmod 2) + 2^{-v-2} i^{v} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\sqrt{\pi} \left(\frac{1}{(d - 2 k f + i p + f v)^{3/2}} \right.\right.$$

$$e^{\frac{a^2-2 i (b+c (v-2 k)) a-b^2-4 c^2 k^2+16 f g k^2-c^2 v^2+4 f g v^2-2 i f \pi v^2+4 d e+4 b c k-8 e f k-8 d g k+4 i e p-8 i g k p+4 i d q-8 i f k q-4 p q-2 b c v+4 e f v+4 d g v+4 c^2 k v-16 f g k v+}{4 (d+i p+f (v-2 k))}}$$

$$\operatorname{erfi}\left(\frac{b+i\,a-2\,c\,k+c\,v+2\,d\sqrt{z}-4\,f\,k\sqrt{z}+2\,i\,p\sqrt{z}+2\,f\,v\sqrt{z}}{2\sqrt{d+i\,p+f\,(v-2\,k)}}\right)$$

$$(-b-i\,a+2\,c\,k-c\,v)-\frac{1}{(d+2\,f\,k+i\,p-f\,v)^{3/2}}$$

$$e^{\frac{a^2-2\,i\,(b+2\,c\,k-c\,v)\,a-b^2-4\,c^2\,k^2+16\,f\,g\,k^2-c^2\,v^2+4\,f\,g\,v^2-2\,i\,f\,\pi\,v^2+4\,d\,e+8\,e\,f\,k+8\,d\,g\,k+4\,i\,e\,p+8\,i\,g\,k\,p+4\,i\,d\,q+8\,i\,f\,k\,q-4\,p\,q-4\,e\,f\,v-4\,d\,g\,v+4\,c^2\,k\,v-16\,f\,g\,k\,v-4\,i\,g\,p\,v-4\,i\,f\,q}{4\,(d+2\,f\,k+i\,p-f\,v)}}$$

$$(b+i\,a+2\,c\,k-c\,v)\operatorname{erfi}\Bigg($$

$$\left.\frac{b+i\,a+2\,c\,k-c\,v+2\,d\sqrt{z}+4\,f\,k\sqrt{z}+2\,i\,p\sqrt{z}-2\,f\,v\sqrt{z}}{2\sqrt{d+2\,f\,k+i\,p-f\,v}}\right)+\frac{1}{(d+2\,f\,k-i\,p-f\,v)^{3/2}}$$

$$e^{\frac{a^2+2\,i\,(b+2\,c\,k-c\,v)\,a-b^2-4\,c^2\,k^2+16\,f\,g\,k^2-c^2\,v^2+4\,f\,g\,v^2-2\,i\,f\,\pi\,v^2+4\,d\,e-4\,b\,c\,k+8\,e\,f\,k+8\,d\,g\,k-4\,i\,e\,p-8\,i\,g\,k\,p-4\,i\,d\,q-8\,i\,f\,k\,q-4\,p\,q+2\,b\,c\,v-4\,e\,f\,v-4\,d\,g\,v+4\,c^2\,k\,v-16\,f\,g\,k\,v+}{4\,(d+2\,f\,k-i\,p-f\,v)}}$$

$$(b-i\,a+2\,c\,k-c\,v)\operatorname{erfi}\Bigg($$

$$\left.\frac{-b+i\,a-2\,c\,k+c\,v-2\,d\sqrt{z}-4\,f\,k\sqrt{z}+2\,i\,p\sqrt{z}+2\,f\,v\sqrt{z}}{2\sqrt{d+2\,f\,k-i\,p-f\,v}}\right)+\frac{1}{(d-i\,p+f\,(v-2\,k))^{3/2}}$$

$$e^{-\frac{-a^2-2\,i\,(b+c\,(v-2\,k))\,a+b^2+4\,c^2\,k^2-16\,f\,g\,k^2+c^2\,v^2-4\,f\,g\,v^2+2\,f\,i\,\pi\,v^2-4\,d\,e+8\,e\,f\,k+8\,d\,g\,k+4\,i\,e\,p-8\,i\,g\,k\,p+4\,i\,d\,q-8\,i\,f\,k\,q+4\,p\,q-4\,e\,f\,v-4\,d\,g\,v-4\,c^2\,k\,v+16\,f\,g\,k\,v+4\,i\,g\,p\,v+4\,i}{4\,(d-i\,p+f\,(v-2\,k))}}$$

$$(b-i\,a+c\,(v-2\,k))\operatorname{erfi}\Bigg($$

$$\left.\left.\frac{-b+i\,a+2\,c\,k-c\,v-2\,d\sqrt{z}+4\,f\,k\sqrt{z}+2\,i\,p\sqrt{z}-2\,f\,v\sqrt{z}}{2\sqrt{d-i\,p+f\,(v-2\,k)}}\right)\right)+$$

$$\frac{2\,e^{\sqrt{z}\,(b+i\,a-2\,c\,k+c\,v)+\frac{1}{2}(2\,e-4\,g\,k+2\,i\,q+2\,g\,v-i\,\pi\,v)+(d-2\,f\,k+i\,p+f\,v)\,z}}{d-2\,f\,k+i\,p+f\,v}+$$

$$\frac{2\,e^{\sqrt{z}\,(b-i\,a-2\,c\,k+c\,v)+\frac{1}{2}(2\,e-4\,g\,k-2\,i\,q+2\,g\,v-i\,\pi\,v)+(d-2\,f\,k-i\,p+f\,v)\,z}}{d-2\,f\,k-i\,p+f\,v}+$$

$$\frac{2\,e^{\frac{1}{2}(2\,e+4\,g\,k+2\,i\,q-2\,g\,v+i\,\pi\,v)+(d+2\,f\,k+i\,p-f\,v)\,z+(b+i\,a+2\,c\,k-c\,v)\sqrt{z}}}{d+2\,f\,k+i\,p-f\,v}+$$

$$\left.\frac{2\,e^{\frac{1}{2}(2\,e+4\,g\,k-2\,i\,q-2\,g\,v+i\,\pi\,v)+(d+2\,f\,k-i\,p-f\,v)\,z+(b-i\,a+2\,c\,k-c\,v)\sqrt{z}}}{d+2\,f\,k-i\,p-f\,v}\right)\,/;\,v\in\mathbb{N}^+$$

Involving cos and rational functions of exp

Involving $\cos(e\,z)\sinh^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.3214.01

$$\int \frac{\cos(e\,z)\sinh^{\nu}(c\,z)}{\left(a+b\,e^{d\,z}\right)^{n}}\,dz = \frac{i^{\nu+1}\,2^{-\nu-1}\,a^{-n}}{e}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i\,e\,z}\,{}_2F_1\!\left(-\frac{i\,e}{d},n;\frac{d-i\,e}{d};-\frac{b\,e^{d\,z}}{a}\right)-e^{i\,e\,z}\,{}_2F_1\!\left(\frac{i\,e}{d},n;\frac{d+i\,e}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)(1-\nu \bmod 2)+$$
$$i^{\nu}\,2^{-\nu-1}\,a^{-n}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(\Bigg(\frac{1}{i\,e+2\,c\,k-c\,\nu}\left(e^{(i\,e+2\,c\,k-c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e+2\,c\,k-c\,\nu}{d},n;\frac{d+i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)-\right.$$
$$\left.e^{(-i\,e-2\,c\,k+c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e-2\,c\,k+c\,\nu}{d},n;\frac{d-i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)+$$
$$\frac{1}{-i\,e+2\,c\,k-c\,\nu}\left(e^{(-i\,e+2\,c\,k-c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e+2\,c\,k-c\,\nu}{d},n;\frac{d-i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)-\right.$$
$$\left.e^{(i\,e-2\,c\,k+c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e-2\,c\,k+c\,\nu}{d},n;\frac{d+i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)\Bigg)\cos\left(\frac{\pi\,\nu}{2}\right)+$$
$$i\Bigg(\frac{1}{i\,e+2\,c\,k-c\,\nu}\left(e^{(-i\,e-2\,c\,k+c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e-2\,c\,k+c\,\nu}{d},n;\frac{d-i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+\right.$$
$$\left.e^{(i\,e+2\,c\,k-c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e+2\,c\,k-c\,\nu}{d},n;\frac{d+i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)+$$
$$\frac{1}{-i\,e+2\,c\,k-c\,\nu}\left(e^{(i\,e-2\,c\,k+c\,\nu)\,z}\,{}_2F_1\!\left(\frac{i\,e-2\,c\,k+c\,\nu}{d},n;\frac{d+i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)+\right.$$
$$\left.e^{(-i\,e+2\,c\,k-c\,\nu)\,z}\,{}_2F_1\!\left(\frac{-i\,e+2\,c\,k-c\,\nu}{d},n;\frac{d-i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d\,z}}{a}\right)\right)\Bigg)\sin\left(\frac{\pi\,\nu}{2}\right)\Bigg)\;/;\;n\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

Involving $e^{p\,z}\cos(e\,z)\sinh^{\nu}(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.3215.01

$$\int \frac{e^{p z} \cos(e z) \sinh^{\nu}(c z)}{\left(a + b\, e^{d z}\right)^{n}}\, dz = 2^{-\nu-1}\, i^{\nu}\, a^{-n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^{k} \binom{\nu}{k} \Bigg(\Bigg(\Bigg(\Bigg(e^{(i e+2 c k+p-c \nu) z} (i e+2 c k-p-c \nu)\, {}_2F_1\left(\frac{i e+2 c k+p-c \nu}{d}, n; \frac{d+i e+2 c k+p-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-i e-2 c k+p+c \nu) z} (i e+2 c k+p-c \nu)\, {}_2F_1\left(\frac{-i e-2 c k+p+c \nu}{d}, n; \frac{d-i e-2 c k+p+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Big/ ((i e+2 c k-p-c \nu)(i e+2 c k+p-c \nu)) + \Bigg(e^{(-i e+2 c k+p-c \nu) z} (-i e+2 c k-p-c \nu)\, {}_2F_1\left(\frac{-i e+2 c k+p-c \nu}{d}, n; \frac{d-i e+2 c k+p-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(i e-2 c k+p+c \nu) z} (-i e+2 c k+p-c \nu)\, {}_2F_1\left(\frac{i e-2 c k+p+c \nu}{d}, n; \frac{d+i e-2 c k+p+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Big/ ((-i e+2 c k-p-c \nu)(-i e+2 c k+p-c \nu))\Bigg) \cos\left(\frac{\pi \nu}{2}\right) + i \Bigg(\Bigg(e^{(-i e-2 c k+p+c \nu) z} (i e+2 c k+p-c \nu)\, {}_2F_1\left(\frac{-i e-2 c k+p+c \nu}{d}, n; \frac{d-i e-2 c k+p+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(i e+2 c k+p-c \nu) z} (i e+2 c k-p-c \nu)\, {}_2F_1\left(\frac{i e+2 c k+p-c \nu}{d}, n; \frac{d+i e+2 c k+p-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Big/ ((i e+2 c k-p-c \nu)(i e+2 c k+p-c \nu)) + \Bigg(e^{(i e-2 c k+p+c \nu) z} (-i e+2 c k+p-c \nu)\, {}_2F_1\left(\frac{i e-2 c k+p+c \nu}{d}, n; \frac{d+i e-2 c k+p+c \nu}{d}; -\frac{b\, e^{d z}}{a}\right) + e^{(-i e+2 c k+p-c \nu) z} (-i e+2 c k-p-c \nu)\, {}_2F_1\left(\frac{-i e+2 c k+p-c \nu}{d}, n; \frac{d-i e+2 c k+p-c \nu}{d}; -\frac{b\, e^{d z}}{a}\right)\Bigg) \Big/ ((-i e+2 c k-p-c \nu)(-i e+2 c k+p-c \nu))\Bigg) \sin\left(\frac{\pi \nu}{2}\right)\Bigg) + \frac{i^{\nu}\, 2^{-\nu-1}\, a^{-n}}{(i e-p)(i e+p)} \binom{\nu}{\frac{\nu}{2}} \left(e^{(i e+p) z} (i e-p)\, {}_2F_1\left(\frac{i e+p}{d}, n; \frac{d+i e+p}{d}; -\frac{b\, e^{d z}}{a}\right) - e^{(-i e+p) z} (i e+p)\, {}_2F_1\left(\frac{-i e+p}{d}, n; \frac{d-i e+p}{d}; -\frac{b\, e^{d z}}{a}\right)\right) (1 - \nu \bmod 2) \;/;\; n \in \mathbb{N}^{+} \land \nu \in \mathbb{N}^{+}$$

Involving cos and algebraic functions of exp

Involving $\left(a + b\, e^{d z}\right)^{\beta} \cos(e z) \sinh^{\nu}(c z)$

01.19.21.3216.01

$$\int \left(a+b\,e^{d z}\right)^{\beta} \cos(e\,z) \sinh^{\nu}(c\,z)\,dz = \frac{1}{e}\left(i^{\nu+1}\,2^{-\nu-1}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{-i e z}\,{}_2F_1\left(-\frac{i\,e}{d},-\beta;\frac{d-i\,e}{d};-\frac{b\,e^{d z}}{a}\right)-e^{i e z}\,{}_2F_1\left(\frac{i\,e}{d},-\beta;\frac{d+i\,e}{d};-\frac{b\,e^{d z}}{a}\right)\right)(1-\nu \bmod 2)\right)+i^{\nu}\,2^{-\nu-1}\left(a+b\,e^{d z}\right)^{\beta}\left(\frac{e^{d z}\,b}{a}+1\right)^{-\beta}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\left(\frac{1}{i\,e+2\,c\,k-c\,\nu}\left(e^{(i e+2 c k-c \nu) z}\,{}_2F_1\left(\frac{i\,e+2\,c\,k-c\,\nu}{d},-\beta;\frac{d+i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)-e^{(-i e-2 c k+c \nu) z}\,{}_2F_1\left(\frac{-i\,e-2\,c\,k+c\,\nu}{d},-\beta;\frac{d-i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)\right)+\frac{1}{-i\,e+2\,c\,k-c\,\nu}\left(e^{(-i e+2 c k-c \nu) z}\,{}_2F_1\left(\frac{-i\,e+2\,c\,k-c\,\nu}{d},-\beta;\frac{d-i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)-e^{(i e-2 c k+c \nu) z}\,{}_2F_1\left(\frac{i\,e-2\,c\,k+c\,\nu}{d},-\beta;\frac{d+i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)\cos\left(\frac{\pi\,\nu}{2}\right)+i\left(\frac{1}{i\,e+2\,c\,k-c\,\nu}\left(e^{(-i e-2 c k+c \nu) z}\,{}_2F_1\left(\frac{-i\,e-2\,c\,k+c\,\nu}{d},-\beta;\frac{d-i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)+e^{(i e+2 c k-c \nu) z}\,{}_2F_1\left(\frac{i\,e+2\,c\,k-c\,\nu}{d},-\beta;\frac{d+i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)\right)+\frac{1}{-i\,e+2\,c\,k-c\,\nu}\left(e^{(i e-2 c k+c \nu) z}\,{}_2F_1\left(\frac{i\,e-2\,c\,k+c\,\nu}{d},-\beta;\frac{d+i\,e-2\,c\,k+c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)+e^{(-i e+2 c k-c \nu) z}\,{}_2F_1\left(\frac{-i\,e+2\,c\,k-c\,\nu}{d},-\beta;\frac{d-i\,e+2\,c\,k-c\,\nu}{d};-\frac{b\,e^{d z}}{a}\right)\right)\right)\sin\left(\frac{\pi\,\nu}{2}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving $e^{p z}\left(a+b\,e^{d z}\right)^{\beta}\cos(e\,z)\sinh^{\nu}(c\,z)$

01.19.21.3217.01

$$\int e^{p z}\left(a+b e^{d z}\right)^{\beta}\cos(e z)\sinh^{\nu}(c z)\,dz = \frac{1}{(i e-p)(i e+p)}\left(i^{\nu} 2^{-\nu-1}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}\binom{\nu}{\frac{\nu}{2}}\left(e^{(i e+p) z}(i e-p)\,{}_2F_1\left(\frac{i e+p}{d},-\beta;\frac{d+i e+p}{d};-\frac{b e^{d z}}{a}\right)-\right.\right.$$
$$\left.\left. e^{(-i e+p) z}(i e+p)\,{}_2F_1\left(\frac{-i e+p}{d},-\beta;\frac{d-i e+p}{d};-\frac{b e^{d z}}{a}\right)\right)(1-\nu \bmod 2)\right)+i^{\nu} 2^{-\nu-1}\left(a+b e^{d z}\right)^{\beta}\left(\frac{e^{d z} b}{a}+1\right)^{-\beta}$$
$$\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\left(\left(\left(e^{(i e+2 c k+p-c \nu) z}(i e+2 c k-p-c \nu)\,{}_2F_1\left(\frac{i e+2 c k+p-c \nu}{d},-\beta;\frac{d+i e+2 c k+p-c \nu}{d};-\frac{b e^{d z}}{a}\right)-\right.\right.\right.\right.$$
$$e^{(-i e-2 c k+p+c \nu) z}(i e+2 c k+p-c \nu)\,{}_2F_1\left(\frac{-i e-2 c k+p+c \nu}{d},-\beta;\right.$$
$$\left.\left.\frac{d-i e-2 c k+p+c \nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/((i e+2 c k-p-c \nu)(i e+2 c k+p-c \nu))+$$
$$\left(e^{(-i e+2 c k+p-c \nu) z}(-i e+2 c k-p-c \nu)\,{}_2F_1\left(\frac{-i e+2 c k+p-c \nu}{d},-\beta;\frac{d-i e+2 c k+p-c \nu}{d};-\frac{b e^{d z}}{a}\right)-\right.$$
$$e^{(i e-2 c k+p+c \nu) z}(-i e+2 c k+p-c \nu)\,{}_2F_1\left(\frac{i e-2 c k+p+c \nu}{d},-\beta;\frac{d+i e-2 c k+p+c \nu}{d};\right.$$
$$\left.\left.\left.-\frac{b e^{d z}}{a}\right)\right)\Big/((-i e+2 c k-p-c \nu)(-i e+2 c k+p-c \nu))\right)\cos\left(\frac{\pi \nu}{2}\right)+$$
$$i\left(\left(e^{(-i e-2 c k+p+c \nu) z}(i e+2 c k+p-c \nu)\,{}_2F_1\left(\frac{-i e-2 c k+p+c \nu}{d},-\beta;\frac{d-i e-2 c k+p+c \nu}{d};-\frac{b e^{d z}}{a}\right)+\right.\right.$$
$$e^{(i e+2 c k+p-c \nu) z}(i e+2 c k-p-c \nu)\,{}_2F_1\left(\frac{i e+2 c k+p-c \nu}{d},-\beta;\right.$$
$$\left.\left.\frac{d+i e+2 c k+p-c \nu}{d};-\frac{b e^{d z}}{a}\right)\right)\Big/((i e+2 c k-p-c \nu)(i e+2 c k+p-c \nu))+$$
$$\left(e^{(i e-2 c k+p+c \nu) z}(-i e+2 c k+p-c \nu)\,{}_2F_1\left(\frac{i e-2 c k+p+c \nu}{d},-\beta;\frac{d+i e-2 c k+p+c \nu}{d};-\frac{b e^{d z}}{a}\right)+\right.$$
$$e^{(-i e+2 c k+p-c \nu) z}(-i e+2 c k-p-c \nu)\,{}_2F_1\left(\frac{-i e+2 c k+p-c \nu}{d},-\beta;\frac{d-i e+2 c k+p-c \nu}{d};\right.$$
$$\left.\left.\left.\left.-\frac{b e^{d z}}{a}\right)\right)\Big/((-i e+2 c k-p-c \nu)(-i e+2 c k+p-c \nu))\right)\sin\left(\frac{\pi \nu}{2}\right)\right)\ /;\ \nu\in\mathbb{N}^+$$

Involving powers of cos and exp

Involving $e^{p z}\cos^{\mu}(c z)\sinh^{\nu}(a z)$

01.19.21.3218.01

$$\int e^{p z} \cos^{\mu}(c z) \sinh^{\nu}(a z) \, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(c z) \left(-\frac{e^{p z} \left(1 + e^{2 i c z}\right)^{-\mu} (\nu \bmod 2 - 1)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p - i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c} - \mu + 2\right); -e^{2 i c z}\right) + i^{-\nu} \left(1 + e^{-2 i c z}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-a z \nu + i \pi \nu + 2 a k z + p z}}{2 a k + p - a \nu + i c \mu} {}_2F_1\left(\frac{i (2 a k + p - a \nu + i c \mu)}{2 c}, -\mu; \frac{i (2 a k + p - a \nu + c i (\mu - 2))}{2 c}; -e^{-2 i c z}\right) + \frac{e^{(p + a (\nu - 2 k)) z}}{p + a (\nu - 2 k) + i c \mu} {}_2F_1\left(\frac{i (p + a (\nu - 2 k) + i c \mu)}{2 c}, -\mu; \frac{i (-2 a k + p + a \nu + c i (\mu - 2))}{2 c}; -e^{-2 i c z}\right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3219.01

$$\int e^{p z} \cos^{m}(c z) \sinh^{\nu}(a z) \, dz = 2^{-m} \left(1 - e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{e^{(-i c m + p + 2 i c s) z}}{-i c m + p + 2 i c s - a \nu} {}_2F_1\left(\frac{-i c m + p + 2 i c s - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a - i c m + p + 2 i c s}{2 a}; e^{2 a z}\right) + \frac{e^{(p + c i (m - 2 s)) z}}{i c m + p - 2 i c s - a \nu} {}_2F_1\left(\frac{i c m + p - 2 i c s - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c m + p - 2 i c s}{a} - \nu + 2\right); e^{2 a z}\right) \right) - \frac{e^{p z} (m \bmod 2 - 1)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2 a z}\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3220.01

$$\int e^{b z} \cos^{m}(c z) \sinh^{\nu}(a z) \, dz = \frac{i^{\nu} 2^{-m-\nu} e^{b z} (1 - m \bmod 2) (1 - \nu \bmod 2)}{b} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - i^{\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{-(-b - i c (m - 2 s)) z}}{-b - i c (m - 2 s)} + \frac{e^{-(-b + i c m - 2 i c s) z}}{-b + i c m - 2 i c s} \right) \binom{m}{s} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{-(-b - a (\nu - 2 k)) z}}{-b - a (\nu - 2 k)} + \frac{e^{i \pi \nu - (-b - 2 a k + a \nu) z}}{-b - 2 a k + a \nu} \right) \binom{\nu}{k} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{i \pi \nu - (-b - 2 a k + i c m - 2 i c s + a \nu) z}}{-b - 2 a k + i c m - 2 i c s + a \nu} + \frac{e^{-(-b + 2 a k - i c m + 2 i c s - a \nu) z}}{-b + 2 a k - i c m + 2 i c s - a \nu} + \frac{e^{-(-b + 2 a k + i c m - 2 i c s - a \nu) z}}{-b + 2 a k + i c m - 2 i c s - a \nu} + \frac{e^{i \pi \nu - (-b - 2 a k - i c m + 2 i c s + a \nu) z}}{-b - 2 a k - i c m + 2 i c s + a \nu} \right) \binom{m}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^{\mu}(c z + d) \sinh^{\nu}(a z)$

01.19.21.3221.01

$$\int e^{p z} \cos^{\mu}(d+c z) \sinh^{\nu}(a z)\, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(d+c z) \left(-\frac{e^{p z} \left(1+e^{2 (i d+i c z)}\right)^{-\mu} (\nu \bmod 2-1)}{p-i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p-i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c}-\mu+2\right); -e^{2 (i d+i c z)}\right) + i^{-\nu} \left(1+e^{-2 (i d+i c z)}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{2 a z k+i \pi \nu+p z-a \nu z}}{2 a k+p-a \nu+i c \mu} {}_2F_1\left(\frac{i (2 a k+p-a \nu+i c \mu)}{2 c}, -\mu; \frac{i (2 a k+p-a \nu+c i (\mu-2))}{2 c}; -e^{-2 (i d+i c z)}\right) + \frac{e^{(p+a (\nu-2 k)) z}}{p+a (\nu-2 k)+i c \mu} {}_2F_1\left(\frac{i (p+a (\nu-2 k)+i c \mu)}{2 c}, -\mu; \frac{i (-2 a k+p+a \nu+c i (\mu-2))}{2 c}; -e^{-2 (i d+i c z)}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3222.01

$$\int e^{p z} \cos^{m}(d+c z) \sinh^{\nu}(a z)\, dz = 2^{-m} \left(1-e^{2 a z}\right)^{-\nu} \sinh^{\nu}(a z) \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{2 i d s-i d m} \binom{m}{s} \left(\frac{e^{(-i c m+p+2 i c s) z}}{-i c m+p+2 i c s-a \nu} {}_2F_1\left(\frac{-i c m+p+2 i c s-a \nu}{2 a}, -\nu; \frac{-\nu a+2 a-i c m+p+2 i c s}{2 a}; e^{2 a z}\right) + \frac{e^{2 d i (m-2 s)+(p+c i (m-2 s)) z}}{i c m+p-2 i c s-a \nu} {}_2F_1\left(\frac{i c m+p-2 i c s-a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c m+p-2 i c s}{a}-\nu+2\right); e^{2 a z}\right)\right) - \frac{e^{p z} (m \bmod 2-1)}{p-a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p-a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a}-\nu+2\right); e^{2 a z}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3223.01

$$\int e^{p z} \cos^{m}(d+c z) \sinh^{\nu}(a z)\, dz = \frac{i^{\nu} 2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2) (1-\nu \bmod 2)}{p} - i^{\nu} 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d (m-2 s)} \left(\frac{e^{2 i d (m-2 s)-(-p-i c (m-2 s)) z}}{-p-i c (m-2 s)} + \frac{e^{(-i c m+p+2 i c s) z}}{i c m-p-2 i c s}\right) \binom{m}{s} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(p+a (\nu-2 k)) z}}{-p-a (\nu-2 k)} + \frac{e^{i \pi \nu-(-2 a k-p+a \nu) z}}{-2 a k-p+a \nu}\right) \binom{\nu}{k} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d m-2 i d s} \left(\frac{e^{4 i d s+i \pi \nu-(-2 a k+i c m-p-2 i c s+a \nu) z}}{-2 a k+i c m-p-2 i c s+a \nu} + \frac{e^{2 i d m-(2 a k-i c m-p+2 i c s-a \nu) z}}{2 a k-i c m-p+2 i c s-a \nu} + \frac{e^{4 i d s-(2 a k+i c m-p-2 i c s-a \nu) z}}{2 a k+i c m-p-2 i c s-a \nu} + \frac{e^{2 i d m+i \pi \nu-(-2 a k-i c m-p+2 i c s+a \nu) z}}{-2 a k-i c m-p+2 i c s+a \nu}\right) \binom{m}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^{\mu}(c z) \sinh^{\nu}(a z+b)$

01.19.21.3224.01

$$\int e^{p z} \cos^{\mu}(c z) \sinh^{\nu}(b+a z) \, dz = \left(\frac{i}{2}\right)^{\nu} \cos^{\mu}(c z) \left(-\frac{e^{p z} \left(1+e^{2 i c z}\right)^{-\mu} (\nu \bmod 2-1)}{p-i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i (p-i c \mu)}{2 c}, -\mu; \frac{1}{2}\left(-\frac{i p}{c}-\mu+2\right); -e^{2 i c z}\right) + i^{-\nu} \left(1+e^{-2 i c z}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b(\nu-2k)} \binom{\nu}{k} \left(\frac{e^{4 b k+2 a z k-2 b \nu+i \pi \nu+p z-a \nu z}}{2 a k+p-a \nu+i c \mu} {}_2F_1\left(\frac{i (2 a k+p-a \nu+i c \mu)}{2 c}, -\mu; \frac{i (2 a k+p-a \nu+c i (\mu-2))}{2 c}; -e^{-2 i c z}\right) + \frac{e^{(p+a(\nu-2k)) z}}{p+a(\nu-2k)+i c \mu} {}_2F_1\left(\frac{i (p+a(\nu-2k)+i c \mu)}{2 c}, -\mu; \frac{i (-2 a k+p+a \nu+c i (\mu-2))}{2 c}; -e^{-2 i c z}\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3225.01

$$\int e^{p z} \cos^{m}(c z) \sinh^{\nu}(b+a z) \, dz = 2^{-m} \left(1-e^{2(b+a z)}\right)^{-\nu} \sinh^{\nu}(b+a z) \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{e^{(-i c m+p+2 i c s) z}}{-i c m+p+2 i c s-a \nu} {}_2F_1\left(\frac{-i c m+p+2 i c s-a \nu}{2 a}, -\nu; \frac{-\nu a+2 a-i c m+p+2 i c s}{2 a}; e^{2(b+a z)}\right) + \frac{e^{(p+c i (m-2 s)) z}}{i c m+p-2 i c s-a \nu} {}_2F_1\left(\frac{i c m+p-2 i c s-a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c m+p-2 i c s}{a}-\nu+2\right); e^{2(b+a z)}\right)\right) - \frac{e^{p z} (m \bmod 2-1)}{p-a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\left(\frac{p-a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a}-\nu+2\right); e^{2(b+a z)}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3226.01

$$\int e^{p z} \cos^m(c z) \sinh^\nu(b + a z) \, dz = \frac{(i^\nu 2^{-m-\nu}) e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} -$$
$$i^\nu 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{(p + c i (m - 2 s)) z}}{-p - i c (m - 2 s)} + \frac{e^{-(i c m - p - 2 i c s) z}}{i c m - p - 2 i c s} \right) \binom{m}{s} -$$
$$2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \left(\frac{e^{2 b \nu - (-p - a(\nu - 2 k)) z}}{-p - a(\nu - 2 k)} + \frac{e^{4 b k + i \pi \nu - (-2 a k - p + a \nu) z}}{-2 a k - p + a \nu} \right) \binom{\nu}{k} -$$
$$2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-2 b k - b \nu} \left(e^{2 b \nu} \left(\frac{e^{-(2 a k + i c m - p - 2 i c s - a \nu) z}}{2 a k + i c m - p - 2 i c s - a \nu} + \frac{e^{-(2 a k - i c m - p + 2 i c s - a \nu) z}}{2 a k - i c m - p + 2 i c s - a \nu} \right) + \right.$$
$$\left. \frac{e^{4 b k + i \pi \nu - (-2 a k - i c m - p + 2 i c s + a \nu) z}}{-2 a k - i c m - p + 2 i c s + a \nu} + \frac{e^{4 b k + i \pi \nu - (-2 a k + i c m - p - 2 i c s + a \nu) z}}{-2 a k + i c m - p - 2 i c s + a \nu} \right) \binom{m}{s} /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^\mu(c z + d) \sinh^\nu(a z + b)$

01.19.21.3227.01

$$\int e^{p z} \cos^\mu(d + c z) \sinh^\nu(b + a z) \, dz =$$
$$\left(\frac{i}{2} \right)^\nu \cos^\mu(d + c z) \left(-\frac{e^{p z} \left(1 + e^{2(i d + i c z)}\right)^{-\mu} (\nu \bmod 2 - 1)}{p - i c \mu} \binom{\nu}{\frac{\nu}{2}} {}_2F_1\left(-\frac{i(p - i c \mu)}{2 c}, -\mu; \frac{1}{2} \left(-\frac{i p}{c} - \mu + 2 \right); -e^{2(i d + i c z)} \right) + \right.$$
$$i^{-\nu} \left(1 + e^{-2(i d + i c z)}\right)^{-\mu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{b(\nu - 2 k)} \binom{\nu}{k} \left(\frac{e^{4 b k + 2 a z k - 2 b \nu + i \pi \nu + p z - a \nu z}}{2 a k + p - a \nu + i c \mu} \right.$$
$${}_2F_1\left(\frac{i(2 a k + p - a \nu + i c \mu)}{2 c}, -\mu; \frac{i(2 a k + p - a \nu + c i(\mu - 2))}{2 c}; -e^{-2(i d + i c z)} \right) + \frac{e^{(p + a(\nu - 2 k)) z}}{p + a(\nu - 2 k) + i c \mu}$$
$$\left. \left. {}_2F_1\left(\frac{i(p + a(\nu - 2 k) + i c \mu)}{2 c}, -\mu; \frac{i(-2 a k + p + a \nu + c i(\mu - 2))}{2 c}; -e^{-2(i d + i c z)} \right) \right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3228.01

$$\int e^{p z} \cos^m(d + c z) \sinh^\nu(b + a z)\, dz = 2^{-m} \left(1 - e^{2(b+a z)}\right)^{-\nu} \sinh^\nu(b + a z) \left(\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{2 i d s - i d m} \binom{m}{s} \left(\frac{e^{(-i c m + p + 2 i c s) z}}{-i c m + p + 2 i c s - a \nu} \, {}_2F_1\!\left(\frac{-i c m + p + 2 i c s - a \nu}{2 a}, -\nu; \frac{-\nu a + 2 a - i c m + p + 2 i c s}{2 a}; e^{2(b+a z)}\right) + \frac{e^{2 d i (m-2 s) + (p + c i (m-2 s)) z}}{i c m + p - 2 i c s - a \nu} \, {}_2F_1\!\left(\frac{i c m + p - 2 i c s - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{i c m + p - 2 i c s}{a} - \nu + 2\right); e^{2(b+a z)}\right)\right) - \frac{e^{p z} (m \bmod 2 - 1)}{p - a \nu} \binom{m}{\frac{m}{2}} {}_2F_1\!\left(\frac{p - a \nu}{2 a}, -\nu; \frac{1}{2}\left(\frac{p}{a} - \nu + 2\right); e^{2(b+a z)}\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3229.01

$$\int e^{p z} \cos^m(c z + d) \sinh^\nu(a z + b)\, dz = \frac{(i^\nu 2^{-m-\nu})\, e^{p z}\, (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - i^\nu 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d (m-2 s)} \left(\frac{e^{2 i d (m-2 s) - (-p - i c (m-2 s)) z}}{-p - i c (m - 2 s)} + \frac{e^{-(i c m - p - 2 i c s) z}}{i c m - p - 2 i c s}\right) \binom{m}{s} - 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \left(\frac{e^{2 b \nu - (-p - a(\nu - 2 k)) z}}{-p - a(\nu - 2 k)} + \frac{e^{4 b k + i \pi \nu - (-2 a k - p + a \nu) z}}{-2 a k - p + a \nu}\right) \binom{\nu}{k} - 2^{-m-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-2 b k - i d m - 2 i d s - b \nu} \left(e^{2 b \nu} \left(\frac{e^{4 i d s - (2 a k + i c m - p - 2 i c s - a \nu) z}}{2 a k + i c m - p - 2 i c s - a \nu} + \frac{e^{2 i d m - (2 a k - i c m - p + 2 i c s - a \nu) z}}{2 a k - i c m - p + 2 i c s - a \nu}\right) + \frac{e^{4 b k + 2 i d m + i \pi \nu - (-2 a k - i c m - p + 2 i c s + a \nu) z}}{-2 a k - i c m - p + 2 i c s + a \nu} + \frac{e^{4 b k + 4 i d s + i \pi \nu - (-2 a k + i c m - p - 2 i c s + a \nu) z}}{-2 a k + i c m - p - 2 i c s + a \nu}\right) \binom{m}{s} /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m\left(b z^r\right) \sinh^\nu(c z)$

01.19.21.3230.01

$$\int e^{p z^2} \cos^m(b z^2) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu-1}\sqrt{\pi}\,(1 - m \bmod 2)(1-\nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}(\sqrt{p}\, z) + \frac{i^\nu 2^{-m-\nu-1}\sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{c^2(\nu-2k)^2 - 2\pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{2pz - c(\nu-2k)}{2\sqrt{p}}\right) + e^{-\frac{c^2(\nu-2k)^2+2\pi i p\nu}{4p}} \operatorname{erfi}\left(\frac{c(\nu-2k)+2pz}{2\sqrt{p}}\right)\right) + i^\nu 2^{-m-\nu-1}\sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\lfloor\frac{m-1}{2}\rfloor} \left(\binom{m}{s}\left((p + b i (m-2s))\sqrt{p - i b(m-2s)}\, \operatorname{erfi}\left(\frac{2pz - 2 i b (m-2s) z}{2\sqrt{p - i b(m-2s)}}\right) + \sqrt{p + b i (m-2s)}\, (p - i b(m-2s)) \operatorname{erfi}\left(\sqrt{p + b i (m-2s)}\, z\right)\right)\right) \Big/ ((p - i b(m-2s))(p + b i (m-2s))) + i^\nu 2^{-m-\nu-1}\sqrt{\pi} \sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\lfloor\frac{m-1}{2}\rfloor} \binom{m}{s} \left(\left(e^{-\frac{c^2(2k-\nu)^2 - 2 i \pi (p + b i (m-2s))\nu}{4(p+bi(m-2s))}} \sqrt{p + b i (m-2s)}\, (p - i b(m-2s)) \operatorname{erfi}\left(\frac{c(2k-\nu) + 2(p + b i (m-2s))z}{2\sqrt{p + b i (m-2s)}}\right) + e^{-\frac{c^2(2k-\nu)^2 + 2 i \pi (p - i b(m-2s))\nu}{4(p - i b(m-2s))}} (p + b i (m-2s))\sqrt{p - i b(m-2s)}\, \operatorname{erfi}\left(\frac{-c(2k-\nu) + 2pz - 2 i b(m-2s) z}{2\sqrt{p - i b(m-2s)}}\right)\right) \Big/ ((p - i b(m-2s))(p + b i (m-2s))) + \left(e^{-\frac{c^2(\nu-2k)^2 + 2 i \pi (p + b i (m-2s))\nu}{4(p+bi(m-2s))}} \sqrt{p + b i (m-2s)}\, (p - i b(m-2s)) \operatorname{erfi}\left(\frac{c(\nu-2k) + 2(p + b i (m-2s))z}{2\sqrt{p + b i (m-2s)}}\right) + e^{-\frac{c^2(\nu-2k)^2 - 2 i \pi (p - i b(m-2s))\nu}{4(p - i b(m-2s))}} (p + b i (m-2s))\sqrt{p - i b(m-2s)}\, \operatorname{erfi}\left(\frac{-c(\nu-2k) + 2pz - 2 i b(m-2s) z}{2\sqrt{p - i b(m-2s)}}\right)\right) \Big/ ((p - i b(m-2s))(p + b i (m-2s)))\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3231.01

$$\int e^{p\sqrt{z}} \cos^m(b\sqrt{z}) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu+1} e^{p\sqrt{z}} (p\sqrt{z} - 1)(1 - m \bmod 2)(1 - \nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + i^\nu 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\lfloor\frac{m-1}{2}\rfloor} e^{(p - i b(m-2s))\sqrt{z}} \left(\frac{e^{2 i b (m-2s)\sqrt{z}} ((p + b i (m-2s))\sqrt{z} - 1)}{(p + b i (m-2s))^2} + \frac{\sqrt{z}}{p - i b (m-2s)} - \frac{1}{(i b(m-2s) - p)^2}\right) \binom{m}{s} +$$

$$(-1)^{\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{e^{\frac{p^2}{4c(\nu-2k)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-2c(\nu-2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} + \right.$$

$$\left. \frac{2 e^{\sqrt{z}\, p - i\pi\nu + c(\nu-2k) z}}{c(\nu-2k)} - \frac{2 e^{p\sqrt{z} - c(\nu-2k) z}}{c(\nu-2k)} - \frac{e^{-\frac{p^2}{4c(\nu-2k)} - i\pi\nu} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+2c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} \right) +$$

$$2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^{\nu} \left(\frac{2 e^{\sqrt{z}\,(p+b i(m-2s)) - i\pi\nu + c(\nu-2k) z}}{c(\nu-2k)} - \frac{2 e^{(p-i b(m-2s))\sqrt{z} - c(\nu-2k) z}}{c(\nu-2k)} - \right.\right.$$

$$\frac{i b e^{\frac{(p-i b(m-2s))^2}{4c(\nu-2k)}} \sqrt{\pi} (m-2s) \operatorname{erfi}\left(\frac{-p+b i(m-2s)+2c(\nu-2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} -$$

$$\frac{e^{\frac{(p-i b(m-2s))^2}{4c(\nu-2k)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-i b(m-2s)-2c(\nu-2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} -$$

$$\frac{e^{-\frac{(p+b i(m-2s))^2}{4c(\nu-2k)} - i\pi\nu} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+b i(m-2s)+2c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} -$$

$$\left. \frac{i b e^{-\frac{(p+b i(m-2s))^2}{4c(\nu-2k)} - i\pi\nu} \sqrt{\pi} (m-2s) \operatorname{erfi}\left(\frac{p+b i(m-2s)+2c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} \right) + \frac{2 e^{\sqrt{z}\,(p+b i(m-2s)) + i\pi\nu + c(2k-\nu) z}}{c(2k-\nu)} -$$

$$\frac{2 e^{(p-i b(m-2s))\sqrt{z} - c(2k-\nu) z}}{c(2k-\nu)} - \frac{i b e^{\frac{(p-i b(m-2s))^2}{4c(2k-\nu)}} \sqrt{\pi} (m-2s) \operatorname{erfi}\left(\frac{-p+b i(m-2s)+2c(2k-\nu)\sqrt{z}}{2\sqrt{-c(2k-\nu)}}\right)}{(-c(2k-\nu))^{3/2}} -$$

$$\frac{e^{\frac{(p-i b(m-2s))^2}{4c(2k-\nu)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p-i b(m-2s)-2c(2k-\nu)\sqrt{z}}{2\sqrt{-c(2k-\nu)}}\right)}{(-c(2k-\nu))^{3/2}} - \frac{e^{i\pi\nu - \frac{(p+b i(m-2s))^2}{4c(2k-\nu)}} p \sqrt{\pi} \operatorname{erfi}\left(\frac{p+b i(m-2s)+2c(2k-\nu)\sqrt{z}}{2\sqrt{c(2k-\nu)}}\right)}{(c(2k-\nu))^{3/2}} -$$

$$\left. \frac{i b e^{i\pi\nu - \frac{(p+b i(m-2s))^2}{4c(2k-\nu)}} \sqrt{\pi} (m-2s) \operatorname{erfi}\left(\frac{p+b i(m-2s)+2c(2k-\nu)\sqrt{z}}{2\sqrt{c(2k-\nu)}}\right)}{(c(2k-\nu))^{3/2}} \right) /;\ m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m(b z) \sinh^\nu(c z)$

01.19.21.3232.01

$$\int e^{p z^2} \cos^m(b z) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}\ (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\ z\right) + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{\frac{b^2 (m-2s)^2}{4p}} \operatorname{erfi}\left(\frac{2 p z - i b (m - 2 s)}{2 \sqrt{p}} \right) + e^{\frac{b^2 (m-2s)^2}{4p}} \operatorname{erfi}\left(\frac{b i (m - 2 s) + 2 p z}{2 \sqrt{p}} \right) \right) + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{c^2 (\nu-2k)^2 - 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{2 p z - c (\nu - 2 k)}{2 \sqrt{p}} \right) + e^{-\frac{c^2 (\nu-2k)^2 + 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{c (\nu - 2 k) + 2 p z}{2 \sqrt{p}} \right) \right) + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{(b i (m-2s) + c (2k-\nu))^2 - 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{b i (m - 2 s) + c (2 k - \nu) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(-i b (m-2s) - c (2k-\nu))^2 + 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{-i b (m - 2 s) - c (2 k - \nu) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(b i (m-2s) + c (\nu-2k))^2 + 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{b i (m - 2 s) + c (\nu - 2 k) + 2 p z}{2 \sqrt{p}} \right) + e^{-\frac{(-i b (m-2s) - c (\nu-2k))^2 - 2 \pi i p \nu}{4p}} \operatorname{erfi}\left(\frac{-i b (m - 2 s) - c (\nu - 2 k) + 2 p z}{2 \sqrt{p}} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3233.01

$$\int e^{p\sqrt{z}} \cos^m(b z) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z} - 1\right)(1 - m \bmod 2)(1 - \nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{2 i e^{p\sqrt{z} - i b(m-2s) z}}{b(m-2s)} - \frac{2 i e^{\sqrt{z}\, p + b i (m-2s) z}}{b(m-2s)} - \frac{e^{-\frac{i p^2}{4 b (m-2s)}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - 2 i b (m-2s)\sqrt{z}}{2\sqrt{-i b (m-2s)}}\right)}{(-i b (m-2s))^{3/2}} - \frac{e^{\frac{i p^2}{4 b (m-2s)}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 b i (m-2s)\sqrt{z}}{2\sqrt{i b (m-2s)}}\right)}{(i b (m-2s))^{3/2}} \right) + (-1)^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-\frac{e^{\frac{p^2}{4 c (\nu - 2k)}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - 2 c (\nu - 2k)\sqrt{z}}{2\sqrt{-c(\nu-2k)}}\right)}{(-c(\nu-2k))^{3/2}} + \frac{2 e^{\sqrt{z}\, p - i\pi\nu + c(\nu-2k) z}}{c(\nu-2k)} - \frac{2 e^{p\sqrt{z} - c(\nu-2k) z}}{c(\nu-2k)} - \frac{e^{-\frac{p^2}{4 c(\nu-2k)} - i\pi\nu} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2 c(\nu-2k)\sqrt{z}}{2\sqrt{c(\nu-2k)}}\right)}{(c(\nu-2k))^{3/2}} \right) + 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \left(\frac{2 e^{\sqrt{z}\, p - i\pi\nu + (b i (m-2s) + c(\nu-2k)) z}}{b i (m-2s) + c(\nu-2k)} - \frac{e^{-\frac{p^2}{4(b i (m-2s) + c(\nu-2k))} - i\pi\nu} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2(b i (m-2s) + c(\nu-2k))\sqrt{z}}{2\sqrt{b i (m-2s) + c(\nu-2k)}}\right)}{(b i (m-2s) + c(\nu-2k))^{3/2}} + \frac{2 e^{\sqrt{z}\, p + (-i b (m-2s) - c(\nu-2k)) z}}{-i b (m-2s) - c(\nu-2k)} - \frac{e^{-\frac{p^2}{4(-i b (m-2s) - c(\nu-2k))}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2(-i b (m-2s) - c(\nu-2k))\sqrt{z}}{2\sqrt{-i b (m-2s) - c(\nu-2k)}}\right)}{(-i b (m-2s) - c(\nu-2k))^{3/2}} \right) + \frac{2 e^{\sqrt{z}\, p + i\pi\nu + (b i (m-2s) + c(2k-\nu)) z}}{b i (m-2s) + c(2k-\nu)} - \frac{e^{i\pi\nu - \frac{p^2}{4(b i (m-2s) + c(2k-\nu))}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2(b i (m-2s) + c(2k-\nu))\sqrt{z}}{2\sqrt{b i (m-2s) + c(2k-\nu)}}\right)}{(b i (m-2s) + c(2k-\nu))^{3/2}} + \frac{2 e^{\sqrt{z}\, p + (-i b (m-2s) - c(2k-\nu)) z}}{-i b (m-2s) - c(2k-\nu)} - \frac{e^{-\frac{p^2}{4(-i b (m-2s) - c(2k-\nu))}} p\sqrt{\pi}\, \mathrm{erfi}\left(\frac{p + 2(-i b (m-2s) - c(2k-\nu))\sqrt{z}}{2\sqrt{-i b (m-2s) - c(2k-\nu)}}\right)}{(-i b (m-2s) - c(2k-\nu))^{3/2}} \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m\left(b z^r\right) \sinh^\nu(c z)$

01.19.21.3234.01

$$\int e^{pz}\cos^m(b z^2)\sinh^\nu(cz)\,dz = \frac{i^\nu 2^{-m-\nu} e^{pz}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m\bmod 2)(1-\nu\bmod 2)}{p} + \frac{1}{b}\left(i^{\nu+1}2^{-m-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2s}\left(\binom{m}{s}\left(e^{-\frac{ip^2}{4b(m-2s)}}\sqrt{-ib(m-2s)}\operatorname{erfi}\left(\frac{p-2ib(m-2s)z}{2\sqrt{-ib(m-2s)}}\right)-e^{\frac{ip^2}{4b(m-2s)}}\sqrt{ib(m-2s)}\operatorname{erfi}\left(\frac{p+2bi(m-2s)z}{2\sqrt{ib(m-2s)}}\right)\right)\right)\right)+i^\nu 2^{-m-\nu+1}e^{pz}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(\cosh(c(\nu-2k)z)\left(p\cos\left(\frac{\pi\nu}{2}\right)-ic(2k-\nu)\sin\left(\frac{\pi\nu}{2}\right)\right)+\left(c(2k-\nu)\cos\left(\frac{\pi\nu}{2}\right)-ip\sin\left(\frac{\pi\nu}{2}\right)\right)\sinh(c(\nu-2k)z)\right)\Big/((2ck+p-c\nu)(p+c(\nu-2k)))+\frac{1}{b}\left(\left(i^{\nu+1}2^{-m-\nu-1}\sqrt{\pi}\right)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{1}{m-2s}\left((-1)^k\binom{\nu}{k}\left(e^{-\frac{i(p-c(2k-\nu))^2}{4b(m-2s)}-\frac{\pi i\nu}{2}}\sqrt{-ib(m-2s)}\operatorname{erfi}\left(\frac{p-c(2k-\nu)-2ib(m-2s)z}{2\sqrt{-ib(m-2s)}}\right)+e^{\frac{\pi i\nu}{2}-\frac{i(p-c(\nu-2k))^2}{4b(m-2s)}}\sqrt{-ib(m-2s)}\operatorname{erfi}\left(\frac{p-c(\nu-2k)-2ib(m-2s)z}{2\sqrt{-ib(m-2s)}}\right)-e^{\frac{i(p+c(2k-\nu))^2}{4b(m-2s)}+\frac{i\pi\nu}{2}}\sqrt{ib(m-2s)}\operatorname{erfi}\left(\frac{p+c(2k-\nu)+2bi(m-2s)z}{2\sqrt{ib(m-2s)}}\right)-e^{\frac{i(p+c(\nu-2k))^2}{4b(m-2s)}-\frac{\pi i\nu}{2}}\sqrt{ib(m-2s)}\operatorname{erfi}\left(\frac{p+c(\nu-2k)+2bi(m-2s)z}{2\sqrt{ib(m-2s)}}\right)\right)\right)\right)\ /;\ m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.3235.01

$$\int e^{p z} \cos^m\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = \frac{i^\nu 2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + (-1)^\nu 2^{-m-\nu} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \left(\frac{e^{(p - c(\nu - 2k)) z}}{p - c(\nu - 2k)} + \frac{e^{(p + c(\nu - 2k)) z - i \pi \nu}}{p + c(\nu - 2k)} \right) \binom{\nu}{k} + i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(-\frac{i b e^{\frac{b^2 (m-2s)^2}{4p}} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{2\sqrt{z}\, p + b i (m-2s)}{2\sqrt{p}}\right)}{p^{3/2}} - \frac{i b e^{\frac{b^2 (m-2s)^2}{4p}} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{i b (m-2s) - 2 p \sqrt{z}}{2\sqrt{p}}\right)}{p^{3/2}} + \frac{2 e^{p z - i b (m-2s) \sqrt{z}}}{p} + \frac{2 e^{b i \sqrt{z} (m-2s) + p z}}{p} \right) + 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k}$$

$$\left((-1)^\nu \left(\frac{2 e^{b i \sqrt{z} (m-2s) - i \pi \nu + (p + c(\nu - 2k)) z}}{p + c(\nu - 2k)} - \frac{i b e^{\frac{b^2 (m-2s)^2}{4(p + c(\nu - 2k))} - i \pi \nu} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{b i (m-2s) + 2 (p + c(\nu - 2k)) \sqrt{z}}{2\sqrt{p + c(\nu - 2k)}}\right)}{(p + c(\nu - 2k))^{3/2}} + \frac{2 e^{(p - c(\nu - 2k)) z - i b (m-2s) \sqrt{z}}}{p - c(\nu - 2k)} - \frac{i b e^{\frac{b^2 (m-2s)^2}{4(p - c(\nu - 2k))}} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{b i (m-2s) + 2 (c(\nu - 2k) - p) \sqrt{z}}{2\sqrt{p - c(\nu - 2k)}}\right)}{(p - c(\nu - 2k))^{3/2}} \right) + \frac{2 e^{b i \sqrt{z} (m-2s) + i \pi \nu + (p + c(2k - \nu)) z}}{p + c(2k - \nu)} - \frac{i b e^{\frac{b^2 (m-2s)^2}{4(p + c(2k - \nu))} + i \pi \nu} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{b i (m-2s) + 2 (p + c(2k - \nu)) \sqrt{z}}{2\sqrt{p + c(2k - \nu)}}\right)}{(p + c(2k - \nu))^{3/2}} + \frac{2 e^{(p - c(2k - \nu)) z - i b (m-2s) \sqrt{z}}}{p - c(2k - \nu)} - \frac{i b e^{\frac{b^2 (m-2s)^2}{4(p - c(2k - \nu))}} \sqrt{\pi} (m - 2s) \operatorname{erfi}\left(\frac{b i (m-2s) + 2 (c(2k - \nu) - p) \sqrt{z}}{2\sqrt{p - c(2k - \nu)}}\right)}{(p - c(2k - \nu))^{3/2}} \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z} \cos^m(b z) \sinh^\nu(c z^r)$

01.19.21.3236.01

$$\int e^{p z} \cos^m(b z) \sinh^\nu(c z^2)\, dz = \frac{i^\nu 2^{-m-\nu} e^{p z} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} - \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{c} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{(-1)^k}{\nu - 2k} \binom{\nu}{k}$$

$$\left(e^{\frac{p^2 + 2 c i \pi \nu (\nu - 2k)}{4 c (\nu - 2k)}} \sqrt{-c(\nu - 2k)}\, \mathrm{erfi}\left(\frac{p - 2c(\nu - 2k) z}{2\sqrt{-c(\nu - 2k)}} \right) - e^{-\frac{p^2 + 2 c i \pi \nu (\nu - 2k)}{4 c (\nu - 2k)}} \sqrt{c(\nu - 2k)}\, \mathrm{erfi}\left(\frac{p + 2c(\nu - 2k) z}{2\sqrt{c(\nu - 2k)}} \right) \right) +$$

$$i^\nu 2^{-m-\nu+1} e^{p z} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \frac{(-p \cos(b(m-2s) z) - b(m-2s) \sin(b(m-2s) z))}{(i b(m-2s) - p)(p + b i (m-2s))} - \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{c}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \frac{1}{2k - \nu} \binom{m}{s} \left(e^{\frac{(p - i b(m-2s))^2 - 2 i c \pi (2k - \nu) \nu}{4 c (2k - \nu)}} \sqrt{-c(2k - \nu)}\, \mathrm{erfi}\left(\frac{p - i b(m-2s) - 2c(2k - \nu) z}{2\sqrt{-c(2k - \nu)}} \right) - \right.$$

$$e^{-\frac{(p + b i (m-2s))^2 - 2 i c \pi (2k - \nu) \nu}{4 c (2k - \nu)}} \sqrt{c(2k - \nu)}\, \mathrm{erfi}\left(\frac{p + b i (m-2s) + 2c(2k - \nu) z}{2\sqrt{c(2k - \nu)}} \right) -$$

$$e^{\frac{(p - i b(m-2s))^2 + 2 c i \pi \nu (\nu - 2k)}{4 c (\nu - 2k)}} \sqrt{-c(\nu - 2k)}\, \mathrm{erfi}\left(\frac{p - i b(m-2s) - 2c(\nu - 2k) z}{2\sqrt{-c(\nu - 2k)}} \right) +$$

$$\left. e^{-\frac{(p + b i (m-2s))^2 + 2 c i \pi \nu (\nu - 2k)}{4 c (\nu - 2k)}} \sqrt{c(\nu - 2k)}\, \mathrm{erfi}\left(\frac{p + b i (m-2s) + 2c(\nu - 2k) z}{2\sqrt{c(\nu - 2k)}} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3237.01

$$\int e^{p z} \cos^m(b z) \sinh^\nu(c \sqrt{z})\, dz = \frac{i^\nu 2^{-m-\nu} e^{p z} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{p} + i^\nu 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\frac{e^{(b i (m-2k)+p) z}}{b i (m-2k) + p} + \frac{e^{(p - i b (m-2k)) z}}{p - i b (m-2k)} \right) \binom{m}{k} + (-1)^\nu 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-\frac{c\, e^{-\frac{c^2 (\nu-2s)^2}{4p} - i \pi \nu} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, p + c(\nu-2s)}{2\sqrt{p}} \right)}{p^{3/2}} - \frac{c\, e^{-\frac{c^2 (\nu-2s)^2}{4p}} \sqrt{\pi} (\nu - 2s) \operatorname{erfi}\left(\frac{c(\nu-2s) - 2 p \sqrt{z}}{2\sqrt{p}} \right)}{p^{3/2}} + \frac{2 e^{p z - c(\nu-2s)\sqrt{z}}}{p} + \frac{2 e^{-i \pi \nu + p z + c(\nu-2s)\sqrt{z}}}{p} \right) + i^\nu 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \Bigg(e^{\frac{i \pi \nu}{2}} \Bigg(\frac{2 e^{(p - i b (2k-m)) z - c(\nu-2s)\sqrt{z}}}{p - i b (2k-m)} - \frac{c\, e^{-\frac{c^2 (\nu-2s)^2}{4(p - i b (2k-m))}} \sqrt{\pi} (\nu-2s) \operatorname{erfi}\left(\frac{2 \sqrt{z} (i b (2k-m) - p) + c(\nu-2s)}{2\sqrt{p - i b (2k-m)}} \right)}{(p - i b (2k-m))^{3/2}} + \frac{2 e^{-i \pi \nu + (b i (2k-m) + p) z + c(\nu-2s)\sqrt{z}}}{b i (2k-m) + p} - \left(c\, e^{-\frac{c^2 (\nu-2s)^2}{4(b i (2k-m) + p)} - i \pi \nu} \sqrt{\pi} (\nu-2s) \operatorname{erfi}\left(\frac{2\sqrt{z} (b i (2k-m) + p) + c(\nu-2s)}{2\sqrt{b i (2k-m) + p}} \right) \right) \Big/ (b i (2k-m) + p)^{3/2} \Bigg) + e^{\frac{i \pi \nu}{2}} \Bigg(\frac{2 e^{(p - i b (m-2k)) z - c(\nu-2s)\sqrt{z}}}{p - i b (m-2k)} - \frac{c\, e^{-\frac{c^2 (\nu-2s)^2}{4(p - i b (m-2k))}} \sqrt{\pi} (\nu-2s) \operatorname{erfi}\left(\frac{2\sqrt{z} (i b (m-2k) - p) + c(\nu-2s)}{2\sqrt{p - i b (m-2k)}} \right)}{(p - i b (m-2k))^{3/2}} + \frac{2 e^{-i \pi \nu + (b i (m-2k) + p) z + c(\nu-2s)\sqrt{z}}}{b i (m-2k) + p} - \left(c\, e^{-\frac{c^2 (\nu-2s)^2}{4(b i (m-2k) + p)} - i \pi \nu} \sqrt{\pi} (\nu-2s) \operatorname{erfi}\left(\frac{2\sqrt{z} (b i (m-2k) + p) + c(\nu-2s)}{2\sqrt{b i (m-2k) + p}} \right) \right) \Big/ (b i (m-2k) + p)^{3/2} \Bigg) \Bigg) \text{/; } m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m(b z) \sinh^\nu(c z^r)$

01.19.21.3238.01

$$\int e^{p z^2} \cos^m(b z) \sinh^\nu(c z^2)\, dz = \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}\, (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\, z\right) + \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}}{\sqrt{p}} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{\frac{b^2 (m-2s)^2}{4p}} \operatorname{erfi}\left(\frac{2 p z - i b (m - 2 s)}{2 \sqrt{p}}\right) + e^{\frac{b^2 (m-2s)^2}{4p}} \operatorname{erfi}\left(\frac{b i (m - 2 s) + 2 p z}{2 \sqrt{p}}\right)\right) + 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left((-1)^\nu (p + c(\nu - 2k)) \sqrt{p - c(\nu - 2k)}\, \operatorname{erfi}\left(\frac{2 p z - 2 c (\nu - 2k) z}{2 \sqrt{p - c(\nu - 2k)}}\right) + \sqrt{p + c(\nu - 2k)}\, (p - c(\nu - 2k)) \operatorname{erfi}\left(\sqrt{p + c(\nu - 2k)}\, z\right)\right)\right) \Big/ ((p - c(\nu - 2k))(p + c(\nu - 2k))) + i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(e^{-\frac{-b^2 (m-2s)^2 - 2 i \pi (p + c(2k - \nu)) \nu}{4 (p + c(2k - \nu))}} \sqrt{p + c(2k - \nu)}\, (p - c(2k - \nu)) \operatorname{erfi}\left(\frac{b i (m - 2s) + 2 (p + c(2k - \nu)) z}{2 \sqrt{p + c(2k - \nu)}}\right) + e^{-\frac{2 i \pi (p - c(2k - \nu)) \nu - b^2 (m-2s)^2}{4 (p - c(2k - \nu))}} (p + c(2k - \nu)) \sqrt{p - c(2k - \nu)}\, \operatorname{erfi}\left(\frac{-i b (m - 2s) + 2 p z - 2 c (2k - \nu) z}{2 \sqrt{p - c(2k - \nu)}}\right)\right) \Big/ ((p - c(2k - \nu))(p + c(2k - \nu))) + \left(e^{-\frac{2 i \pi \nu (p + c(\nu - 2k)) - b^2 (m-2s)^2}{4 (p + c(\nu - 2k))}} \sqrt{p + c(\nu - 2k)}\, (p - c(\nu - 2k)) \operatorname{erfi}\left(\frac{b i (m - 2s) + 2 (p + c(\nu - 2k)) z}{2 \sqrt{p + c(\nu - 2k)}}\right) + e^{-\frac{-b^2 (m-2s)^2 - 2 i \pi \nu (p - c(\nu - 2k))}{4 (p - c(\nu - 2k))}} (p + c(\nu - 2k)) \sqrt{p - c(\nu - 2k)}\, \operatorname{erfi}\left(\frac{-i b (m - 2s) + 2 p z - 2 c (\nu - 2k) z}{2 \sqrt{p - c(\nu - 2k)}}\right)\right) \Big/ ((p - c(\nu - 2k))(p + c(\nu - 2k)))\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3239.01

$$\int e^{p \sqrt{z}} \cos^m(b z) \sinh^\nu\left(c \sqrt{z}\right) dz = \frac{i^{-\nu} \left(2^{-m-\nu+1} e^{p \sqrt{z}} \left(p \sqrt{z} - 1\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1 - m \bmod 2)(1 - \nu \bmod 2)\right)}{p^2} + 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{(p + c(\nu - 2s)) \sqrt{z}} \left(\frac{e^{2\left(-\frac{1}{2} i \pi \nu - c(\nu - 2s) \sqrt{z}\right)} \left(\sqrt{z}\, p - c(\nu - 2s) \sqrt{z} - 1\right)}{(p - c(\nu - 2s))^2} + \frac{\sqrt{z}}{p + c(\nu - 2s)} - \frac{1}{(-p - c(\nu - 2s))^2}\right) \binom{\nu}{s} +$$

$$i^{-\nu} 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(\frac{2\, i\, e^{p\sqrt{z} - i\, b\, (m-2k)\, z}}{b\, (m-2k)} - \frac{2\, i\, e^{\sqrt{z}\, p + b\, i\, (m-2k)\, z}}{b\, (m-2k)} - \frac{e^{-\frac{i\, p^2}{4\, b\, (m-2k)}}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{p - 2\, i\, b\, (m-2k)\sqrt{z}}{2\sqrt{-i\, b\, (m-2k)}} \right)}{(-i\, b\, (m-2k))^{3/2}} - \frac{e^{\frac{i\, p^2}{4\, b\, (m-2k)}}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (m-2k) + p}{2\sqrt{i\, b\, (m-2k)}} \right)}{(i\, b\, (m-2k))^{3/2}} \right) +$$

$$i^{-\nu} 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{k} \left(e^{\frac{i\pi\nu}{2}} \left(\frac{2\, i\, e^{(p+c\,(\nu-2s))\sqrt{z} - i\, b\, (2k-m)\, z}}{b\, (2k-m)} - \frac{2\, i\, e^{-i\pi\nu + b\, i\, (2k-m)\, z + (p - c\,(\nu-2s))\sqrt{z}}}{b\, (2k-m)} - \right.\right.$$

$$\frac{e^{-\frac{i\,(p+c\,(\nu-2s))^2}{4\, b\, (2k-m)}}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{-2\, i\, b\sqrt{z}\, (2k-m) + p + c\,(\nu-2s)}{2\sqrt{-i\, b\, (2k-m)}} \right)}{(-i\, b\, (2k-m))^{3/2}} +$$

$$\frac{c\, e^{-\frac{i\,(p+c\,(\nu-2s))^2}{4\, b\, (2k-m)}}\, \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (2k-m) - p - c\,(\nu-2s)}{2\sqrt{-i\, b\, (2k-m)}} \right)}{(-i\, b\, (2k-m))^{3/2}} -$$

$$\frac{e^{\frac{i\,(p-c\,(\nu-2s))^2}{4\, b\, (2k-m)} - i\pi\nu}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (2k-m) + p - c\,(\nu-2s)}{2\sqrt{i\, b\, (2k-m)}} \right)}{(i\, b\, (2k-m))^{3/2}} +$$

$$\left.\frac{c\, e^{\frac{i\,(p-c\,(\nu-2s))^2}{4\, b\, (2k-m)} - i\pi\nu}\, \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (2k-m) + p - c\,(\nu-2s)}{2\sqrt{i\, b\, (2k-m)}} \right)}{(i\, b\, (2k-m))^{3/2}} \right) + e^{\frac{i\pi\nu}{2}} \left(\frac{2\, i\, e^{(p+c\,(\nu-2s))\sqrt{z} - i\, b\, (m-2k)\, z}}{b\, (m-2k)} - \right.$$

$$\frac{2\, i\, e^{-i\pi\nu + b\, i\, (m-2k)\, z + (p-c\,(\nu-2s))\sqrt{z}}}{b\, (m-2k)} - \frac{e^{-\frac{i\,(p+c\,(\nu-2s))^2}{4\, b\, (m-2k)}}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{-2\, i\, b\sqrt{z}\, (m-2k) + p + c\,(\nu-2s)}{2\sqrt{-i\, b\, (m-2k)}} \right)}{(-i\, b\, (m-2k))^{3/2}} +$$

$$\frac{c\, e^{-\frac{i\,(p+c\,(\nu-2s))^2}{4\, b\, (m-2k)}}\, \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (m-2k) - p - c\,(\nu-2s)}{2\sqrt{-i\, b\, (m-2k)}} \right)}{(-i\, b\, (m-2k))^{3/2}} -$$

$$\frac{e^{\frac{i\,(p-c\,(\nu-2s))^2}{4\, b\, (m-2k)} - i\pi\nu}\, p\, \sqrt{\pi}\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (m-2k) + p - c\,(\nu-2s)}{2\sqrt{i\, b\, (m-2k)}} \right)}{(i\, b\, (m-2k))^{3/2}} +$$

$$\left.\left. c\, e^{\frac{i\,(p-c\,(\nu-2s))^2}{4\, b\, (m-2k)} - i\pi\nu}\, \sqrt{\pi}\, (\nu - 2s)\, \mathrm{erfi}\left(\frac{2\, b\, i\sqrt{z}\, (m-2k) + p - c\,(\nu-2s)}{2\sqrt{i\, b\, (m-2k)}} \right) \right) \right)$$

Involving $e^{pz}\cos^m(b z^r)\sinh^\nu(c z^r)$

01.19.21.3240.01

$$\int e^{pz}\cos^m(bz^2)\sinh^\nu(cz^2)\,dz = \frac{i^\nu 2^{-m-\nu} e^{pz}(1-m \bmod 2)(1-\nu \bmod 2)}{p}\binom{m}{\frac m2}\binom{\nu}{\frac\nu2} + \frac{i\, i^\nu 2^{-m-\nu-1}\sqrt\pi}{b}\binom{\nu}{\frac\nu2}(1-\nu\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2s}\binom{m}{s}\left(e^{-\frac{ip^2}{4b(m-2s)}}\sqrt{-ib(m-2s)}\,\operatorname{erfi}\left(\frac{p-2ib(m-2s)z}{2\sqrt{-ib(m-2s)}}\right) - e^{\frac{ip^2}{4b(m-2s)}}\sqrt{ib(m-2s)}\,\operatorname{erfi}\left(\frac{p+2bi(m-2s)z}{2\sqrt{ib(m-2s)}}\right)\right) - \frac{i^\nu 2^{-m-\nu-1}\sqrt\pi}{c}\binom{m}{\frac m2}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\frac{(-1)^k}{\nu-2k}\binom{\nu}{k}\left(e^{\frac{p^2+2ci\pi\nu(\nu-2k)}{4c(\nu-2k)}}\sqrt{-c(\nu-2k)}\,\operatorname{erfi}\left(\frac{p-2c(\nu-2k)z}{2\sqrt{-c(\nu-2k)}}\right) - e^{-\frac{p^2+2ci\pi\nu(\nu-2k)}{4c(\nu-2k)}}\sqrt{c(\nu-2k)}\,\operatorname{erfi}\left(\frac{p+2c(\nu-2k)z}{2\sqrt{c(\nu-2k)}}\right)\right) + i^\nu 2^{-m-\nu-1}\sqrt\pi\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\left(e^{-\frac{p^2-2i\pi(bi(m-2s)+c(2k-\nu))\nu}{4(bi(m-2s)+c(2k-\nu))}}\sqrt{bi(m-2s)+c(2k-\nu)}\,(-ib(m-2s)-c(2k-\nu))\,\operatorname{erfi}\left(\frac{p+2(bi(m-2s)+c(2k-\nu))z}{2\sqrt{bi(m-2s)+c(2k-\nu)}}\right) + e^{-\frac{p^2+2i\pi(-ib(m-2s)-c(2k-\nu))\nu}{4(-ib(m-2s)-c(2k-\nu))}}(bi(m-2s)+c(2k-\nu))\sqrt{-ib(m-2s)-c(2k-\nu)}\,\operatorname{erfi}\left(\frac{p-2(bi(m-2s)+c(2k-\nu))z}{2\sqrt{-ib(m-2s)-c(2k-\nu)}}\right)\right)\Big/((-ib(m-2s)-c(2k-\nu))(bi(m-2s)+c(2k-\nu))) + \left(e^{-\frac{p^2+2i\pi\nu(bi(m-2s)+c(\nu-2k))}{4(bi(m-2s)+c(\nu-2k))}}\sqrt{bi(m-2s)+c(\nu-2k)}\,(-ib(m-2s)-c(\nu-2k))\,\operatorname{erfi}\left(\frac{p+2(bi(m-2s)+c(\nu-2k))z}{2\sqrt{bi(m-2s)+c(\nu-2k)}}\right) + e^{-\frac{p^2-2i\pi\nu(-ib(m-2s)-c(\nu-2k))}{4(-ib(m-2s)-c(\nu-2k))}}(bi(m-2s)+c(\nu-2k))\sqrt{-ib(m-2s)-c(\nu-2k)}\,\operatorname{erfi}\left(\frac{p-2(bi(m-2s)+c(\nu-2k))z}{2\sqrt{-ib(m-2s)-c(\nu-2k)}}\right)\right)\Big/((-ib(m-2s)-c(\nu-2k))(bi(m-2s)+c(\nu-2k)))\right) /;\ m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

01.19.21.3241.01

$$\int e^{pz}\cos^m\left(b\sqrt z\right)\sinh^\nu\left(c\sqrt z\right)dz = \frac{i^{-\nu}\left(2^{-m-\nu}e^{pz}\binom{m}{\frac m2}\binom{\nu}{\frac\nu2}(1-m\bmod 2)(1-\nu\bmod 2)\right)}{p} + 2^{-m-\nu-1}e^{-\frac{i\nu\pi}{2}}\binom{\nu}{\frac\nu2}(1-\nu\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{4e^{pz}\cos\left(b(m-2s)\sqrt z\right)}{p} + \right.$$

$$\left.\frac{i\, b\, e^{-\frac{(2 i b s - i b m)^2}{4 p}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - i b (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}} - \frac{i\, b\, e^{\frac{b^2 (m-2 s)^2}{4 p}} \sqrt{\pi}\, (m-2 s) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, p + b\, i (m-2 s)}{2 \sqrt{p}}\right)}{p^{3/2}}\right) +$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\frac{4\, e^{p z - \frac{i \pi v}{2}} \cos\left(c\, i \sqrt{z}\, (2 k - v) + \frac{\pi v}{2}\right)}{p} - \right.$$

$$\left.\frac{e^{-\frac{(c v - 2 c k)^2}{4 p}} \sqrt{\pi}\, (c v - 2 c k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (2 k - v)}{2 \sqrt{p}}\right)}{p^{3/2}} + \frac{c\, e^{-\frac{c^2 (v-2 k)^2}{4 p} - i \pi v} \sqrt{\pi}\, (v - 2 k) \operatorname{erfi}\left(\frac{2 p \sqrt{z} - c (v - 2 k)}{2 \sqrt{p}}\right)}{p^{3/2}}\right) +$$

$$i^{-v}\, 2^{-m-v-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(e^{-\frac{1}{2} i \pi v} \left(\frac{4\, e^{\frac{i \pi v}{2} + p z} \cos\left(\frac{\pi v}{2} + (2 i c k + b m - 2 b s - i c v) \sqrt{z}\right)}{p} + \right.\right.$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(2 i c k + b m - 2 b s - i c v)^2}{4 p}} \sqrt{\pi}\, (2 i c k + b m - 2 b s - i c v) \operatorname{erf}\left(\frac{2 i \sqrt{z}\, p + b (m - 2 s) + c\, i (2 k - v)}{2 \sqrt{p}}\right)\right) +$$

$$\frac{1}{p^{3/2}} \left(e^{\frac{(-2 c i k - b m + 2 b s + i c v)^2}{4 p} + i \pi v} \sqrt{\pi}\, (2 i c k + b m - 2 b s - i c v)\right.$$

$$\left.\left.\left.\operatorname{erf}\left(\frac{-2 i \sqrt{z}\, p + b (m - 2 s) + c\, i (2 k - v)}{2 \sqrt{p}}\right)\right)\right) +\right.$$

$$e^{\frac{i \pi v}{2}} \left(\frac{4\, e^{p z - \frac{i \pi v}{2}} \cos\left(\frac{\pi v}{2} + (2 i c k - b m + 2 b s - i c v) \sqrt{z}\right)}{p} - \frac{1}{p^{3/2}} \left(e^{\frac{(b (m - 2 s) + c\, i (v - 2 k))^2}{4 p}} \sqrt{\pi}\, (b (m - 2 s) + \right.\right.$$

$$\left. c\, i (v - 2 k)) \operatorname{erf}\left(\frac{-2 i \sqrt{z}\, p - b (m - 2 s) + c\, i (2 k - v)}{2 \sqrt{p}}\right)\right) - \frac{1}{p^{3/2}} \left(i\, e^{\frac{(b (m - 2 s) + c\, i (v - 2 k))^2}{4 p} - i \pi v} \sqrt{\pi}\right.$$

$$\left.\left.\left.(b (m - 2 s) + c\, i (v - 2 k)) \operatorname{erfi}\left(\frac{2 \sqrt{z}\, p + b\, i (m - 2 s) - c (v - 2 k)}{2 \sqrt{p}}\right)\right)\right)\right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving $e^{p z^r} \cos^m(b z^r) \sinh^v(c z^r)$

01.19.21.3242.01

$$\int e^{p z^r} \cos^m(b z^r) \sinh^\nu(c z^r) \, dz = -\frac{2^{-m-\nu} z}{r} \left(i^\nu \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{1}{r}, -p z^r\right) (1 - m \bmod 2)(1 - \nu \bmod 2)(-p z^r)^{-1/r} + i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{1}{r}, (-i b m - p + 2 i b s) z^r\right) ((-i b m - p + 2 i b s) z^r)^{-1/r} + ((i b m - p - 2 i b s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (i b m - p - 2 i b s) z^r\right)\right) + \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-2 c k - p + c \nu) z^r\right) ((-2 c k - p + c \nu) z^r)^{-1/r} + ((2 c k - p - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - p - c \nu) z^r\right)\right) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left((-1)^\nu \Gamma\left(\frac{1}{r}, (-2 c k - i b m - p + 2 i b s + c \nu) z^r\right) ((-2 c k - i b m - p + 2 i b s + c \nu) z^r)^{-1/r} + (-1)^\nu ((-2 c k + i b m - p - 2 i b s + c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-2 c k + i b m - p - 2 i b s + c \nu) z^r\right) + ((2 c k - i b m - p + 2 i b s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k - i b m - p + 2 i b s - c \nu) z^r\right) + ((2 c k + i b m - p - 2 i b s - c \nu) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (2 c k + i b m - p - 2 i b s - c \nu) z^r\right)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3243.01

$$\int e^{p z^2} \cos^m(b z^2) \sinh^\nu(c z^2)\, dz = \frac{i^\nu 2^{-m-\nu-1} \sqrt{\pi}\ (1 - m \bmod 2)(1 - \nu \bmod 2)}{\sqrt{p}} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}\left(\sqrt{p}\ z\right) +$$

$$i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{\operatorname{erfi}\left(\sqrt{p + b\, i\, (m - 2 s)}\ z\right)}{\sqrt{p + b\, i\, (m - 2 s)}} + \frac{\operatorname{erfi}\left(\sqrt{p - i\, b\, (m - 2 s)}\ z\right)}{\sqrt{p - i\, b\, (m - 2 s)}} \right) +$$

$$i^\nu 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{e^{-\frac{1}{2} i \pi \nu} \operatorname{erfi}\left(\sqrt{p + c\,(\nu - 2 k)}\ z\right)}{\sqrt{p + c\,(\nu - 2 k)}} + \frac{e^{\frac{i \pi \nu}{2}} \operatorname{erfi}\left(\sqrt{p - c\,(\nu - 2 k)}\ z\right)}{\sqrt{p - c\,(\nu - 2 k)}} \right) +$$

$$i^\nu 2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\frac{\operatorname{erfi}\left(\sqrt{-2 c k - i b m + p + 2 i b s + c \nu}\ z\right)}{\sqrt{-2 c k - i b m + p + 2 i b s + c \nu}} + \right.\right.$$

$$\frac{\operatorname{erfi}\left(\sqrt{-2 c k + i b m + p - 2 i b s + c \nu}\ z\right)}{\sqrt{-2 c k + i b m + p - 2 i b s + c \nu}} + \frac{\operatorname{erfi}\left(\sqrt{2 c k - i b m + p + 2 i b s - c \nu}\ z\right)}{\sqrt{2 c k - i b m + p + 2 i b s - c \nu}} +$$

$$\left. \frac{\operatorname{erfi}\left(\sqrt{2 c k + i b m + p - 2 i b s - c \nu}\ z\right)}{\sqrt{2 c k + i b m + p - 2 i b s - c \nu}} \right) \cos\left(\frac{\pi \nu}{2}\right) + i \left(-\frac{\operatorname{erfi}\left(\sqrt{-2 c k - i b m + p + 2 i b s + c \nu}\ z\right)}{\sqrt{-2 c k - i b m + p + 2 i b s + c \nu}} + \right.$$

$$\frac{\operatorname{erfi}\left(\sqrt{2 c k - i b m + p + 2 i b s - c \nu}\ z\right)}{\sqrt{2 c k - i b m + p + 2 i b s - c \nu}} + \frac{\operatorname{erfi}\left(\sqrt{2 c k + i b m + p - 2 i b s - c \nu}\ z\right)}{\sqrt{2 c k + i b m + p - 2 i b s - c \nu}} -$$

$$\left.\left. \frac{\operatorname{erfi}\left(\sqrt{-2 c k + i b m + p - 2 i b s + c \nu}\ z\right)}{\sqrt{-2 c k + i b m + p - 2 i b s + c \nu}} \right) \sin\left(\frac{\pi \nu}{2}\right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3244.01

$$\int e^{p\sqrt{z}} \cos^m\left(b\sqrt{z}\right) \sinh^\nu\left(c\sqrt{z}\right) dz = \frac{i^\nu 2^{-m-\nu+1} e^{p\sqrt{z}} \left(p\sqrt{z}-1\right)(1-m \bmod 2)(1-\nu \bmod 2)}{p^2} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} + i^\nu 2^{-m-\nu+2} e^{p\sqrt{z}} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} \frac{1}{\left(p^2-c^2(\nu-2k)^2\right)^2} \left((-1)^k \binom{\nu}{k} \left(\left(p^2\left(p\sqrt{z}-1\right)-c^2(\nu-2k)^2\left(\sqrt{z}\,p+1\right)\right) \cos\left(\frac{\pi\nu}{2}+c\,i(\nu-2k)\sqrt{z}\right) + c\,i(\nu-2k)\left(\sqrt{z}\,p^2-2p-c^2(\nu-2k)^2\sqrt{z}\right)\sin\left(\frac{\pi\nu}{2}+c\,i(\nu-2k)\sqrt{z}\right)\right)\right) + i^\nu 2^{-m-\nu+2} e^{p\sqrt{z}} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \frac{1}{\left(p^2+b^2(m-2s)^2\right)^2} \left(\binom{m}{s}\left(\left(\left(p\sqrt{z}-1\right)p^2+b^2(m-2s)^2\left(\sqrt{z}\,p+1\right)\right)\cos\left(b(m-2s)\sqrt{z}\right) + b(m-2s)\left(\sqrt{z}\,p^2-2p+b^2(m-2s)^2\sqrt{z}\right)\sin\left(b(m-2s)\sqrt{z}\right)\right)\right) + i^\nu 2^{-m-\nu+2} e^{p\sqrt{z}} \sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} \binom{m}{s} \left(\left(\left(\left(p^2\left(p\sqrt{z}-1\right)-(2ck-ibm+2ibs-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\cosh\left((2ck-ibm+2ibs-c\nu)\sqrt{z}\right) - (2ck-ibm+2ibs-c\nu)\left(\sqrt{z}\,p^2-2p-(2ck-ibm+2ibs-c\nu)^2\sqrt{z}\right)\sinh\left((2ck-ibm+2ibs-c\nu)\sqrt{z}\right)\right) \Big/ \left(p^2-(2ck-ibm+2ibs-c\nu)^2\right)^2 + \left(\left(p^2\left(p\sqrt{z}-1\right)-(2ck+ibm-2ibs-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\cosh\left((2ck+ibm-2ibs-c\nu)\sqrt{z}\right) - (2ck+ibm-2ibs-c\nu)\left(\sqrt{z}\,p^2-2p-(2ck+ibm-2ibs-c\nu)^2\sqrt{z}\right)\sinh\left((2ck+ibm-2ibs-c\nu)\sqrt{z}\right)\right) \Big/ \left(p^2-(2ck+ibm-2ibs-c\nu)^2\right)^2\right)\cos\left(\frac{\pi\nu}{2}\right) + \left(\left(i\left(p^2\left(p\sqrt{z}-1\right)-(2ck-ibm+2ibs-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\sinh\left((2ck-ibm+2ibs-c\nu)\sqrt{z}\right) - i(2ck-ibm+2ibs-c\nu)\left(\sqrt{z}\,p^2-2p-(2ck-ibm+2ibs-c\nu)^2\sqrt{z}\right)\cosh\left((2ck-ibm+2ibs-c\nu)\sqrt{z}\right)\right) \Big/ \left(p^2-(2ck-ibm+2ibs-c\nu)^2\right)^2 + \left(i\left(p^2\left(p\sqrt{z}-1\right)-(2ck+ibm-2ibs-c\nu)^2\left(\sqrt{z}\,p+1\right)\right)\sinh\left((2ck+ibm-2ibs-c\nu)\sqrt{z}\right) - i(2ck+ibm-2ibs-c\nu)\left(\sqrt{z}\,p^2-2p-(2ck+ibm-2ibs-c\nu)^2\sqrt{z}\right)\cosh\left((2ck+ibm-2ibs-c\nu)\sqrt{z}\right)\right) \Big/ \left(p^2-(2ck+ibm-2ibs-c\nu)^2\right)^2\right)\sin\left(\frac{\pi\nu}{2}\right)\right) \;/;\; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

Involving $e^{b z^r + e} \cos^m\left(a z^r + q\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.3245.01

$$\int e^{b z^r+e} \cos^m(a z^r+q) \sinh^v(c z^r+g)\, dz = -\frac{i^v 2^{-m-v} z}{r} \Bigg(e^e \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{1}{r}, -b z^r\right) (1-m \bmod 2)(1-v \bmod 2)(-b z^r)^{-1/r} +$$

$$\binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Big(e^{e+i m q-2 i q s} \Gamma\left(\frac{1}{r}, (-b-i a m+2 i a s) z^r\right) ((-b-i a m+2 i a s) z^r)^{-1/r} +$$

$$e^{e-i m q+2 i q s} ((-b+i a m-2 i a s) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+i a m-2 i a s) z^r\right)\Big) +$$

$$\binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \Big(e^{e+2 g k-g v+\frac{i \pi v}{2}} \Gamma\left(\frac{1}{r}, (-b-2 c k+c v) z^r\right) ((-b-2 c k+c v) z^r)^{-1/r} +$$

$$e^{e-2 g k+g v-\frac{i \pi v}{2}} ((-b+2 c k-c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 c k-c v) z^r\right)\Big) +$$

$$\sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Big(e^{e+2 g k+i m q-2 i q s-g v+\frac{i \pi v}{2}} \Gamma\left(\frac{1}{r}, (-b-2 c k-i a m+2 i a s+c v) z^r\right)$$

$$((-b-2 c k-i a m+2 i a s+c v) z^r)^{-1/r} + e^{e+2 g k-i m q+2 i q s-g v+\frac{i \pi v}{2}}$$

$$((-b-2 c k+i a m-2 i a s+c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b-2 c k+i a m-2 i a s+c v) z^r\right) +$$

$$e^{e-2 g k+i m q-2 i q s+g v-\frac{i \pi v}{2}} ((-b+2 c k-i a m+2 i a s-c v) z^r)^{-1/r}$$

$$\Gamma\left(\frac{1}{r}, (-b+2 c k-i a m+2 i a s-c v) z^r\right) + e^{e-2 g k-i m q+2 i q s+g v-\frac{i \pi v}{2}}$$

$$((-b+2 c k+i a m-2 i a s-c v) z^r)^{-1/r} \Gamma\left(\frac{1}{r}, (-b+2 c k+i a m-2 i a s-c v) z^r\right)\Big)\Bigg) /;\ m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.3246.01

$$\int e^{b z^2+e} \cos^m(a z^2+q) \sinh^\nu(c z^2+g)\, dz = \frac{i^{-\nu}\left(2^{-m-\nu-1} e^e \sqrt{\pi} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \operatorname{erfi}(\sqrt{b}\, z)(1-m \bmod 2)(1-\nu \bmod 2)\right)}{\sqrt{b}} + i^{-\nu} 2^{-m-\nu-1} \sqrt{\pi} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} e^{e+i(m-2k)q} \binom{m}{k} \left(\frac{\operatorname{erfi}(\sqrt{b+a i (m-2k)}\, z)}{\sqrt{b+a i (m-2k)}} + \frac{e^{-2i(m-2k)q} \operatorname{erfi}(\sqrt{b-i a (m-2k)}\, z)}{\sqrt{b-i a(m-2k)}} \right) + i^{-\nu} 2^{-m-\nu-1} \sqrt{\pi} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k e^{e-g(\nu-2k)-\frac{i\pi\nu}{2}} \binom{\nu}{k} \left(\frac{e^{2\left(\frac{i\pi\nu}{2}+g(\nu-2k)\right)} \operatorname{erfi}(\sqrt{b+c(\nu-2k)}\, z)}{\sqrt{b+c(\nu-2k)}} + \frac{\operatorname{erfi}(\sqrt{b-c(\nu-2k)}\, z)}{\sqrt{b-c(\nu-2k)}} \right) + i^{-\nu} 2^{-m-\nu-1} \sqrt{\pi} \sum_{k=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{k} \sum_{s=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^s \binom{\nu}{s} \left(e^{e-i(m-2k)q-\frac{i\pi\nu}{2}-g(\nu-2s)} \left(\frac{e^{2\left(i(m-2k)q+\frac{i\pi\nu}{2}+g(\nu-2s)\right)} \operatorname{erfi}(\sqrt{b+a i (m-2k)+c(\nu-2s)}\, z)}{\sqrt{b+a i(m-2k)+c(\nu-2s)}} + \frac{\operatorname{erfi}(\sqrt{b-i a(m-2k)-c(\nu-2s)}\, z)}{\sqrt{b-i a (m-2k)-c(\nu-2s)}} \right) + e^{e+i(m-2k)q-\frac{i\pi\nu}{2}-g(\nu-2s)} \left(\frac{e^{2\left(-i(m-2k)q+\frac{i\pi\nu}{2}+g(\nu-2s)\right)} \operatorname{erfi}(\sqrt{b-i a(m-2k)+c(\nu-2s)}\, z)}{\sqrt{b-i a(m-2k)+c(\nu-2s)}} + \frac{\operatorname{erfi}(\sqrt{b+a i(m-2k)-c(\nu-2s)}\, z)}{\sqrt{b+a i (m-2k)-c(\nu-2s)}} \right) \right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3247.01

$$\int e^{\sqrt{z}\, b+e} \cos^m\left(\sqrt{z}\, a+q\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = \frac{i^{-\nu}\left(2^{-m-\nu+1} e^{\sqrt{z}\, b+e}\left(b\sqrt{z}-1\right)\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}(1-m \bmod 2)(1-\nu \bmod 2)\right)}{b^2} +$$

$$i^{-\nu} 2^{-m-\nu+1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left(\frac{e^{e+i(m-2k)q+(b+a i(m-2k))\sqrt{z}}\left(\sqrt{z}\, b+a i(m-2k)\sqrt{z}-1\right)}{(-b-i a(m-2k))^2} + \frac{e^{e-i(m-2k)q+(b-i a(m-2k))\sqrt{z}}\left(\sqrt{z}\, b-i a(m-2k)\sqrt{z}-1\right)}{(b-i a(m-2k))^2}\right)\binom{m}{k} +$$

$$i^{-\nu} 2^{-m-\nu+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\left(\frac{e^{e+\frac{i\pi\nu}{2}+g(\nu-2k)+(b+c(\nu-2k))\sqrt{z}}\left(\sqrt{z}\, b+c(\nu-2k)\sqrt{z}-1\right)}{(b+c(\nu-2k))^2} + \frac{e^{e-g(\nu-2k)+(b-c(\nu-2k))\sqrt{z}-\frac{i\pi\nu}{2}}\left(\sqrt{z}\, b-c(\nu-2k)\sqrt{z}-1\right)}{(c(\nu-2k)-b)^2}\right)\binom{\nu}{k} + i^{-\nu} 2^{-m-\nu+1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\left(\left(e^{e-i(m-2k)q+\frac{i\pi\nu}{2}+g(\nu-2s)+(b-i a(m-2k)+c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\, b+(c(\nu-2s)-i a(m-2k))\sqrt{z}-1\right)\right)\Big/ (b-i a(m-2k)+c(\nu-2s))^2 + \left(e^{e+i(m-2k)q+\frac{i\pi\nu}{2}+g(\nu-2s)+(b+a i(m-2k)+c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\, b+(a i(m-2k)+c(\nu-2s))\sqrt{z}-1\right)\right)\Big/ (b+a i(m-2k)+c(\nu-2s))^2 + \left(e^{e+i(m-2k)q-\frac{i\pi\nu}{2}-g(\nu-2s)+(b+a i(m-2k)-c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\, b-(c(\nu-2s)-i a(m-2k))\sqrt{z}-1\right)\right)\Big/ (-b-i a(m-2k)+c(\nu-2s))^2 + \left(e^{e-i(m-2k)q-\frac{i\pi\nu}{2}-g(\nu-2s)+(b-i a(m-2k)-c(\nu-2s))\sqrt{z}}\left(\sqrt{z}\, b-(a i(m-2k)+c(\nu-2s))\sqrt{z}-1\right)\right)\Big/ (-b+a i(m-2k)+c(\nu-2s))^2\right)\binom{\nu}{s} /;\ m\in\mathbb{N}^+ \land \nu\in\mathbb{N}^+$$

Involving $e^{b z^r+d z+e} \cos^m\left(a z^r+p z+q\right) \sinh^\nu\left(c z^r+f z+g\right)$

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$$\int e^{b z^2+d z+e} \cos^m\left(a z^2+p z+q\right) \sinh^\nu\left(c z^2+f z+g\right) dz =$$

$$\frac{i^\nu 2^{-m-\nu-1}\sqrt{\pi}\,(1-m \bmod 2)(1-\nu \bmod 2)}{\sqrt{b}}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}} e^{-\frac{d^2-4 b e}{4 b}} \operatorname{erfi}\left(\frac{d+2 b z}{2\sqrt{b}}\right) +$$

$$i^\nu 2^{-m-\nu-1}\sqrt{\pi}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\left(\binom{m}{s}\left(e^{-\frac{(d+i p(m-2s))^2-4(b+a i(m-2s))(e+i q(m-2s))}{4(b+a i(m-2s))}}\sqrt{b+a i(m-2s)}\right.\right.$$

$$(b-i a(m-2s)) \operatorname{erfi}\left(\frac{d+i p(m-2s)+2(b+a i(m-2s))z}{2\sqrt{b+a i(m-2s)}}\right) + e^{-\frac{(d-i p(m-2s))^2-4(b-i a(m-2s))(e-i q(m-2s))}{4(b-i a(m-2s))}}$$

$$(b+a\,i\,(m-2\,s))\sqrt{b-i\,a\,(m-2\,s)}\;\operatorname{erfi}\left(\frac{d-i\,p\,(m-2\,s)+2\,b\,z-2\,i\,a\,(m-2\,s)\,z}{2\sqrt{b-i\,a\,(m-2\,s)}}\right)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$((b-i\,a\,(m-2\,s))\,(b+a\,i\,(m-2\,s)))+i^{v}\,2^{-m-v-1}\sqrt{\pi}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\left((-1)^{k}\binom{v}{k}\left(e^{-\frac{(d+f\,(v-2\,k))^{2}-4\,(b+c\,(v-2\,k))\left(e+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}\right)}{4\,(b+c\,(v-2\,k))}}\sqrt{b+c\,(v-2\,k)}\;(b-c\,(v-2\,k))\operatorname{erfi}\left(\right.\right.\right.$$

$$\left.\frac{d+f\,(v-2\,k)+2\,(b+c\,(v-2\,k))\,z}{2\sqrt{b+c\,(v-2\,k)}}\right)+e^{-\frac{(d-f\,(v-2\,k))^{2}-4\,(b-c\,(v-2\,k))\left(e+\frac{i\,\pi\,v}{2}-g\,(v-2\,k)\right)}{4\,(b-c\,(v-2\,k))}}\;(b+c\,(v-2\,k))\sqrt{b-c\,(v-2\,k)}$$

$$\left.\left.\left.\operatorname{erfi}\left(\frac{d-f\,(v-2\,k)+2\,b\,z-2\,c\,(v-2\,k)\,z}{2\sqrt{b-c\,(v-2\,k)}}\right)\right)\right)\right/((b-c\,(v-2\,k))\,(b+c\,(v-2\,k)))+i^{v}\,2^{-m-v-1}\sqrt{\pi}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k}\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\left(\left(e^{-\frac{(d+i\,p\,(m-2\,s)+f\,(2\,k-v))^{2}-4\,(b+a\,i\,(m-2\,s)+c\,(2\,k-v))\left(e+i\,q\,(m-2\,s)+g\,(2\,k-v)+\frac{i\,\pi\,v}{2}\right)}{4\,(b+a\,i\,(m-2\,s)+c\,(2\,k-v))}}\sqrt{b+a\,i\,(m-2\,s)+c\,(2\,k-v)}\right.\right.\right.$$

$$(b-i\,a\,(m-2\,s)-c\,(2\,k-v))\operatorname{erfi}\left(\frac{d+i\,p\,(m-2\,s)+f\,(2\,k-v)+2\,(b+a\,i\,(m-2\,s)+c\,(2\,k-v))\,z}{2\sqrt{b+a\,i\,(m-2\,s)+c\,(2\,k-v)}}\right)+$$

$$e^{-\frac{(d-i\,p\,(m-2\,s)-f\,(2\,k-v))^{2}-4\,(b-i\,a\,(m-2\,s)-c\,(2\,k-v))\left(e-i\,q\,(m-2\,s)-g\,(2\,k-v)-\frac{i\,\pi\,v}{2}\right)}{4\,(b-i\,a\,(m-2\,s)-c\,(2\,k-v))}}$$

$$(b+a\,i\,(m-2\,s)+c\,(2\,k-v))\sqrt{b-i\,a\,(m-2\,s)-c\,(2\,k-v)}$$

$$\left.\left.\operatorname{erfi}\left(\frac{d-i\,p\,(m-2\,s)-f\,(2\,k-v)+2\,b\,z-2\,(a\,i\,(m-2\,s)+c\,(2\,k-v))\,z}{2\sqrt{b-i\,a\,(m-2\,s)-c\,(2\,k-v)}}\right)\right)\right/$$

$$((b-i\,a\,(m-2\,s)-c\,(2\,k-v))\,(b+a\,i\,(m-2\,s)+c\,(2\,k-v)))+$$

$$\left(e^{-\frac{(d+i\,p\,(m-2\,s)+f\,(v-2\,k))^{2}-4\,(b+a\,i\,(m-2\,s)+c\,(v-2\,k))\left(e+i\,q\,(m-2\,s)+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}\right)}{4\,(b+a\,i\,(m-2\,s)+c\,(v-2\,k))}}\sqrt{b+a\,i\,(m-2\,s)+c\,(v-2\,k)}\right.$$

$$(b-i\,a\,(m-2\,s)-c\,(v-2\,k))\operatorname{erfi}\left(\frac{d+i\,p\,(m-2\,s)+f\,(v-2\,k)+2\,(b+a\,i\,(m-2\,s)+c\,(v-2\,k))\,z}{2\sqrt{b+a\,i\,(m-2\,s)+c\,(v-2\,k)}}\right)+$$

$$e^{-\frac{(d-i\,p\,(m-2\,s)-f\,(v-2\,k))^{2}-4\,(b-i\,a\,(m-2\,s)-c\,(v-2\,k))\left(e-i\,q\,(m-2\,s)+\frac{i\,\pi\,v}{2}-g\,(v-2\,k)\right)}{4\,(b-i\,a\,(m-2\,s)-c\,(v-2\,k))}}$$

$$(b+a\,i\,(m-2\,s)+c\,(v-2\,k))\sqrt{b-i\,a\,(m-2\,s)-c\,(v-2\,k)}$$

$$\left.\left.\operatorname{erfi}\left(\frac{d-i\,p\,(m-2\,s)-f\,(v-2\,k)+2\,b\,z-2\,(a\,i\,(m-2\,s)+c\,(v-2\,k))\,z}{2\sqrt{b-i\,a\,(m-2\,s)-c\,(v-2\,k)}}\right)\right)\right/$$

$$\left.((b-i\,a\,(m-2\,s)-c\,(v-2\,k))\,(b+a\,i\,(m-2\,s)+c\,(v-2\,k)))\right)\;/;\;m\in\mathbb{N}^{+}\land v\in\mathbb{N}^{+}$$

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$$\int e^{\sqrt{z}\, b+e+d z} \cos^m\left(\sqrt{z}\, a+q+p z\right) \sinh^\nu\left(\sqrt{z}\, c+g+f z\right) dz =$$

$$i^\nu\, 2^{-m-\nu-2}\, e^e \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \left(\frac{4\, e^{\sqrt{z}\, b+d z}}{d} - \frac{2\, b \sqrt{\pi}}{d^{3/2}}\, e^{-\frac{b^2}{4 d}} \operatorname{erfi}\left(\frac{b+2 d \sqrt{z}}{2 \sqrt{d}}\right)\right) (1-m \bmod 2)\, (1-\nu \bmod 2) +$$

$$i^\nu\, 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{e-i q (m-2 s)} \binom{m}{s}$$

$$\Bigg(\sqrt{\pi} \Bigg(-\frac{e^{-\frac{(b-i a m+2 i a s)^2}{4 (d-i m p+2 i p s)}} (b-i a m+2 i a s) \operatorname{erfi}\left(\frac{b+a i (2 s-m)+2 (d-i m p+2 i p s) \sqrt{z}}{2 \sqrt{d-i m p+2 i p s}}\right)}{(d-i m p+2 i p s)^{3/2}} - \Bigg(e^{2 i q (m-2 s)-\frac{(b+a i (m-2 s))^2}{4 (d+i p (m-2 s))}}$$

$$(b+a i (m-2 s)) \operatorname{erfi}\left(\frac{b+a i (m-2 s)+2 (d+i m p-2 i p s) \sqrt{z}}{2 \sqrt{d+i p (m-2 s)}}\right)\Bigg) \Big/ (d+i p (m-2 s))^{3/2}\Bigg) +$$

$$\frac{2\, e^{2 i q (m-2 s)+(d+i p (m-2 s)) z+(b+a i (m-2 s)) \sqrt{z}}}{d+i p (m-2 s)} + \frac{2\, e^{\sqrt{z}\, (b-i a (m-2 s))+(d-i p (m-2 s)) z}}{d-i p (m-2 s)}\Bigg) + i^\nu\, 2^{-m-\nu-1} \binom{m}{\frac{m}{2}}$$

$$(1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k\, e^{e+\frac{i \pi \nu}{2}-g (\nu-2 k)} \binom{\nu}{k} \Bigg(\sqrt{\pi} \Bigg(-\frac{e^{-\frac{(b+2 c k-c \nu)^2}{4 (d+2 f k-f \nu)}} (b+2 c k-c \nu) \operatorname{erfi}\left(\frac{b+c (2 k-\nu)+2 (d+2 f k-f \nu) \sqrt{z}}{2 \sqrt{d+2 f k-f \nu}}\right)}{(d+2 f k-f \nu)^{3/2}} -$$

$$\frac{e^{-\frac{(b+c (\nu-2 k))^2}{4 (d+f (\nu-2 k))}-i \pi \nu+2 g (\nu-2 k)} (b+c (\nu-2 k)) \operatorname{erfi}\left(\frac{b+c (\nu-2 k)+2 (d-2 f k+f \nu) \sqrt{z}}{2 \sqrt{d+f (\nu-2 k)}}\right)}{(d+f (\nu-2 k))^{3/2}}\Bigg) +$$

$$\frac{2\, e^{\sqrt{z}\, (b+c (\nu-2 k))+2 \left(g (\nu-2 k)-\frac{i \pi \nu}{2}\right)+(d+f (\nu-2 k)) z}}{d+f (\nu-2 k)} + \frac{2\, e^{\sqrt{z}\, (b-c (\nu-2 k))+(d-f (\nu-2 k)) z}}{d-f (\nu-2 k)}\Bigg) +$$

$$i^\nu\, 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(e^{e-i q (m-2 s)-g (2 k-\nu)-\frac{i \pi \nu}{2}} \Bigg(\frac{2\, e^{\sqrt{z}\, (b-2 c k-i a m+2 i a s+c \nu)+(d-2 f k-i m p+2 i p s+f \nu) z}}{d-2 f k-i m p+2 i p s+f \nu} -$$

$$\Bigg(e^{-\frac{(b-2 c k-i a m+2 i a s+c \nu)^2}{4 (d-2 f k-i m p+2 i p s+f \nu)}} \sqrt{\pi}\, (b-2 c k-i a m+2 i a s+c \nu)$$

$$\operatorname{erfi}\Big((b+a i (2 s-m)+c (\nu-2 k)+2 (d-2 f k-i m p+2 i p s+f \nu) \sqrt{z}\Big) \Big/$$

$$\left(2\sqrt{d-2fk-i m p+2 i p s+f v}\right)\Bigg)\Bigg)\Big/(d-2fk-imp+2ips+fv)^{3/2}+$$

$$\left(2e^{4gk+2iq(m-2s)-2gv+i\pi v+(d+2fk+imp-2ips-fv)z+(b+2ck+iam-2ias-cv)\sqrt{z}}\right)\Big/(d+2fk+imp-2ips-fv)-\Bigg(e^{-\frac{(b+2ck+iam-2ias-cv)^2}{4(d+2fk+imp-2ips-fv)}+4gk+2iq(m-2s)-2gv+i\pi v}\sqrt{\pi}\,(b+2ck+iam-2ias-cv)$$

$$\operatorname{erfi}\Big(\big(b+ai(m-2s)+c(2k-v)+2(d+2fk+imp-2ips-fv)\sqrt{z}\big)\Big/\left(2\sqrt{d+2fk+imp-2ips-fv}\right)\Big)\Bigg)\Big/(d+2fk+imp-2ips-fv)^{3/2}\Bigg)+$$

$$e^{e-iq(m-2s)+\frac{i\pi v}{2}-g(v-2k)}\Bigg(\left(2e^{2iq(m-2s)-i\pi v+2g(v-2k)+(d-2fk+imp-2ips+fv)z+(b-2ck+iam-2ias+cv)\sqrt{z}}\right)\Big/(d-2fk+imp-2ips+fv)-\Bigg(e^{-\frac{(b+ai(m-2s)+c(v-2k))^2}{4(d-2fk+imp-2ips+fv)}+2iq(m-2s)-i\pi v+2g(v-2k)}$$

$$\sqrt{\pi}\,(b+ai(m-2s)+c(v-2k))\operatorname{erfi}\Big(\big(b+ai(m-2s)+c(v-2k)+2(d-2fk+imp-2ips+fv)\sqrt{z}\big)\Big/\left(2\sqrt{d-2fk+imp-2ips+fv}\right)\Big)\Bigg)\Big/$$

$$(d-2fk+imp-2ips+fv)^{3/2}+\frac{2e^{\sqrt{z}\,(b+2ck-iam+2ias-cv)+(d+2fk-imp+2ips-fv)z}}{d+2fk-imp+2ips-fv}-$$

$$\Bigg(e^{-\frac{(b+2ck-iam+2ias-cv)^2}{4(d+2fk-imp+2ips-fv)}}\sqrt{\pi}\,(b+2ck-iam+2ias-cv)\operatorname{erfi}\Big(\big(b+ai(2s-m)+c(2k-v)+2(d+2fk-imp+2ips-fv)\sqrt{z}\big)\Big/\left(2\sqrt{d+2fk-imp+2ips-fv}\right)\Big)\Bigg)\Big/(d+2fk-imp+2ips-fv)^{3/2}\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving powers of cos and rational functions of exp

Involving $\cos^m(e\,z)\sinh^v(c\,z)\left(a+b\,e^{d\,z}\right)^{-n}$

01.19.21.3250.01

$$\int\frac{\cos^m(e\,z)\sinh^v(c\,z)}{\left(a+b\,e^{d\,z}\right)^n}\,dz=$$

$$2^{-m-v}\,i^v\,a^{-n}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\Bigg(\Bigg(\Bigg(e^{(2ck+iem-2ies-cv)z}\,{}_2F_1\left(\frac{2ck+iem-2ies-cv}{d},n;\frac{d+2ck+iem-2ies-cv}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-2ck-iem+2ies+cv)z}\,{}_2F_1\left(\frac{-2ck-iem+2ies+cv}{d},n;\frac{d-2ck-iem+2ies+cv}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Big/(2ck+iem-2ies-cv)+$$

$$\Bigg(\Bigg(e^{(2ck-iem+2ies-cv)z}\,{}_2F_1\Big(\frac{2ck-iem+2ies-cv}{d},n;\frac{d+2ck-iem+2ies-cv}{d};-\frac{b\,e^{dz}}{a}\Big)-e^{(-2ck+iem-2ies+cv)z}\,{}_2F_1\Big(\frac{-2ck+iem-2ies+cv}{d},n;\frac{d-2ck+iem-2ies+cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Bigg)\Big/(2ck-iem+2ies-cv)\Bigg)\cos\Big(\frac{\pi v}{2}\Big)+$$

$$i\Bigg(\Bigg(e^{(-2ck-iem+2ies+cv)z}\,{}_2F_1\Big(\frac{-2ck-iem+2ies+cv}{d},n;\frac{d-2ck-iem+2ies+cv}{d};-\frac{b\,e^{dz}}{a}\Big)+e^{(2ck+iem-2ies-cv)z}\,{}_2F_1\Big(\frac{2ck+iem-2ies-cv}{d},n;\frac{d+2ck+iem-2ies-cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Bigg)\Big/(2ck+iem-2ies-cv)+$$

$$\Bigg(e^{(-2ck+iem-2ies+cv)z}\,{}_2F_1\Big(\frac{-2ck+iem-2ies+cv}{d},n;\frac{d-2ck+iem-2ies+cv}{d};-\frac{b\,e^{dz}}{a}\Big)+e^{(2ck-iem+2ies-cv)z}\,{}_2F_1\Big(\frac{2ck-iem+2ies-cv}{d},n;\frac{d+2ck-iem+2ies-cv}{d};-\frac{b\,e^{dz}}{a}\Big)\Bigg)\Big/(2ck-iem+2ies-cv)\Bigg)\sin\Big(\frac{\pi v}{2}\Big)\Bigg)-$$

$$\frac{i^v\,2^{-m-v}\,b^{-n}\,e^{-dnz}\,(1-m\bmod 2)(1-v\bmod 2)}{d\,n}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\Big(n,n;n+1;-\frac{a\,e^{-dz}}{b}\Big)-$$

$$\frac{i^{v+1}\,2^{-m-v}\,a^{-n}}{e}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2s}\binom{m}{s}\Bigg(e^{ie(m-2s)z}\,{}_2F_1\Big(\frac{ie(m-2s)}{d},n;\frac{d+ei(m-2s)}{d};-\frac{b\,e^{dz}}{a}\Big)-e^{-ie(m-2s)z}\,{}_2F_1\Big(-\frac{ie(m-2s)}{d},n;\frac{d-ie(m-2s)}{d};-\frac{b\,e^{dz}}{a}\Big)\Bigg)+$$

$$\frac{i^v\,2^{-m-v}\,a^{-n}}{c}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{(-1)^k}{v-2k}\binom{v}{k}\Bigg(e^{c(v-2k)z-\frac{i\pi v}{2}}\,{}_2F_1\Big(\frac{c(v-2k)}{d},n;\frac{d+c(v-2k)}{d};-\frac{b\,e^{dz}}{a}\Big)-e^{\frac{i\pi v}{2}-c(v-2k)z}\,{}_2F_1\Big(-\frac{c(v-2k)}{d},n;\frac{d-c(v-2k)}{d};-\frac{b\,e^{dz}}{a}\Big)\Bigg)\;/;\;n\in\mathbb{N}^+\wedge m\in\mathbb{N}^+\wedge v\in\mathbb{N}^+$$

Involving $e^{pz}\cos^m(ez)\sinh^v(cz)\left(a+b\,e^{dz}\right)^{-n}$

01.19.21.3251.01

$$\int \frac{e^{p z} \cos^m(e z) \sinh^\nu(c z)}{\left(a + b e^{d z}\right)^n} \, dz = 2^{-m-\nu} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \, a^{-n} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{s} \left(e^{(p+e i (m-2s)) z} (i e (m-2s) - p) \, {}_2F_1\left(\frac{p + e i (m-2s)}{d}, n; \frac{d + p + e i (m-2s)}{d}; -\frac{b e^{d z}}{a} \right) - e^{(p - i e (m-2s)) z} (p + e i (m-2s)) \, {}_2F_1\left(\frac{p - i e (m-2s)}{d}, n; \frac{d + p - i e (m-2s)}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \Big/ ((i e (m-2s) - p)(p + e i (m-2s))) + 2^{-m-\nu} i^\nu \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \, a^{-n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(e^{(p + c(\nu - 2k)) z - \frac{i \pi \nu}{2}} (c(\nu - 2k) - p) \, {}_2F_1\left(\frac{p + c(\nu-2k)}{d}, n; \frac{d + p + c(\nu - 2k)}{d}; -\frac{b e^{d z}}{a} \right) - e^{\frac{i \pi \nu}{2} + (p - c(\nu - 2k)) z} (p + c(\nu - 2k)) \, {}_2F_1\left(\frac{p - c(\nu - 2k)}{d}, n; \frac{d + p - c(\nu - 2k)}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \Big/ ((c(\nu - 2k) - p)(p + c(\nu - 2k))) + 2^{-m-\nu} i^\nu a^{-n} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\left(\left(e^{(2ck + iem + p - 2ies - c\nu) z} (2ck + iem - p - 2ies - c\nu) \, {}_2F_1\left(\frac{2ck + iem + p - 2ies - c\nu}{d}, n; \frac{d + 2ck + iem + p - 2ies - c\nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2ck - iem + p + 2ies + c\nu) z} (2ck + iem + p - 2ies - c\nu) \, {}_2F_1\left(\frac{-2ck - iem + p + 2ies + c\nu}{d}, n; \frac{d - 2ck - iem + p + 2ies + c\nu}{d}; -\frac{b e^{d z}}{a} \right) \right) \right) \Big/ ((2ck + iem - p - 2ies - c\nu)(2ck + iem + p - 2ies - c\nu)) + \left(e^{(2ck - iem + p + 2ies - c\nu) z} (2ck - iem - p + 2ies - c\nu) \, {}_2F_1\left(\frac{2ck - iem + p + 2ies - c\nu}{d}, n; \frac{d + 2ck - iem + p + 2ies - c\nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2ck + iem + p - 2ies + c\nu) z} (2ck - iem + p + 2ies - c\nu) \, {}_2F_1\left(\frac{-2ck + iem + p - 2ies + c\nu}{d}, n; \frac{d - 2ck + iem + p - 2ies + c\nu}{d}; -\frac{b e^{d z}}{a} \right) \right) \Big/ ((2ck - iem - p + 2ies - c\nu)(2ck - iem + p + 2ies - c\nu)) \right) \cos\left(\frac{\pi \nu}{2}\right) + i \left(\left(e^{(-2ck - iem + p + 2ies + c\nu) z} (2ck + iem + p - 2ies - c\nu) \, {}_2F_1\left(\frac{-2ck - iem + p + 2ies + c\nu}{d}, n; \frac{d - 2ck - iem + p + 2ies + c\nu}{d}; -\frac{b e^{d z}}{a} \right) + e^{(2ck + iem + p - 2ies - c\nu) z} (2ck + iem - \right.\right.$$

$$p-2\,i\,e\,s-c\,v)\,{}_2F_1\!\left(\frac{2\,c\,k+i\,e\,m+p-2\,i\,e\,s-c\,v}{d},\,n;\,\frac{d+2\,c\,k+i\,e\,m+p-2\,i\,e\,s-c\,v}{d};\right.$$

$$\left.\left.-\frac{b\,e^{d\,z}}{a}\right)\right)\Big/\left((2\,c\,k+i\,e\,m-p-2\,i\,e\,s-c\,v)\,(2\,c\,k+i\,e\,m+p-2\,i\,e\,s-c\,v)\right)+$$

$$\left(e^{(-2\,c\,k+i\,e\,m+p-2\,i\,e\,s+c\,v)\,z}\,(2\,c\,k-i\,e\,m+p+2\,i\,e\,s-c\,v)\,{}_2F_1\!\left(\frac{-2\,c\,k+i\,e\,m+p-2\,i\,e\,s+c\,v}{d},\right.\right.$$

$$\left.n;\,\frac{d-2\,c\,k+i\,e\,m+p-2\,i\,e\,s+c\,v}{d};\,-\frac{b\,e^{d\,z}}{a}\right)+e^{(2\,c\,k-i\,e\,m+p+2\,i\,e\,s-c\,v)\,z}\,(2\,c\,k-i\,e\,m-$$

$$p+2\,i\,e\,s-c\,v)\,{}_2F_1\!\left(\frac{2\,c\,k-i\,e\,m+p+2\,i\,e\,s-c\,v}{d},\,n;\,\frac{d+2\,c\,k-i\,e\,m+p+2\,i\,e\,s-c\,v}{d};\right.$$

$$\left.\left.\left.-\frac{b\,e^{d\,z}}{a}\right)\right)\Big/\left((2\,c\,k-i\,e\,m-p+2\,i\,e\,s-c\,v)\,(2\,c\,k-i\,e\,m+p+2\,i\,e\,s-c\,v)\right)\right)\sin\!\left(\frac{\pi\,v}{2}\right)\right)+$$

$$\frac{i^v\,2^{-m-v}\,a^{-n}\,e^{p\,z}\,(1-m\bmod 2)\,(1-v\bmod 2)}{p}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\!\left(\frac{p}{d},\,n;\,\frac{d+p}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\,/;\,n\in\mathbb{N}^+\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving powers of cos and algebraic functions of exp

Involving $\left(a+b\,e^{d\,z}\right)^\beta\cos^m(e\,z)\sinh^v(c\,z)$

01.19.21.3252.01

$$\int\left(a+b\,e^{d\,z}\right)^\beta\cos^m(e\,z)\sinh^v(c\,z)\,dz=$$

$$\frac{1}{d\,\beta}\left(i^v\,2^{-m-v}\left(\frac{e^{-d\,z}\,a}{b}+1\right)^{-\beta}\left(a+b\,e^{d\,z}\right)^\beta\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\!\left(-\beta,\,-\beta;\,1-\beta;\,-\frac{a\,e^{-d\,z}}{b}\right)(1-m\bmod 2)\,(1-v\bmod 2)\right)-$$

$$\frac{1}{e}\left(i\,i^v\,2^{-m-v}\left(a+b\,e^{d\,z}\right)^\beta\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\right.$$

$$\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{m-2\,s}\left(\binom{m}{s}\left(e^{i\,e\,(m-2\,s)\,z}\,{}_2F_1\!\left(\frac{i\,e\,(m-2\,s)}{d},\,-\beta;\,\frac{d+e\,i\,(m-2\,s)}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-e^{-i\,e\,(m-2\,s)\,z}\right.\right.$$

$$\left.\left.\left.{}_2F_1\!\left(-\frac{i\,e\,(m-2\,s)}{d},\,-\beta;\,\frac{d-i\,e\,(m-2\,s)}{d};\,-\frac{b\,e^{d\,z}}{a}\right)\right)\right)\right)+\frac{1}{c}\left(i^v\,2^{-m-v}\left(a+b\,e^{d\,z}\right)^\beta\left(\frac{e^{d\,z}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\right.$$

$$(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}\frac{1}{v-2\,k}\left((-1)^k\binom{v}{k}\left(e^{c\,(v-2\,k)\,z-\frac{i\,\pi\,v}{2}}\,{}_2F_1\!\left(\frac{c\,(v-2\,k)}{d},\,-\beta;\,\frac{d+c\,(v-2\,k)}{d};\,-\frac{b\,e^{d\,z}}{a}\right)-\right.\right.$$

$$e^{\frac{i\pi v}{2}-c(v-2k)z}\,{}_2F_1\left(-\frac{c(v-2k)}{d},-\beta;\frac{d-c(v-2k)}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg)\Bigg)\Bigg)+i^v\,2^{-m-v}\left(a+b\,e^{dz}\right)^\beta\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(\Bigg(\Bigg(\Bigg(e^{(2ck+iem-2ies-cv)z}\,{}_2F_1\left(\frac{2ck+iem-2ies-cv}{d},-\beta;\frac{d+2ck+iem-2ies-cv}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-2ck-iem+2ies+cv)z}\,{}_2F_1\left(\frac{-2ck-iem+2ies+cv}{d},-\beta;\frac{d-2ck-iem+2ies+cv}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg/(2ck+iem-2ies-cv)+$$

$$\left(e^{(2ck-iem+2ies-cv)z}\,{}_2F_1\left(\frac{2ck-iem+2ies-cv}{d},-\beta;\frac{d+2ck-iem+2ies-cv}{d};-\frac{b\,e^{dz}}{a}\right)-e^{(-2ck+iem-2ies+cv)z}\,{}_2F_1\left(\frac{-2ck+iem-2ies+cv}{d},-\beta;\frac{d-2ck+iem-2ies+cv}{d};-\frac{b\,e^{dz}}{a}\right)\right)\Bigg/(2ck-iem+2ies-cv)\Bigg)\cos\left(\frac{\pi v}{2}\right)+$$

$$i\Bigg(\Bigg(e^{(-2ck-iem+2ies+cv)z}\,{}_2F_1\left(\frac{-2ck-iem+2ies+cv}{d},-\beta;\frac{d-2ck-iem+2ies+cv}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(2ck+iem-2ies-cv)z}\,{}_2F_1\left(\frac{2ck+iem-2ies-cv}{d},-\beta;\frac{d+2ck+iem-2ies-cv}{d};-\frac{b\,e^{dz}}{a}\right)\Bigg)\Bigg/(2ck+iem-2ies-cv)+$$

$$\left(e^{(-2ck+iem-2ies+cv)z}\,{}_2F_1\left(\frac{-2ck+iem-2ies+cv}{d},-\beta;\frac{d-2ck+iem-2ies+cv}{d};-\frac{b\,e^{dz}}{a}\right)+e^{(2ck-iem+2ies-cv)z}\,{}_2F_1\left(\frac{2ck-iem+2ies-cv}{d},-\beta;\frac{d+2ck-iem+2ies-cv}{d};-\frac{b\,e^{dz}}{a}\right)\right)\Bigg/(2ck-iem+2ies-cv)\Bigg)\sin\left(\frac{\pi v}{2}\right)\Bigg)\Bigg)\,/;\,m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $e^{pz}\left(a+b\,e^{dz}\right)^\beta\cos^m(e\,z)\sinh^v(c\,z)$

01.19.21.3253.01

$$\int e^{pz}\left(a+b\,e^{dz}\right)^\beta\cos^m(e\,z)\sinh^v(c\,z)\,dz=$$

$$\frac{i^v\,2^{-m-v}}{p}\,e^{pz}\left(a+b\,e^{dz}\right)^\beta\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\,{}_2F_1\left(\frac{p}{d},-\beta;\frac{d+p}{d};-\frac{b\,e^{dz}}{a}\right)(1-m\bmod 2)(1-v\bmod 2)+$$

$$i^v\,2^{-m-v}\left(a+b\,e^{dz}\right)^\beta\left(\frac{e^{dz}\,b}{a}+1\right)^{-\beta}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \left(\binom{m}{s} \left(e^{(p+e i (m-2 s)) z} (i e (m-2 s) - p)\, {}_2F_1\!\left(\frac{p+e i (m-2 s)}{d}, -\beta; \frac{d+p+e i (m-2 s)}{d}; -\frac{b e^{d z}}{a} \right) - \right.\right.$$

$$\left.\left. e^{(p-i e (m-2 s)) z} (p+e i (m-2 s))\, {}_2F_1\!\left(\frac{p-i e (m-2 s)}{d}, -\beta; \frac{d+p-i e (m-2 s)}{d}; -\frac{b e^{d z}}{a} \right)\right)\right) \Big/$$

$$((i e (m-2 s) - p)(p + e i (m-2 s))) + i^{\nu}\, 2^{-m-\nu} \left(a + b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta} \binom{m}{\frac{m}{2}} (1 - m \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k \binom{\nu}{k} \left(e^{(p+c(\nu-2k)) z - \frac{i \pi \nu}{2}} (c(\nu-2k) - p)\, {}_2F_1\!\left(\frac{p+c(\nu-2k)}{d}, -\beta; \frac{d+p+c(\nu-2k)}{d}; -\frac{b e^{d z}}{a} \right) - \right.\right.$$

$$\left.\left. e^{\frac{i \pi \nu}{2} + (p-c(\nu-2k)) z} (p+c(\nu-2k))\, {}_2F_1\!\left(\frac{p-c(\nu-2k)}{d}, -\beta; \frac{d+p-c(\nu-2k)}{d}; -\frac{b e^{d z}}{a} \right)\right)\right) \Big/$$

$$((c(\nu-2k) - p)(p + c(\nu-2k))) + i^{\nu}\, 2^{-m-\nu} \left(a + b e^{d z}\right)^{\beta} \left(\frac{e^{d z} b}{a} + 1 \right)^{-\beta}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\left(\left(e^{(2 c k + i e m + p - 2 i e s - c \nu) z} (2 c k + i e m - p - 2 i e s - c \nu)\, {}_2F_1\!\left(\frac{2 c k + i e m + p - 2 i e s - c \nu}{d}, -\beta; \right.\right.\right.\right.$$

$$\left. \frac{d + 2 c k + i e m + p - 2 i e s - c \nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2 c k - i e m + p + 2 i e s + c \nu) z} (2 c k + i e m + p -$$

$$2 i e s - c \nu)\, {}_2F_1\!\left(\frac{-2 c k - i e m + p + 2 i e s + c \nu}{d}, -\beta; \frac{d - 2 c k - i e m + p + 2 i e s + c \nu}{d}; \right.$$

$$\left.\left. -\frac{b e^{d z}}{a} \right)\right) \Big/ ((2 c k + i e m - p - 2 i e s - c \nu)(2 c k + i e m + p - 2 i e s - c \nu)) +$$

$$\left(e^{(2 c k - i e m + p + 2 i e s - c \nu) z} (2 c k - i e m - p + 2 i e s - c \nu)\, {}_2F_1\!\left(\frac{2 c k - i e m + p + 2 i e s - c \nu}{d}, -\beta; \right.\right.$$

$$\left. \frac{d + 2 c k - i e m + p + 2 i e s - c \nu}{d}; -\frac{b e^{d z}}{a} \right) - e^{(-2 c k + i e m + p - 2 i e s + c \nu) z} (2 c k - i e m + p +$$

$$2 i e s - c \nu)\, {}_2F_1\!\left(\frac{-2 c k + i e m + p - 2 i e s + c \nu}{d}, -\beta; \frac{d - 2 c k + i e m + p - 2 i e s + c \nu}{d}; \right.$$

$$\left.\left.\left. -\frac{b e^{d z}}{a} \right)\right) \Big/ ((2 c k - i e m - p + 2 i e s - c \nu)(2 c k - i e m + p + 2 i e s - c \nu)) \right) \cos\!\left(\frac{\pi \nu}{2} \right) +$$

$$i \left(\left(e^{(-2 c k - i e m + p + 2 i e s + c \nu) z} (2 c k + i e m + p - 2 i e s - c \nu)\, {}_2F_1\!\left(\frac{-2 c k - i e m + p + 2 i e s + c \nu}{d}, \right.\right.\right.$$

$$\left. -\beta; \frac{d - 2 c k - i e m + p + 2 i e s + c \nu}{d}; -\frac{b e^{d z}}{a} \right) +$$

$$e^{(2 c k + i e m + p - 2 i e s - c \nu) z} (2 c k + i e m - p - 2 i e s - c \nu)\, {}_2F_1\!\left(\frac{2 c k + i e m + p - 2 i e s - c \nu}{d}, \right.$$

$$\left.\left. -\beta; \frac{d + 2 c k + i e m + p - 2 i e s - c \nu}{d}; -\frac{b e^{d z}}{a} \right)\right) \Big/ ((2 c k + i e m - p - 2 i e s - c \nu)$$

$$(2\,c\,k + i\,e\,m + p - 2\,i\,e\,s - c\,v)) + \Bigg(e^{(-2\,c\,k + i\,e\,m + p - 2\,i\,e\,s + c\,v)\,z}\,(2\,c\,k - i\,e\,m + p + 2\,i\,e\,s - c\,v)$$
$${}_2F_1\!\left(\frac{-2\,c\,k + i\,e\,m + p - 2\,i\,e\,s + c\,v}{d}, -\beta;\, \frac{d - 2\,c\,k + i\,e\,m + p - 2\,i\,e\,s + c\,v}{d};\, -\frac{b\,e^{d\,z}}{a}\right) +$$
$$e^{(2\,c\,k - i\,e\,m + p + 2\,i\,e\,s - c\,v)\,z}\,(2\,c\,k - i\,e\,m - p + 2\,i\,e\,s - c\,v)$$
$${}_2F_1\!\left(\frac{2\,c\,k - i\,e\,m + p + 2\,i\,e\,s - c\,v}{d}, -\beta;\, \frac{d + 2\,c\,k - i\,e\,m + p + 2\,i\,e\,s - c\,v}{d};\, -\frac{b\,e^{d\,z}}{a}\right)\Bigg)\Bigg/$$
$$((2\,c\,k - i\,e\,m - p + 2\,i\,e\,s - c\,v)\,(2\,c\,k - i\,e\,m + p + 2\,i\,e\,s - c\,v))\Bigg)\sin\!\left(\frac{\pi\,v}{2}\right)\Bigg) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

Involving tan and exp

01.19.21.3254.01

$$\int e^{p\,z}\tan(b\,z)\sinh^{v}(c\,z)\,dz =$$
$$\frac{v \bmod 2 - 1}{(i\,p - 2\,b)\,p}\left(\frac{i}{2}\right)^{v}\binom{v}{\frac{v}{2}}\left(e^{p\,z}\,(2\,i\,b + p)\,{}_2F_1\!\left(-\frac{i\,p}{2\,b}, 1;\, 1 - \frac{i\,p}{2\,b};\, -e^{2\,i\,b\,z}\right) - e^{(2\,i\,b + p)\,z}\,p\,{}_2F_1\!\left(1 - \frac{i\,p}{2\,b}, 1;\, 2 - \frac{i\,p}{2\,b};\, -e^{2\,i\,b\,z}\right)\right) -$$
$$i\,2^{-v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k}\binom{v}{k}\Bigg((-1)^{v}\Bigg(\frac{e^{(2\,i\,b + 2\,c\,k + p - c\,v)\,z}}{2\,i\,b + 2\,c\,k + p - c\,v}\,{}_2F_1\!\left(\frac{2\,b - i\,(2\,c\,k + p - c\,v)}{2\,b}, 1;\, \frac{4\,b - i\,(2\,c\,k + p - c\,v)}{2\,b};\, -e^{2\,i\,b\,z}\right) -$$
$$\frac{e^{(2\,c\,k + p - c\,v)\,z}}{2\,c\,k + p - c\,v}\,{}_2F_1\!\left(-\frac{i\,(2\,c\,k + p - c\,v)}{2\,b}, 1;\, 1 - \frac{i\,(2\,c\,k + p - c\,v)}{2\,b};\, -e^{2\,i\,b\,z}\right)\Bigg) -$$
$$\frac{e^{(p + c\,(v - 2\,k))\,z}}{p + c\,(v - 2\,k)}\,{}_2F_1\!\left(\frac{i\,(2\,c\,k - p - c\,v)}{2\,b}, 1;\, \frac{i\,(2\,c\,k - p - c\,v)}{2\,b} + 1;\, -e^{2\,i\,b\,z}\right) +$$
$$\frac{e^{(2\,i\,b + p + c\,(v - 2\,k))\,z}}{2\,i\,b + p + c\,(v - 2\,k)}\,{}_2F_1\!\left(\frac{2\,b + i\,(2\,c\,k - p - c\,v)}{2\,b}, 1;\, \frac{4\,b + i\,(2\,c\,k - p - c\,v)}{2\,b};\, -e^{2\,i\,b\,z}\right)\Bigg) /;\, v \in \mathbb{N}^+$$

Involving cot and exp

01.19.21.3255.01

$$\int e^{pz}\cot(bz)\sinh^{\nu}(cz)\,dz = i\,2^{-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^{\nu}\left(-\frac{e^{(2ib+2ck+p-c\nu)z}}{2ib+2ck+p-c\nu}\,{}_2F_1\left(\frac{2b-i(2ck+p-c\nu)}{2b},1;\frac{4b-i(2ck+p-c\nu)}{2b};e^{2ibz}\right)-\frac{e^{(2ck+p-c\nu)z}}{2ck+p-c\nu}\,{}_2F_1\left(-\frac{i(2ck+p-c\nu)}{2b},1;1-\frac{i(2ck+p-c\nu)}{2b};e^{2ibz}\right)\right)-\frac{e^{(2ib+p+c(\nu-2k))z}}{2ib+p+c(\nu-2k)}\,{}_2F_1\left(\frac{2b+i(2ck-p-c\nu)}{2b},1;\frac{4b+i(2ck-p-c\nu)}{2b};e^{2ibz}\right)-\frac{e^{(p+c(\nu-2k))z}}{p+c(\nu-2k)}\,{}_2F_1\left(\frac{i(2ck-p-c\nu)}{2b},1;\frac{i(2ck-p-c\nu)}{2b}+1;e^{2ibz}\right)\right)-\frac{1-\nu\bmod 2}{(2b-ip)p}\left(\frac{i}{2}\right)^{\nu}\binom{\nu}{\frac{\nu}{2}}\left(e^{pz}(2ib+p)\,{}_2F_1\left(-\frac{ip}{2b},1;1-\frac{ip}{2b};e^{2ibz}\right)+e^{(2ib+p)z}\,p\,{}_2F_1\left(1-\frac{ip}{2b},1;2-\frac{ip}{2b};e^{2ibz}\right)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving csc and exp

01.19.21.3256.01

$$\int e^{pz}\csc(bz)\sinh^{\nu}(cz)\,dz = -\frac{i^{\nu}\,2^{1-\nu}\,e^{(ib+p)z}(1-\nu\bmod 2)}{b-ip}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(\frac{b-ip}{2b},1;\frac{3}{2}-\frac{ip}{2b};e^{2ibz}\right)+2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}e^{(ib+p-c(2k+\nu))z}\left(e^{2c\nu z}(ib+2ck+p-c\nu)\,{}_2F_1\left(\frac{b+i(2ck-p-c\nu)}{2b},1;\frac{3b+i(2ck-p-c\nu)}{2b};e^{2ibz}\right)+e^{i\pi\nu+4ckz}(ib+p+c(\nu-2k))\,{}_2F_1\left(\frac{b-i(2ck+p-c\nu)}{2b},1;\frac{3b-i(2ck+p-c\nu)}{2b};e^{2ibz}\right)\right)\Big/\left((ib+2ck+p-c\nu)(-b-2ick+ip+ic\nu)\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving sec and exp

01.19.21.3257.01

$$\int e^{pz}\sec(bz)\sinh^{\nu}(cz)\,dz = -\frac{i^{\nu+1}\,2^{1-\nu}\,e^{(ib+p)z}(1-\nu\bmod 2)}{b-ip}\binom{\nu}{\frac{\nu}{2}}\,{}_2F_1\left(\frac{b-ip}{2b},1;\frac{3}{2}-\frac{ip}{2b};-e^{2ibz}\right)+2^{1-\nu}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}\left((-1)^k\binom{\nu}{k}e^{(ib+p-c(2k+\nu))z}\left(e^{2c\nu z}(ib+2ck+p-c\nu)\,{}_2F_1\left(\frac{b+i(2ck-p-c\nu)}{2b},1;\frac{3b+i(2ck-p-c\nu)}{2b};-e^{2ibz}\right)+e^{i\pi\nu+4ckz}(ib+p+c(\nu-2k))\,{}_2F_1\left(\frac{b-i(2ck+p-c\nu)}{2b},1;\frac{3b-i(2ck+p-c\nu)}{2b};-e^{2ibz}\right)\right)\right)\Big/\left((ib+2ck+p-c\nu)(ib+p+c(\nu-2k))\right)\;/;\;\nu\in\mathbb{N}^+$$

Involving products of two direct functions , trigonometric and exponential functions

Involving sin and exp

Involving $e^{p z} \sin(a z) \sinh(b z) \sinh(c z)$

01.19.21.3258.01

$$\int e^{p z} \sin(a z) \sinh(b z) \sinh(c z)\, dz = -\frac{i}{4} e^{p z} \left(\frac{(b+c-i a) \cosh((-b-c+i a) z) + p \sinh((-b-c+i a) z)}{(-b-c+i a+p)(b+c-i a+p)} + \frac{(b-c+i a) \cosh((b-c+i a) z) - p \sinh((b-c+i a) z)}{(b-c+i a+p)(-b+c-i a+p)} + \frac{(-b+c+i a) \cosh((-b+c+i a) z) - p \sinh((-b+c+i a) z)}{(b-c-i a+p)(-b+c+i a+p)} + \frac{(b+c+i a) \cosh((b+c+i a) z) - p \sinh((b+c+i a) z)}{(b+c+i a-p)(b+c+i a+p)} \right)$$

Involving rational functions of sin and exp

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a+b \sin(c z)}$

01.19.21.3259.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{a + b \sin(c z)} \, dz = -\frac{1}{4\sqrt{b^2 - a^2}} \left(b \left(\frac{e^{(-d-e+i c+p) z} \, {}_2F_1\left(\frac{c+i(d+e-p)}{c}, 1; \frac{2c+i(d+e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right)(c + i(d+e-p))} + \frac{e^{(-d-e+i c+p) z} \, {}_2F_1\left(\frac{c+i(d+e-p)}{c}, 1; \frac{2c+i(d+e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right)(c + i(d+e-p))} + \right.\right.$$

$$\frac{e^{(d+e+i c+p) z} \, {}_2F_1\left(\frac{c-i(d+e+p)}{c}, 1; \frac{2c-i(d+e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right)(c - i(d+e+p))} +$$

$$\frac{e^{(d+e+i c+p) z} \, {}_2F_1\left(\frac{c-i(d+e+p)}{c}, 1; \frac{2c-i(d+e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right)(c - i(d+e+p))} -$$

$$\frac{e^{(-d+e+i c+p) z} \, {}_2F_1\left(\frac{c+i(d-e-p)}{c}, 1; \frac{2c+i(d-e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right)(c + i(d-e-p))} -$$

$$\frac{e^{(-d+e+i c+p) z} \, {}_2F_1\left(\frac{c+i(d-e-p)}{c}, 1; \frac{2c+i(d-e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right)(c + i(d-e-p))} -$$

$$\frac{e^{(d-e+i c+p) z} \, {}_2F_1\left(\frac{c-i(d-e+p)}{c}, 1; \frac{2c-i(d-e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right)(c - i(d-e+p))} -$$

$$\left.\left.\frac{e^{(d-e+i c+p) z} \, {}_2F_1\left(\frac{c-i(d-e+p)}{c}, 1; \frac{2c-i(d-e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right)(c - i(d-e+p))}\right)\right)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) (a + b \sin(c z))^{-n}$

01.19.21.3260.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{(a + b \sin(c z))^2} \, dz = -\frac{1}{8 \left(b^2 - a^2\right)^{3/2}} \left(i\, b \left(\frac{e^{(-d+e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c + i (d - e - p)} + \right.\right.$$

$$\frac{\left(-i a + \sqrt{b^2 - a^2}\right) e^{(-d+e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right) (c + i (d - e - p))} +$$

$$\frac{2 \sqrt{b^2 - a^2} \; e^{(-d+e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 2; \frac{2 c+i (d-e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right) (c + i (d - e - p))} +$$

$$\frac{\left(i a + \sqrt{b^2 - a^2}\right) e^{(-d-e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 1; \frac{2 c+i (d+e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right) (c + i (d + e - p))} +$$

$$\frac{e^{(-d-e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 1; \frac{2 c+i (d+e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c + i (d + e - p)} +$$

$$\frac{2 \sqrt{b^2 - a^2} \; e^{(-d-e+i c+p) z} \, {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 2; \frac{2 c+i (d+e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right) (c + i (d + e - p))} +$$

$$\frac{e^{(d-e+i c+p) z} \, {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 1; \frac{2 c-i (d-e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c - i (d - e + p)} +$$

$$\frac{\left(-i a + \sqrt{b^2 - a^2}\right) e^{(d-e+i c+p) z} \, {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 1; \frac{2 c-i (d-e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a + \sqrt{b^2 - a^2}\right) (c - i (d - e + p))} +$$

$$\frac{2 \sqrt{b^2 - a^2} \; e^{(d-e+i c+p) z} \, {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 2; \frac{2 c-i (d-e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right) (c - i (d - e + p))} +$$

$$\frac{\left(i a + \sqrt{b^2 - a^2}\right) e^{(d+e+i c+p) z} \, {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 1; \frac{2 c-i (d+e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a + \sqrt{b^2 - a^2}\right) (c - i (d + e + p))} +$$

$$\frac{e^{(d+e+i c+p) z} {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 1; \frac{2 c-i (d+e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c-i (d+e+p)} +$$

$$\frac{2 \sqrt{b^2-a^2}\; e^{(d+e+i c+p) z} {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 2; \frac{2 c-i (d+e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (c-i (d+e+p))} -$$

$$\frac{e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c+i (d-e-p)} -$$

$$\frac{\left(i a+\sqrt{b^2-a^2}\right) e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (c+i (d-e-p))} -$$

$$\frac{2 \sqrt{b^2-a^2}\; e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 2; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (c+i (d-e-p))} -$$

$$\frac{e^{(-d-e+i c+p) z} {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 1; \frac{2 c+i (d+e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c+i (d+e-p)} -$$

$$\frac{2 \sqrt{b^2-a^2}\; e^{(-d-e+i c+p) z} {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 2; \frac{2 c+i (d+e-p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (c+i (d+e-p))} -$$

$$\frac{\left(-i a+\sqrt{b^2-a^2}\right) e^{(-d-e+i c+p) z} {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 1; \frac{2 c+i (d+e-p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (c+i (d+e-p))} -$$

$$\frac{e^{(d-e+i c+p) z} {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 1; \frac{2 c-i (d-e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{c-i (d-e+p)} -$$

$$\frac{\left(i a+\sqrt{b^2-a^2}\right) e^{(d-e+i c+p) z} {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 1; \frac{2 c-i (d-e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (c-i (d-e+p))} -$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(d-e+i c+p) z}\, {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 2; \frac{2 c-i (d-e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (c-i (d-e+p))} -$$

$$\frac{e^{(d+e+i c+p) z}\, {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 1; \frac{2 c-i (d+e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{c-i (d+e+p)} -$$

$$\frac{2\sqrt{b^2-a^2}\; e^{(d+e+i c+p) z}\, {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 2; \frac{2 c-i (d+e+p)}{c}; \frac{b e^{i c z}}{-i a+\sqrt{b^2-a^2}}\right)}{\left(-i a+\sqrt{b^2-a^2}\right) (c-i (d+e+p))} -$$

$$\left.\left.\frac{\left(-i a+\sqrt{b^2-a^2}\right) e^{(d+e+i c+p) z}\, {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 1; \frac{2 c-i (d+e+p)}{c}; -\frac{b e^{i c z}}{i a+\sqrt{b^2-a^2}}\right)}{\left(i a+\sqrt{b^2-a^2}\right) (c-i (d+e+p))}\right)\right)$$

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a+b \sin^2(c z)}$

01.19.21.3261.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{b \sin^2(c z) + a} \, dz = \frac{1}{4 \sqrt{a} \, b \sqrt{a+b}} \left(\frac{1}{2 c - i (d - e - p)} \left(i e^{(-d+e-2 i c+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c - i (d - e - p)}{2 c}, 1; \frac{4 c - i (d - e - p)}{2 c}; \frac{b e^{-2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c - i (d - e - p)}{2 c}, 1; \frac{4 c - i (d - e - p)}{2 c}; \frac{b e^{-2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) + \frac{1}{d + e + 2 i c - p} \left(e^{(-d-e-2 i c+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c - i (d + e - p)}{2 c}, 1; \frac{4 c - i (d + e - p)}{2 c}; \frac{b e^{-2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c - i (d + e - p)}{2 c}, 1; \frac{4 c - i (d + e - p)}{2 c}; \frac{b e^{-2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) + \frac{1}{2 c + i (d - e + p)} \left(i e^{(d-e-2 i c+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c + i (d - e + p)}{2 c}, 1; \frac{4 c + i (d - e + p)}{2 c}; \frac{b e^{-2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + i (d - e + p)}{2 c}, 1; \frac{4 c + i (d - e + p)}{2 c}; \frac{b e^{-2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) - \frac{1}{2 c + i (d + e + p)} \left(i e^{(d+e-2 i c+p) z} \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) {}_2F_1\left(\frac{2 c + i (d + e + p)}{2 c}, 1; \frac{4 c + i (d + e + p)}{2 c}; \frac{b e^{-2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right) + \left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) {}_2F_1\left(\frac{2 c + i (d + e + p)}{2 c}, 1; \frac{4 c + i (d + e + p)}{2 c}; \frac{b e^{-2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \right) \right)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) \left(a + b \sin^2(c z)\right)^{-n}$

01.19.21.3262.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{\left(a + b \sin^2(c z)\right)^2} \, dz = \frac{1}{16 a^{3/2} (a+b)^{3/2}} \left(i b \left(\frac{e^{(-d+e+2 i c+p) z} {}_2F_1\left(\frac{2 c + i (d - e - p)}{2 c}, 1; \frac{4 c + i (d - e - p)}{2 c}; \frac{b e^{2 i c z}}{2 a + 2 \sqrt{a+b} \sqrt{a} + b} \right)}{2 c + i (d - e - p)} + \left(\left(2 a + 2 \sqrt{a+b} \sqrt{a} + b\right) e^{(-d+e+2 i c+p) z} {}_2F_1\left(\frac{2 c + i (d - e - p)}{2 c}, 1; \frac{4 c + i (d - e - p)}{2 c}; \frac{b e^{2 i c z}}{2 a - 2 \sqrt{a+b} \sqrt{a} + b} \right) \right) \Big/ \left(\left(-2 a + 2 \sqrt{a+b} \sqrt{a} - b\right) \right.\right.\right.$$

$$(2c + i(d-e-p))\Big) + \frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d-e-p)}{2c}, 2; \frac{4c+i(d-e-p)}{2c}; \frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c+i(d-e-p))} +$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c}, 1; \frac{4c+i(d+e-p)}{2c};\right.\right.$$

$$\left.\left.\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right) \Big/ \left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c+i(d+e-p))\right) +$$

$$\frac{e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c}, 1; \frac{4c+i(d+e-p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c+i(d+e-p)} +$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c}, 2; \frac{4c+i(d+e-p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c+i(d+e-p))} +$$

$$\frac{e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c}, 1; \frac{4c-i(d-e+p)}{2c}; \frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d-e+p)} +$$

$$\left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c}, 1; \frac{4c-i(d-e+p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)\right) \Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d-e+p))\right) +$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c}, 2; \frac{4c-i(d-e+p)}{2c}; \frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)(2c-i(d-e+p))} +$$

$$\left(\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)e^{(d+e+2ic+p)z}\right.$$

$$\left.{}_2F_1\left(\frac{2c-i(d+e+p)}{2c}, 1; \frac{4c-i(d+e+p)}{2c}; \frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\,\sqrt{a}+b}\right)\right) \Big/ \left(\left(2a+2\sqrt{a+b}\,\sqrt{a}+b\right)\right.$$

$$(2c-i(d+e+p))\Big) + \frac{e^{(d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d+e+p)}{2c}, 1; \frac{4c-i(d+e+p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c-i(d+e+p)} +$$

$$\frac{4\sqrt{a}\,\sqrt{a+b}\,e^{(d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d+e+p)}{2c}, 2; \frac{4c-i(d+e+p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\,\sqrt{a}-b\right)(2c-i(d+e+p))} -$$

$$\frac{e^{(-d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d-e-p)}{2c}, 1; \frac{4c+i(d-e-p)}{2c}; \frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\,\sqrt{a}+b}\right)}{2c+i(d-e-p)} -$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d-e-p)}{2c},2;\frac{4c+i(d-e-p)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c+i(d-e-p))}-$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)e^{(-d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d-e-p)}{2c},1;\frac{4c+i(d-e-p)}{2c};\right.\right.$$
$$\left.\left.\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c+i(d-e-p))\right)-$$

$$\frac{e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c+i(d+e-p)}-\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)\right.$$
$$\left.e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/$$
$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c+i(d+e-p))\right)-$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},2;\frac{4c+i(d+e-p)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c+i(d+e-p))}-$$

$$\frac{e^{(d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c-i(d-e+p)}-$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d-e+p)}{2c},2;\frac{4c-i(d-e+p)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c-i(d-e+p))}-$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)e^{(d-e+2ic+p)z}\right.$$
$$\left.{}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)\right.$$
$$\left.(2c-i(d-e+p))\right)-\frac{e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c-i(d+e+p)}-$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/$$
$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c-i(d+e+p))\right)-$$

$$\left.\left.\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},2;\frac{4c-i(d+e+p)}{2c};\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c-i(d+e+p))}\right)\right)$$

Involving algebraic functions of sin and exp

Involving $e^{p z} \sinh(d z) \sinh(e z) (a + b \sin(c z))^{\beta}$

01.19.21.3263.01

$$\int e^{p z} \sinh(d z) \sinh(e z) (a + b \sin(c z))^{\beta} \, dz = \frac{1}{4} \left(1 + \frac{i b e^{i c z}}{\sqrt{a^2 - b^2} - a}\right)^{-\beta} \left(1 - \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}\right)^{-\beta} \left(a - \frac{1}{2} i b e^{-i c z} \left(-1 + e^{2 i c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(-d+e+p) z}}{d - e - p + i c \beta} F_1\left(\frac{i (d - e - p + i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c + i (d - e - p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{i b e^{i c z}}{a - \sqrt{a^2 - b^2}}\right) - \right.$$
$$\frac{e^{-(d+e-p) z}}{d + e - p + i c \beta} F_1\left(\frac{i (d + e - p + i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c + i (d + e - p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{i b e^{i c z}}{a - \sqrt{a^2 - b^2}}\right) -$$
$$\frac{e^{(d-e+p) z}}{d - e + p - i c \beta} F_1\left(-\frac{i (d - e + p - i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c - i (d - e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{i b e^{i c z}}{a - \sqrt{a^2 - b^2}}\right) +$$
$$\left.\frac{e^{(d+e+p) z}}{d + e + p - i c \beta} F_1\left(-\frac{i (d + e + p - i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c - i (d + e + p)}{c}; \frac{i b e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{i b e^{i c z}}{a - \sqrt{a^2 - b^2}}\right)\right)$$

Involving $e^{p z} \sinh(d z) \sinh(e z) \left(a + b \sin^2(c z)\right)^{\beta}$

01.19.21.3264.01

$$\int e^{p z} \sinh(d z) \sinh(e z) \left(b \sin^2(c z) + a\right)^{\beta} \, dz =$$
$$\frac{1}{4} \left(1 - \frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right)^{-\beta} \left(1 - \frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}\right)^{-\beta} \left(a - \frac{1}{4} b e^{-2 i c z} \left(-1 + e^{2 i c z}\right)^2\right)^{\beta}$$
$$\left(\frac{e^{(-d+e+p) z}}{d - e - p + 2 i c \beta} F_1\left(\frac{i (d - e - p + 2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i (d - e - p) - 2 c (\beta - 1)}{2 c}; \frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, \right.\right.$$
$$\left.\frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) + \frac{e^{(d+e+p) z}}{d + e + p - 2 i c \beta} F_1\left(-\frac{i (d + e + p - 2 i c \beta)}{2 c}; -\beta, -\beta; -\frac{i (d + e + p) + 2 c (\beta - 1)}{2 c}; \right.$$
$$\left.\frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) - \frac{e^{-(d+e-p) z}}{d + e - p + 2 i c \beta} F_1\left(\frac{i (d + e - p + 2 i c \beta)}{2 c}; -\beta, \right.$$
$$\left.-\beta; \frac{i (d + e - p) - 2 c (\beta - 1)}{2 c}; \frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right) - \frac{e^{(d-e+p) z}}{d - e + p - 2 i c \beta}$$
$$\left.F_1\left(-\frac{i (d - e + p - 2 i c \beta)}{2 c}; -\beta, -\beta; -\frac{i (d - e + p) + 2 c (\beta - 1)}{2 c}; \frac{b e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, \frac{b e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}}\right)\right)$$

Involving cos and exp

Involving $e^{p z} \cos(a z) \sinh(b z) \sinh(c z)$

01.19.21.3265.01

$$\int e^{p z} \cos(a z) \sinh(b z) \sinh(c z)\, dz = \frac{1}{4} e^{p z} \left(\frac{p \cosh((-b-c+i a) z) + (b+c-i a) \sinh((-b-c+i a) z)}{(-b-c+i a+p)(b+c-i a+p)} + \frac{(b-c+i a) \sinh((b-c+i a) z) - p \cosh((b-c+i a) z)}{(b-c+i a+p)(-b+c-i a+p)} + \frac{(-b+c+i a) \sinh((-b+c+i a) z) - p \cosh((-b+c+i a) z)}{(b-c-i a+p)(-b+c+i a+p)} - \frac{p \cosh((b+c+i a) z) - (b+c+i a) \sinh((b+c+i a) z)}{(b+c+i a-p)(b+c+i a+p)} \right)$$

Involving rational functions of cos and exp

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a+b \cos(c z)}$

01.19.21.3266.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{a + b \cos(c z)} \, dz = -\frac{i}{4 b \sqrt{a^2 - b^2}} \left(-\frac{1}{c + i (d - e - p)} \left(e^{(-d+e+i c+p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + i (d - e - p)}{c}, 1; \frac{2 c + i (d - e - p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + i (d - e - p)}{c}, 1; \frac{2 c + i (d - e - p)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{c + i (d + e - p)} \left(e^{(-d-e+i c+p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c + i (d + e - p)}{c}, 1; \frac{2 c + i (d + e - p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c + i (d + e - p)}{c}, 1; \frac{2 c + i (d + e - p)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) - \frac{1}{c - i (d - e + p)} \left(e^{(d-e+i c+p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c - i (d - e + p)}{c}, 1; \frac{2 c - i (d - e + p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c - i (d - e + p)}{c}, 1; \frac{2 c - i (d - e + p)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) + \frac{1}{c - i (d + e + p)} \left(e^{(d+e+i c+p) z} \left(\left(a + \sqrt{a^2 - b^2} \right) {}_2F_1\left(\frac{c - i (d + e + p)}{c}, 1; \frac{2 c - i (d + e + p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \left(\sqrt{a^2 - b^2} - a \right) {}_2F_1\left(\frac{c - i (d + e + p)}{c}, 1; \frac{2 c - i (d + e + p)}{c}; -\frac{b e^{i c z}}{a + \sqrt{a^2 - b^2}} \right) \right) \right) \right)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) (a + b \cos(c z))^{-n}$

01.19.21.3267.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{(a + b \cos(c z))^2} \, dz = \frac{1}{8 \left(a^2 - b^2\right)^{3/2}} \left(i b \left(\frac{e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2} - a} \right)}{c + i (d - e - p)} - \frac{e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}} \right)}{c + i (d - e - p)} + \frac{\left(\sqrt{a^2 - b^2} - a \right) e^{(-d+e+i c+p) z} {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}} \right)}{\left(a + \sqrt{a^2 - b^2} \right) (c + i (d - e - p))} + \right.\right.$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(-d+e+i c+p)z}\ {}_2F_1\left(\frac{c+i(d-e-p)}{c},2;\frac{2c+i(d-e-p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c+i(d-e-p))}-$$

$$\frac{e^{(-d-e+i c+p)z}\ {}_2F_1\left(\frac{c+i(d+e-p)}{c},1;\frac{2c+i(d+e-p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{c+i(d+e-p)}+$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right)e^{(-d-e+i c+p)z}\ {}_2F_1\left(\frac{c+i(d+e-p)}{c},1;\frac{2c+i(d+e-p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c+i(d+e-p))}+$$

$$\frac{e^{(-d-e+i c+p)z}\ {}_2F_1\left(\frac{c+i(d+e-p)}{c},1;\frac{2c+i(d+e-p)}{c};-\frac{b e^{icz}}{a+\sqrt{a^2-b^2}}\right)}{c+i(d+e-p)}+$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(-d-e+i c+p)z}\ {}_2F_1\left(\frac{c+i(d+e-p)}{c},2;\frac{2c+i(d+e-p)}{c};-\frac{b e^{icz}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right)(c+i(d+e-p))}+$$

$$\frac{e^{(d-e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d-e+p)}{c},1;\frac{2c-i(d-e+p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{c-i(d-e+p)}-\frac{e^{(d-e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d-e+p)}{c},1;\frac{2c-i(d-e+p)}{c};-\frac{b e^{icz}}{a+\sqrt{a^2-b^2}}\right)}{c-i(d-e+p)}+$$

$$\frac{\left(\sqrt{a^2-b^2}-a\right)e^{(d-e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d-e+p)}{c},1;\frac{2c-i(d-e+p)}{c};-\frac{b e^{icz}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right)(c-i(d-e+p))}+$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(d-e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d-e+p)}{c},2;\frac{2c-i(d-e+p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c-i(d-e+p))}-$$

$$\frac{e^{(d+e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d+e+p)}{c},1;\frac{2c-i(d+e+p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{c-i(d+e+p)}+$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right)e^{(d+e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d+e+p)}{c},1;\frac{2c-i(d+e+p)}{c};\frac{b e^{icz}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right)(c-i(d+e+p))}+$$

$$\frac{e^{(d+e+i c+p)z}\ {}_2F_1\left(\frac{c-i(d+e+p)}{c},1;\frac{2c-i(d+e+p)}{c};-\frac{b e^{icz}}{a+\sqrt{a^2-b^2}}\right)}{c-i(d+e+p)}+$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(d+e+i c+p) z}\ {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 2; \frac{2 c-i (d+e+p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d+e+p))} -$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right) e^{(-d+e+i c+p) z}\ {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 1; \frac{2 c+i (d-e-p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c+i (d-e-p))} -$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(-d+e+i c+p) z}\ {}_2F_1\left(\frac{c+i (d-e-p)}{c}, 2; \frac{2 c+i (d-e-p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c+i (d-e-p))} -$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(-d-e+i c+p) z}\ {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 2; \frac{2 c+i (d+e-p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c+i (d+e-p))} -$$

$$\frac{\left(\sqrt{a^2-b^2}-a\right) e^{(-d-e+i c+p) z}\ {}_2F_1\left(\frac{c+i (d+e-p)}{c}, 1; \frac{2 c+i (d+e-p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c+i (d+e-p))} -$$

$$\frac{\left(a+\sqrt{a^2-b^2}\right) e^{(d-e+i c+p) z}\ {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 1; \frac{2 c-i (d-e+p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c-i (d-e+p))} -$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(d-e+i c+p) z}\ {}_2F_1\left(\frac{c-i (d-e+p)}{c}, 2; \frac{2 c-i (d-e+p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d-e+p))} -$$

$$\frac{2\sqrt{a^2-b^2}\ e^{(d+e+i c+p) z}\ {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 2; \frac{2 c-i (d+e+p)}{c}; \frac{b e^{i c z}}{\sqrt{a^2-b^2}-a}\right)}{\left(\sqrt{a^2-b^2}-a\right) (c-i (d+e+p))} -$$

$$\left.\left.\frac{\left(\sqrt{a^2-b^2}-a\right) e^{(d+e+i c+p) z}\ {}_2F_1\left(\frac{c-i (d+e+p)}{c}, 1; \frac{2 c-i (d+e+p)}{c}; -\frac{b e^{i c z}}{a+\sqrt{a^2-b^2}}\right)}{\left(a+\sqrt{a^2-b^2}\right) (c-i (d+e+p))}\right)\right)$$

Involving $\frac{e^{p z} \sinh(e z) \sinh(d z)}{a+b \cos^2(c z)}$

01.19.21.3268.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{a + b \cos^2(c z)} \, dz = \frac{1}{4 \sqrt{a}\, b \sqrt{a+b}} \Bigg(i \Bigg(\frac{1}{-2c - i(d-e-p)} \Bigg(e^{(-d+e+2 i c+p) z} \Bigg(\left(2a - 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c + i(d-e-p)}{2c}, 1; \frac{4c + i(d-e-p)}{2c}; -\frac{b e^{2 i c z}}{2a + 2\sqrt{a+b}\sqrt{a} + b} \Bigg) - \left(2a + 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c + i(d-e-p)}{2c}, 1; \frac{4c + i(d-e-p)}{2c}; -\frac{b e^{2 i c z}}{2a - 2\sqrt{a+b}\sqrt{a} + b} \Bigg) \Bigg) \Bigg) + \frac{1}{i(d-e+p) - 2c} \Bigg(e^{(d-e+2 i c+p) z} \Bigg(\left(2a - 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c - i(d-e+p)}{2c}, 1; \frac{4c - i(d-e+p)}{2c}; -\frac{b e^{2 i c z}}{2a + 2\sqrt{a+b}\sqrt{a} + b} \Bigg) - \left(2a + 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c - i(d-e+p)}{2c}, 1; \frac{4c - i(d-e+p)}{2c}; -\frac{b e^{2 i c z}}{2a - 2\sqrt{a+b}\sqrt{a} + b} \Bigg) \Bigg) \Bigg) + \frac{1}{i(d+e+p) - 2c} \Bigg(e^{(d+e+2 i c+p) z} \Bigg(\left(-2a + 2\sqrt{a+b}\sqrt{a} - b\right) {}_2F_1\Bigg(\frac{2c - i(d+e+p)}{2c}, 1; \frac{4c - i(d+e+p)}{2c}; -\frac{b e^{2 i c z}}{2a + 2\sqrt{a+b}\sqrt{a} + b} \Bigg) + \left(2a + 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c - i(d+e+p)}{2c}, 1; \frac{4c - i(d+e+p)}{2c}; -\frac{b e^{2 i c z}}{2a - 2\sqrt{a+b}\sqrt{a} + b} \Bigg) \Bigg) \Bigg) - \frac{1}{2c + i(d+e-p)} \Bigg(e^{(-d-e+2 i c+p) z} \Bigg(\left(-2a + 2\sqrt{a+b}\sqrt{a} - b\right) {}_2F_1\Bigg(\frac{2c + i(d+e-p)}{2c}, 1; \frac{4c + i(d+e-p)}{2c}; -\frac{b e^{2 i c z}}{2a + 2\sqrt{a+b}\sqrt{a} + b} \Bigg) + \left(2a + 2\sqrt{a+b}\sqrt{a} + b\right) {}_2F_1\Bigg(\frac{2c + i(d+e-p)}{2c}, 1; \frac{4c + i(d+e-p)}{2c}; -\frac{b e^{2 i c z}}{2a - 2\sqrt{a+b}\sqrt{a} + b} \Bigg) \Bigg) \Bigg) \Bigg) \Bigg)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) \left(a + b \cos^2(c z)\right)^{-n}$

01.19.21.3269.01

$$\int \frac{e^{p z} \sinh(e z) \sinh(d z)}{\left(a + b \cos^2(c z)\right)^2} \, dz = \frac{1}{16 a^{3/2} (a+b)^{3/2}} \Bigg(i b \Bigg(\Bigg(\left(-2a + 2\sqrt{a+b}\sqrt{a} - b\right) e^{(-d+e+2 i c+p) z} {}_2F_1\Bigg(\frac{2c + i(d-e-p)}{2c}, 1; \frac{4c + i(d-e-p)}{2c}; -\frac{b e^{2 i c z}}{2a + 2\sqrt{a+b}\sqrt{a} + b} \Bigg) \Bigg) \Big/ \left(\left(2a + 2\sqrt{a+b}\sqrt{a} + b\right) (2c + i(d-e-p)) \right) + \frac{e^{(-d+e+2 i c+p) z} {}_2F_1\left(\frac{2c + i(d-e-p)}{2c}, 1; \frac{4c + i(d-e-p)}{2c}; -\frac{b e^{2 i c z}}{2a - 2\sqrt{a+b}\sqrt{a} + b} \right)}{2c + i(d-e-p)} +$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d-e-p)}{2c},2;\frac{4c+i(d-e-p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c+i(d-e-p))}+$$

$$\frac{e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c+i(d+e-p)}+$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c+i(d+e-p))\right)+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(-d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d+e-p)}{2c},2;\frac{4c+i(d+e-p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c+i(d+e-p))}+$$

$$\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)e^{(d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c-i(d-e+p))\right)+$$

$$\frac{e^{(d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c-i(d-e+p)}+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(d-e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d-e+p)}{2c},2;\frac{4c-i(d-e+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c-i(d-e+p))}+$$

$$\frac{e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c-i(d+e+p)}+$$

$$\left(\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};-\frac{be^{2icz}}{2a-2\sqrt{a+b}\ \sqrt{a}+b}\right)\right)\Big/\left(\left(-2a+2\sqrt{a+b}\ \sqrt{a}-b\right)(2c-i(d+e+p))\right)+$$

$$\frac{4\sqrt{a}\ \sqrt{a+b}\ e^{(d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c-i(d+e+p)}{2c},2;\frac{4c-i(d+e+p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\ \sqrt{a}+b\right)(2c-i(d+e+p))}-$$

$$\frac{e^{(-d+e+2ic+p)z}\ {}_2F_1\left(\frac{2c+i(d-e-p)}{2c},1;\frac{4c+i(d-e-p)}{2c};-\frac{be^{2icz}}{2a+2\sqrt{a+b}\ \sqrt{a}+b}\right)}{2c+i(d-e-p)}-$$

$$\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(-d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d-e-p)}{2c},1;\frac{4c+i(d-e-p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+i(d-e-p))\right)-$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d-e-p)}{2c},2;\frac{4c+i(d-e-p)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+i(d-e-p))}-$$

$$\frac{e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c+i(d+e-p)}-$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c},2;\frac{4c+i(d+e-p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c+i(d+e-p))}-$$

$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(-d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c+i(d+e-p)}{2c},1;\frac{4c+i(d+e-p)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c+i(d+e-p))\right)-$$

$$\frac{e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d-e+p)}-\left(\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c},1;\frac{4c-i(d-e+p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)\right)\Big/$$

$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c-i(d-e+p))\right)-$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(d-e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d-e+p)}{2c},2;\frac{4c-i(d-e+p)}{2c};-\frac{b\,e^{2icz}}{2a+2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a+b}\sqrt{a}+b\right)(2c-i(d-e+p))}-$$

$$\frac{e^{(d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{2c-i(d+e+p)}-$$

$$\frac{4\sqrt{a}\sqrt{a+b}\,e^{(d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d+e+p)}{2c},2;\frac{4c-i(d+e+p)}{2c};-\frac{b\,e^{2icz}}{2a-2\sqrt{a+b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)(2c-i(d+e+p))}-$$

$$\left(\left(-2a+2\sqrt{a+b}\sqrt{a}-b\right)e^{(d+e+2ic+p)z}\,{}_2F_1\left(\frac{2c-i(d+e+p)}{2c},1;\frac{4c-i(d+e+p)}{2c};\right.\right.$$

Involving algebraic functions of cos and exp

Involving $e^{p z} \sinh(e z) \sinh(d z) (a + b \cos(c z))^{\beta}$

01.19.21.3270.01

$$\int e^{p z} \sinh(e z) \sinh(d z) (a + b \cos(c z))^{\beta} \, dz = -\frac{1}{4} \left(\frac{e^{i c z} b}{a - \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(\frac{e^{i c z} b}{a + \sqrt{a^2 - b^2}} + 1 \right)^{-\beta} \left(a + \frac{1}{2} b\, e^{-i c z} \left(1 + e^{2 i c z} \right) \right)^{\beta}$$
$$\left(-\frac{e^{(-d+e+p) z}}{d - e - p + i c \beta} F_1\left(\frac{i (d - e - p + i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c + i (d - e - p)}{c}; -\frac{b\, e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) + \right.$$
$$\frac{e^{-(d+e-p) z}}{d + e - p + i c \beta} F_1\left(\frac{i (d + e - p + i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c + i (d + e - p)}{c}; -\frac{b\, e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) +$$
$$\frac{e^{(d-e+p) z}}{d - e + p - i c \beta} F_1\left(-\frac{i (d - e + p - i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c - i (d - e + p)}{c}; -\frac{b\, e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) -$$
$$\left. \frac{e^{(d+e+p) z}}{d + e + p - i c \beta} F_1\left(-\frac{i (d + e + p - i c \beta)}{c}; -\beta, -\beta; \frac{-\beta c + c - i (d + e + p)}{c}; -\frac{b\, e^{i c z}}{a + \sqrt{a^2 - b^2}}, \frac{b\, e^{i c z}}{\sqrt{a^2 - b^2} - a} \right) \right)$$

Involving $e^{p z} \sinh(e z) \sinh(d z) \left(a + b \cos^2(c z)\right)^{\beta}$

01.19.21.3271.01

$$\int e^{p z} \sinh(e z) \sinh(d z) \left(a + b \cos^2(c z) \right)^{\beta} dz =$$
$$\frac{1}{4} \left(\frac{e^{2 i c z} b}{2 a + b - 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(\frac{e^{2 i c z} b}{2 a + b + 2 \sqrt{a (a + b)}} + 1 \right)^{-\beta} \left(a + \frac{1}{4} b \left(2 + e^{-2 i c z} + e^{2 i c z} \right) \right)^{\beta}$$
$$\left(\frac{e^{(-d+e+p) z}}{d - e - p + 2 i c \beta} F_1\left(\frac{i (d - e - p + 2 i c \beta)}{2 c}; -\beta, -\beta; \frac{i (d - e - p) - 2 c (\beta - 1)}{2 c}; -\frac{b\, e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, \right. \right.$$
$$\left. -\frac{b\, e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) + \frac{e^{(d+e+p) z}}{d + e + p - 2 i c \beta} F_1\left(-\frac{i (d + e + p - 2 i c \beta)}{2 c}; -\beta, -\beta; -\frac{i (d + e + p) + 2 c (\beta - 1)}{2 c}; \right.$$
$$\left. -\frac{b\, e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b\, e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) - \frac{e^{-(d+e-p) z}}{d + e - p + 2 i c \beta} F_1\left(\frac{i (d + e - p + 2 i c \beta)}{2 c}; -\beta, \right.$$
$$\left. -\beta; \frac{i (d + e - p) - 2 c (\beta - 1)}{2 c}; -\frac{b\, e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b\, e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) - \frac{e^{(d-e+p) z}}{d - e + p - 2 i c \beta}$$
$$\left. F_1\left(-\frac{i (d - e + p - 2 i c \beta)}{2 c}; -\beta, -\beta; -\frac{i (d - e + p) + 2 c (\beta - 1)}{2 c}; -\frac{b\, e^{2 i c z}}{2 a + b + 2 \sqrt{a (a + b)}}, -\frac{b\, e^{2 i c z}}{2 a + b - 2 \sqrt{a (a + b)}} \right) \right)$$

Involving rational functions of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $\frac{e^{p z} \sin(d z)}{a+b \sinh(c z)}$

01.19.21.3272.01

$$\int \frac{e^{p z} \sin(d z)}{a + b \sinh(c z)} \, dz = \frac{1}{2 b \sqrt{a^2 + b^2}} i \, e^{(c - i d + p) z} \left(\frac{1}{c + i d + p} \left(e^{2 i d z} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c + i d + p}{c}, 1; \frac{2 c + i d + p}{c}; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c + i d + p}{c}, 1; \frac{2 c + i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) - \frac{1}{c - i d + p} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c - i d + p}{c}, 1; \frac{2 c - i d + p}{c}; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c - i d + p}{c}, 1; \frac{2 c - i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right)$$

Involving $e^{p z} \sin(d z) (a + b \sinh(c z))^{-n}$

01.19.21.3273.01

$$\int \frac{e^{p z} \sin(d z)}{(a+b \sinh(c z))^2} \, dz = \frac{1}{2\left(a^2+b^2\right)^{3/2}} \left(i\, b\, e^{(c-i d+p) z} \left(\frac{a\, e^{2 i d z}\, {}_2F_1\left(\frac{c+i d+p}{c}, 1; \frac{2c+i d+p}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i d+p)} + \frac{a\, e^{2 i d z}\, {}_2F_1\left(\frac{c+i d+p}{c}, 1; \frac{2c+i d+p}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i d+p)} + \frac{\sqrt{a^2+b^2}\, e^{2 i d z}\, {}_2F_1\left(\frac{c+i d+p}{c}, 2; \frac{2c+i d+p}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i d+p)} + \frac{\sqrt{a^2+b^2}\, {}_2F_1\left(\frac{c-i d+p}{c}, 2; \frac{2c-i d+p}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i d+p)} - \frac{\sqrt{a^2+b^2}\, e^{2 i d z}\, {}_2F_1\left(\frac{c+i d+p}{c}, 2; \frac{2c+i d+p}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i d+p)} - \frac{a\, {}_2F_1\left(\frac{c-i d+p}{c}, 1; \frac{2c-i d+p}{c}; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i d+p)} - \frac{a\, {}_2F_1\left(\frac{c-i d+p}{c}, 1; \frac{2c-i d+p}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i d+p)} - \frac{\sqrt{a^2+b^2}\, {}_2F_1\left(\frac{c-i d+p}{c}, 2; \frac{2c-i d+p}{c}; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i d+p)} \right) \right)$$

Involving $\frac{e^{p z} \sin(d z)}{a+b \sinh^2(c z)}$

01.19.21.3274.01

$$\int \frac{e^{p z} \sin(d z)}{a+b \sinh^2(c z)} \, dz = \frac{i\, b\, e^{(2c-i d+p) z}}{2\sqrt{a}\sqrt{a-b}} \left(\frac{e^{2 i d z}}{2c+i d+p} \left(\frac{1}{-2a+2\sqrt{a-b}\sqrt{a}+b}\, {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + \frac{1}{2a+2\sqrt{a-b}\sqrt{a}-b}\, {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right) \right) + \frac{1}{\left(-2a-2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)}\, {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right) - \frac{1}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)}\, {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) \right)$$

Involving $e^{p z} \sin(d z) \left(a+b \sinh^2(c z)\right)^{-n}$

01.19.21.3275.01

$$\int \frac{e^{p z} \sin(d z)}{\left(a + b \sinh^2(c z)\right)^2} \, dz = -\frac{1}{4 a^{3/2} (a-b)^{3/2}} \left(i\, b \left(\frac{2 \sqrt{a} \sqrt{a-b}\, e^{(2c+i d+p) z} {}_2F_1\left(\frac{2c+i d+p}{2c}, 2; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c+i d+p)} + \right.\right.$$

$$\frac{(2a-b)\, e^{(2c-i d+p) z} {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)} +$$

$$\frac{(2a-b)\, e^{(2c-i d+p) z} {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c-i d+p)} +$$

$$\frac{2 \sqrt{a} \sqrt{a-b}\, e^{(2c-i d+p) z} {}_2F_1\left(\frac{2c-i d+p}{2c}, 2; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c-i d+p)} -$$

$$\frac{(2a-b)\, e^{(2c+i d+p) z} {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c+i d+p)} -$$

$$\frac{2 \sqrt{a} \sqrt{a-b}\, e^{(2c+i d+p) z} {}_2F_1\left(\frac{2c+i d+p}{2c}, 2; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c+i d+p)} -$$

$$\frac{(2a-b)\, e^{(2c+i d+p) z} {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c+i d+p)} -$$

$$\left.\left.\frac{2 \sqrt{a} \sqrt{a-b}\, e^{(2c-i d+p) z} {}_2F_1\left(\frac{2c-i d+p}{2c}, 2; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)}\right)\right)$$

Involving $\frac{e^{p z} \sin(e z) \sinh(d z)}{a+b \sinh(c z)}$

01.19.21.3276.01

$$\int \frac{e^{p z} \sin(e z) \sinh(d z)}{a + b \sinh(c z)} \, dz = \frac{1}{4} i \left(\frac{1}{b \sqrt{a^2+b^2} \, (c+d+i e+p)} \left(e^{(c+d+i e+p) z} \left(\left(a + \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c+d+i e+p}{c}, 1; \frac{d+i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + \left(\sqrt{a^2+b^2} - a\right) {}_2F_1\left(\frac{c+d+i e+p}{c}, 1; \frac{d+i e+p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2+b^2}} \right) \right) \right) + \frac{1}{b \sqrt{a^2+b^2} \, (c-d-i e+p)} \left(e^{(c-d-i e+p) z} \left(\left(a + \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 1; \frac{-d-i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + \left(\sqrt{a^2+b^2} - a\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 1; \frac{-d-i e+p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2+b^2}} \right) \right) \right) - \frac{1}{b \sqrt{a^2+b^2} \, (c-d+i e+p)} \left(e^{(c-d+i e+p) z} \left(\left(a + \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + \left(\sqrt{a^2+b^2} - a\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2+b^2}} \right) \right) \right) - \frac{1}{b \sqrt{a^2+b^2} \, (c+d-i e+p)} \left(e^{(c+d-i e+p) z} \left(\left(a + \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c+d-i e+p}{c}, 1; \frac{d-i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + \left(\sqrt{a^2+b^2} - a\right) {}_2F_1\left(\frac{c+d-i e+p}{c}, 1; \frac{d-i e+p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2+b^2}} \right) \right) \right) \right)$$

Involving $e^{p z} \sin(e z) \sinh(d z) (a + b \sinh(c z))^{-n}$

01.19.21.3277.01

$$\int \frac{e^{p z} \sin(e z) \sinh(d z)}{(a + b \sinh(c z))^2} \, dz = \frac{1}{4} i \left(\frac{1}{b \left(a^2+b^2\right)^{3/2} (c-d+i e+p)} \left(e^{(c-d+i e+p) z} \left(-a \left(a + \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + a \left(a - \sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2+b^2}} \right) + \left(a^2 + \sqrt{a^2+b^2} \, a + b^2\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 2; \frac{-d+i e+p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2+b^2} - a} \right) + \left(-a^2 + \sqrt{a^2+b^2} \, a - b^2\right) \right.\right.\right.$$

$$ {}_2F_1\left(\frac{c-d+i\,e+p}{c}, 2; \frac{-d+i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg) + \frac{1}{b\left(a^2+b^2\right)^{3/2}(c+d-i\,e+p)} $$

$$ \Bigg(e^{(c+d-i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i\,e+p}{c}, 1; \frac{d-i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ $$

$$ a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d-i\,e+p}{c}, 1; \frac{d-i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+ $$

$$ \left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d-i\,e+p}{c}, 2; \frac{d-i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right) $$

$$ {}_2F_1\left(\frac{c+d-i\,e+p}{c}, 2; \frac{d-i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg) - \frac{1}{b\left(a^2+b^2\right)^{3/2}(c+d+i\,e+p)} $$

$$ \Bigg(e^{(c+d+i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i\,e+p}{c}, 1; \frac{d+i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ $$

$$ a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+d+i\,e+p}{c}, 1; \frac{d+i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+ $$

$$ \left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c+d+i\,e+p}{c}, 2; \frac{d+i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+\left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right) $$

$$ {}_2F_1\left(\frac{c+d+i\,e+p}{c}, 2; \frac{d+i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg) - \frac{1}{b\left(a^2+b^2\right)^{3/2}(c-d-i\,e+p)} $$

$$ \Bigg(e^{(c-d-i\,e+p)\,z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i\,e+p}{c}, 1; \frac{-d-i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ $$

$$ a\left(a-\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-d-i\,e+p}{c}, 1; \frac{-d-i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)+ $$

$$ \left(a^2+\sqrt{a^2+b^2}\,a+b^2\right){}_2F_1\left(\frac{c-d-i\,e+p}{c}, 2; \frac{-d-i\,e+p}{c}+2; \frac{b\,e^{c\,z}}{\sqrt{a^2+b^2}-a}\right)+ $$

$$ \left(-a^2+\sqrt{a^2+b^2}\,a-b^2\right){}_2F_1\left(\frac{c-d-i\,e+p}{c}, 2; \frac{-d-i\,e+p}{c}+2; -\frac{b\,e^{c\,z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg) $$

Involving $\frac{e^{p z} \sin(e z) \sinh(d z)}{a+b \sinh^2(c z)}$

01.19.21.3278.01

$$\int \frac{e^{p z} \sin(e z) \sinh(d z)}{a + b \sinh^2(c z)}\, dz = \frac{1}{4} i \left(\frac{1}{\sqrt{a} \sqrt{a-b}\, b(-2c-d+i e+p)} \left(e^{(-2c-d+i e+p) z} \left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right) {}_2F_1\left(1-\frac{-d+i e+p}{2c}, 1; 2-\frac{-d+i e+p}{2c}; \frac{b e^{-2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + \left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) {}_2F_1\left(1-\frac{-d+i e+p}{2c}, 1; 2-\frac{-d+i e+p}{2c}; \frac{b e^{-2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right) + \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c+d-i e+p)} \left(e^{(-2c+d-i e+p) z} \left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right) {}_2F_1\left(1-\frac{d-i e+p}{2c}, 1; 2-\frac{d-i e+p}{2c}; \frac{b e^{-2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + \left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) {}_2F_1\left(1-\frac{d-i e+p}{2c}, 1; 2-\frac{d-i e+p}{2c}; \frac{b e^{-2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right) - \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c+d+i e+p)} \left(e^{(-2c+d+i e+p) z} \left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right) {}_2F_1\left(1-\frac{d+i e+p}{2c}, 1; 2-\frac{d+i e+p}{2c}; \frac{b e^{-2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + \left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) {}_2F_1\left(1-\frac{d+i e+p}{2c}, 1; 2-\frac{d+i e+p}{2c}; \frac{b e^{-2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right) - \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c-d-i e+p)} \left(e^{(-2c-d-i e+p) z} \left(\left(2a+2\sqrt{a-b}\sqrt{a}-b\right) {}_2F_1\left(1-\frac{-d-i e+p}{2c}, 1; 2-\frac{-d-i e+p}{2c}; \frac{b e^{-2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + \left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) {}_2F_1\left(1-\frac{-d-i e+p}{2c}, 1; 2-\frac{-d-i e+p}{2c}; \frac{b e^{-2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\right)\right)$$

Involving $e^{p z} \sin(e z) \sinh(d z) \left(a + b \sinh^2(c z)\right)^{-n}$

01.19.21.3279.01

$$\int \frac{e^{p z} \sin(e z) \sinh(d z)}{\left(a + b \sinh^2(c z)\right)^2}\, dz = \frac{1}{4} i \left(\frac{1}{2 a^{3/2} (a-b)^{3/2} b (2c-d+i e+p)} \left(e^{(2c-d+i e+p) z} \left((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right) {}_2F_1\left(\frac{-d+i e+p}{2c}+1, 1; \frac{-d+i e+p}{2c}+2; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right) + (2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right) {}_2F_1\left(\frac{-d+i e+p}{2c}+1, 1; \frac{-d+i e+p}{2c}+2; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right) + \right.\right.\right.$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,2;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,2;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)+$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c+d-i e+p)}\Bigg(e^{(2c+d-i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,1;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,1;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,2;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,2;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)-$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c+d+i e+p)}\Bigg(e^{(2c+d+i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,1;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,1;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,2;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,2;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)-$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c-d-i e+p)}\Bigg(e^{(2c-d-i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,1;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,1;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\;a+2b\sqrt{a}+\sqrt{a-b}\;b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,2;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\;a-2b\sqrt{a}+\sqrt{a-b}\;b\right)\right.$$
$$\left.{}_2F_1\left(\frac{-d-i e+p}{2c}+1,2;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)\Bigg)$$

Involving cos and exp

Involving $\frac{e^{pz}\cos(dz)}{a+b\sinh(cz)}$

01.19.21.3280.01

$$\int\frac{e^{pz}\cos(dz)}{a+b\sinh(cz)}\,dz ==$$
$$-\frac{1}{2b\sqrt{a^2+b^2}}\left(e^{(c-i d+p)z}\left(\frac{1}{c-i d+p}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c-i d+p}{c},1;\frac{2c-i d+p}{c};\frac{b e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.\right.$$
$$\left.\left.\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c-i d+p}{c},1;\frac{2c-i d+p}{c};-\frac{b e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)+$$
$$\frac{1}{c+i d+p}\left(e^{2i d z}\left(\left(a+\sqrt{a^2+b^2}\right){}_2F_1\left(\frac{c+i d+p}{c},1;\frac{2c+i d+p}{c};\frac{b e^{cz}}{\sqrt{a^2+b^2}-a}\right)+\right.\right.$$
$$\left.\left.\left.\left(\sqrt{a^2+b^2}-a\right){}_2F_1\left(\frac{c+i d+p}{c},1;\frac{2c+i d+p}{c};-\frac{b e^{cz}}{a+\sqrt{a^2+b^2}}\right)\right)\right)\right)$$

Involving $e^{pz}\cos(dz)(a+b\sinh(cz))^{-n}$

01.19.21.3281.01

$$\int \frac{e^{pz}\cos(dz)}{(a+b\sinh(cz))^2}\,dz = -\frac{1}{2\left(a^2+b^2\right)^{3/2}}\left(b\left(\frac{a\,e^{(c+i\,d+p)z}\,{}_2F_1\left(\frac{c+i\,d+p}{c},1;\frac{2c+i\,d+p}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d+p)}+\frac{a\,e^{(c+i\,d+p)z}\,{}_2F_1\left(\frac{c+i\,d+p}{c},1;\frac{2c+i\,d+p}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d+p)}+\frac{\sqrt{a^2+b^2}\,e^{(c+i\,d+p)z}\,{}_2F_1\left(\frac{c+i\,d+p}{c},2;\frac{2c+i\,d+p}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c+i\,d+p)}+\frac{a\,e^{(c-i\,d+p)z}\,{}_2F_1\left(\frac{c-i\,d+p}{c},1;\frac{2c-i\,d+p}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d+p)}+\frac{a\,e^{(c-i\,d+p)z}\,{}_2F_1\left(\frac{c-i\,d+p}{c},1;\frac{2c-i\,d+p}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d+p)}+\frac{\sqrt{a^2+b^2}\,e^{(c-i\,d+p)z}\,{}_2F_1\left(\frac{c-i\,d+p}{c},2;\frac{2c-i\,d+p}{c};-\frac{b\,e^{cz}}{a+\sqrt{a^2+b^2}}\right)}{\left(a+\sqrt{a^2+b^2}\right)(c-i\,d+p)}-\frac{\sqrt{a^2+b^2}\,e^{(c+i\,d+p)z}\,{}_2F_1\left(\frac{c+i\,d+p}{c},2;\frac{2c+i\,d+p}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c+i\,d+p)}-\frac{\sqrt{a^2+b^2}\,e^{(c-i\,d+p)z}\,{}_2F_1\left(\frac{c-i\,d+p}{c},2;\frac{2c-i\,d+p}{c};\frac{b\,e^{cz}}{\sqrt{a^2+b^2}-a}\right)}{\left(\sqrt{a^2+b^2}-a\right)(c-i\,d+p)}\right)\right)$$

Involving $\frac{e^{pz}\cos(dz)}{a+b\sinh^2(cz)}$

01.19.21.3282.01

$$\int \frac{e^{pz}\cos(dz)}{a+b\sinh^2(cz)}\,dz = -\frac{1}{2\sqrt{a}\,\sqrt{a-b}}\,b\left(\frac{1}{2c+i\,d+p}\left(e^{(2c+i\,d+p)z}\left(\frac{{}_2F_1\left(\frac{2c+i\,d+p}{2c},1;\frac{4c+i\,d+p}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}+\frac{{}_2F_1\left(\frac{2c+i\,d+p}{2c},1;\frac{4c+i\,d+p}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{2a+2\sqrt{a-b}\,\sqrt{a}-b}\right)\right)+\frac{e^{(2c-i\,d+p)z}\,{}_2F_1\left(\frac{2c-i\,d+p}{2c},1;\frac{4c-i\,d+p}{2c};\frac{b\,e^{2cz}}{-2a+2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\,\sqrt{a}+b\right)(2c-i\,d+p)}+\frac{e^{(2c-i\,d+p)z}\,{}_2F_1\left(\frac{2c-i\,d+p}{2c},1;\frac{4c-i\,d+p}{2c};\frac{b\,e^{2cz}}{-2a-2\sqrt{a-b}\,\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\,\sqrt{a}-b\right)(2c-i\,d+p)}\right)$$

Involving $e^{p z} \cos(d z) \left(a + b \sinh^2(c z)\right)^{-n}$

01.19.21.3283.01

$$\int \frac{e^{p z} \cos(d z)}{\left(a + b \sinh^2(c z)\right)^2} \, dz = -\frac{1}{4 a^{3/2} (a-b)^{3/2}} \left(b \left(\frac{(2a-b) e^{(2c+i d+p) z} \, {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c+i d+p)} + \right.\right.$$

$$\frac{(2a-b) e^{(2c+i d+p) z} \, {}_2F_1\left(\frac{2c+i d+p}{2c}, 1; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c+i d+p)} +$$

$$\frac{2\sqrt{a}\sqrt{a-b} \, e^{(2c+i d+p) z} \, {}_2F_1\left(\frac{2c+i d+p}{2c}, 2; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c+i d+p)} +$$

$$\frac{(2a-b) e^{(2c-i d+p) z} \, {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)} +$$

$$\frac{(2a-b) e^{(2c-i d+p) z} \, {}_2F_1\left(\frac{2c-i d+p}{2c}, 1; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c-i d+p)} +$$

$$\frac{2\sqrt{a}\sqrt{a-b} \, e^{(2c-i d+p) z} \, {}_2F_1\left(\frac{2c-i d+p}{2c}, 2; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(2a+2\sqrt{a-b}\sqrt{a}-b\right)(2c-i d+p)} -$$

$$\frac{2\sqrt{a}\sqrt{a-b} \, e^{(2c+i d+p) z} \, {}_2F_1\left(\frac{2c+i d+p}{2c}, 2; \frac{4c+i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c+i d+p)} -$$

$$\left.\left.\frac{2\sqrt{a}\sqrt{a-b} \, e^{(2c-i d+p) z} \, {}_2F_1\left(\frac{2c-i d+p}{2c}, 2; \frac{4c-i d+p}{2c}; \frac{b e^{2 c z}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)}{\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right)(2c-i d+p)}\right)\right)$$

Involving $\frac{e^{p z} \cos(e z) \sinh(d z)}{a+b \sinh(c z)}$

01.19.21.3284.01

$$\int \frac{e^{p z} \cos(e z) \sinh(d z)}{a + b \sinh(c z)} \, dz = \frac{1}{4} \left(\frac{1}{b \sqrt{a^2 + b^2} (c - d + i e + p)} \left(e^{(c-d+i e+p) z} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c - d + i e + p}{c}, 1; \frac{-d + i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c - d + i e + p}{c}, 1; \frac{-d + i e + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) + \frac{1}{b \sqrt{a^2 + b^2} (c - d - i e + p)} \left(e^{(c-d-i e+p) z} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c - d - i e + p}{c}, 1; \frac{-d - i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c - d - i e + p}{c}, 1; \frac{-d - i e + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) - \frac{1}{b \sqrt{a^2 + b^2} (c + d + i e + p)} \left(e^{(c+d+i e+p) z} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c + d + i e + p}{c}, 1; \frac{d + i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c + d + i e + p}{c}, 1; \frac{d + i e + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) - \frac{1}{b \sqrt{a^2 + b^2} (c + d - i e + p)} \left(e^{(c+d-i e+p) z} \left(\left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c + d - i e + p}{c}, 1; \frac{d - i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(\sqrt{a^2 + b^2} - a \right) {}_2F_1\left(\frac{c + d - i e + p}{c}, 1; \frac{d - i e + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) \right) \right) \right)$$

Involving $e^{p z} \cos(e z) \sinh(d z) (a + b \sinh(c z))^{-n}$

01.19.21.3285.01

$$\int \frac{e^{p z} \cos(e z) \sinh(d z)}{(a + b \sinh(c z))^2} \, dz = \frac{1}{4} \left(\frac{1}{b \left(a^2 + b^2\right)^{3/2} (c + d + i e + p)} \left(e^{(c+d+i e+p) z} \left(-a \left(a + \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c + d + i e + p}{c}, 1; \frac{d + i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + a \left(a - \sqrt{a^2 + b^2} \right) {}_2F_1\left(\frac{c + d + i e + p}{c}, 1; \frac{d + i e + p}{c} + 2; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}} \right) + \left(a^2 + \sqrt{a^2 + b^2} \, a + b^2 \right) {}_2F_1\left(\frac{c + d + i e + p}{c}, 2; \frac{d + i e + p}{c} + 2; \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a} \right) + \left(-a^2 + \sqrt{a^2 + b^2} \, a - b^2 \right) \right.\right.\right.$$

$$ {}_2F_1\left(\frac{c+d+i e+p}{c}, 2; \frac{d+i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg) + \frac{1}{b\left(a^2+b^2\right)^{3/2} (c+d-i e+p)} $$

$$ \Bigg(e^{(c+d-i e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c+d-i e+p}{c}, 1; \frac{d-i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + $$

$$ a\left(a-\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c+d-i e+p}{c}, 1; \frac{d-i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right) + $$

$$ \left(a^2+\sqrt{a^2+b^2}\, a+b^2\right) {}_2F_1\left(\frac{c+d-i e+p}{c}, 2; \frac{d-i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + \left(-a^2+\sqrt{a^2+b^2}\, a-b^2\right) $$

$$ {}_2F_1\left(\frac{c+d-i e+p}{c}, 2; \frac{d-i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg) - \frac{1}{b\left(a^2+b^2\right)^{3/2} (c-d+i e+p)} $$

$$ \Bigg(e^{(c-d+i e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + $$

$$ a\left(a-\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 1; \frac{-d+i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right) + $$

$$ \left(a^2+\sqrt{a^2+b^2}\, a+b^2\right) {}_2F_1\left(\frac{c-d+i e+p}{c}, 2; \frac{-d+i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + \left(-a^2+\sqrt{a^2+b^2}\, a-b^2\right) $$

$$ {}_2F_1\left(\frac{c-d+i e+p}{c}, 2; \frac{-d+i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg) - \frac{1}{b\left(a^2+b^2\right)^{3/2} (c-d-i e+p)} $$

$$ \Bigg(e^{(c-d-i e+p) z}\Bigg(-a\left(a+\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 1; \frac{-d-i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + $$

$$ a\left(a-\sqrt{a^2+b^2}\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 1; \frac{-d-i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right) + $$

$$ \left(a^2+\sqrt{a^2+b^2}\, a+b^2\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 2; \frac{-d-i e+p}{c}+2; \frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right) + $$

$$ \left(-a^2+\sqrt{a^2+b^2}\, a-b^2\right) {}_2F_1\left(\frac{c-d-i e+p}{c}, 2; \frac{-d-i e+p}{c}+2; -\frac{b e^{c z}}{a+\sqrt{a^2+b^2}}\right)\Bigg)\Bigg)\Bigg)\Bigg) $$

Involving $\frac{e^{p z} \cos(e z) \sinh(d z)}{a+b \sinh^2(c z)}$

01.19.21.3286.01

$$\int \frac{e^{p z} \cos(e z) \sinh(d z)}{a + b \sinh^2(c z)} \, dz = \frac{1}{4} \Bigg(\frac{1}{\sqrt{a} \sqrt{a-b} \, b(-2c + d + i e + p)} \Bigg(e^{(-2c+d+ie+p)z} \Bigg(\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d+ie+p}{2c}, 1; 2 - \frac{d+ie+p}{2c}; \frac{b e^{-2cz}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + \left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d+ie+p}{2c}, 1; 2 - \frac{d+ie+p}{2c}; \frac{b e^{-2cz}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right)\Bigg)\Bigg) + \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c + d - ie + p)} \Bigg(e^{(-2c+d-ie+p)z} \Bigg(\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right) {}_2F_1\left(1 - \frac{d-ie+p}{2c}, 1; 2 - \frac{d-ie+p}{2c}; \frac{b e^{-2cz}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + \left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right) {}_2F_1\left(1 - \frac{d-ie+p}{2c}, 1; 2 - \frac{d-ie+p}{2c}; \frac{b e^{-2cz}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right)\Bigg)\Bigg) - \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c - d + ie + p)} \Bigg(e^{(-2c-d+ie+p)z} \Bigg(\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right) {}_2F_1\left(1 - \frac{-d+ie+p}{2c}, 1; 2 - \frac{-d+ie+p}{2c}; \frac{b e^{-2cz}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + \left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right) {}_2F_1\left(1 - \frac{-d+ie+p}{2c}, 1; 2 - \frac{-d+ie+p}{2c}; \frac{b e^{-2cz}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right)\Bigg)\Bigg) - \frac{1}{\sqrt{a}\sqrt{a-b}\, b(-2c - d - ie + p)} \Bigg(e^{(-2c-d-ie+p)z} \Bigg(\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right) {}_2F_1\left(1 - \frac{-d-ie+p}{2c}, 1; 2 - \frac{-d-ie+p}{2c}; \frac{b e^{-2cz}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + \left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right) {}_2F_1\left(1 - \frac{-d-ie+p}{2c}, 1; 2 - \frac{-d-ie+p}{2c}; \frac{b e^{-2cz}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right)\Bigg)\Bigg)\Bigg)$$

Involving $e^{p z} \cos(e z) \sinh(d z) \left(a + b \sinh^2(c z)\right)^{-n}$

01.19.21.3287.01

$$\int \frac{e^{p z} \cos(e z) \sinh(d z)}{\left(a + b \sinh^2(c z)\right)^2} \, dz = \frac{1}{4} \Bigg(\frac{1}{2 a^{3/2} (a-b)^{3/2} \, b (2c + d + ie + p)} \Bigg(e^{(2c+d+ie+p)z} \Bigg((2a - b)\left(2a + 2\sqrt{a-b}\sqrt{a} - b\right) {}_2F_1\left(\frac{d+ie+p}{2c} + 1, 1; \frac{d+ie+p}{2c} + 2; \frac{b e^{2cz}}{-2a + 2\sqrt{a-b}\sqrt{a} + b}\right) + (2a - b)\left(-2a + 2\sqrt{a-b}\sqrt{a} + b\right) {}_2F_1\left(\frac{d+ie+p}{2c} + 1, 1; \frac{d+ie+p}{2c} + 2; \frac{b e^{2cz}}{-2a - 2\sqrt{a-b}\sqrt{a} + b}\right) +$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,2;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d+i e+p}{2c}+1,2;\frac{d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c+d-i e+p)}\Bigg(e^{(2c+d-i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,1;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,1;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,2;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{d-i e+p}{2c}+1,2;\frac{d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)-$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c-d+i e+p)}\Bigg(e^{(2c-d+i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,1;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,1;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,2;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d+i e+p}{2c}+1,2;\frac{-d+i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)-$$

$$\frac{1}{2a^{3/2}(a-b)^{3/2}b(2c-d-i e+p)}\Bigg(e^{(2c-d-i e+p)z}\Bigg((2a-b)\left(2a+2\sqrt{a-b}\sqrt{a}-b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,1;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$(2a-b)\left(-2a+2\sqrt{a-b}\sqrt{a}+b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,1;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)+$$

$$2\sqrt{a}\left(\left(-2a^{3/2}-2\sqrt{a-b}\,a+2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,2;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a+2\sqrt{a-b}\sqrt{a}+b}\right)+\left(2a^{3/2}-2\sqrt{a-b}\,a-2b\sqrt{a}+\sqrt{a-b}\,b\right){}_2F_1\left(\frac{-d-i e+p}{2c}+1,2;\frac{-d-i e+p}{2c}+2;\frac{b e^{2cz}}{-2a-2\sqrt{a-b}\sqrt{a}+b}\right)\right)\Bigg)\Bigg)\Bigg)$$

Involving algebraic functions of the direct function, trigonometric and exponential functions

Involving sin and exp

Involving $e^{pz}\sin(dz)(a+b\sinh(cz))^\beta$

01.19.21.3288.01

$$\int e^{pz}\sin(dz)(a+b\sinh(cz))^\beta\,dz = -\frac{1}{2\left(d^2+(p-c\beta)^2\right)}\left(i e^{(-i d+p)z}\left(\frac{e^{cz}b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{cz}b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2}b e^{-cz}\left(-1+e^{2cz}\right)\right)^\beta\left((-i d-p+c\beta)F_1\left(\frac{-i d+p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c-i d+p}{c};-\frac{b e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b e^{cz}}{\sqrt{a^2+b^2}-a}\right)+e^{2idz}(-i d+p-c\beta)F_1\left(\frac{i d+p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c+i d+p}{c};-\frac{b e^{cz}}{a+\sqrt{a^2+b^2}},\frac{b e^{cz}}{\sqrt{a^2+b^2}-a}\right)\right)\right)$$

Involving $e^{pz}\sin(dz)\left(a+b\sinh^2(cz)\right)^\beta$

01.19.21.3289.01

$$\int e^{pz}\sin(dz)\left(a+b\sinh^2(cz)\right)^\beta\,dz = -\frac{1}{2\left(d^2+(p-2c\beta)^2\right)}\left(e^{(-i d+p)z}\left(\frac{e^{2cz}b}{2a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(\frac{1}{4}b e^{-2cz}\left(-1+e^{2cz}\right)^2+a\right)^\beta\left((d-i(p-2c\beta))F_1\left(\frac{-i d+p-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c-i d+p}{2c};\frac{b e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)+e^{2idz}(d+i(p-2c\beta))F_1\left(\frac{i d+p-2c\beta}{2c};-\beta,-\beta;\frac{-2\beta c+2c+i d+p}{2c};\frac{b e^{2cz}}{-2a+b-2\sqrt{a(a-b)}},\frac{b e^{2cz}}{-2a+b+2\sqrt{a(a-b)}}\right)\right)\right)$$

Involving $e^{p z} \sin(d z) \sinh(e z) (a + b \sinh(c z))^{\beta}$

01.19.21.3290.01

$$\int e^{p z} \sin(d z) \sinh(e z) (a + b \sinh(c z))^{\beta} \, dz = -\frac{1}{4} i \left(\frac{e^{c z} b}{a - \sqrt{a^2 + b^2}} + 1\right)^{-\beta} \left(\frac{e^{c z} b}{a + \sqrt{a^2 + b^2}} + 1\right)^{-\beta} \left(a + \frac{1}{2} b e^{-c z} \left(-1 + e^{2 c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(-e + i d + p) z}}{e - i d - p + c \beta} F_1\left(\frac{-e + i d + p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c - e + i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) + \right.$$
$$\frac{e^{(e - i d + p) z}}{-e + i d - p + c \beta} F_1\left(\frac{e - i d + p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c - i d + e + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) +$$
$$\frac{e^{(e + i d + p) z}}{e + i d + p - c \beta} F_1\left(\frac{e + i d + p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c + e + i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) -$$
$$\left.\frac{e^{(-e - i d + p) z}}{e + i d - p + c \beta} F_1\left(-\frac{e + i d - p + c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c - i d - e + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right)\right)$$

Involving $e^{p z} \sin(d z) \sinh(e z) \left(a + b \sinh^2(c z)\right)^{\beta}$

01.19.21.3291.01

$$\int e^{p z} \sin(d z) \sinh(e z) \left(a + b \sinh^2(c z)\right)^{\beta} \, dz =$$
$$-\frac{1}{4} i \left(\frac{e^{2 c z} b}{2 a - b + 2 \sqrt{a (a - b)}} + 1\right)^{-\beta} \left(1 - \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)^{-\beta} \left(\frac{1}{4} b e^{-2 c z} \left(-1 + e^{2 c z}\right)^2 + a\right)^{\beta}$$
$$\left(\frac{e^{(-e + i d + p) z}}{e - i d - p + 2 c \beta} F_1\left(\frac{-e + i d + p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{-e + i d + p}{2 c} - \beta + 1; \frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \right.\right.$$
$$\left.\frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right) + \frac{e^{(e + i d + p) z}}{e + i d + p - 2 c \beta} F_1\left(\frac{e + i d + p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{e + i d + p}{2 c} - \beta + 1; \right.$$
$$\left.\frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right) + \frac{e^{(-e - i d + p) z}}{-e - i d + p - 2 c \beta} F_1\left(-\frac{e + i d - p + 2 c \beta}{2 c}; -\beta, \right.$$
$$\left.-\beta; -\frac{e + i d - p}{2 c} - \beta + 1; \frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right) - \frac{e^{(e - i d + p) z}}{e - i d + p - 2 c \beta}$$
$$\left.F_1\left(\frac{e - i d + p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{e - i d + p}{2 c} - \beta + 1; \frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)\right)$$

Involving cos and exp

Involving $e^{p z} \cos(d z) (a + b \sinh(c z))^\beta$

01.19.21.3292.01

$$\int e^{p z} \cos(d z) (a + b \sinh(c z))^\beta \, dz = \left(\left(\frac{e^{c z} b}{a - \sqrt{a^2 + b^2}} + 1\right)^{-\beta} \left(\frac{e^{c z} b}{a + \sqrt{a^2 + b^2}} + 1\right)^{-\beta} \left(a + \frac{1}{2} b\, e^{-c z} \left(-1 + e^{2 c z}\right)\right)^\beta \left(e^{(-i d + p) z} (d + i (c \beta - p)) F_1\left(\frac{-i d + p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c - i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right) - e^{(i d + p) z} (d + i (p - c \beta)) F_1\left(\frac{i d + p - c \beta}{c}; -\beta, -\beta; \frac{-\beta c + c + i d + p}{c}; -\frac{b e^{c z}}{a + \sqrt{a^2 + b^2}}, \frac{b e^{c z}}{\sqrt{a^2 + b^2} - a}\right)\right)\right) \Big/ (2 (-i d + p - c \beta) (d + i (c \beta - p)))$$

Involving $e^{p z} \cos(d z) \left(a + b \sinh^2(c z)\right)^\beta$

01.19.21.3293.01

$$\int e^{p z} \cos(d z) \left(a + b \sinh^2(c z)\right)^\beta \, dz = \left(\left(\frac{e^{2 c z} b}{2 a - b + 2 \sqrt{a (a - b)}} + 1\right)^{-\beta} \left(1 - \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)^{-\beta} \left(\frac{1}{4} b\, e^{-2 c z} \left(-1 + e^{2 c z}\right)^2 + a\right)^\beta \left(e^{(-i d + p) z} (d - i (p - 2 c \beta)) F_1\left(\frac{-i d + p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{-i d + p}{2 c} - \beta + 1; \frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right) - e^{(i d + p) z} (d + i (p - 2 c \beta)) F_1\left(\frac{i d + p - 2 c \beta}{2 c}; -\beta, -\beta; \frac{i d + p}{2 c} - \beta + 1; \frac{b e^{2 c z}}{-2 a + b - 2 \sqrt{a (a - b)}}, \frac{b e^{2 c z}}{-2 a + b + 2 \sqrt{a (a - b)}}\right)\right)\right) \Big/ (2 (-i d + p - 2 c \beta) (d - i (p - 2 c \beta)))$$

Involving $e^{p z} \cos(d z) \sinh(e z) (a + b \sinh(c z))^\beta$

01.19.21.3294.01

$$\int e^{p z}\cos(d z)\sinh(e z)\,(a+b\sinh(c z))^{\beta}\,dz = \frac{1}{4}\left(\frac{e^{c z} b}{a-\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(\frac{e^{c z} b}{a+\sqrt{a^2+b^2}}+1\right)^{-\beta}\left(a+\frac{1}{2} b e^{-c z}\left(-1+e^{2 c z}\right)\right)^{\beta}$$
$$\left(\frac{e^{(-e+i d+p) z}}{e-i d-p+c\beta} F_1\left(\frac{-e+i d+p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c-e+i d+p}{c};-\frac{b e^{c z}}{a+\sqrt{a^2+b^2}},\frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+\right.$$
$$\frac{e^{(e-i d+p) z}}{e-i d+p-c\beta} F_1\left(\frac{e-i d+p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c-i d+e+p}{c};-\frac{b e^{c z}}{a+\sqrt{a^2+b^2}},\frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\frac{e^{(e+i d+p) z}}{e+i d+p-c\beta} F_1\left(\frac{e+i d+p-c\beta}{c};-\beta,-\beta;\frac{-\beta c+c+e+i d+p}{c};-\frac{b e^{c z}}{a+\sqrt{a^2+b^2}},\frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)+$$
$$\left.\frac{e^{(-e-i d+p) z}}{e+i d-p+c\beta} F_1\left(-\frac{e+i d-p+c\beta}{c};-\beta,-\beta;\frac{-\beta c+c-i d-e+p}{c};-\frac{b e^{c z}}{a+\sqrt{a^2+b^2}},\frac{b e^{c z}}{\sqrt{a^2+b^2}-a}\right)\right)$$

Involving $e^{p z}\cos(d z)\sinh(e z)\left(a+b\sinh^2(c z)\right)^{\beta}$

01.19.21.3295.01

$$\int e^{p z}\cos(d z)\sinh(e z)\left(a+b\sinh^2(c z)\right)^{\beta}\,dz =$$
$$\frac{1}{4}\left(\frac{e^{2 c z} b}{2 a-b+2\sqrt{a(a-b)}}+1\right)^{-\beta}\left(1-\frac{b e^{2 c z}}{-2 a+b+2\sqrt{a(a-b)}}\right)^{-\beta}\left(\frac{1}{4} b e^{-2 c z}\left(-1+e^{2 c z}\right)^2+a\right)^{\beta}$$
$$\left(\frac{1}{e-i d-p+2 c\beta}\left(e^{(-e+i d+p) z} F_1\left(\frac{-e+i d+p-2 c\beta}{2 c};-\beta,-\beta;\frac{-e+i d+p}{2 c}-\beta+1;\frac{b e^{2 c z}}{-2 a+b-2\sqrt{a(a-b)}},\right.\right.\right.$$
$$\left.\left.\frac{b e^{2 c z}}{-2 a+b+2\sqrt{a(a-b)}}\right)\right)+\frac{1}{e-i d+p-2 c\beta}\left(e^{(e-i d+p) z}\right.$$
$$\left.F_1\left(\frac{e-i d+p-2 c\beta}{2 c};-\beta,-\beta;\frac{e-i d+p}{2 c}-\beta+1;\frac{b e^{2 c z}}{-2 a+b-2\sqrt{a(a-b)}},\frac{b e^{2 c z}}{-2 a+b+2\sqrt{a(a-b)}}\right)\right)+$$
$$\frac{1}{e+i d+p-2 c\beta}\left(e^{(e+i d+p) z} F_1\left(\frac{e+i d+p-2 c\beta}{2 c};-\beta,-\beta;\frac{e+i d+p}{2 c}-\beta+1;\right.\right.$$
$$\left.\left.\frac{b e^{2 c z}}{-2 a+b-2\sqrt{a(a-b)}},\frac{b e^{2 c z}}{-2 a+b+2\sqrt{a(a-b)}}\right)\right)+\frac{1}{e+i d-p+2 c\beta}\left(e^{(-e-i d+p) z}\right.$$
$$\left.\left.F_1\left(-\frac{e+i d-p+2 c\beta}{2 c};-\beta,-\beta;-\frac{e+i d-p}{2 c}-\beta+1;\frac{b e^{2 c z}}{-2 a+b-2\sqrt{a(a-b)}},\frac{b e^{2 c z}}{-2 a+b+2\sqrt{a(a-b)}}\right)\right)\right)$$

Involving functions of the direct function, trigonometric, exponential and a power functions

Involving powers of the direct function, trigonometric, exponential and a power functions

Involving sin, exp and power

Involving $z^{\alpha-1} e^{p z} \sin(c z) \sinh^{\nu}(a z)$

01.19.21.3296.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \sinh^{\nu}(a z)\, dz = 2^{-\nu-1} z^{\alpha}\, i \left(e^{\frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} \left(((-i c - p) z)^{-\alpha}\, \Gamma(\alpha, -i c z - p z) - (i (c + i p) z)^{-\alpha}\, \Gamma(\alpha, i c z - p z)\right) (1 - \nu \bmod 2) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(e^{i \pi \nu} \left(((i c - p - 2 a s + a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c - p - 2 a s + a \nu) z) - ((-i c - p - 2 a s + a \nu) z)^{-\alpha}\, \Gamma(\alpha, (-i c - p - 2 a s + a \nu) z)\right) - ((-i c - p + 2 a s - a \nu) z)^{-\alpha}\, \Gamma(\alpha, (-i c - p + 2 a s - a \nu) z) + ((i c - p + 2 a s - a \nu) z)^{-\alpha}\, \Gamma(\alpha, (i c - p + 2 a s - a \nu) z)\right) \right) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3297.01

$$\int z^{n} e^{p z} \sin(c z) \sinh^{\nu}(a z)\, dz = \frac{1}{2}\, i \left(1 - e^{-2 a z}\right)^{-\nu} n!\, \sinh^{\nu}(a z) \left(e^{(-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p + a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\!\left(-\frac{-i c + p + a \nu}{2 a}, \ldots, -\frac{-i c + p + a \nu}{2 a}, -\nu; 1 - \frac{-i c + p + a \nu}{2 a}, \ldots, 1 - \frac{-i c + p + a \nu}{2 a}; e^{-2 a z}\right) - e^{(i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p + a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\!\left(-\frac{i c + p + a \nu}{2 a}, \ldots, -\frac{i c + p + a \nu}{2 a}, -\nu; 1 - \frac{i c + p + a \nu}{2 a}, \ldots, 1 - \frac{i c + p + a \nu}{2 a}; e^{-2 a z}\right) \right) /;\ n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \sinh^{\nu}(a z)$

01.19.21.3298.01

$$\int z^{\alpha-1} e^{p z} \sin(d + c z) \sinh^{\nu}(a z) \, dz = 2^{-\nu-1} z^{\alpha} i \left(e^{\frac{1}{2} i (\pi \nu - 2 d)} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} ((-i c - p) z)^{-\alpha} \Gamma(\alpha, -i c z - p z) - (i (c + i p) z)^{-\alpha} \Gamma(\alpha, i c z - p z)\right) (1 - \nu \bmod 2) - e^{-i d} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left(-e^{2 i d} \Gamma(\alpha, (-i c - p + 2 a s - a \nu) z) ((-i c - p + 2 a s - a \nu) z)^{-\alpha} + e^{i \pi \nu} \left(((i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p - 2 a s + a \nu) z) - e^{2 i d} ((-i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c - p - 2 a s + a \nu) z)\right) + ((i c - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p + 2 a s - a \nu) z)\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3299.01

$$\int z^{n} e^{p z} \sin(d + c z) \sinh^{\nu}(a z) \, dz = \frac{1}{2} i \left(1 - e^{-2 a z}\right)^{-\nu} n! \sinh^{\nu}(a z) \left(e^{-i d + (-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-i c + p + a \nu}{2 a}, \ldots, -\frac{-i c + p + a \nu}{2 a}, -\nu; 1 - \frac{-i c + p + a \nu}{2 a}, \ldots, 1 - \frac{-i c + p + a \nu}{2 a}; e^{-2 a z}\right) - e^{i d + (i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i c + p + a \nu}{2 a}, \ldots, -\frac{i c + p + a \nu}{2 a}, -\nu; 1 - \frac{i c + p + a \nu}{2 a}, \ldots, 1 - \frac{i c + p + a \nu}{2 a}; e^{-2 a z}\right) \right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin(c z) \sinh^{\nu}(a z + b)$

01.19.21.3300.01

$$\int z^{\alpha-1} e^{p z} \sin(c z) \sinh^{\nu}(b + a z) \, dz = 2^{-\nu-1} z^{\alpha} i \left(e^{\frac{i \pi \nu}{2}} \binom{\nu}{\frac{\nu}{2}} (((-i c - p) z)^{-\alpha} \Gamma(\alpha, -i c z - p z) - (i (c + i p) z)^{-\alpha} \Gamma(\alpha, i c z - p z)) (1 - \nu \bmod 2) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-b (2 s + \nu)} \binom{\nu}{s} \left(-e^{2 b \nu} \Gamma(\alpha, (-i c - p + 2 a s - a \nu) z) ((-i c - p + 2 a s - a \nu) z)^{-\alpha} + e^{4 b s + i \pi \nu} (((i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p - 2 a s + a \nu) z) - ((-i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c - p - 2 a s + a \nu) z)) + e^{2 b \nu} ((i c - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p + 2 a s - a \nu) z)\right) \right) /; \nu \in \mathbb{N}^+$$

01.19.21.3301.01

$$\int z^n e^{p z} \sin(c z) \sinh^\nu(b + a z) \, dz = \frac{1}{2} i \left(1 - e^{-2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b + a z) \left(e^{(-i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{-i c + p + a \nu}{2 a}, \ldots, -\frac{-i c + p + a \nu}{2 a}, -\nu; 1 - \frac{-i c + p + a \nu}{2 a}, \ldots, 1 - \frac{-i c + p + a \nu}{2 a}; e^{-2(b+a z)}\right) - e^{(i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i c + p + a \nu}{2 a}, \ldots, -\frac{i c + p + a \nu}{2 a}, -\nu; 1 - \frac{i c + p + a \nu}{2 a}, \ldots, 1 - \frac{i c + p + a \nu}{2 a}; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \sin(c z + d) \sinh^\nu(a z + b)$

01.19.21.3302.01

$$\int z^{\alpha-1} e^{p z} \sin(c z + d) \sinh^\nu(a z + b) \, dz = 2^{-\nu-1} z^\alpha i \left(e^{\frac{1}{2} i (\pi \nu - 2 d)} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d} ((-i c - p) z)^{-\alpha} \Gamma(\alpha, -i c z - p z) - (i (c + i p) z)^{-\alpha} \Gamma(\alpha, i c z - p z)\right) (1 - \nu \bmod 2) - \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-i d - b(2 s+\nu)} \binom{\nu}{s} \left(-e^{2 i d + 2 b \nu} \Gamma(\alpha, (-i c - p + 2 a s - a \nu) z) ((-i c - p + 2 a s - a \nu) z)^{-\alpha} + e^{4 b s + i \pi \nu} \left(((i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p - 2 a s + a \nu) z) - e^{2 i d} ((-i c - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c - p - 2 a s + a \nu) z)\right) + e^{2 b \nu} ((i c - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - p + 2 a s - a \nu) z)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3303.01

$$\int z^n e^{p z} \sin(d + c z) \sinh^\nu(b + a z) \, dz = \frac{1}{2} i \left(1 - e^{-2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b + a z) \left(e^{-i d + (-i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{-i c + p + a \nu}{2 a}, \ldots, -\frac{-i c + p + a \nu}{2 a}, -\nu; 1 - \frac{-i c + p + a \nu}{2 a}, \ldots, 1 - \frac{-i c + p + a \nu}{2 a}; e^{-2(b+a z)}\right) - e^{i d + (i c+p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p + a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i c + p + a \nu}{2 a}, \ldots, -\frac{i c + p + a \nu}{2 a}, -\nu; 1 - \frac{i c + p + a \nu}{2 a}, \ldots, 1 - \frac{i c + p + a \nu}{2 a}; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \sin(b z^r) \sinh^\nu(c z)$

01.19.21.3304.01

$$\int z^n e^{p z^2} \sin(b z^2) \sinh^\nu(c z)\, dz = 2^{-\nu-2} \left(-i^{\nu-1}\right) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, z^{n+1} \left(\left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) - \left((i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p) z^2\right)\right) - i\, 2^{-\nu-2} \sum_{j=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^j \binom{\nu}{j} \left((-1)^\nu e^{-\frac{c^2 (\nu-2j)^2}{4(-i b+p)}} (-i b + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (c(\nu - 2j))^{n-h} (2(-i b + p) z - c(\nu - 2j))^{h+1} \left(-\frac{(2(-i b + p) z - c(\nu - 2j))^2}{-i b + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(-i b + p) z - c(\nu - 2j))^2}{4(-i b + p)}\right) + e^{-\frac{c^2 (\nu-2j)^2}{4(-i b+p)}} (-i b + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (-c(\nu - 2j))^{n-h} (c(\nu - 2j) + 2(-i b + p) z)^{h+1} \left(-\frac{(c(\nu - 2j) + 2(-i b + p) z)^2}{-i b + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c(\nu - 2j) + 2(-i b + p) z)^2}{4(-i b + p)}\right) - (-1)^\nu e^{-\frac{c^2 (\nu-2j)^2}{4(i b+p)}} (i b + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (c(\nu - 2j))^{n-h} (2(i b + p) z - c(\nu - 2j))^{h+1} \left(-\frac{(2(i b + p) z - c(\nu - 2j))^2}{i b + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(i b + p) z - c(\nu - 2j))^2}{4(i b + p)}\right) - e^{-\frac{c^2 (\nu-2j)^2}{4(i b+p)}} (i b + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (-c(\nu - 2j))^{n-h} (c(\nu - 2j) + 2(i b + p) z)^{h+1} \left(-\frac{(c(\nu - 2j) + 2(i b + p) z)^2}{i b + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c(\nu - 2j) + 2(i b + p) z)^2}{4(i b + p)}\right)\right) /;\ \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3305.01

$$\int z^n e^{p \sqrt{z}} \sin\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = -i^{\nu+1} 2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(\left((i b - p) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b - p) \sqrt{z}\right) - \left((-i b - p) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b - p) \sqrt{z}\right)\right) (1 - \nu \bmod 2) + i\, 2^{-2n-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{\frac{(-i b+p)^2}{4 c (\nu-2s)}} (-c(\nu - 2s))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b + p)^{-h-j+2n} \left(-i b + p - 2c(\nu - 2s) \sqrt{z}\right)^{h+j} \left(\frac{\left(-i b + p - 2c(\nu - 2s) \sqrt{z}\right)^2}{c(\nu - 2s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((-i b + p) \left(-i b + p - 2c(\nu - 2s) \sqrt{z}\right) \Gamma\left(\right.\right.\right.$$

$$\frac{1}{2}(h+j+1),\ \frac{\left(-i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\Bigg)-2\,c\,(v-2\,s)\,\sqrt{\frac{\left(-i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\Bigg($$

$$\frac{1}{2}(h+j+2),\ \frac{\left(-i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\Bigg)\Bigg)\Bigg)-(-1)^v\,e^{\frac{(i\,b+p)^2}{4\,c\,(v-2\,s)}}\,(-c\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+p)^{-h-j+2\,n}\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((i\,b+p)\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ \frac{\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-$$

$$2\,c\,(v-2\,s)\,\sqrt{\frac{\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\ \frac{\left(i\,b+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)+$$

$$e^{-\frac{(-i\,b+p)^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+p)^{-h-j+2\,n}\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((-i\,b+p)\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\ -\frac{\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+$$

$$2\,c\,(v-2\,s)\,\sqrt{-\frac{\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\ -\frac{\left(-i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\Bigg)-$$

$$e^{-\frac{(i\,b+p)^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+p)^{-h-j+2\,n}\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\,b+p)\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+2\,c\,(v-2\,s)\sqrt{-\frac{\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+2),-\frac{\left(i\,b+p+2\,c\,(v-2\,s)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)\text{/; } n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z^r}\,\sin(b\,z)\,\sinh^v(c\,z)$

01.19.21.3306.01

$$\int z^n e^{p z^2} \sin(b z) \sinh^\nu(c z)\, dz = -i^{\nu+1} 2^{-\nu-2} p^{-n-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left(e^{\frac{b^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b + 2 p z)^{j+1} \left(-\frac{(-i b+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b+2 p z)^2}{4p}\right) - e^{\frac{b^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b + 2 p z)^{j+1} \left(-\frac{(i b+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b+2 p z)^2}{4p}\right)\right) - i\, 2^{-\nu-2} p^{-n-1} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{(-i b + c(2s-\nu))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (i b - c(2s-\nu))^{n-j} (-i b + c(2s-\nu) + 2 p z)^{j+1} \left(-\frac{(-i b + c(2s-\nu)+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b + c(2s-\nu)+2 p z)^2}{4p}\right) - (-1)^\nu e^{-\frac{(i b + c(2s-\nu))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-i b - c(2s-\nu))^{n-j} (i b + c(2s-\nu) + 2 p z)^{j+1} \left(-\frac{(i b + c(2s-\nu)+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b + c(2s-\nu)+2 p z)^2}{4p}\right) + e^{-\frac{(-i b + c(\nu-2s))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (i b - c(\nu-2s))^{n-j} (-i b + c(\nu-2s) + 2 p z)^{j+1} \left(-\frac{(-i b + c(\nu-2s)+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b + c(\nu-2s)+2 p z)^2}{4p}\right) - e^{-\frac{(i b + c(\nu-2s))^2}{4p}} \sum_{j=0}^{n} 2^{j-n} (-i b - c(\nu-2s))^{n-j} (i b + c(\nu-2s) + 2 p z)^{j+1} \left(-\frac{(i b + c(\nu-2s)+2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b + c(\nu-2s)+2 p z)^2}{4p}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3307.01

$$\int z^n e^{p\sqrt{z}} \sin(b z) \sinh^\nu(c z)\, dz = i^{\nu+1} 2^{-2n-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \left((-i b)^{-2n-2} e^{-\frac{i p^2}{4b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p - 2 i b \sqrt{z}\right)^{h+j} \left(-\frac{i\left(p-2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(p\left(p - 2 i b\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(p-2 i b\sqrt{z}\right)^2}{4b}\right) - \right.\right.$$

$$2\,i\,b\sqrt{-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)-$$

$$(i\,b)^{-2\,n-2}\,e^{\frac{i\,p^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,i\,b\sqrt{z}\right)^{h+j}\left(\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}$$

$$\binom{n}{j}\Bigg(p\left(p+2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)+$$

$$2\sqrt{\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)+i\,2^{-2\,n-\nu-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg((-1)^\nu\,e^{-\frac{p^2}{4(-i\,b+c\,(2\,s-\nu))}}\,(-i\,b+c\,(2\,s-\nu))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^2}{-i\,b+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^2}{4\,(-i\,b+c\,(2\,s-\nu))}\Bigg)+2\sqrt{-\frac{\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^2}{-i\,b+c\,(2\,s-\nu)}}$$

$$(-i\,b+c\,(2\,s-\nu))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(p+2\,(-i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^2}{4\,(-i\,b+c\,(2\,s-\nu))}\right)\Bigg)-$$

$$(-1)^\nu\,e^{-\frac{p^2}{4(i\,b+c\,(2\,s-\nu))}}\,(i\,b+c\,(2\,s-\nu))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,(i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,(i\,b+c\,(2\,s-\nu))\sqrt{z}\right)^2}{i\,b+c\,(2\,s-\nu)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p+2\,(i\,b+c\,(2\,s-\nu))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(p+2(i b+c(2 s-v))\sqrt{z}\right)^2}{4(i b+c(2 s-v))}\Bigg)+2\sqrt{-\frac{\left(p+2(i b+c(2 s-v))\sqrt{z}\right)^2}{i b+c(2 s-v)}}$$

$$(i b+c(2 s-v))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2(i b+c(2 s-v))\sqrt{z}\right)^2}{4(i b+c(2 s-v))}\right)\Bigg)\Bigg)+$$

$$e^{-\frac{p^2}{4(-i b+c(v-2 s))}}(-i b+c(v-2 s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)^2}{-i b+c(v-2 s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)^2}{4(-i b+c(v-2 s))}\Bigg)+2\sqrt{-\frac{\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)^2}{-i b+c(v-2 s)}}$$

$$(-i b+c(v-2 s))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2(-i b+c(v-2 s))\sqrt{z}\right)^2}{4(-i b+c(v-2 s))}\right)\Bigg)-$$

$$e^{-\frac{p^2}{4(i b+c(v-2 s))}}(i b+c(v-2 s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2n}\left(p+2(i b+c(v-2 s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2(i b+c(v-2 s))\sqrt{z}\right)^2}{i b+c(v-2 s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(p\left(p+2(i b+c(v-2 s))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(p+2(i b+c(v-2 s))\sqrt{z}\right)^2}{4(i b+c(v-2 s))}\Bigg)+2\sqrt{-\frac{\left(p+2(i b+c(v-2 s))\sqrt{z}\right)^2}{i b+c(v-2 s)}}$$

$$(i b+c(v-2 s))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(p+2(i b+c(v-2 s))\sqrt{z}\right)^2}{4(i b+c(v-2 s))}\right)\Bigg)\Bigg)\Bigg)\ /;\ n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{p z} \sin(b z^r) \sinh^v(c z)$

01.19.21.3308.01

$$\int z^n e^{p z} \sin(b z^2) \sinh^\nu(c z) \, dz = -i^{\nu+1} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg((-i b)^{-n-1} e^{-\frac{i p^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p - 2 i b z)^{j+1} \left(-\frac{i (p - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (p - 2 i b z)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i p^2}{4 b}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 i b z)^{j+1} \left(\frac{i (p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (p + 2 i b z)^2}{4 b}\right)\Bigg) - i^{\nu+1} 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg(e^{\frac{i \pi \nu}{2} - \frac{i (p + c (2 s - \nu))^2}{4 b}} (-i b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p - c (2 s - \nu))^{n-j} (p + c (2 s - \nu) - 2 i b z)^{j+1} \left(-\frac{i (p + c (2 s - \nu) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (p + c (2 s - \nu) - 2 i b z)^2}{4 b}\right) + e^{-\frac{i (p + c (\nu - 2 s))^2}{4 b} - \frac{i \pi \nu}{2}} (-i b)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p - c (\nu - 2 s))^{n-j} (p + c (\nu - 2 s) - 2 i b z)^{j+1} \left(-\frac{i (p + c (\nu - 2 s) - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (p + c (\nu - 2 s) - 2 i b z)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i (p + c (2 s - \nu))^2}{4 b} + \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-p - c (2 s - \nu))^{n-j} (p + c (2 s - \nu) + 2 i b z)^{j+1} \left(\frac{i (p + c (2 s - \nu) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (p + c (2 s - \nu) + 2 i b z)^2}{4 b}\right) - (i b)^{-n-1} e^{\frac{i (p + c (\nu - 2 s))^2}{4 b} - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} 2^{j-n} (-p - c (\nu - 2 s))^{n-j} (p + c (\nu - 2 s) + 2 i b z)^{j+1} \left(\frac{i (p + c (\nu - 2 s) + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (p + c (\nu - 2 s) + 2 i b z)^2}{4 b}\right)\Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3309.01

$$\int z^n e^{p z} \sin(b \sqrt{z}) \sinh^\nu(c z) \, dz = i^{\nu+1} 2^{-2 n-\nu-2} p^{-2 n-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \Bigg(e^{\frac{b^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2 p \sqrt{-\frac{\left(-i b + 2 p \sqrt{z}\right)^2}{p}} \Gamma\left(\frac{1}{2}(h + j + 2), -\frac{\left(-i b + 2 p \sqrt{z}\right)^2}{4 p}\right) -$$

$$i\, b \left(-i\, b + 2\, p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i\, b + 2\, p \sqrt{z}\right)^2}{4\, p}\right)\Bigg)\Bigg) -$$

$$e^{\frac{b^2}{4\, p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2\, n} \left(i\, b + 2\, p \sqrt{z}\right)^{h+j} \left(-\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left(b\, i \left(i\, b + 2\, p \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{4\, p}\right) + \right.$$

$$\left. 2 \sqrt{-\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{p}}\; p\, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i\, b + 2\, p \sqrt{z}\right)^2}{4\, p}\right)\right)\Bigg)\Bigg) + i\, 2^{-2\, n-\nu-2}$$

$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \Bigg((-1)^\nu\, e^{\frac{b^2}{4\,(p+c\,(2\, s-\nu))}} (p + c\,(2\, s-\nu))^{-2\, n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\, b)^{-h-j+2\, n} \left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^2}{p + c\,(2\, s-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(2\,(p + c\,(2\, s-\nu))$$

$$\sqrt{-\frac{\left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^2}{p + c\,(2\, s-\nu)}}\; \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^2}{4\,(p + c\,(2\, s-\nu))}\right) -$$

$$i\, b \left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^2}{4\,(p + c\,(2\, s-\nu))}\right)\Bigg) -$$

$$(-1)^\nu\, e^{\frac{b^2}{4\,(p+c\,(2\, s-\nu))}} (p + c\,(2\, s-\nu))^{-2\, n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\, b)^{-h-j+2\, n} \left(i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right)^2}{p + c\,(2\, s-\nu)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \Bigg(b\, i \left(i\, b + 2\,(p + c\,(2\, s-\nu)) \sqrt{z}\right) \Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(i\,b+2\,(p+c\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(p+c\,(2\,s-v))}\Bigg)+2\,\sqrt{-\frac{\left(i\,b+2\,(p+c\,(2\,s-v))\,\sqrt{z}\right)^2}{p+c\,(2\,s-v)}}$$

$$(p+c\,(2\,s-v))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i\,b+2\,(p+c\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(p+c\,(2\,s-v))}\right)\Bigg)\Bigg)+$$

$$e^{\frac{b^2}{4\,(p+c\,(v-2\,s))}}\,(p+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(p+c\,(v-2\,s))$$

$$\sqrt{-\frac{\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,(v-2\,s)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,(v-2\,s))}\right)-$$

$$i\,b\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,(v-2\,s))}\right)\Bigg)-$$

$$e^{\frac{b^2}{4\,(p+c\,(v-2\,s))}}\,(p+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1), -\frac{\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,(v-2\,s))}\Bigg)+2\,\sqrt{-\frac{\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{p+c\,(v-2\,s)}}$$

$$(p+c\,(v-2\,s))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i\,b+2\,(p+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(p+c\,(v-2\,s))}\right)\Bigg)\Bigg)\Bigg)\;/;\; n\in\mathbb{N}\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\,\sin(b\,z)\,\sinh^v\left(c\,z^r\right)$

01.19.21.3310.01

$$\int z^n e^{p z} \sin(b z) \sinh^\nu(c z^2)\, dz = 2^{-\nu-1} (-i^\nu) \binom{\nu}{\frac{\nu}{2}} \left(i ((i b - p) z)^{-n-1} \Gamma(n+1, (i b - p) z) - i ((-i b - p) z)^{-n-1} \Gamma(n+1, (-i b - p) z)\right) (1 - \nu \bmod 2) z^{n+1} - 2^{-\nu-2} i \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{(-i b+p)^2}{4 c (2 s-\nu)}} \left(\sum_{j=0}^n 2^{j-n} (i b - p)^{n-j} (-i b + p + 2 c (2 s - \nu) z)^{j+1} \left(-\frac{(-i b + p + 2 c (2 s - \nu) z)^2}{c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b + p + 2 c (2 s - \nu) z)^2}{4 c (2 s - \nu)}\right)\right) (c (2 s - \nu))^{-n-1} - (-1)^\nu e^{-\frac{(i b+p)^2}{4 c (2 s-\nu)}} \left(\sum_{j=0}^n 2^{j-n} (-i b - p)^{n-j} (i b + p + 2 c (2 s - \nu) z)^{j+1} \left(-\frac{(i b + p + 2 c (2 s - \nu) z)^2}{c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b + p + 2 c (2 s - \nu) z)^2}{4 c (2 s - \nu)}\right)\right) (c (2 s - \nu))^{-n-1} + e^{-\frac{(-i b+p)^2}{4 c (\nu-2 s)}} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (i b - p)^{n-j} (-i b + p + 2 c (\nu - 2 s) z)^{j+1} \left(-\frac{(-i b + p + 2 c (\nu - 2 s) z)^2}{c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(-i b + p + 2 c (\nu - 2 s) z)^2}{4 c (\nu - 2 s)}\right) - e^{-\frac{(i b+p)^2}{4 c (\nu-2 s)}} (c (\nu - 2 s))^{-n-1} \sum_{j=0}^n 2^{j-n} (-i b - p)^{n-j} (i b + p + 2 c (\nu - 2 s) z)^{j+1} \left(-\frac{(i b + p + 2 c (\nu - 2 s) z)^2}{c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(i b + p + 2 c (\nu - 2 s) z)^2}{4 c (\nu - 2 s)}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3311.01

$$\int z^n e^{p z} \sin(b z) \sinh^\nu(c \sqrt{z})\, dz = -i^{\nu-1} 2^{-\nu-1} \binom{\nu}{\frac{\nu}{2}} \left((-i b - p)^{-n-1} \Gamma(n+1, (-i b - p) z) - (i b - p)^{-n-1} \Gamma(n+1, (i b - p) z)\right) (1 - \nu \bmod 2) - i (-1)^\nu 2^{-2 n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(-e^{-\frac{c^2 (2 k-\nu)^2}{4 (-i b+p)}} \left(\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (c (2 k - \nu))^{-h-j+2 n} \left(2 \sqrt{z} (-i b + p) + c (2 k - \nu)\right)^{h+j} \left(-\frac{\left(2 \sqrt{z} (-i b + p) + c (2 k - \nu)\right)^2}{-i b + p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(c (2 k - \nu) \left(2 \sqrt{z} (-i b + p) + c (2 k - \nu)\right) \right.\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(2\,k-v)\right)^2}{4\,(-i\,b+p)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(2\,k-v)\right)^2}{-i\,b+p}}$$

$$(-i\,b+p)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(2\,k-v)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)(-i\,b+p)^{-2\,n-2}+$$

$$(-1)^{v+1}\,e^{-\frac{c^2\,(v-2\,k)^2}{4\,(-i\,b+p)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)^{h+j}\right.$$

$$\left(-\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)^2}{-i\,b+p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2\,k)\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)^2}{4\,(-i\,b+p)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)^2}{-i\,b+p}}$$

$$(-i\,b+p)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(-i\,b+p)+c\,(v-2\,k)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)(-i\,b+p)^{-2\,n-2}+$$

$$e^{-\frac{c^2\,(2\,k-v)^2}{4\,(i\,b+p)}}\,(i\,b+p)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2\,k-v))^{-h-j+2\,n}\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)^2}{i\,b+p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg(c\,(2\,k-v)\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)^2}{4\,(i\,b+p)}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)^2}{i\,b+p}}\,(i\,b+p)\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(2\,k-v)\right)^2}{4\,(i\,b+p)}\right)\Bigg)+$$

$$(-1)^v\,e^{-\frac{c^2\,(v-2\,k)^2}{4\,(i\,b+p)}}\,(i\,b+p)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)^{h+j}$$

$$\left(-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)^2}{i\,b+p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(c\,(v-2\,k)\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)^2}{4\,(i\,b+p)}\right)+2\sqrt{-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)^2}{i\,b+p}}\,(i\,b+p)\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,k)\right)^2}{4\,(i\,b+p)}\right)\right)\Bigg)\Bigg) /;\, n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z^r}\,\sin(b\,z)\,\sinh^v(c\,z^r)$

01.19.21.3312.01

$$\int z^n e^{p z^2} \sin(b z) \sinh^\nu(c z^2)\, dz = -i^{\nu+1} 2^{-\nu-2} p^{-n-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, e^{\frac{b^2}{4p}} \left(\sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b + 2 p z)^{j+1} \left(-\frac{(-i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-i b + 2 p z)^2}{4 p}\right) - \sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b + 2 p z)^{j+1} \left(-\frac{(i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(i b + 2 p z)^2}{4 p}\right)\right) - i\, 2^{-\nu-2} \sum_{h=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^h \binom{\nu}{h} \left(e^{\frac{b^2}{4(p+c(\nu-2h))}} \left(\sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b + 2 (p + c(\nu - 2h)) z)^{j+1} \left(-\frac{(-i b + 2 (p + c(\nu-2h)) z)^2}{p + c(\nu - 2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-i b + 2(p + c(\nu-2h)) z)^2}{4(p + c(\nu - 2h))}\right)\right) (p + c(\nu - 2h))^{-n-1} - e^{\frac{b^2}{4(p+c(\nu-2h))}} \left(\sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b + 2 (p + c(\nu - 2h)) z)^{j+1} \left(-\frac{(i b + 2 (p + c(\nu-2h)) z)^2}{p + c(\nu - 2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(i b + 2(p + c(\nu-2h)) z)^2}{4(p + c(\nu - 2h))}\right)\right) (p + c(\nu - 2h))^{-n-1} + (-1)^\nu e^{\frac{b^2}{4(p-c(\nu-2h))}} (p - c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i b)^{n-j} (-i b + 2 (p - c(\nu - 2h)) z)^{j+1} \left(-\frac{(-i b + 2 (p - c(\nu-2h)) z)^2}{p - c(\nu - 2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(-i b + 2(p - c(\nu-2h)) z)^2}{4(p - c(\nu - 2h))}\right) - (-1)^\nu e^{\frac{b^2}{4(p-c(\nu-2h))}} (p - c(\nu-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i b)^{n-j} (i b + 2 (p - c(\nu - 2h)) z)^{j+1} \left(-\frac{(i b + 2 (p - c(\nu-2h)) z)^2}{p - c(\nu - 2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(i b + 2(p - c(\nu-2h)) z)^2}{4(p - c(\nu - 2h))}\right)\right) /;\, n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3313.01

$$\int z^n e^{p \sqrt{z}} \sin(b z) \sinh^\nu(c \sqrt{z})\, dz = (-1)^{n-1} 2^{-2n-\nu-2} i^{\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, b^{-2n-2} \left(e^{-\frac{i p^2}{4 b}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p - 2 i b \sqrt{z}\right)^{h+j} \right.$$

$$\left(-\frac{i\left(p-2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(p\left(p-2\,i\,b\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{i\left(p-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)-\right.$$

$$\left.\left.2\,i\,b\sqrt{-\frac{i\left(p-2\,i\,b\,\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{i\left(p-2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)\right)-$$

$$e^{\frac{i\,p^2}{4\,b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,i\,b\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(p+2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left(p\left(p+2\,i\,b\,\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(p+2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)+2\sqrt{\frac{i\left(p+2\,i\,b\,\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(p+2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)\right)+$$

$$(-1)^{n-1}\,2^{-2\,n-\nu-2}\,i^{\nu+1}\,b^{-2\,n-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(-e^{\frac{i\,(p+c\,(\nu-2\,k))^2}{4\,b}-\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p+c\,(\nu-2\,k))^{-h-j+2\,n}\right.$$

$$\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^{h+j}\left(\frac{i\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((p+c\,(\nu-2\,k))\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{i\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{i\left(p+c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^2}{4\,b}\right)\right)-$$

$$e^{\frac{i\,(p-c\,(\nu-2\,k))^2}{4\,b}+\frac{i\,\pi\,\nu}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-c\,(\nu-2\,k))^{-h-j+2\,n}\left(p-c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(p-c\,(\nu-2\,k)+2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((p-c(v-2k))\left(p-c(v-2k)+2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\frac{i\left(p-c(v-2k)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)+\right.$$

$$\left.2\sqrt{\frac{i\left(p-c(v-2k)+2\,i\,b\sqrt{z}\right)^2}{b}}\;b\,i\,\Gamma\left(\frac{1}{2}(h+j+2),\frac{i\left(p-c(v-2k)+2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)+$$

$$e^{-\frac{i(p+c(v-2k))^2}{4b}-\frac{i\pi v}{2}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p+c(v-2k))^{-h-j+2n}\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((p+c(v-2k))\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{i\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)-\right.$$

$$\left.2\,i\,b\sqrt{-\frac{i\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{i\left(p+c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)+$$

$$e^{\frac{i\pi v}{2}-\frac{i(p-c(v-2k))^2}{4b}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-c(v-2k))^{-h-j+2n}\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{i\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-c(v-2k))\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}(h+j+1),-\frac{i\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)-2\,i\,b\sqrt{-\frac{i\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}(h+j+2),-\frac{i\left(p-c(v-2k)-2\,i\,b\sqrt{z}\right)^2}{4b}\right)\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n\,e^{p z}\sin\left(b\,z^r\right)\sinh^v\left(c\,z^r\right)$

01.19.21.3314.01

$$\int z^n e^{p z} \sin\left(b z^2\right) \sinh^\nu\left(c z^2\right) dz = -i^{\nu+1} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left((-i b)^{-n-1} e^{-\frac{i p^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p - 2 i b z)^{j+1} \left(-\frac{i (p - 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{i (p - 2 i b z)^2}{4 b}\right) - \right.$$

$$\left. (i b)^{-n-1} e^{\frac{i p^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 i b z)^{j+1} \left(\frac{i (p + 2 i b z)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i (p + 2 i b z)^2}{4 b}\right)\right) -$$

$$i\, 2^{-\nu-2} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu e^{-\frac{p^2}{4(-i b + c (2 s - \nu))}} (-i b + c (2 s - \nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (-i b + c (2 s - \nu)) z)^{j+1} \right.$$

$$\left(-\frac{(p + 2 (-i b + c (2 s - \nu)) z)^2}{-i b + c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (-i b + c (2 s - \nu)) z)^2}{4 (-i b + c (2 s - \nu))}\right) -$$

$$(-1)^\nu e^{-\frac{p^2}{4(i b + c (2 s - \nu))}} (i b + c (2 s - \nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (i b + c (2 s - \nu)) z)^{j+1}$$

$$\left(-\frac{(p + 2 (i b + c (2 s - \nu)) z)^2}{i b + c (2 s - \nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (i b + c (2 s - \nu)) z)^2}{4 (i b + c (2 s - \nu))}\right) +$$

$$e^{-\frac{p^2}{4(-i b + c (\nu - 2 s))}} (-i b + c (\nu - 2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (-i b + c (\nu - 2 s)) z)^{j+1}$$

$$\left(-\frac{(p + 2 (-i b + c (\nu - 2 s)) z)^2}{-i b + c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (-i b + c (\nu - 2 s)) z)^2}{4 (-i b + c (\nu - 2 s))}\right) -$$

$$e^{-\frac{p^2}{4(i b + c (\nu - 2 s))}} (i b + c (\nu - 2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p + 2 (i b + c (\nu - 2 s)) z)^{j+1}$$

$$\left.\left(-\frac{(p + 2 (i b + c (\nu - 2 s)) z)^2}{i b + c (\nu - 2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p + 2 (i b + c (\nu - 2 s)) z)^2}{4 (i b + c (\nu - 2 s))}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3315.01

$$\int z^n e^{p z} \sin\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = i^{-\nu-1} 2^{-2n-\nu-2} p^{-2n-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$

$$\left(e^{\frac{b^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b)^{-h-j+2n} \left(i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(i b + 2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(b\, i \left(i b + 2 p \sqrt{z}\right) \right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i b+2 p \sqrt{z}\right)^2}{4 p}\right)+2 \sqrt{-\frac{\left(i b+2 p \sqrt{z}\right)^2}{p}}\ p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i b+2 p \sqrt{z}\right)^2}{4 p}\right)\Bigg)\Bigg)-$$

$$e^{\frac{b^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b+2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i b+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left(2 p \sqrt{-\frac{\left(-i b+2 p \sqrt{z}\right)^2}{p}}\ \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i b+2 p \sqrt{z}\right)^2}{4 p}\right)-\right.$$

$$\left.i b\left(-i b+2 p \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i b+2 p \sqrt{z}\right)^2}{4 p}\right)\right)\Bigg)\Bigg)-$$

$$i (-1)^{\nu} 2^{-2 n-\nu-2} p^{-2 n-2} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \Bigg((-1)^{\nu+1} e^{-\frac{(-i b-c(2 s-\nu))^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b-c(2 s-\nu))^{-h-j+2 n}$$

$$\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((-i b-c(2 s-\nu))\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)^2}{4 p}\right)+\right.$$

$$\left.2 \sqrt{-\frac{\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)^2}{p}}\ p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i b-c(2 s-\nu)+2 p \sqrt{z}\right)^2}{4 p}\right)\right)+$$

$$(-1)^{\nu} e^{-\frac{(i b-c(2 s-\nu))^2}{4 p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b-c(2 s-\nu))^{-h-j+2 n} \left(i b-c(2 s-\nu)+2 p \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i b-c(2 s-\nu)+2 p \sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((i\,b - c\,(2\,s - v))\left(i\,b - c\,(2\,s - v) + 2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(i\,b - c\,(2\,s - v) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right) + \right.$$

$$\left. 2\,\sqrt{-\frac{\left(i\,b - c\,(2\,s - v) + 2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}\,(h + j + 2), -\frac{\left(i\,b - c\,(2\,s - v) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right) -$$

$$e^{-\frac{(-i\,b - c\,(v - 2\,s))^2}{4\,p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (-i\,b - c\,(v - 2\,s))^{-h-j+2\,n} \left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b - c\,(v - 2\,s))\left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h + j + 1), -\frac{\left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right) + \right.$$

$$\left. 2\,\sqrt{-\frac{\left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}\,(h + j + 2), -\frac{\left(-i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right) +$$

$$e^{-\frac{(i\,b - c\,(v - 2\,s))^2}{4\,p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (i\,b - c\,(v - 2\,s))^{-h-j+2\,n} \left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)} \binom{j}{h}\binom{n}{j}\left((i\,b - c\,(v - 2\,s))\left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h + j + 1), -\frac{\left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right) + 2\,\sqrt{-\frac{\left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\right.$$

$$\left.\left.\left.\frac{1}{2}\,(h + j + 2), -\frac{\left(i\,b - c\,(v - 2\,s) + 2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right) /;\; n \in \mathbb{N} \land v \in \mathbb{N}^+$$

Involving $z^{\alpha-1}\, e^{p\,z^r}\, \sin\left(b\,z^r\right) \sinh^v\left(c\,z^r\right)$

01.19.21.3316.01

$$\int z^{\alpha-1} e^{p z^r} \sin(b z^r) \sinh^\nu(c z^r) \, dz = \frac{i\, 2^{-\nu-1} z^\alpha}{r} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-i b - p - 2 c s + c \nu) z^r\right) ((-i b - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} + (-1)^{\nu+1} ((i b - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - p - 2 c s + c \nu) z^r\right) + ((-i b - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-i b - p + 2 c s - c \nu) z^r\right) - ((i b - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - p + 2 c s - c \nu) z^r\right)\right) + \frac{2^{-\nu-1} z^\alpha}{r} e^{\frac{1}{2} i \pi (\nu-1)} \binom{\nu}{\frac{\nu}{2}} \left(((i b - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - p) z^r\right) - \Gamma\left(\frac{\alpha}{r}, (-i b - p) z^r\right) ((-i b - p) z^r)^{-\frac{\alpha}{r}}\right) (1 - \nu \bmod 2) \; /; \; \nu \in \mathbb{N}^+$$

01.19.21.3317.01

$$\int z^n e^{p z^2} \sin\left(b z^2\right) \sinh^\nu\left(c z^2\right) dz = i\, 2^{-\nu-2} z^{n+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(\frac{n+1}{2}, (-i b - p - 2 c s + c \nu) z^2\right) \left((-i b - p - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^{\nu+1} \left((i b - p - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p - 2 c s + c \nu) z^2\right) + \left((-i b - p + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - p + 2 c s - c \nu) z^2\right) - \left((i b - p + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p + 2 c s - c \nu) z^2\right)\right) - 2^{-\nu-2} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{1}{2} i \pi (\nu-1)} \Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) \left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{1}{2} i \pi (\nu+1)} \left((i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p) z^2\right)\right) (1 - \nu \bmod 2) \; /; \; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3318.01

$$\int z^n e^{p \sqrt{z}} \sin\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = i\, 2^{-\nu} z^{n+1} \sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^\nu \Gamma\left(2(n+1), (-i b - p - 2 c s + c \nu) \sqrt{z}\right) \left((-i b - p - 2 c s + c \nu) \sqrt{z}\right)^{-2(n+1)} + (-1)^{\nu+1} \left((i b - p - 2 c s + c \nu) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b - p - 2 c s + c \nu) \sqrt{z}\right) + \left((-i b - p + 2 c s - c \nu) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b - p + 2 c s - c \nu) \sqrt{z}\right) - \left((i b - p + 2 c s - c \nu) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b - p + 2 c s - c \nu) \sqrt{z}\right)\right) - 2^{-\nu} z^{n+1} \binom{\nu}{\frac{\nu}{2}} \left(e^{\frac{1}{2} i \pi (\nu-1)} \Gamma\left(2(n+1), (-i b - p) \sqrt{z}\right) \left((-i b - p) \sqrt{z}\right)^{-2(n+1)} + e^{\frac{1}{2} i \pi (\nu+1)} \left((i b - p) \sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (i b - p) \sqrt{z}\right)\right) (1 - \nu \bmod 2) \; /; \; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin\left(a z^r + q\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.3319.01

$$\int z^{\alpha-1} e^{b z^r+e} \sin(a z^r + q) \sinh^v(c z^r + g)\, dz = \frac{i\, 2^{-v-1} z^\alpha}{r} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{e+i q+2 g s-g v} \Gamma\Big(\frac{\alpha}{r}, (-b - i a - 2 c s + c v) z^r\Big) ((-b - i a - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} + (-1)^{v+1} e^{e-i q+2 g s-g v} ((-b + i a - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b + i a - 2 c s + c v) z^r\Big) + e^{e+i q-2 g s+g v} ((-b - i a + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b - i a + 2 c s - c v) z^r\Big) - e^{e-i q-2 g s+g v} ((-b + i a + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (-b + i a + 2 c s - c v) z^r\Big)\Big) - \frac{2^{-v-1} z^\alpha}{r} \binom{v}{\frac{v}{2}} \Big(e^{e+i q+\frac{1}{2} i \pi (v-1)} \Gamma\Big(\frac{\alpha}{r}, (-b - i a) z^r\Big) ((-b - i a) z^r)^{-\frac{\alpha}{r}} + e^{e-i q+\frac{1}{2} i \pi (v+1)} ((i a - b) z^r)^{-\frac{\alpha}{r}} \Gamma\Big(\frac{\alpha}{r}, (i a - b) z^r\Big)\Big) (1 - v \bmod 2) \;/;\; v \in \mathbb{N}^+$$

01.19.21.3320.01

$$\int z^n e^{b z^2+e} \sin(a z^2 + q) \sinh^v(c z^2 + g)\, dz = i\, 2^{-v-2} z^{n+1} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{e+i q+2 g s-g v} \Gamma\Big(\frac{n+1}{2}, (-b - i a - 2 c s + c v) z^2\Big) ((-b - i a - 2 c s + c v) z^2)^{\frac{1}{2}(-n-1)} + (-1)^{v+1} e^{e-i q+2 g s-g v} ((-b + i a - 2 c s + c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b + i a - 2 c s + c v) z^2\Big) + e^{e+i q-2 g s+g v} ((-b - i a + 2 c s - c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b - i a + 2 c s - c v) z^2\Big) - e^{e-i q-2 g s+g v} ((-b + i a + 2 c s - c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (-b + i a + 2 c s - c v) z^2\Big)\Big) - 2^{-v-2} z^{n+1} \binom{v}{\frac{v}{2}} \Big(e^{e+i q+\frac{1}{2} i \pi (v-1)} \Gamma\Big(\frac{n+1}{2}, (-b - i a) z^2\Big) ((-b - i a) z^2)^{\frac{1}{2}(-n-1)} + e^{e-i q+\frac{1}{2} i \pi (v+1)} ((i a - b) z^2)^{\frac{1}{2}(-n-1)} \Gamma\Big(\frac{n+1}{2}, (i a - b) z^2\Big)\Big) (1 - v \bmod 2) \;/;\; v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3321.01

$$\int z^n e^{\sqrt{z}\, b+e} \sin(\sqrt{z}\, a + q) \sinh^v(\sqrt{z}\, c + g)\, dz = i\, 2^{-v} z^{n+1} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Big((-1)^v e^{e+i q+2 g s-g v} \Gamma\big(2(n+1), (-b - i a - 2 c s + c v) \sqrt{z}\big) \big((-b - i a - 2 c s + c v) \sqrt{z}\big)^{-2(n+1)} + (-1)^{v+1} e^{e-i q+2 g s-g v} \big((-b + i a - 2 c s + c v) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (-b + i a - 2 c s + c v) \sqrt{z}\big) + e^{e+i q-2 g s+g v} \big((-b - i a + 2 c s - c v) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (-b - i a + 2 c s - c v) \sqrt{z}\big) - e^{e-i q-2 g s+g v} \big((-b + i a + 2 c s - c v) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (-b + i a + 2 c s - c v) \sqrt{z}\big)\Big) - 2^{-v} z^{n+1} \binom{v}{\frac{v}{2}} \Big(e^{e+i q+\frac{1}{2} i \pi (v-1)} \Gamma\big(2(n+1), (-b - i a) \sqrt{z}\big) \big((-b - i a) \sqrt{z}\big)^{-2(n+1)} + e^{e-i q+\frac{1}{2} i \pi (v+1)} \big((i a - b) \sqrt{z}\big)^{-2(n+1)} \Gamma\big(2(n+1), (i a - b) \sqrt{z}\big)\Big) (1 - v \bmod 2) \;/;\; v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^r + d z + e} \sin(a z^r + p z + q) \sinh^\nu(c z^r + f z + g)$

01.19.21.3322.01

$$\int z^n e^{b z^2+d z+e} \sin(a z^2+p z+q) \sinh^\nu(c z^2+f z+g)\,dz = -i^\nu 2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\Bigg(e^{-\frac{(d-i p)^2}{4(b-i a)}+e-i q+\frac{i\pi}{2}}(b-i a)^{-n-1}\sum_{j=0}^{n}2^{j-n}(i p-d)^{n-j}(d-i p+2(b-i a)z)^{j+1}\left(-\frac{(d-i p+2(b-i a)z)^2}{b-i a}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d-i p+2(b-i a)z)^2}{4(b-i a)}\right)+ (b+i a)^{-n-1} e^{-\frac{(d+i p)^2}{4(b+i a)}+e+i q-\frac{i\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-d-i p)^{n-j}(d+i p+2(b+i a)z)^{j+1}\left(-\frac{(d+i p+2(b+i a)z)^2}{b+i a}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+i p+2(b+i a)z)^2}{4(b+i a)}\right)\Bigg)- i\,2^{-\nu-2}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\Bigg((-1)^\nu e^{-\frac{(d-i p+f(2s-\nu))^2}{4(b-i a+c(2s-\nu))}+e-i q+g(2s-\nu)}(b-i a+c(2s-\nu))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d+i p-f(2s-\nu))^{n-j}(d-i p+f(2s-\nu)+2(b-i a+c(2s-\nu))z)^{j+1}\left(-\frac{(d-i p+f(2s-\nu)+2(b-i a+c(2s-\nu))z)^2}{b-i a+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d-i p+f(2s-\nu)+2(b-i a+c(2s-\nu))z)^2}{4(b-i a+c(2s-\nu))}\right)-(-1)^\nu e^{-\frac{(d+i p+f(2s-\nu))^2}{4(b+i a+c(2s-\nu))}+e+i q+g(2s-\nu)}(b+i a+c(2s-\nu))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d-i p-f(2s-\nu))^{n-j}(d+i p+f(2s-\nu)+2(b+i a+c(2s-\nu))z)^{j+1}\left(-\frac{(d+i p+f(2s-\nu)+2(b+i a+c(2s-\nu))z)^2}{b+i a+c(2s-\nu)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(d+i p+f(2s-\nu)+2(b+i a+c(2s-\nu))z)^2}{4(b+i a+c(2s-\nu))}\right)+e^{-\frac{(d-i p+f(\nu-2s))^2}{4(b-i a+c(\nu-2s))}+e-i q+g(\nu-2s)}(b-i a+c(\nu-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}(-d+i p-f(\nu-2s))^{n-j}(d-i p+f(\nu-2s)+2(b-i a+c(\nu-2s))z)^{j+1}\left(-\frac{(d-i p+f(\nu-2s)+2(b-i a+c(\nu-2s))z)^2}{b-i a+c(\nu-2s)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d-i p+f(v-2 s)+2(b-i a+c(v-2 s)) z)^2}{4(b-i a+c(v-2 s))}\right)-e^{-\frac{(d+i p+f(v-2 s))^2}{4(b+i a+c(v-2 s))}+e+i q+g(v-2 s)}$$

$$(b+i a+c(v-2 s))^{-n-1} \sum_{j=0}^n 2^{j-n}(-d-i p-f(v-2 s))^{n-j}(d+i p+f(v-2 s)+2(b+i a+c(v-2 s)) z)^{j+1}$$

$$\left(-\frac{(d+i p+f(v-2 s)+2(b+i a+c(v-2 s)) z)^2}{b+i a+c(v-2 s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\Gamma\left(\frac{j+1}{2}, -\frac{(d+i p+f(v-2 s)+2(b+i a+c(v-2 s)) z)^2}{4(b+i a+c(v-2 s))}\right)\right) /; n \in \mathbb{N} \wedge v \in \mathbb{N}^+$$

01.19.21.3323.01

$$\int z^n e^{\sqrt{z}\, b+e+d z} \sin\left(\sqrt{z}\, a+q+p z\right) \sinh^v\left(\sqrt{z}\, c+g+f z\right) dz =$$

$$i^{v+1} 2^{-2 n-v-2} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \left(e^{-\frac{(b-i a)^2}{4(d-i p)}+e-i q} (d-i p)^{-2 n-2} \sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (b-i a)^{-h-j+2 n} \left(b-i a+2(d-i p) \sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{\left(b-i a+2(d-i p) \sqrt{z}\right)^2}{d-i p}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left((b-i a)\left(b-i a+2(d-i p) \sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b-i a+2(d-i p) \sqrt{z}\right)^2}{4(d-i p)}\right)+2 \sqrt{-\frac{\left(b-i a+2(d-i p) \sqrt{z}\right)^2}{d-i p}}$$

$$\left.\left.(d-i p) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b-i a+2(d-i p) \sqrt{z}\right)^2}{4(d-i p)}\right)\right)\right)-e^{-\frac{(b+i a)^2}{4(d+i p)}+e+i q} (d+i p)^{-2 n-2}$$

$$\sum_{j=0}^n \sum_{h=0}^j (-1)^{j-h} 4^j (b+i a)^{-h-j+2 n} \left(b+i a+2(d+i p) \sqrt{z}\right)^{h+j} \left(-\frac{\left(b+i a+2(d+i p) \sqrt{z}\right)^2}{d+i p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left((b+i a)\left(b+i a+2(d+i p) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b+i a+2(d+i p) \sqrt{z}\right)^2}{4(d+i p)}\right)+\right.$$

$$\left.\left.\left.2 \sqrt{-\frac{\left(b+i a+2(d+i p) \sqrt{z}\right)^2}{d+i p}} (d+i p) \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b+i a+2(d+i p) \sqrt{z}\right)^2}{4(d+i p)}\right)\right)\right)\right)+i 2^{-2 n-v-2}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(-(-1)^v e^{-\frac{(b+i a+c(2s-v))^2}{4(d+i p+f(2s-v))}+e+i q+g(2s-v)}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+i a+c(2s-v))^{-h-j+2n}\Big(b+i a+c(2s-v)+$$

$$2(d+i p+f(2s-v))\sqrt{z}\Big)^{h+j}\left(-\frac{\left(b+i a+c(2s-v)+2(d+i p+f(2s-v))\sqrt{z}\right)^2}{d+i p+f(2s-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+i a+c(2s-v))\left(b+i a+c(2s-v)+2(d+i p+f(2s-v))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b+i a+c(2s-v)+2(d+i p+f(2s-v))\sqrt{z}\right)^2}{4(d+i p+f(2s-v))}\right)+2$$

$$(d+i p+f(2s-v))\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b+i a+c(2s-v)+2(d+i p+f(2s-v))\sqrt{z}\right)^2}{4(d+i p+f(2s-v))}\right)$$

$$\sqrt{-\frac{\left(b+i a+c(2s-v)+2(d+i p+f(2s-v))\sqrt{z}\right)^2}{d+i p+f(2s-v)}}\Bigg)\Bigg)$$

$$(d+i p+f(2s-v))^{-2n-2}+(-1)^v e^{-\frac{(b-i a+c(2s-v))^2}{4(d-i p+f(2s-v))}+e-i q+g(2s-v)}(d-i p+f(2s-v))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b-i a+c(2s-v))^{-h-j+2n}\left(b-i a+c(2s-v)+2(d-i p+f(2s-v))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-i a+c(2s-v)+2(d-i p+f(2s-v))\sqrt{z}\right)^2}{d-i p+f(2s-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b-i a+c(2s-v))\left(b-i a+c(2s-v)+2(d-i p+f(2s-v))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),-\frac{\left(b-i a+c(2s-v)+2(d-i p+f(2s-v))\sqrt{z}\right)^2}{4(d-i p+f(2s-v))}\Bigg)+$$

$$2(d-i p+f(2s-v))\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b-i a+c(2s-v)+2(d-i p+f(2s-v))\sqrt{z}\right)^2}{4(d-i p+f(2s-v))}\right)$$

$$\left.\sqrt{-\frac{\left(b-i\,a+c\,(2\,s-v)+2\,(d-i\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2}{d-i\,p+f\,(2\,s-v)}}\right)-$$

$$e^{-\frac{(b+i\,a+c\,(v-2\,s))^2}{4\,(d+i\,p+f\,(v-2\,s))}+e+i\,q+g\,(v-2\,s)}\,(d+i\,p+f\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+i\,a+c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+i\,p+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b+i\,a+c\,(v-2\,s))\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\left.\frac{1}{2}\,(h+j+1),-\frac{\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+i\,p+f\,(v-2\,s))}\right)+$$

$$2\,(d+i\,p+f\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),-\frac{\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(d+i\,p+f\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(b+i\,a+c\,(v-2\,s)+2\,(d+i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d+i\,p+f\,(v-2\,s)}}\right)+$$

$$e^{-\frac{(b-i\,a+c\,(v-2\,s))^2}{4\,(d-i\,p+f\,(v-2\,s))}+e-i\,q+g\,(v-2\,s)}\,(d-i\,p+f\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b-i\,a+c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(b-i\,a+c\,(v-2\,s)+2\,(d-i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b-i\,a+c\,(v-2\,s)+2\,(d-i\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2}{d-i\,p+f\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((b-i\,a+c\,(v-2\,s))\left(b-i\,a+c\,(v-2\,s)+2\,(d-i\,p+f\,(v-2\,s))\,\sqrt{z}\right)\Gamma\left(\right.\right.$$

$$\frac{1}{2}(h+j+1),\, -\frac{\left(b - i\,a + c\,(v-2\,s) + 2\,(d - i\,p + f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d - i\,p + f\,(v-2\,s))}\Bigg) +$$

$$2\,(d - i\,p + f\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\, -\frac{\left(b - i\,a + c\,(v-2\,s) + 2\,(d - i\,p + f\,(v-2\,s))\sqrt{z}\right)^2}{4\,(d - i\,p + f\,(v-2\,s))}\right)$$

$$\sqrt{-\frac{\left(b - i\,a + c\,(v-2\,s) + 2\,(d - i\,p + f\,(v-2\,s))\sqrt{z}\right)^2}{d - i\,p + f\,(v-2\,s)}}\Bigg)\Bigg) /;\, n \in \mathbb{N} \bigwedge v \in \mathbb{N}^+$$

Involving powers of sin, exp and power

Involving $z^{\alpha-1}\, e^{p\,z} \sin^{\mu}(c\,z) \sinh^{\nu}(a\,z)$

01.19.21.3324.01

$$\int z^{\alpha-1}\, e^{p\,z} \sin^m(c\,z) \sinh^v(a\,z)\, dz = -i^v\, 2^{-m-v} z^\alpha (-p\,z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(\alpha, -p\,z)\,(1 - m \bmod 2)\,(1 - v \bmod 2) -$$

$$2^{-m-v} z^\alpha\, e^{\frac{1}{2} i\,(v-m)\,\pi} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\left(e^{i\,m\,\pi}\, \Gamma(\alpha, (-2\,c\,i\,k + i\,c\,m - p)\,z)\,((-2\,c\,i\,k + i\,c\,m - p)\,z)^{-\alpha} + ((-i\,c\,(m-2\,k) - p)\,z)^{-\alpha}\, \Gamma(\alpha, (-i\,c\,(m-2\,k) - p)\,z)\right) -$$

$$2^{-m-v} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(e^{i\,\pi\,v}\, \Gamma(\alpha, (-p - 2\,a\,s + a\,v)\,z)\,((-p - 2\,a\,s + a\,v)\,z)^{-\alpha} +\right.$$

$$\left.((-p - a\,(v-2\,s))\,z)^{-\alpha}\, \Gamma(\alpha, (-p - a\,(v-2\,s))\,z)\right) + 2^{-m-v} z^\alpha\, e^{-\frac{i\,m\,\pi}{2}} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left(-e^{i\,\pi\,m + i\,\pi\,v}\, \Gamma(\alpha, (-2\,c\,i\,k + i\,c\,m - p - 2\,a\,s + a\,v)\,z)\,((-2\,c\,i\,k + i\,c\,m - p - 2\,a\,s + a\,v)\,z)^{-\alpha} -\right.$$

$$e^{i\,\pi\,v}\,((2\,i\,c\,k - i\,c\,m - p - 2\,a\,s + a\,v)\,z)^{-\alpha}\, \Gamma(\alpha, (2\,i\,c\,k - i\,c\,m - p - 2\,a\,s + a\,v)\,z) -$$

$$e^{i\,m\,\pi}\,((-2\,c\,i\,k + i\,c\,m - p + 2\,a\,s - a\,v)\,z)^{-\alpha}\, \Gamma(\alpha, (-2\,c\,i\,k + i\,c\,m - p + 2\,a\,s - a\,v)\,z) -$$

$$\left.((2\,i\,c\,k - i\,c\,m - p + 2\,a\,s - a\,v)\,z)^{-\alpha}\, \Gamma(\alpha, (2\,i\,c\,k - i\,c\,m - p + 2\,a\,s - a\,v)\,z)\right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+$$

01.19.21.3325.01

$$\int z^n e^{pz}\sin^\mu(cz)\sinh^\nu(az)\,dz = 2^{-\nu} i^{-\nu} e^{pz}\left(1-e^{2icz}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\sin^\mu(cz) \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip+c\mu}{2c},\ldots,-\frac{ip+c\mu}{2c},-\mu;1-\frac{ip+c\mu}{2c},\ldots,1-\frac{ip+c\mu}{2c};e^{2icz}\right)+ 2^{-\nu}\left(1-e^{2icz}\right)^{-\mu} n!\sin^\mu(cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu e^{(p-a(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip-ia(\nu-2k)+c\mu}{2c}, -\mu;1-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip-ia(\nu-2k)+c\mu}{2c};e^{2icz}\right)+e^{(p+a(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip+ia(\nu-2k)+c\mu}{2c}, -\mu;1-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip+ia(\nu-2k)+c\mu}{2c};e^{2icz}\right)\right)\;/;\;n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.3326.01

$$\int z^n e^{pz}\sin^m(cz)\sinh^\nu(az)\,dz = 2^{-m} e^{pz}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^\nu(az) \left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{p+a\nu}{2a},\ldots,-\frac{p+a\nu}{2a},-\nu;1-\frac{p+a\nu}{2a},\ldots,1-\frac{p+a\nu}{2a};e^{-2az}\right)\right) \left(1-e^{-2az}\right)^{-\nu}+2^{-m} n!\sinh^\nu(az) \left(\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\pi m}{2}+(p-ic(m-2k))z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(-ic(m-2k)+p+a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{2ick-icm+p+a\nu}{2a},\ldots, -\frac{2ick-icm+p+a\nu}{2a},-\nu;1-\frac{2ick-icm+p+a\nu}{2a},\ldots,1-\frac{2ick-icm+p+a\nu}{2a};e^{-2az}\right)+ e^{(ci(m-2k)+p)z-\frac{im\pi}{2}}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(ci(m-2k)+p+a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{-2ick+icm+p+a\nu}{2a}, \ldots,-\frac{-2ick+icm+p+a\nu}{2a},-\nu;1-\frac{-2ick+icm+p+a\nu}{2a},\ldots, 1-\frac{-2ick+icm+p+a\nu}{2a};e^{-2az}\right)\right)\right)\left(1-e^{-2az}\right)^{-\nu}\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{pz}\sin^\mu(cz+d)\sinh^\nu(az)$

01.19.21.3327.01

$$\int z^{\alpha-1} e^{p z} \sin^m(d+c z) \sinh^\nu(a z)\, dz = -i^\nu 2^{-m-\nu} z^\alpha (-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z)(1 - m \bmod 2)(1-\nu \bmod 2) - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor} (-1)^k e^{-2 d i k - i d m + \frac{1}{2} i (\nu - m)\pi} \binom{m}{k} \Big(e^{4 i d k + i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p) z)((-2 c i k + i c m - p) z)^{-\alpha} + e^{2 i d m} ((-i c (m-2k) - p) z)^{-\alpha} \Gamma(\alpha, (-i c (m-2k) - p) z)\Big) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\lfloor\frac{\nu-1}{2}\rfloor} (-1)^s \binom{\nu}{s} \Big(e^{i\pi\nu} \Gamma(\alpha, (-p - 2 a s + a \nu) z)((-p - 2 a s + a\nu) z)^{-\alpha} + ((-p - a(\nu - 2s)) z)^{-\alpha} \Gamma(\alpha, (-p - a(\nu-2s)) z)\Big) + 2^{-m-\nu} z^\alpha \sum_{k=0}^{\lfloor\frac{m-1}{2}\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\lfloor\frac{\nu-1}{2}\rfloor} (-1)^s e^{-2 d i k - i d m - \frac{i m \pi}{2}} \binom{\nu}{s} \Big(-e^{4 i d k + i \pi \nu + i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p - 2 a s + a \nu) z)((-2 c i k + i c m - p - 2 a s + a\nu) z)^{-\alpha} - e^{2 i d m + i \pi \nu} ((2 i c k - i c m - p - 2 a s + a\nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p - 2 a s + a \nu) z) - e^{4 i d k + i m \pi} ((-2 c i k + i c m - p + 2 a s - a\nu) z)^{-\alpha} \Gamma(\alpha, (-2 c i k + i c m - p + 2 a s - a \nu) z) - e^{2 i d m} ((2 i c k - i c m - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p + 2 a s - a\nu) z)\Big) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3328.01

$$\int z^n e^{p z} \sin^\mu(d + c z) \sinh^\nu(a z)\, dz = 2^{-\nu} i^{-\nu} e^{p z} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n!\,(1 - \nu \bmod 2) \sin^\mu(d + c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + c\mu}{2c}, \ldots, -\frac{i p + c \mu}{2c}, -\mu; 1 - \frac{i p + c\mu}{2c}, \ldots, 1 - \frac{i p + c \mu}{2c}; e^{2 i (d + c z)}\right) + 2^{-\nu} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n!\, \sin^\mu(d + c z) \sum_{k=0}^{\lfloor\frac{\nu-1}{2}\rfloor} (-1)^k \binom{\nu}{k} \Bigg((-1)^\nu e^{(p - a(\nu - 2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a(\nu - 2k) - i c \mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p - i a(\nu - 2k) + c\mu}{2c}, \ldots, -\frac{i p - i a (\nu - 2k) + c\mu}{2c}, -\mu; 1 - \frac{i p - i a(\nu - 2k) + c\mu}{2c}, \ldots, 1 - \frac{i p - i a(\nu-2k) + c\mu}{2c}; e^{2 i (d + c z)}\right) + e^{(p + a(\nu - 2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a(\nu - 2k) - i c\mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{i p + i a(\nu-2k) + c\mu}{2c}, \ldots, -\frac{i p + i a(\nu - 2k) + c\mu}{2c}, -\mu; 1 - \frac{i p + i a (\nu - 2k) + c\mu}{2c}, \ldots, 1 - \frac{i p + i a(\nu - 2k) + c\mu}{2c}; e^{2 i (d + c z)}\right)\Bigg) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3329.01

$$\int z^n e^{p z} \sin^m(d + c z) \sinh^\nu(a z)\, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} n! \,(1 - m \bmod 2) \sinh^\nu(a z) \left(\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{p + a \nu}{2 a}, \ldots, -\frac{p + a \nu}{2 a}, -\nu; 1 - \frac{p + a \nu}{2 a}, \ldots, 1 - \frac{p + a \nu}{2 a}; e^{-2 a z}\right)\right) \left(1 - e^{-2 a z}\right)^{-\nu} + 2^{-m} n! \sinh^\nu(a z) \left(\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i \pi m}{2} - i d (m - 2 k) + (p - i c (m - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m - 2 k) + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{2 i c k - i c m + p + a \nu}{2 a}, \ldots, -\frac{2 i c k - i c m + p + a \nu}{2 a}, -\nu; 1 - \frac{2 i c k - i c m + p + a \nu}{2 a}, \ldots, 1 - \frac{2 i c k - i c m + p + a \nu}{2 a}; e^{-2 a z}\right) + e^{-\frac{1}{2} i \pi m + d i (m - 2 k) + (c i (m - 2 k) + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2 k) + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-2 i c k + i c m + p + a \nu}{2 a}, \ldots, -\frac{-2 i c k + i c m + p + a \nu}{2 a}, -\nu; 1 - \frac{-2 i c k + i c m + p + a \nu}{2 a}, \ldots, 1 - \frac{-2 i c k + i c m + p + a \nu}{2 a}; e^{-2 a z}\right)\right)\right) \left(1 - e^{-2 a z}\right)^{-\nu} /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z} \sin^\mu(c z) \sinh^\nu(a z + b)$

01.19.21.3330.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z) \sinh^\nu(b + a z)\, dz = -i^\nu 2^{-m-\nu} z^\alpha (-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z) (1 - m \bmod 2) (1 - \nu \bmod 2) - 2^{-m-\nu} e^{\frac{1}{2} i (\nu - m) \pi} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p) z) ((-2 c i k + i c m - p) z)^{-\alpha} + ((-i c (m - 2 k) - p) z)^{-\alpha} \Gamma(\alpha, (-i c (m - 2 k) - p) z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \binom{\nu}{s} \left(e^{4 b s + i \pi \nu} \Gamma(\alpha, (-p - 2 a s + a \nu) z) ((-p - 2 a s + a \nu) z)^{-\alpha} + e^{2 b \nu} ((-p - a (\nu - 2 s)) z)^{-\alpha} \Gamma(\alpha, (-p - a (\nu - 2 s)) z)\right) + 2^{-m-\nu} z^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-\frac{1}{2} i \pi m - 2 b s - b \nu} \binom{\nu}{s} \left(-e^{i \pi m + 4 b s + i \pi \nu} \Gamma(\alpha, (-2 c i k + i c m - p - 2 a s + a \nu) z) ((-2 c i k + i c m - p - 2 a s + a \nu) z)^{-\alpha} - e^{4 b s + i \pi \nu} ((2 i c k - i c m - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p - 2 a s + a \nu) z) + e^{2 b \nu} \left(-e^{i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p + 2 a s - a \nu) z) ((-2 c i k + i c m - p + 2 a s - a \nu) z)^{-\alpha} - ((2 i c k - i c m - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p + 2 a s - a \nu) z)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3331.01

$$\int z^n e^{p z} \sin^{\mu}(c z) \sinh^{\nu}(b + a z) \, dz = 2^{-\nu} i^{-\nu} e^{p z} \left(1 - e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n! \, (1 - \nu \bmod 2) \sin^{\mu}(c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; e^{2 i c z}\right) + 2^{-\nu} i^{-\nu} \left(1 - e^{2 i c z}\right)^{-\mu} n! \sin^{\mu}(c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu - b (\nu - 2 k) + (p - a (\nu - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, \ldots, -\frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, -\mu; 1 - \frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, \ldots, 1 - \frac{i p - i a (\nu - 2 k) + c \mu}{2 c}; e^{2 i c z}\right) + e^{\frac{i \pi \nu}{2} + b (\nu - 2 k) + (p + a (\nu - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, \ldots, -\frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, -\mu; 1 - \frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, \ldots, 1 - \frac{i p + i a (\nu - 2 k) + c \mu}{2 c}; e^{2 i c z}\right)\right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.19.21.3332.01

$$\int z^n e^{p z} \sin^{m}(c z) \sinh^{\nu}(b + a z) \, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} n! \, (1 - m \bmod 2) \sinh^{\nu}(b + a z) \left(1 - e^{-2 (b + a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{p + a \nu}{2 a}, \ldots, -\frac{p + a \nu}{2 a}, -\nu; 1 - \frac{p + a \nu}{2 a}, \ldots, 1 - \frac{p + a \nu}{2 a}; e^{-2 (b + a z)}\right) + 2^{-m} n! \sinh^{\nu}(b + a z) \left(1 - e^{-2 (b + a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i \pi m}{2} + (p - i c (m - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m - 2 k) + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{2 i c k - i c m + p + a \nu}{2 a}, \ldots, -\frac{2 i c k - i c m + p + a \nu}{2 a}, -\nu; 1 - \frac{2 i c k - i c m + p + a \nu}{2 a}, \ldots, 1 - \frac{2 i c k - i c m + p + a \nu}{2 a}; e^{-2 (b + a z)}\right) + e^{-\frac{1}{2} i \pi m + (c i (m - 2 k) + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2 k) + p + a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{-2 i c k + i c m + p + a \nu}{2 a}, \ldots, -\frac{-2 i c k + i c m + p + a \nu}{2 a}, -\nu; 1 - \frac{-2 i c k + i c m + p + a \nu}{2 a}, \ldots, 1 - \frac{-2 i c k + i c m + p + a \nu}{2 a}; e^{-2 (b + a z)}\right)\right) /; n \in \mathbb{N} \wedge m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z} \sin^{\mu}(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.3333.01

$$\int z^{\alpha-1} e^{p z} \sin^m(c z + d) \sinh^\nu(a z + b) \, dz = -i^\nu 2^{-m-\nu} z^\alpha (-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z) (1 - m \bmod 2) (1 - \nu \bmod 2) - 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k e^{-2 d i k - i d m + \frac{1}{2} i (\nu - m) \pi} \binom{m}{k} \left(e^{4 i d k + i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p) z) ((-2 c i k + i c m - p) z)^{-\alpha} + e^{2 i d m} ((-i c (m - 2k) - p) z)^{-\alpha} \Gamma(\alpha, (-i c (m - 2k) - p) z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 b s - b \nu} \binom{\nu}{s} \left(e^{4 b s + i \pi \nu} \Gamma(\alpha, (-p - 2 a s + a \nu) z) ((-p - 2 a s + a \nu) z)^{-\alpha} + e^{2 b \nu} ((-p - a (\nu - 2 s)) z)^{-\alpha} \Gamma(\alpha, (-p - a (\nu - 2 s)) z)\right) + 2^{-m-\nu} z^\alpha \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s e^{-2 d i k - i d m - 2 b s - b \nu - \frac{i m \pi}{2}} \binom{\nu}{s} \left(-e^{4 i d k + 4 b s + i \pi \nu + i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p - 2 a s + a \nu) z) ((-2 c i k + i c m - p - 2 a s + a \nu) z)^{-\alpha} - e^{2 i d m + 4 b s + i \pi \nu} ((2 i c k - i c m - p - 2 a s + a \nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p - 2 a s + a \nu) z) + e^{2 b \nu} \left(-e^{4 i d k + i m \pi} \Gamma(\alpha, (-2 c i k + i c m - p + 2 a s - a \nu) z) ((-2 c i k + i c m - p + 2 a s - a \nu) z)^{-\alpha} - e^{2 i d m} ((2 i c k - i c m - p + 2 a s - a \nu) z)^{-\alpha} \Gamma(\alpha, (2 i c k - i c m - p + 2 a s - a \nu) z)\right)\right) /; m \in \mathbb{N}^+ \wedge \nu \in \mathbb{N}^+$$

01.19.21.3334.01

$$\int z^n e^{p z} \sin^\mu(d + c z) \sinh^\nu(b + a z) \, dz = 2^{-\nu} i^{-\nu} e^{p z} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n! (1 - \nu \bmod 2) \sin^\mu(d + c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; e^{2 i (d + c z)}\right) + 2^{-\nu} i^{-\nu} \left(1 - e^{2 i (d + c z)}\right)^{-\mu} n! \sin^\mu(d + c z) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu - b (\nu - 2k) + (p - a (\nu - 2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a (\nu - 2k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p - i a (\nu - 2k) + c \mu}{2 c}, \ldots, -\frac{i p - i a (\nu - 2k) + c \mu}{2 c}, -\mu; 1 - \frac{i p - i a (\nu - 2k) + c \mu}{2 c}, \ldots, 1 - \frac{i p - i a (\nu - 2k) + c \mu}{2 c}; e^{2 i (d + c z)}\right) + e^{\frac{i \pi \nu}{2} + b (\nu - 2k) + (p + a (\nu - 2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a (\nu - 2k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + i a (\nu - 2k) + c \mu}{2 c}, \ldots, -\frac{i p + i a (\nu - 2k) + c \mu}{2 c}, -\mu; 1 - \frac{i p + i a (\nu - 2k) + c \mu}{2 c}, \ldots, 1 - \frac{i p + i a (\nu - 2k) + c \mu}{2 c}; e^{2 i (d + c z)}\right)\right) /; n \in \mathbb{N} \wedge \nu \in \mathbb{N}^+$$

01.19.21.3335.01

$$\int z^n e^{p z} \sin^m(d + c z) \sinh^\nu(b + a z)\, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} n!\, (1 - m \bmod 2) \sinh^\nu(b + a z) \left(1 - e^{-2(b+a z)}\right)^{-\nu} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{p + a\nu}{2 a}, \ldots, -\frac{p + a\nu}{2 a}, -\nu; 1 - \frac{p + a\nu}{2 a}, \ldots, 1 - \frac{p + a\nu}{2 a}; e^{-2(b+a z)}\right) + 2^{-m} n! \sinh^\nu(b + a z) \left(1 - e^{-2(b+a z)}\right)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i \pi m}{2} - i d (m - 2k) + (p - i c (m - 2k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c (m - 2k) + p + a\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{2 i c k - i c m + p + a\nu}{2 a}, \ldots, -\frac{2 i c k - i c m + p + a\nu}{2 a}, -\nu; 1 - \frac{2 i c k - i c m + p + a\nu}{2 a}, \ldots, 1 - \frac{2 i c k - i c m + p + a\nu}{2 a}; e^{-2(b+a z)}\right) + e^{-\frac{1}{2} i \pi m + d i (m - 2k) + (c i (m - 2k) + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (c i (m - 2k) + p + a\nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\left(-\frac{-2 i c k + i c m + p + a\nu}{2 a}, \ldots, -\frac{-2 i c k + i c m + p + a\nu}{2 a}, -\nu; 1 - \frac{-2 i c k + i c m + p + a\nu}{2 a}, \ldots, 1 - \frac{-2 i c k + i c m + p + a\nu}{2 a}; e^{-2(b+a z)}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^n e^{p z^r} \sin^m(b z^r) \sinh^\nu(c z)$

01.19.21.3336.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \sinh^\nu(c z)\, dz = -i^\nu 2^{-m-\nu-1} z^{n+1} \left(-p z^2\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2)(1 - \nu \bmod 2) - i^{\nu-m} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left((-1)^m \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - p) z^2\right) \left((-2 b i k + i b m - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left((-i b (m - 2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b (m - 2k) - p) z^2\right)\right) - 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) p^{-n-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{-\frac{c^2 (\nu - 2k)^2}{4 p}} \sum_{h=0}^{n} 2^{h-n} (c (\nu - 2k))^{n-h} (2 p z - c (\nu - 2k))^{h+1} \left(-\frac{(2 p z - c (\nu - 2k))^2}{p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2 p z - c (\nu - 2k))^2}{4 p}\right) + e^{-\frac{c^2 (\nu - 2k)^2}{4 p}} \sum_{h=0}^{n} 2^{h-n} (-c (\nu - 2k))^{n-h} (c (\nu - 2k) + 2 p z)^{h+1} \left(-\frac{(c (\nu - 2k) + 2 p z)^2}{p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c (\nu - 2k) + 2 p z)^2}{4 p}\right)\right) -$$

$$2^{-m-v-1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{j=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^j \binom{v}{j} \Bigg(e^{-\frac{c^2 (v-2j)^2}{4(p-i b(m-2k))} + i\pi v + \frac{i m \pi}{2}} (p - i b (m-2k))^{-n-1}$$

$$\sum_{h=0}^{n} 2^{h-n} (c(v-2j))^{n-h} (2(p - i b(m-2k)) z - c(v-2j))^{h+1}$$

$$\left(-\frac{(2(p - i b(m-2k)) z - c(v-2j))^2}{p - i b(m-2k)}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(p - i b(m-2k)) z - c(v-2j))^2}{4(p - i b(m-2k))}\right) +$$

$$e^{\frac{i m \pi}{2} - \frac{c^2 (v-2j)^2}{4(p-i b(m-2k))}} (p - i b(m-2k))^{-n-1} \sum_{h=0}^{n} 2^{h-n} (-c(v-2j))^{n-h} (c(v-2j) + 2(p - i b(m-2k)) z)^{h+1}$$

$$\left(-\frac{(c(v-2j) + 2(p - i b(m-2k)) z)^2}{p - i b(m-2k)}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(c(v-2j) + 2(p - i b(m-2k)) z)^2}{4(p - i b(m-2k))}\right) +$$

$$e^{-\frac{c^2 (v-2j)^2}{4(b i (m-2k)+p)} + i\pi v - \frac{i m \pi}{2}} (b i (m-2k) + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (c(v-2j))^{n-h} (2(b i (m-2k) + p) z - c(v-2j))^{h+1}$$

$$\left(-\frac{(2(b i (m-2k) + p) z - c(v-2j))^2}{b i (m-2k) + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h} \Gamma\left(\frac{h+1}{2}, -\frac{(2(b i (m-2k) + p) z - c(v-2j))^2}{4(b i (m-2k) + p)}\right) +$$

$$e^{-\frac{c^2 (v-2j)^2}{4(b i (m-2k)+p)} - \frac{i m \pi}{2}} (b i (m-2k) + p)^{-n-1} \sum_{h=0}^{n} 2^{h-n} (-c(v-2j))^{n-h} (c(v-2j) + 2(b i (m-2k) + p) z)^{h+1}$$

$$\left(-\frac{(c(v-2j) + 2(b i (m-2k) + p) z)^2}{b i (m-2k) + p}\right)^{\frac{1}{2}(-h-1)} \binom{n}{h}$$

$$\Gamma\left(\frac{h+1}{2}, -\frac{(c(v-2j) + 2(b i (m-2k) + p) z)^2}{4(b i (m-2k) + p)}\right)\Bigg) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

01.19.21.3337.01

$$\int z^n e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right) \sinh^v(c z)\, dz =$$

$$-2^{-m-v+1} i^v z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1 - m \bmod 2)(1 - v \bmod 2) \left(-p\sqrt{z}\right)^{-2(n+1)} - i^v 2^{-m-v+1} \binom{v}{\frac{v}{2}}$$

$$(1 - v \bmod 2) z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{i m \pi}{2}} \Gamma\left(2(n+1), (-2 b i k + i b m - p)\sqrt{z}\right) \left((-2 b i k + i b m - p)\sqrt{z}\right)^{-2(n+1)} + \right.$$

$$\left. e^{-\frac{1}{2} i m \pi} \left((-i b(m-2k) - p)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-i b(m-2k) - p)\sqrt{z}\right)\right) +$$

$$2^{-m-2n-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \Bigg((-1)^v e^{\frac{p^2}{4c(v-2k)}} (-c(v-2k))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2n}\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)\right)+e^{-\frac{p^{2}}{4\,c\,(v-2\,k)}}$$

$$(c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2n}\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)+\right.$$

$$\left.\left.2\,c\,(v-2\,k)\sqrt{-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)\right)\right)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^{k}\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{s}\binom{v}{s}\left((-1)^{v}\,e^{\frac{(p-i\,b\,(m-2\,k))^{2}}{4\,c\,(v-2\,s)}+\frac{i\,m\,\pi}{2}}\,(-c\,(v-2\,s))^{-2\,n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(p-i\,b\,(m-2\,k))^{-h-j+2n}\left(-i\,b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(-i\,b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{2}}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+\right.\right.$$

$$\left.p-2\,c\,(v-2\,s)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b\,(m-2\,k)+p-2\,c\,(v-2\,s)\,\sqrt{z}\right)^{2}}{4\,c\,(v-2\,s)}\right)-$$

$$2\,c\,(v-2\,s)\sqrt{\frac{\left(-i\,b\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\left.\frac{\left(-i\,b\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)\right)+(-1)^v\,e^{\frac{(b\,i\,(m-2\,k)+p)^2}{4\,c\,(v-2\,s)}-\frac{i\,m\,\pi}{2}}\,(-c\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+p)^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((b\,i\,(m-2\,k)+p)\right.$$

$$\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\;\frac{\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)-$$

$$2\,c\,(v-2\,s)\sqrt{\frac{\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(b\,i\,(m-2\,k)+p-2\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)\right)+e^{\frac{i\,m\,\pi}{2}-\frac{(p-i\,b\,(m-2\,k))^2}{4\,c\,(v-2\,s)}}\,(c\,(v-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(-i\,b\,(m-2\,k)+p+2\,c\,(v-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b\,(m-2\,k)+p+2\,c\,(v-2\,s)\sqrt{z}\right)^2}{c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-i\,b\,(m-2\,k))\left(-i\,b\,(m-2\,k)+\right.\right.$$

$$\left.p+2\,c\,(v-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\;-\frac{\left(-i\,b\,(m-2\,k)+p+2\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)+$$

$$2\,c\,(v-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\;-\frac{\left(-i\,b\,(m-2\,k)+p+2\,c\,(v-2\,s)\sqrt{z}\right)^2}{4\,c\,(v-2\,s)}\right)$$

$$\sqrt{-\frac{\left(-i\, b\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{c\,(\nu-2\,s)}}\Bigg)+e^{-\frac{(b\,i\,(m-2\,k)+p)^2}{4\,c\,(\nu-2\,s)}-\frac{i\,m\,\pi}{2}}\,(c\,(\nu-2\,s))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b\,i\,(m-2\,k)+p)^{-h-j+2\,n}\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{c\,(\nu-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((b\,i\,(m-2\,k)+p)$$

$$\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{4\,c\,(\nu-2\,s)}\right)+$$

$$2\,c\,(\nu-2\,s)\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{4\,c\,(\nu-2\,s)}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2\,k)+p+2\,c\,(\nu-2\,s)\sqrt{z}\right)^2}{c\,(\nu-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land \nu\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z^r}\sin^m(b\,z)\sinh^\nu(c\,z)$

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$$\int z^n\, e^{p\,z^2}\sin^m(b\,z)\sinh^\nu(c\,z)\,dz ==$$

$$-i^\nu\,2^{-m-\nu-1}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\,p^{-n-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{b^2(2\,k-m)^2}{4\,p}+\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(-i\,b\,(2\,k-m))^{n-j}\,(b\,i\,(2\,k-m)+2\,p\,z)^{j+1}$$

$$\left(-\frac{(b\,i\,(2\,k-m)+2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(b\,i\,(2\,k-m)+2\,p\,z)^2}{4\,p}\right)+$$

$$e^{\frac{b^2(m-2\,k)^2}{4\,p}-\frac{i\,m\,\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(-i\,b\,(m-2\,k))^{n-j}\,(b\,i\,(m-2\,k)+2\,p\,z)^{j+1}\left(-\frac{(b\,i\,(m-2\,k)+2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(b\,i\,(m-2\,k)+2\,p\,z)^2}{4\,p}\right)\Bigg)-2^{-m-\nu-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,p^{-n-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v e^{-\frac{c^2(2k-v)^2}{4p}}\sum_{j=0}^{n}2^{j-n}(-c(2k-v))^{n-j}(c(2k-v)+2pz)^{j+1}\left(-\frac{(c(2k-v)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(c(2k-v)+2pz)^2}{4p}\right)+e^{-\frac{c^2(v-2k)^2}{4p}}\sum_{j=0}^{n}2^{j-n}(-c(v-2k))^{n-j}(c(v-2k)+2pz)^{j+1}\left(-\frac{(c(v-2k)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(c(v-2k)+2pz)^2}{4p}\right)\right)-2^{-m-v-1}p^{-n-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}$$

$$\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v e^{\frac{i m\pi}{2}-\frac{(b i(2k-m)+c(2s-v))^2}{4p}}\sum_{j=0}^{n}2^{j-n}(-i b(2k-m)-c(2s-v))^{n-j}(b i(2k-m)+c(2s-v)+2pz)^{j+1}\left(-\frac{(b i(2k-m)+c(2s-v)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(b i(2k-m)+c(2s-v)+2pz)^2}{4p}\right)+\right.$$

$$(-1)^v e^{-\frac{(b i(m-2k)+c(2s-v))^2}{4p}-\frac{i m\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-i b(m-2k)-c(2s-v))^{n-j}(b i(m-2k)+c(2s-v)+2pz)^{j+1}\left(-\frac{(b i(m-2k)+c(2s-v)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(b i(m-2k)+c(2s-v)+2pz)^2}{4p}\right)+$$

$$e^{\frac{i m\pi}{2}-\frac{(b i(2k-m)+c(v-2s))^2}{4p}}\sum_{j=0}^{n}2^{j-n}(-i b(2k-m)-c(v-2s))^{n-j}(b i(2k-m)+c(v-2s)+2pz)^{j+1}\left(-\frac{(b i(2k-m)+c(v-2s)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(b i(2k-m)+c(v-2s)+2pz)^2}{4p}\right)+$$

$$\left.e^{-\frac{(b i(m-2k)+c(v-2s))^2}{4p}-\frac{i m\pi}{2}}\sum_{j=0}^{n}2^{j-n}(-i b(m-2k)-c(v-2s))^{n-j}(b i(m-2k)+c(v-2s)+2pz)^{j+1}\left(-\frac{(b i(m-2k)+c(v-2s)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},-\frac{(b i(m-2k)+c(v-2s)+2pz)^2}{4p}\right)\right)-$$

$$2^{-m-v-1}i^v z^{n+1}\left(-pz^2\right)^{\frac{1}{2}(-n-1)}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\left(\frac{n+1}{2},-pz^2\right)(1-m\bmod 2)(1-v\bmod 2)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n e^{p\sqrt{z}} \sin^m(b z) \sinh^v(c z)\, dz = -2^{-m-v+1} i^v z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1 - m \bmod 2)(1 - v \bmod 2) \left(-p\sqrt{z}\right)^{-2(n+1)} +$$

$$2^{-m-2n-v-1} i^v \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{\frac{i p^2}{4b(2k-m)} + \frac{i m \pi}{2}} (i b (2k-m))^{-2n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2 b i \sqrt{z}\,(2k-m) + p\right)^{h+j} \left(\frac{i\left(2 b i \sqrt{z}\,(2k-m) + p\right)^2}{b(2k-m)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}$$

$$\binom{n}{j} \left(p\left(2 b i \sqrt{z}\,(2k-m) + p\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(2 b i \sqrt{z}\,(2k-m) + p\right)^2}{4b(2k-m)}\right) + 2 b i (2k-m) \right.$$

$$\left. \sqrt{\frac{i\left(2 b i \sqrt{z}\,(2k-m) + p\right)^2}{b(2k-m)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2 b i \sqrt{z}\,(2k-m) + p\right)^2}{4b(2k-m)}\right)\right) + e^{\frac{i p^2}{4b(m-2k)} - \frac{i m \pi}{2}}$$

$$(i b (m-2k))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(2 b i \sqrt{z}\,(m-2k) + p\right)^{h+j} \left(\frac{i\left(2 b i \sqrt{z}\,(m-2k) + p\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h} \binom{n}{j} \left(p\left(2 b i \sqrt{z}\,(m-2k) + p\right) \Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(2 b i \sqrt{z}\,(m-2k) + p\right)^2}{4b(m-2k)}\right) + \right.$$

$$\left.\left. 2 b i (m-2k) \sqrt{\frac{i\left(2 b i \sqrt{z}\,(m-2k) + p\right)^2}{b(m-2k)}}\; \Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(2 b i \sqrt{z}\,(m-2k) + p\right)^2}{4b(m-2k)}\right)\right)\right) +$$

$$2^{-m-2n-v-1} i^v \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \Bigg(e^{\frac{i \pi v}{2} - \frac{p^2}{4c(2k-v)}} (c(2k-v))^{-2n-2}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p + 2c(2k-v)\sqrt{z}\right)^{h+j} \left(-\frac{\left(p + 2c(2k-v)\sqrt{z}\right)^2}{c(2k-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2c(2k-v)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(p+2c(2k-v)\sqrt{z}\right)^2}{4c(2k-v)}\right)+\right.$$

$$\left.\left.2c(2k-v)\sqrt{-\frac{\left(p+2c(2k-v)\sqrt{z}\right)^2}{c(2k-v)}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(p+2c(2k-v)\sqrt{z}\right)^2}{4c(2k-v)}\right)\right)\right)+e^{-\frac{p^2}{4c(v-2k)}-\frac{i\pi v}{2}}$$

$$(c(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j p^{-h-j+2n}\left(p+2c(v-2k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2c(v-2k)\sqrt{z}\right)^2}{c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2c(v-2k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(p+2c(v-2k)\sqrt{z}\right)^2}{4c(v-2k)}\right)+\right.$$

$$\left.\left.\left.2c(v-2k)\sqrt{-\frac{\left(p+2c(v-2k)\sqrt{z}\right)^2}{c(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(p+2c(v-2k)\sqrt{z}\right)^2}{4c(v-2k)}\right)\right)\right)\right)+$$

$$2^{-m-2n-v-1}\,i^v\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{p^2}{4(bi(2k-m)+c(2s-v))}+\frac{i\pi v}{2}+\frac{im\pi}{2}}(bi(2k-m)+c(2s-v))^{-2n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j p^{-h-j+2n}\left(p+2(bi(2k-m)+c(2s-v))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2(bi(2k-m)+c(2s-v))\sqrt{z}\right)^2}{bi(2k-m)+c(2s-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2(bi(2k-m)+c(2s-v))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(p+2(bi(2k-m)+c(2s-v))\sqrt{z}\right)^2}{4(bi(2k-m)+c(2s-v))}\right)+\right.$$

$$2(bi(2k-m)+c(2s-v))\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(p+2(bi(2k-m)+c(2s-v))\sqrt{z}\right)^2}{4(bi(2k-m)+c(2s-v))}\right)$$

$$\left.\sqrt{-\frac{\left(p+2\,(b\,i\,(2\,k-m)+c\,(2\,s-v))\,\sqrt{z}\right)^2}{b\,i\,(2\,k-m)+c\,(2\,s-v)}}\right)+e^{-\frac{p^2}{4\,(b\,i\,(m-2\,k)+c\,(2\,s-v))}+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}$$

$$(b\,i\,(m-2\,k)+c\,(2\,s-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)^2}{b\,i\,(m-2\,k)+c\,(2\,s-v)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(b\,i\,(m-2\,k)+c\,(2\,s-v))}\right)+\right.$$

$$2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)^2}{4\,(b\,i\,(m-2\,k)+c\,(2\,s-v))}\right)$$

$$\left.\sqrt{-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(2\,s-v))\,\sqrt{z}\right)^2}{b\,i\,(m-2\,k)+c\,(2\,s-v)}}\right)+e^{-\frac{p^2}{4\,(b\,i\,(2\,k-m)+c\,(v-2\,s))}-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}$$

$$(b\,i\,(2\,k-m)+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)^2}{b\,i\,(2\,k-m)+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(b\,i\,(2\,k-m)+c\,(v-2\,s))}\right)+\right.$$

$$2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)^2}{4\,(b\,i\,(2\,k-m)+c\,(v-2\,s))}\right)$$

$$\left.\sqrt{-\frac{\left(p+2\,(b\,i\,(2\,k-m)+c\,(v-2\,s))\,\sqrt{z}\right)^2}{b\,i\,(2\,k-m)+c\,(v-2\,s)}}\right)+e^{-\frac{p^2}{4\,(b\,i\,(m-2\,k)+c\,(v-2\,s))}-\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}$$

$$(b\,i\,(m-2\,k)+c\,(v-2\,s))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)^2}{b\,i\,(m-2\,k)+c\,(v-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)^2}{4\,(b\,i\,(m-2\,k)+c\,(v-2\,s))}\right)+\right.$$

$$2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)^2}{4\,(b\,i\,(m-2\,k)+c\,(v-2\,s))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(p+2\,(b\,i\,(m-2\,k)+c\,(v-2\,s))\sqrt{z}\right)^2}{b\,i\,(m-2\,k)+c\,(v-2\,s)}}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\,\sin^m\left(b\,z^r\right)\sinh^v(c\,z)$

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$$\int z^n\,e^{p\,z}\,\sin^m\left(b\,z^2\right)\sinh^v(c\,z)\,dz = 2^{-m-v}\,(-i^v)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2)\,(-p)^{-n-1}-$$

$$2^{-m-v}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\,z^{n+1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Big((-1)^v\,\Gamma(n+1,\,-(2\,c\,k+p-c\,v)\,z)\,(-(2\,c\,k+p-c\,v)\,z)^{-n-1}+$$

$$(-(p+c\,(v-2\,k))\,z)^{-n-1}\,\Gamma(n+1,\,-(p+c\,(v-2\,k))\,z)\Big)-i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{i\,p^2}{4\,b\,(2\,k-m)}+\frac{i\,m\,\pi}{2}}\,(i\,b\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,b\,i\,(2\,k-m)\,z)^{j+1}\left(\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{4\,b\,(2\,k-m)}\right)+e^{\frac{i\,p^2}{4\,b\,(m-2\,k)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}$$

$$\left.(p+2\,b\,i\,(m-2\,k)\,z)^{j+1}\left(\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{4\,b\,(m-2\,k)}\right)\right)-$$

$$i^v\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{\frac{i\,(p+c\,(2\,s-v))^2}{4\,b\,(2\,k-m)}+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(i\,b\,(2\,k-m))^{-n-1}\right.$$

$$\sum_{j=0}^{n} 2^{j-n} (-p-c(2s-v))^{n-j} (p+c(2s-v)+2bi(2k-m)z)^{j+1} \left(\frac{i(p+c(2s-v)+2bi(2k-m)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(p+c(2s-v)+2bi(2k-m)z)^2}{4b(2k-m)}\right) +$$

$$e^{\frac{i(p+c(v-2s))^2}{4b(2k-m)} - \frac{i\pi v}{2} + \frac{im\pi}{2}} (ib(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p-c(v-2s))^{n-j} (p+c(v-2s)+2bi(2k-m)z)^{j+1} \left(\frac{i(p+c(v-2s)+2bi(2k-m)z)^2}{b(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(p+c(v-2s)+2bi(2k-m)z)^2}{4b(2k-m)}\right) +$$

$$e^{\frac{i(p+c(2s-v))^2}{4b(m-2k)} + \frac{i\pi v}{2} - \frac{im\pi}{2}} (ib(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p-c(2s-v))^{n-j} (p+c(2s-v)+2bi(m-2k)z)^{j+1} \left(\frac{i(p+c(2s-v)+2bi(m-2k)z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, \frac{i(p+c(2s-v)+2bi(m-2k)z)^2}{4b(m-2k)}\right) +$$

$$e^{\frac{i(p+c(v-2s))^2}{4b(m-2k)} - \frac{i\pi v}{2} - \frac{im\pi}{2}} (ib(m-2k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p-c(v-2s))^{n-j} (p+c(v-2s)+2bi(m-2k)z)^{j+1} \left(\frac{i(p+c(v-2s)+2bi(m-2k)z)^2}{b(m-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, \frac{i(p+c(v-2s)+2bi(m-2k)z)^2}{4b(m-2k)}\right)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{pz} \sin^m\left(b\sqrt{z}\right) \sinh^v(cz)\, dz ==$$

$$-2^{-m-v} i^v \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(n+1, -pz)(1-m \bmod 2)(1-v \bmod 2)(-p)^{-n-1} - 2^{-m-v} \binom{m}{\frac{m}{2}} (1-m \bmod 2) z^{n+1}$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \Big((-1)^v \Gamma(n+1, -(2ck+p-cv)z)(-(2ck+p-cv)z)^{-n-1} + (-(p+c(v-2k))z)^{-n-1}$$

$$\Gamma(n+1, -(p+c(v-2k))z)\Big) + 2^{-m-2n-v-1} i^v \binom{v}{\frac{v}{2}} (1-v \bmod 2) p^{-2n-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \Bigg(e^{\frac{b^2(2k-m)^2}{4p} + \frac{im\pi}{2}}$$

$$\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (ib(2k-m))^{-h-j+2n} \left(bi(2k-m)+2p\sqrt{z}\right)^{h+j} \left(-\frac{\left(bi(2k-m)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(2k-m)\left(b\,i\,(2k-m)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(2k-m)+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(b\,i\,(2k-m)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(2k-m)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)+e^{\frac{b^2(m-2k)^2}{4p}-\frac{i\,m\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2k))^{-h-j+2n}\left(b\,i\,(m-2k)+2p\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2k)+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2k)\left(b\,i\,(m-2k)+2p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(m-2k)+2p\sqrt{z}\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(b\,i\,(m-2k)+2p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2),-\frac{\left(b\,i\,(m-2k)+2p\sqrt{z}\right)^2}{4p}\right)\Bigg)\Bigg)\Bigg)+2^{-m-2n-v-1}\,i^v$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{\frac{b^2(2k-m)^2}{4(p+c(2s-v))}+\frac{i\pi v}{2}+\frac{i\,m\pi}{2}}\,(p+c\,(2s-v))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(2k-m))^{-h-j+2n}$$

$$\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)^2}{p+c\,(2s-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(2k-m)\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),-\frac{\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)^2}{4\,(p+c\,(2s-v))}\right)+2\,(p+c\,(2s-v))\,\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)^2}{4\,(p+c\,(2s-v))}\Bigg)\sqrt{-\frac{\left(b\,i\,(2k-m)+2\,(p+c\,(2s-v))\sqrt{z}\right)^2}{p+c\,(2s-v)}}\Bigg)+$$

$$e^{\frac{b^2 (m-2k)^2}{4(p+c(2s-v))}+\frac{i\pi v}{2}-\frac{i m\pi}{2}} (p+c(2s-v))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2k))^{-h-j+2n}$$

$$\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)^2}{p+c(2s-v)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(b i (m-2k)\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)^2}{4(p+c(2s-v))}\right) + 2(p+c(2s-v))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left. -\frac{\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)^2}{4(p+c(2s-v))}\right)\sqrt{-\frac{\left(b i (m-2k)+2(p+c(2s-v))\sqrt{z}\right)^2}{p+c(2s-v)}}\right) +$$

$$e^{\frac{b^2 (2k-m)^2}{4(p+c(v-2s))}-\frac{i\pi v}{2}+\frac{i m\pi}{2}} (p+c(v-2s))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (2k-m))^{-h-j+2n}$$

$$\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)^{h+j} \left(-\frac{\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)^2}{p+c(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j} \Bigg(b i (2k-m)\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)^2}{4(p+c(v-2s))}\right) + 2(p+c(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left. -\frac{\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)^2}{4(p+c(v-2s))}\right)\sqrt{-\frac{\left(b i (2k-m)+2(p+c(v-2s))\sqrt{z}\right)^2}{p+c(v-2s)}}\right) +$$

$$e^{\frac{b^2 (m-2k)^2}{4(p+c(v-2s))}-\frac{i\pi v}{2}-\frac{i m\pi}{2}} (p+c(v-2s))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b (m-2k))^{-h-j+2n}$$

$$\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)^{h+j}\left(-\frac{\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)^2}{p+c\,(v-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2k)\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)^2}{4\,(p+c\,(v-2s))}\right)+$$

$$2\,(p+c\,(v-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)^2}{4\,(p+c\,(v-2s))}\right)$$

$$\sqrt{-\frac{\left(b\,i\,(m-2k)+2\,(p+c\,(v-2s))\sqrt{z}\right)^2}{p+c\,(v-2s)}}\Bigg)\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n\, e^{p\,z}\, \sin^m(b\,z)\, \sinh^v(c\,z^r)$

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$$\int z^n\,e^{p\,z}\sin^m(b\,z)\sinh^v\!\left(c\,z^2\right)dz = -2^{-m-v}\,i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2)\,(-p)^{-n-1}-$$

$$i^v\,2^{-m-v}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,m\,\pi}{2}}\,\Gamma(n+1,\,(-2\,b\,i\,k+i\,b\,m-p)\,z)\,(-2\,b\,i\,k+i\,b\,m-p)^{-n-1}+$$

$$e^{-\frac{1}{2}i\,m\,\pi}\,(-i\,b\,(m-2k)-p)^{-n-1}\,\Gamma(n+1,\,(-i\,b\,(m-2k)-p)\,z)\Bigg)-$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v\,e^{-\frac{p^2}{4c(2k-v)}}\,(c\,(2k-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,c\,(2k-v)\,z)^{j+1}$$

$$\left(-\frac{(p+2\,c\,(2k-v)\,z)^2}{c\,(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(p+2\,c\,(2k-v)\,z)^2}{4\,c\,(2k-v)}\right)+e^{-\frac{p^2}{4c(v-2k)}}\,(c\,(v-2k))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,c\,(v-2k)\,z)^{j+1}\left(-\frac{(p+2\,c\,(v-2k)\,z)^2}{c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\,-\frac{(p+2\,c\,(v-2k)\,z)^2}{4\,c\,(v-2k)}\right)\Bigg)-$$

$$2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg((-1)^v\,e^{\frac{i\,m\,\pi}{2}-\frac{(b\,i\,(2k-m)+p)^2}{4c(2s-v)}}\,(c\,(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-i\, b\,(2k-m)-p)^{n-j} (b\, i\,(2k-m)+p+2c\,(2s-v)\,z)^{j+1}$$

$$\left(-\frac{(b\, i\,(2k-m)+p+2c\,(2s-v)\,z)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b\, i\,(2k-m)+p+2c\,(2s-v)\,z)^2}{4c\,(2s-v)}\right)+$$

$$(-1)^v e^{-\frac{(b\, i\,(m-2k)+p)^2}{4c\,(2s-v)}-\frac{i\, m\,\pi}{2}} (c\,(2s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, b\,(m-2k)-p)^{n-j} (b\, i\,(m-2k)+p+2c\,(2s-v)\,z)^{j+1}$$

$$\left(-\frac{(b\, i\,(m-2k)+p+2c\,(2s-v)\,z)^2}{c\,(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b\, i\,(m-2k)+p+2c\,(2s-v)\,z)^2}{4c\,(2s-v)}\right)+$$

$$e^{\frac{i\, m\,\pi}{2}-\frac{(b\, i\,(2k-m)+p)^2}{4c\,(v-2s)}} (c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, b\,(2k-m)-p)^{n-j} (b\, i\,(2k-m)+p+2c\,(v-2s)\,z)^{j+1}$$

$$\left(-\frac{(b\, i\,(2k-m)+p+2c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\!\left(\frac{j+1}{2}, -\frac{(b\, i\,(2k-m)+p+2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)+$$

$$e^{-\frac{(b\, i\,(m-2k)+p)^2}{4c\,(v-2s)}-\frac{i\, m\,\pi}{2}} (c\,(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, b\,(m-2k)-p)^{n-j} (b\, i\,(m-2k)+p+2c\,(v-2s)\,z)^{j+1}$$

$$\left(-\frac{(b\, i\,(m-2k)+p+2c\,(v-2s)\,z)^2}{c\,(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\left.\Gamma\!\left(\frac{j+1}{2}, -\frac{(b\, i\,(m-2k)+p+2c\,(v-2s)\,z)^2}{4c\,(v-2s)}\right)\right) /;\, n\in\mathbb{N} \land m\in\mathbb{N}^+ \land v\in\mathbb{N}^+$$

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$$\int z^n e^{p\,z} \sin^m(b\,z) \sinh^v\!\left(c\sqrt{z}\right) dz ==$$

$$-i^v\, 2^{-m-v} (-p)^{-n-1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(n+1, -p\,z)\,(1-m \bmod 2)\,(1-v \bmod 2) - i^{v-m}\, 2^{-m-v} z^{n+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \Big((-1)^m\, \Gamma(n+1, (-2\,b\,i\,k+i\,b\,m-p)\,z)\,((-2\,b\,i\,k+i\,b\,m-p)\,z)^{-n-1} + ((-i\,b\,(m-2k)-p)\,z)^{-n-1}$$

$$\Gamma(n+1, (-i\,b\,(m-2k)-p)\,z)\Big) + (-1)^v\, i^{-m}\, 2^{-m-2n-v-1}\, p^{-2n-2} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k}$$

$$\left(e^{\frac{i\, m\,\pi}{2}-\frac{c^2 (2k-v)^2}{4p}} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h}\, 4^j\, (c\,(2k-v))^{-h-j+2n} \left(2\sqrt{z}\; p+c\,(2k-v)\right)^{h+j} \left(-\frac{\left(2\sqrt{z}\; p+c\,(2k-v)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(2\,k-v)\left(2\,\sqrt{z}\;p+c\,(2\,k-v)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,\sqrt{z}\;p+c\,(2\,k-v)\right)^2}{4\,p}\right)+\right.$$

$$\left.2\,\sqrt{-\frac{\left(2\,\sqrt{z}\;p+c\,(2\,k-v)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,\sqrt{z}\;p+c\,(2\,k-v)\right)^2}{4\,p}\right)\right)+(-1)^v\,e^{\frac{i\,m\,\pi}{2}-\frac{c^2\,(v-2\,k)^2}{4\,p}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2\,k))^{-h-j+2\,n}\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)^{h+j}\left(-\frac{\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2\,k)\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)^2}{4\,p}\right)+\right.$$

$$\left.\left.2\,\sqrt{-\frac{\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,\sqrt{z}\;p+c\,(v-2\,k)\right)^2}{4\,p}\right)\right)\right)+$$

$$(-1)^v\,i^{-m}\,2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left((-1)^m\,e^{-\frac{c^2\,(2\,k-v)^2}{4\,(p+b\,i\,(2\,s-m))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2\,k-v))^{-h-j+2\,n}\right.\right.$$

$$\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)^{h+j}\left(-\frac{\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)^2}{p+b\,i\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(2\,k-v)\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)+2\,(p+b\,i\,(2\,s-m))\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)\sqrt{-\frac{\left(2\,\sqrt{z}\;(p+b\,i\,(2\,s-m))+c\,(2\,k-v)\right)^2}{p+b\,i\,(2\,s-m)}}\right)\right)$$

$$(p+b\,i\,(2s-m))^{-2n-2}+(-1)^{m+v}\,e^{-\frac{c^2(v-2k)^2}{4(p+b\,i\,(2s-m))}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}\right.$$

$$\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)^2}{p+b\,i\,(2s-m)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(v-2k)\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)^2}{4\,(p+b\,i\,(2s-m))}\right)+2\,(p+b\,i\,(2s-m))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left.-\frac{\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)^2}{4\,(p+b\,i\,(2s-m))}\right)\sqrt{-\frac{\left(2\sqrt{z}\,(p+b\,i\,(2s-m))+c\,(v-2k)\right)^2}{p+b\,i\,(2s-m)}}\right)\right)$$

$$(p+b\,i\,(2s-m))^{-2n-2}+e^{-\frac{c^2(2k-v)^2}{4(p+b\,i\,(m-2s))}}\,(p+b\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(2k-v))^{-h-j+2n}$$

$$\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)^2}{p+b\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(c\,(2k-v)\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)\Gamma\left(\frac{1}{2}(h+j+1),\right.\right.$$

$$\left.-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)^2}{4\,(p+b\,i\,(m-2s))}\right)+2\,(p+b\,i\,(m-2s))\,\Gamma\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)^2}{4\,(p+b\,i\,(m-2s))}\right)\sqrt{-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(2k-v)\right)^2}{p+b\,i\,(m-2s)}}\right)+$$

$$(-1)^v\,e^{-\frac{c^2(v-2k)^2}{4(p+b\,i\,(m-2s))}}\,(p+b\,i\,(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(c\,(v-2k))^{-h-j+2n}$$

$$\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)^2}{p+b\,i\,(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(c\,(v-2k)\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)^2}{4\,(p+b\,i\,(m-2s))}\right)+$$

$$2\,(p+b\,i\,(m-2s))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)^2}{4\,(p+b\,i\,(m-2s))}\right)$$

$$\sqrt{-\frac{\left(2\sqrt{z}\,(p+b\,i\,(m-2s))+c\,(v-2k)\right)^2}{p+b\,i\,(m-2s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^n e^{p z^r} \sin^m(b z) \sinh^v(c z^r)$

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$$\int z^n e^{p z^2}\sin^m(b z)\sinh^v(c z^2)\,dz = -2^{-m-v-1}\,i^v z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\!\left(\frac{n+1}{2},-p z^2\right)(1-m \bmod 2)(1-v \bmod 2)\left(-p z^2\right)^{\frac{1}{2}(-n-1)}-$$

$$2^{-m-v-1} z^{n+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,\Gamma\!\left(\frac{n+1}{2},(-2ck-p+cv)z^2\right)\left((-2ck-p+cv)z^2\right)^{\frac{1}{2}(-n-1)}+\right.$$

$$\left.\left((-p-c(v-2k))z^2\right)^{\frac{1}{2}(-n-1)}\Gamma\!\left(\frac{n+1}{2},(-p-c(v-2k))z^2\right)\right)-i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\,p^{-n-1}$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{b^2(m-2k)^2}{4p}+\frac{i m\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(i\,b\,(m-2k))^{n-j}\,(2pz-i\,b\,(m-2k))^{j+1}\left(-\frac{(2pz-i\,b\,(m-2k))^2}{p}\right)^{\frac{1}{2}(-j-1)}\right.$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(2pz-i\,b\,(m-2k))^2}{4p}\right)+e^{\frac{b^2(m-2k)^2}{4p}-\frac{i m\pi}{2}}\sum_{j=0}^{n}2^{j-n}\,(-i\,b\,(m-2k))^{n-j}$$

$$\left.(b\,i\,(m-2k)+2pz)^{j+1}\left(-\frac{(b\,i\,(m-2k)+2pz)^2}{p}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(b\,i\,(m-2k)+2pz)^2}{4p}\right)\right)-$$

$$i^v\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{h=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^h\binom{v}{h}\Bigg(e^{\frac{b^2(m-2k)^2}{4(p+c(v-2h))}-\frac{i\pi v}{2}+\frac{i m\pi}{2}}\,(p+c\,(v-2h))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (i\, b\,(m-2k))^{n-j} (2(p+c(v-2h))z - i\, b\,(m-2k))^{j+1}$$

$$\left(-\frac{(2(p+c(v-2h))z - i\, b\,(m-2k))^2}{p+c(v-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(p+c(v-2h))z - i\, b\,(m-2k))^2}{4(p+c(v-2h))}\right) +$$

$$e^{\frac{b^2 (m-2k)^2}{4(p+c(v-2h))} - \frac{i\pi v}{2} - \frac{i m \pi}{2}} (p+c(v-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, b\,(m-2k))^{n-j} (b\, i\,(m-2k) + 2(p+c(v-2h))z)^{j+1}$$

$$\left(-\frac{(b\, i\,(m-2k) + 2(p+c(v-2h))z)^2}{p+c(v-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(b\, i\,(m-2k) + 2(p+c(v-2h))z)^2}{4(p+c(v-2h))}\right) +$$

$$e^{\frac{b^2 (m-2k)^2}{4(p-c(v-2h))} + \frac{i\pi v}{2} + \frac{i m \pi}{2}} (p-c(v-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i\, b\,(m-2k))^{n-j} (2(p-c(v-2h))z - i\, b\,(m-2k))^{j+1}$$

$$\left(-\frac{(2(p-c(v-2h))z - i\, b\,(m-2k))^2}{p-c(v-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(2(p-c(v-2h))z - i\, b\,(m-2k))^2}{4(p-c(v-2h))}\right) +$$

$$e^{\frac{b^2 (m-2k)^2}{4(p-c(v-2h))} + \frac{i\pi v}{2} - \frac{i m \pi}{2}} (p-c(v-2h))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-i\, b\,(m-2k))^{n-j} (b\, i\,(m-2k) + 2(p-c(v-2h))z)^{j+1}$$

$$\left(-\frac{(b\, i\,(m-2k) + 2(p-c(v-2h))z)^2}{p-c(v-2h)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(b\, i\,(m-2k) + 2(p-c(v-2h))z)^2}{4(p-c(v-2h))}\right)\Bigg) /;\, n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{p\sqrt{z}} \sin^m(b z) \sinh^v\left(c\sqrt{z}\right) dz =$$

$$(-1)^m 2^{-m-v+1} (-i^{-v}) \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1 - m \bmod 2)(1 - v \bmod 2)\, p^{-2(n+1)} -$$

$$(-1)^{m+v} 2^{-m-v+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left(\Gamma\left(2(n+1), (-2ck - p + cv)\sqrt{z}\right)(-2ck - p + cv)^{-2(n+1)} +\right.$$

$$\left.(-1)^v (-p - c(v-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-p - c(v-2k))\sqrt{z}\right)\right) + 2^{-m-2n-v-1} i^{m+v} \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k$$

$$\binom{m}{k} \left(e^{-\frac{i p^2}{4b(m-2k)}} \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j p^{-h-j+2n} \left(p - 2\, i\, b\,(m-2k)\sqrt{z}\right)^{h+j} \left(-\frac{i\left(p - 2\, i\, b\,(m-2k)\sqrt{z}\right)^2}{b(m-2k)}\right)^{\frac{1}{2}(-h-j-1)} \right.\right.$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)-2\,i\,b\right.$$

$$\left.\left.(m-2\,k)\,\sqrt{-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{i\left(p-2\,i\,b\,(m-2\,k)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,k)}\right)\right)\right)$$

$$(-i\,b\,(m-2\,k))^{-2\,n-2}+(-1)^m\,e^{\frac{i\,p^2}{4\,b\,(m-2\,k)}}\,(i\,b\,(m-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}$$

$$\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^{h+j}\left(\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left(p\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^2}{4\,b\,(m-2\,k)}\right)+\right.$$

$$\left.\left.\left.2\,b\,i\,(m-2\,k)\,\sqrt{\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^2}{b\,(m-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(2\,b\,i\,\sqrt{z}\,\,(m-2\,k)+p\right)^2}{4\,b\,(m-2\,k)}\right)\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^{m+v}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^s\binom{m}{s}\left(e^{-\frac{i\,(p+c\,(v-2\,k))^2}{4\,b\,(m-2\,s)}-\frac{i\,\pi\,v}{2}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p+c\,(v-2\,k))^{-h-j+2\,n}\right.\right.$$

$$\left(p+c\,(v-2\,k)-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^{h+j}\left(-\frac{i\left(p+c\,(v-2\,k)-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((p+c\,(v-2\,k))\left(p+c\,(v-2\,k)-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{i\left(p+c\,(v-2\,k)-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)-$$

$$2\,i\,b\,(m-2\,s)\,\sqrt{-\frac{i\left(p+c\,(v-2\,k)-2\,i\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}}$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{i\left(p+c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)\Bigg)\Bigg)(-i\,b(m-2s))^{-2n-2}+$$

$$e^{\frac{i\pi v}{2}-\frac{i(p-c(v-2k))^2}{4b(m-2s)}}\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(p-c(v-2k))^{-h-j+2n}\left(p-c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^{h+j}\right.$$

$$\left(-\frac{i\left(p-c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((p-c(v-2k))\left(p-c(v-2k)-\right.$$

$$\left.2\,i\,b(m-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{i\left(p-c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)-$$

$$2\,i\,b(m-2s)\sqrt{-\frac{i\left(p-c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}\;\Gamma\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{i\left(p-c(v-2k)-2\,i\,b(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\Bigg)\Bigg)\Bigg)(-i\,b(m-2s))^{-2n-2}+(-1)^m e^{\frac{i(p+c(v-2k))^2}{4b(m-2s)}-\frac{i\pi v}{2}}$$

$$(i\,b(m-2s))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(p+c(v-2k))^{-h-j+2n}\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((p+c(v-2k))$$

$$\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), \frac{i\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)+$$

$$2\,b\,i(m-2s)\,\Gamma\left(\frac{1}{2}(h+j+2), \frac{i\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)^2}{4b(m-2s)}\right)$$

$$\left.\sqrt{\frac{i\left(p+c(v-2k)+2\,b\,i(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}\right)+(-1)^m e^{\frac{i(p-c(v-2k))^2}{4b(m-2s)}+\frac{i\pi v}{2}}(i\,b(m-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-c\,(v-2\,k))^{-h-j+2\,n}\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{i\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg((p-c\,(v-2\,k))$$

$$\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,\frac{i\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)+$$

$$2\,b\,i\,(m-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,\frac{i\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{4\,b\,(m-2\,s)}\right)$$

$$\sqrt{\frac{i\left(p-c\,(v-2\,k)+2\,b\,i\,(m-2\,s)\sqrt{z}\right)^2}{b\,(m-2\,s)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

Involving $z^n\,e^{p\,z}\,\sin^m(b\,z^r)\,\sinh^v(c\,z^r)$

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$$\int z^n\,e^{p\,z}\,\sin^m(b\,z^2)\,\sinh^v(c\,z^2)\,dz=$$

$$-2^{-m-v}\,i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m\bmod 2)\,(1-v\bmod 2)\,(-p)^{-n-1}-i^v\,2^{-m-v-1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\Bigg(e^{\frac{i\,p^2}{4\,b\,(2\,k-m)}+\frac{i\,m\,\pi}{2}}\,(i\,b\,(2\,k-m))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,b\,i\,(2\,k-m)\,z)^{j+1}\left(\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{b\,(2\,k-m)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(p+2\,b\,i\,(2\,k-m)\,z)^2}{4\,b\,(2\,k-m)}\right)+e^{\frac{i\,p^2}{4\,b\,(m-2\,k)}-\frac{i\,m\,\pi}{2}}\,(i\,b\,(m-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}$$

$$(p+2\,b\,i\,(m-2\,k)\,z)^{j+1}\left(\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{b\,(m-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,\frac{i\,(p+2\,b\,i\,(m-2\,k)\,z)^2}{4\,b\,(m-2\,k)}\right)\Bigg)-$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v\,e^{-\frac{p^2}{4\,c\,(2\,k-v)}}\,(c\,(2\,k-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-p)^{n-j}\,(p+2\,c\,(2\,k-v)\,z)^{j+1}$$

$$\left(-\frac{(p+2\,c\,(2\,k-v)\,z)^2}{c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},\,-\frac{(p+2\,c\,(2\,k-v)\,z)^2}{4\,c\,(2\,k-v)}\right)+e^{-\frac{p^2}{4\,c\,(v-2\,k)}}\,(c\,(v-2\,k))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2c(v-2k)z)^{j+1} \left(-\frac{(p+2c(v-2k)z)^2}{c(v-2k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2c(v-2k)z)^2}{4c(v-2k)}\right)\Bigg) -$$

$$i^v 2^{-m-v-1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \Bigg(e^{-\frac{p^2}{4(b i(2k-m)+c(2s-v))}+\frac{i\pi v}{2}+\frac{i m\pi}{2}} (b i(2k-m)+c(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b i(2k-m)+c(2s-v))z)^{j+1} \left(-\frac{(p+2(b i(2k-m)+c(2s-v))z)^2}{b i(2k-m)+c(2s-v)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b i(2k-m)+c(2s-v))z)^2}{4(b i(2k-m)+c(2s-v))}\right) + e^{-\frac{p^2}{4(b i(m-2k)+c(2s-v))}+\frac{i\pi v}{2}-\frac{i m\pi}{2}}$$

$$(b i(m-2k)+c(2s-v))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b i(m-2k)+c(2s-v))z)^{j+1}$$

$$\left(-\frac{(p+2(b i(m-2k)+c(2s-v))z)^2}{b i(m-2k)+c(2s-v)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b i(m-2k)+c(2s-v))z)^2}{4(b i(m-2k)+c(2s-v))}\right) +$$

$$e^{-\frac{p^2}{4(b i(2k-m)+c(v-2s))}-\frac{i\pi v}{2}+\frac{i m\pi}{2}} (b i(2k-m)+c(v-2s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b i(2k-m)+c(v-2s))z)^{j+1}$$

$$\left(-\frac{(p+2(b i(2k-m)+c(v-2s))z)^2}{b i(2k-m)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b i(2k-m)+c(v-2s))z)^2}{4(b i(2k-m)+c(v-2s))}\right) +$$

$$e^{-\frac{p^2}{4(b i(m-2k)+c(v-2s))}-\frac{i\pi v}{2}-\frac{i m\pi}{2}} (b i(m-2k)+c(v-2s))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-p)^{n-j} (p+2(b i(m-2k)+c(v-2s))z)^{j+1} \left(-\frac{(p+2(b i(m-2k)+c(v-2s))z)^2}{b i(m-2k)+c(v-2s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(p+2(b i(m-2k)+c(v-2s))z)^2}{4(b i(m-2k)+c(v-2s))}\right)\Bigg)\Bigg) /; n \in \mathbb{N} \land m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

01.19.21.3347.01

$$\int z^n e^{pz} \sin^m\left(b\sqrt{z}\right) \sinh^v\left(c\sqrt{z}\right) dz = i^{-v} (-1)^{m+n} 2^{-m-v} p^{-n-1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma(n+1, -pz) (1-m \bmod 2) (1-v \bmod 2) +$$

$$i^{-m-v} 2^{-m-2n-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) p^{-2n-2} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k}$$

$$\Bigg(e^{\frac{b^2(2k-m)^2}{4p}} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b(2k-m))^{-h-j+2n} \left(2p\sqrt{z} - i b(2k-m)\right)^{h+j} \left(-\frac{\left(2p\sqrt{z} - i b(2k-m)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(2\,k-m)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(2\,k-m)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.i\,b\,(2\,k-m)\left(2\,p\sqrt{z}\,-i\,b\,(2\,k-m)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(2\,k-m)\right)^2}{4\,p}\right)\right)\right)+(-1)^m\,e^{\frac{b^2\,(m-2\,k)^2}{4\,p}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k))^{-h-j+2\,n}\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)^{h+j}\left(-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.\left.i\,b\,(m-2\,k)\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\sqrt{z}\,-i\,b\,(m-2\,k)\right)^2}{4\,p}\right)\right)\right)\right)+$$

$$i^{-m}\,(-1)^\nu\,2^{-m-2\,n-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\,p^{-2\,n-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu\,e^{-\frac{c^2\,(2\,k-\nu)^2}{4\,p}-\frac{i\,m\,\pi}{2}}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(2\,k-\nu))^{-h-j+2\,n}\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)^{h+j}\left(-\frac{\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.c\,(2\,k-\nu)\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\sqrt{z}\,-c\,(2\,k-\nu)\right)^2}{4\,p}\right)\right)\right)+e^{-\frac{c^2\,(\nu-2\,k)^2}{4\,p}-\frac{i\,m\,\pi}{2}}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-c\,(\nu-2\,k))^{-h-j+2\,n}\left(2\,p\sqrt{z}\,-c\,(\nu-2\,k)\right)^{h+j}\left(-\frac{\left(2\,p\sqrt{z}\,-c\,(\nu-2\,k)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}\,-c\,(v-2\,k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\sqrt{z}\,-c\,(v-2\,k)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.\left.c\,(v-2\,k)\left(2\,p\sqrt{z}\,-c\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\sqrt{z}\,-c\,(v-2\,k)\right)^2}{4\,p}\right)\right)\right)\right)+i^{-m}\,(-1)^v\,2^{-m-2\,n-v-1}$$

$$p^{-2\,n-2}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left((-1)^v\,e^{-\frac{(-i\,b\,(2\,k-m)-c\,(2\,s-v))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(2\,k-m)-c\,(2\,s-v))^{-h-j+2\,n}\right.$$

$$\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b\,(2\,k-m)-c\,(2\,s-v))\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{4\,p}\right)+2\,p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{4\,p}\right)\sqrt{-\frac{\left(-i\,b\,(2\,k-m)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{p}}\right)+$$

$$(-1)^{m+v}\,e^{-\frac{(-i\,b\,(m-2\,k)-c\,(2\,s-v))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,k)-c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(-i\,b\,(m-2\,k)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\,b\,(m-2\,k)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((-i\,b\,(m-2\,k)-c\,(2\,s-v))\left(-i\,b\,(m-2\,k)-c\,(2\,s-v)+2\,p\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\,b\,(m-2\,k)-c\,(2\,s-v)+2\,p\sqrt{z}\right)^2}{4\,p}\right)+2\,p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$-\frac{\left(-i\, b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)\sqrt{-\frac{\left(-i\, b\,(m-2\,k)-c\,(2\,s-v)+2\,p\,\sqrt{z}\right)^2}{p}}\Bigg)+$$

$$e^{-\frac{(-i\, b\,(2\,k-m)-c\,(v-2\,s))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\, b\,(2\,k-m)-c\,(v-2\,s))^{-h-j+2\,n}\,\Big(-i\, b\,(2\,k-m)-$$

$$c\,(v-2\,s)+2\,p\,\sqrt{z}\Big)^{h+j}\left(-\frac{\left(-i\, b\,(2\,k-m)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\, b\,(2\,k-m)-c\,(v-2\,s))\left(-i\, b\,(2\,k-m)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\, b\,(2\,k-m)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,p\,\Gamma\Bigg(\frac{1}{2}\,(h+j+2),$$

$$-\frac{\left(-i\, b\,(2\,k-m)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\Bigg)\sqrt{-\frac{\left(-i\, b\,(2\,k-m)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\Bigg)+$$

$$(-1)^m\,e^{-\frac{(-i\, b\,(m-2\,k)-c\,(v-2\,s))^2}{4\,p}}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\, b\,(m-2\,k)-c\,(v-2\,s))^{-h-j+2\,n}$$

$$\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((-i\, b\,(m-2\,k)-c\,(v-2\,s))\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+$$

$$2\,p\,\Gamma\!\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)$$

$$\sqrt{-\frac{\left(-i\, b\,(m-2\,k)-c\,(v-2\,s)+2\,p\,\sqrt{z}\right)^2}{p}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \sinh^\nu(c z^r)$

01.19.21.3348.01

$$\int z^{\alpha-1} e^{p z^r} \sin^m(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{i^\nu 2^{-m-\nu} z^\alpha (-p z^r)^{-\frac{\alpha}{r}} (1 - m \bmod 2)(1 - \nu \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -p z^r\right) -$$
$$\frac{2^{-m-\nu} z^\alpha}{r} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{1}{2} i \pi (m+\nu)} \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m - p) z^r\right) ((-2 b i k + i b m - p) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. e^{\frac{1}{2} i \pi (\nu-m)} ((2 i b k - i b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m - p) z^r\right)\right) -$$
$$\frac{2^{-m-\nu} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-2 c k - p + c \nu) z^r\right) ((-2 c k - p + c \nu) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. ((2 c k - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 c k - p - c \nu) z^r\right)\right) - \frac{i^{-m} 2^{-m-\nu} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k}$$
$$\sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m - p - 2 c s + c \nu) z^r\right) ((-2 b i k + i b m - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$(-1)^\nu ((2 i b k - i b m - p - 2 c s + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m - p - 2 c s + c \nu) z^r\right) +$$
$$(-1)^m ((-2 b i k + i b m - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-2 b i k + i b m - p + 2 c s - c \nu) z^r\right) +$$
$$\left. ((2 i b k - i b m - p + 2 c s - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b k - i b m - p + 2 c s - c \nu) z^r\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3349.01

$$\int z^n e^{p z^2} \sin^m(b z^2) \sinh^\nu(c z^2)\, dz = -i^\nu 2^{-m-\nu-1} z^{n+1} (-p z^2)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2)(1 - \nu \bmod 2) - 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{\frac{1}{2} i \pi (m+\nu)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - p) z^2\right) \left((-2 b i k + i b m - p) z^2\right)^{\frac{1}{2}(-n-1)} + e^{\frac{1}{2} i \pi (\nu - m)} \left((2 i b k - i b m - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - p) z^2\right)\right) - 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{n+1}{2}, (-2 c k - p + c \nu) z^2\right) \left((-2 c k - p + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + \left((2 c k - p - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 c k - p - c \nu) z^2\right)\right) - i^{-m} 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^s \binom{\nu}{s} \left((-1)^{m+\nu} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - p - 2 c s + c \nu) z^2\right) \left((-2 b i k + i b m - p - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} + (-1)^\nu \left((2 i b k - i b m - p - 2 c s + c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - p - 2 c s + c \nu) z^2\right) + (-1)^m \left((-2 b i k + i b m - p + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-2 b i k + i b m - p + 2 c s - c \nu) z^2\right) + \left((2 i b k - i b m - p + 2 c s - c \nu) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (2 i b k - i b m - p + 2 c s - c \nu) z^2\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3350.01

$$\int z^n e^{p\sqrt{z}} \sin^m\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right) dz = -i^\nu 2^{-m-\nu+1}\left(-p\sqrt{z}\right)^{-2(n+1)} z^{n+1}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\Gamma\left(2(n+1), -p\sqrt{z}\right)(1-m \bmod 2)(1-\nu \bmod 2) - 2^{-m-\nu+1} z^{n+1}\binom{\nu}{\frac{\nu}{2}}$$
$$(1-\nu \bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{\frac{1}{2}i\pi(m+\nu)}\Gamma\left(2(n+1), (-2bik+ibm-p)\sqrt{z}\right)\left((-2bik+ibm-p)\sqrt{z}\right)^{-2(n+1)} + \right.$$
$$\left. e^{\frac{1}{2}i\pi(\nu-m)}\left((2ibk-ibm-p)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (2ibk-ibm-p)\sqrt{z}\right)\right) -$$
$$2^{-m-\nu+1} z^{n+1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left((-1)^\nu\Gamma\left(2(n+1), (-2ck-p+c\nu)\sqrt{z}\right)\left((-2ck-p+c\nu)\sqrt{z}\right)^{-2(n+1)} + \right.$$
$$\left.\left((2ck-p-c\nu)\sqrt{z}\right)^{-2(n+1)}\Gamma\left(2(n+1), (2ck-p-c\nu)\sqrt{z}\right)\right) -$$
$$i^{-m} 2^{-m-\nu+1} z^{n+1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^s\binom{\nu}{s}\left((-1)^{m+\nu}\Gamma\left(2(n+1), (-2bik+ibm-p-2cs+c\nu)\sqrt{z}\right)\right.$$
$$\left((-2bik+ibm-p-2cs+c\nu)\sqrt{z}\right)^{-2(n+1)} + (-1)^\nu\left((2ibk-ibm-p-2cs+c\nu)\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (2ibk-ibm-p-2cs+c\nu)\sqrt{z}\right) + (-1)^m\left((-2bik+ibm-p+2cs-c\nu)\sqrt{z}\right)^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-2bik+ibm-p+2cs-c\nu)\sqrt{z}\right) + \left((2ibk-ibm-p+2cs-c\nu)\sqrt{z}\right)^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (2ibk-ibm-p+2cs-c\nu)\sqrt{z}\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \sin^m\left(a z^r + q\right)\sinh^\nu\left(c z^r + g\right)$

01.19.21.3351.01

$$\int z^{\alpha-1} e^{b z^r+e} \sin^m(a z^r+q) \sinh^v(c z^r+g) \, dz = -\frac{2^{-m-v} i^v e^e z^\alpha (-b z^r)^{-\frac{\alpha}{r}} (1-m \bmod 2)(1-v \bmod 2)}{r} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) - \frac{2^{-m-v} z^\alpha}{r} \binom{v}{\frac{v}{2}} (1-v \bmod 2)$$
$$\sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \left(e^{e+2 i k q - i m q + \frac{1}{2} i (m+v)\pi} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m) z^r\right) ((-b-2 i a k + i a m) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. e^{e-2 i k q + i m q + \frac{1}{2} i (v-m)\pi} ((-b+2 i a k - i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m) z^r\right) \right) -$$
$$\frac{2^{-m-v} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{e+2 g k - g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 c k + c v) z^r\right) ((-b-2 c k + c v) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. e^{e-2 g k + g v} ((-b+2 c k - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 c k - c v) z^r\right) \right) -$$
$$\frac{i^{-m} 2^{-m-v} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{e+2 i k q - i m q + 2 g s - g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m - 2 c s + c v) z^r\right) \right.$$
$$((-b-2 i a k + i a m - 2 c s + c v) z^r)^{-\frac{\alpha}{r}} + (-1)^v e^{e-2 i k q + i m q + 2 g s - g v} ((-b+2 i a k - i a m - 2 c s + c v) z^r)^{-\frac{\alpha}{r}}$$
$$\Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m - 2 c s + c v) z^r\right) + (-1)^m e^{e+2 i k q - i m q - 2 g s + g v}$$
$$((-b-2 i a k + i a m + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a k + i a m + 2 c s - c v) z^r\right) + e^{e-2 i k q + i m q - 2 g s + g v}$$
$$\left. ((-b+2 i a k - i a m + 2 c s - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 i a k - i a m + 2 c s - c v) z^r\right) \right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{b z^2+e} \sin^m(a z^2+q) \sinh^v(c z^2+g) \, dz = -i^v 2^{-m-v-1} e^e z^{n+1} (-b z^2)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-m \bmod 2)(1-v \bmod 2) - 2^{-m-v-1} z^{n+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{e+2 i k q-i m q+\frac{1}{2} i \pi (m+v)} \Gamma\left(\frac{n+1}{2}, (-b-2 i a k+i a m) z^2\right) ((-b-2 i a k+i a m) z^2)^{\frac{1}{2}(-n-1)} + e^{e-2 i k q+i m q+\frac{1}{2} i \pi (v-m)} ((-b+2 i a k-i a m) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+2 i a k-i a m) z^2\right)\right) - 2^{-m-v-1} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{e+2 g k-g v} \Gamma\left(\frac{n+1}{2}, (-b-2 c k+c v) z^2\right) ((-b-2 c k+c v) z^2)^{\frac{1}{2}(-n-1)} + e^{e-2 g k+g v} ((-b+2 c k-c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+2 c k-c v) z^2\right)\right) - i^{-m} 2^{-m-v-1} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{e+2 i k q-i m q+2 g s-g v} \Gamma\left(\frac{n+1}{2}, (-b-2 i a k+i a m-2 c s+c v) z^2\right) ((-b-2 i a k+i a m-2 c s+c v) z^2)^{\frac{1}{2}(-n-1)} + (-1)^v e^{e-2 i k q+i m q+2 g s-g v} ((-b+2 i a k-i a m-2 c s+c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+2 i a k-i a m-2 c s+c v) z^2\right) + (-1)^m e^{e+2 i k q-i m q-2 g s+g v} ((-b-2 i a k+i a m+2 c s-c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-2 i a k+i a m+2 c s-c v) z^2\right) + e^{e-2 i k q+i m q-2 g s+g v} ((-b+2 i a k-i a m+2 c s-c v) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+2 i a k-i a m+2 c s-c v) z^2\right)\right) /; m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{\sqrt{z}\, b+e} \sin^m\left(\sqrt{z}\, a+q\right) \sinh^v\left(\sqrt{z}\, c+g\right) dz = -i^v\, 2^{-m-v+1} e^e \left(-b\sqrt{z}\right)^{-2(n+1)} z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right)(1-m \bmod 2)(1-v \bmod 2) - 2^{-m-v+1} z^{n+1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{e+2ikq-imq+\frac{1}{2}i\pi(m+v)}\, \Gamma\left(2(n+1), (-b-2iak+iam)\sqrt{z}\right)\left((-b-2iak+iam)\sqrt{z}\right)^{-2(n+1)} + e^{e-2ikq+imq+\frac{1}{2}i\pi(v-m)} \left((-b+2iak-iam)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b+2iak-iam)\sqrt{z}\right)\right) - 2^{-m-v+1} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{e+2gk-gv}\, \Gamma\left(2(n+1), (-b-2ck+cv)\sqrt{z}\right)\left((-b-2ck+cv)\sqrt{z}\right)^{-2(n+1)} + e^{e-2gk+gv} \left((-b+2ck-cv)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b+2ck-cv)\sqrt{z}\right)\right) - i^{-m}\, 2^{-m-v+1} z^{n+1} \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor} (-1)^s \binom{v}{s} \left((-1)^{m+v} e^{e+2ikq-imq+2gs-gv}\, \Gamma\left(2(n+1), (-b-2iak+iam-2cs+cv)\sqrt{z}\right) \left((-b-2iak+iam-2cs+cv)\sqrt{z}\right)^{-2(n+1)} + (-1)^v e^{e-2ikq+imq+2gs-gv} \left((-b+2iak-iam-2cs+cv)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b+2iak-iam-2cs+cv)\sqrt{z}\right) + (-1)^m e^{e+2ikq-imq-2gs+gv} \left((-b-2iak+iam+2cs-cv)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b-2iak+iam+2cs-cv)\sqrt{z}\right) + e^{e-2ikq+imq-2gs+gv} \left((-b+2iak-iam+2cs-cv)\sqrt{z}\right)^{-2(n+1)} \Gamma\left(2(n+1), (-b+2iak-iam+2cs-cv)\sqrt{z}\right)\right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^2+d z+e} \sin^m\left(a z^2+p z+q\right) \sinh^v\left(c z^2+f z+g\right)$

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$$\int z^n e^{b z^2+d z+e} \sin^m\left(a z^2+p z+q\right) \sinh^v\left(c z^2+f z+g\right) dz = 2^{-m-v-1} e^{e-\frac{d^2}{4b}} \left(-i^v\right) \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} (1-m \bmod 2)(1-v \bmod 2)\, b^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d+2bz)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - i^v\, 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor} (-1)^k \binom{m}{k} \left(e^{-\frac{(d+i(2k-m)p)^2}{4(b+ai(2k-m))}+e+i(2k-m)q+\frac{im\pi}{2}} (b+ai(2k-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-i(2k-m)p)^{n-j} (d+i(2k-m)p+2(b+ai(2k-m))z)^{j+1} \left(-\frac{(d+i(2k-m)p+2(b+ai(2k-m))z)^2}{b+ai(2k-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+i(2k-m)p+2(b+ai(2k-m))z)^2}{4(b+ai(2k-m))}\right) + \right.$$

$$e^{-\frac{(d+i(m-2k)p)^2}{4(b+a\,i(m-2k))}+e+i(m-2k)q-\frac{i m\pi}{2}}\,(b+a\,i\,(m-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-i\,(m-2k)\,p)^{n-j}$$

$$(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^{j+1}\left(-\frac{(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^2}{b+a\,i\,(m-2k)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d+i\,(m-2k)\,p+2\,(b+a\,i\,(m-2k))\,z)^2}{4\,(b+a\,i\,(m-2k))}\right)\Bigg)-$$

$$i^{v}\,2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg(e^{-\frac{(d+f(2k-v))^2}{4(b+c(2k-v))}+e+g(2k-v)+\frac{i\pi v}{2}}\,(b+c\,(2k-v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-d-f\,(2k-v))^{n-j}\,(d+f\,(2k-v)+2\,(b+c\,(2k-v))\,z)^{j+1}$$

$$\left(-\frac{(d+f\,(2k-v)+2\,(b+c\,(2k-v))\,z)^2}{b+c\,(2k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d+f\,(2k-v)+2\,(b+c\,(2k-v))\,z)^2}{4\,(b+c\,(2k-v))}\right)+$$

$$e^{-\frac{(d+f(v-2k))^2}{4(b+c(v-2k))}+e+g(v-2k)-\frac{i\pi v}{2}}\,(b+c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-f\,(v-2k))^{n-j}\,(d+f\,(v-2k)+2\,(b+c\,(v-2k))\,z)^{j+1}$$

$$\left(-\frac{(d+f\,(v-2k)+2\,(b+c\,(v-2k))\,z)^2}{b+c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-\frac{(d+f\,(v-2k)+2\,(b+c\,(v-2k))\,z)^2}{4\,(b+c\,(v-2k))}\right)\Bigg)-$$

$$i^{v}\,2^{-m-v-1}\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\Bigg(e^{-\frac{(d+i(2k-m)p+f(2s-v))^2}{4(b+a\,i(2k-m)+c(2s-v))}+e+i(2k-m)q+g(2s-v)+\frac{i\pi v}{2}+\frac{i m\pi}{2}}\,(b+a\,i\,(2k-m)+c\,(2s-v))^{-n-1}$$

$$\sum_{j=0}^{n}2^{j-n}\,(-d-i\,(2k-m)\,p-f\,(2s-v))^{n-j}\,(d+i\,(2k-m)\,p+f\,(2s-v)+2\,(b+a\,i\,(2k-m)+c\,(2s-v))$$

$$z)^{j+1}\left(-(d+i\,(2k-m)\,p+f\,(2s-v)+2\,(b+a\,i\,(2k-m)+c\,(2s-v))\,z)^2\Big/\right.$$

$$\left.(b+a\,i\,(2k-m)+c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-(d+i\,(2k-m)\,p+f\,(2s-v)+\right.$$

$$\left.2\,(b+a\,i\,(2k-m)+c\,(2s-v))\,z)^2\Big/(4\,(b+a\,i\,(2k-m)+c\,(2s-v)))\right)+$$

$$e^{-\frac{(d+i(m-2k)p+f(2s-v))^2}{4(b+a\,i(m-2k)+c(2s-v))}+e+i(m-2k)q+g(2s-v)+\frac{i\pi v}{2}-\frac{i m\pi}{2}}\,(b+a\,i\,(m-2k)+c\,(2s-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$

$$(-d-i\,(m-2k)\,p-f\,(2s-v))^{n-j}\,(d+i\,(m-2k)\,p+f\,(2s-v)+2\,(b+a\,i\,(m-2k)+c\,(2s-v))\,z)^{j+1}$$

$$\left(-(d+i\,(m-2k)\,p+f\,(2s-v)+2\,(b+a\,i\,(m-2k)+c\,(2s-v))\,z)^2\Big/\right.$$

$$\left.(b+a\,i\,(m-2k)+c\,(2s-v))\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\!\left(\frac{j+1}{2},-(d+i\,(m-2k)\,p+f\,(2s-v)+\right.$$

$$\left.2\,(b+a\,i\,(m-2k)+c\,(2s-v))\,z)^2\Big/(4\,(b+a\,i\,(m-2k)+c\,(2s-v)))\right)+$$

$$e^{-\frac{(d+i(2k-m)p+f(v-2s))^2}{4(b+a i(2k-m)+c(v-2s))}+e+i(2k-m)q+g(v-2s)-\frac{i\pi v}{2}+\frac{i m\pi}{2}}(b+a\,i\,(2k-m)+c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$
$$(-d-i\,(2k-m)\,p-f\,(v-2s))^{n-j}\,(d+i\,(2k-m)\,p+f\,(v-2s)+2\,(b+a\,i\,(2k-m)+c\,(v-2s))\,z)^{j+1}$$
$$\left(-(d+i\,(2k-m)\,p+f\,(v-2s)+2\,(b+a\,i\,(2k-m)+c\,(v-2s))\,z)^2\right/$$
$$(b+a\,i\,(2k-m)+c\,(v-2s))\Big)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\Bigg(\frac{j+1}{2},\,-(d+i\,(2k-m)\,p+f\,(v-2s)+$$
$$2\,(b+a\,i\,(2k-m)+c\,(v-2s))\,z)^2\Big/(4\,(b+a\,i\,(2k-m)+c\,(v-2s)))\Bigg)+$$
$$e^{-\frac{(d+i(m-2k)p+f(v-2s))^2}{4(b+a i(m-2k)+c(v-2s))}+e+i(m-2k)q+g(v-2s)-\frac{i\pi v}{2}-\frac{i m\pi}{2}}(b+a\,i\,(m-2k)+c\,(v-2s))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$
$$(-d-i\,(m-2k)\,p-f\,(v-2s))^{n-j}\,(d+i\,(m-2k)\,p+f\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,(v-2s))\,z)^{j+1}$$
$$\left(-(d+i\,(m-2k)\,p+f\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,(v-2s))\,z)^2\right/$$
$$(b+a\,i\,(m-2k)+c\,(v-2s))\Big)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\Bigg(\frac{j+1}{2},\,-(d+i\,(m-2k)\,p+f\,(v-2s)+2\,(b+a\,i\,(m-2k)+c\,(v-2s))\,z)^2\Big/$$
$$(4\,(b+a\,i\,(m-2k)+c\,(v-2s)))\Bigg)\Bigg)/;\ n\in\mathbb{N}\bigwedge m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+$$

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$$\int z^n\,e^{\sqrt{z}\,b+d\,z+e}\sin^m\left(\sqrt{z}\,a+p\,z+q\right)\sinh^v\left(\sqrt{z}\,c+f\,z+g\right)dz = 2^{-m-2n-v-1}\,e^{e-\frac{b^2}{4d}}\,i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)$$
$$(1-v\bmod 2)\,d^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,b^{-h-j+2n}\left(b+2d\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$
$$2^{-m-2n-v-1}\,i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\left(e^{-\frac{(b+a i(2k-m))^2}{4(d+i(2k-m)p)}+e+i(2k-m)q+\frac{i m\pi}{2}}(d+i\,(2k-m)\,p)^{-2n-2}\right.$$
$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+a\,i\,(2k-m))^{-h-j+2n}\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^{h+j}$$
$$\left(-\frac{\left(b+a\,i\,(2k-m)+2\,(d+i\,(2k-m)\,p)\sqrt{z}\right)^2}{d+i\,(2k-m)\,p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Big((b+a\,i\,(2k-m))\left(b+a\,i\,(2k-m)+\right.$$

$$2\,(d+i\,(2\,k-m)\,p)\,\sqrt{z}\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+a\,i\,(2\,k-m)+2\,(d+i\,(2\,k-m)\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,(2\,k-m)\,p)}\right)+$$

$$2\,\sqrt{-\frac{\left(b+a\,i\,(2\,k-m)+2\,(d+i\,(2\,k-m)\,p)\,\sqrt{z}\right)^2}{d+i\,(2\,k-m)\,p}}\;(d+i\,(2\,k-m)\,p)\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+a\,i\,(2\,k-m)+2\,(d+i\,(2\,k-m)\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,(2\,k-m)\,p)}\Bigg)\Bigg)\Bigg)+$$

$$e^{-\frac{(b+a\,i\,(m-2\,k))^2}{4\,(d+i\,(m-2\,k)\,p)}+e+i\,(m-2\,k)\,q-\frac{i\,m\,\pi}{2}}\,(d+i\,(m-2\,k)\,p)^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+a\,i\,(m-2\,k))^{-h-j+2\,n}$$

$$\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{d+i\,(m-2\,k)\,p}\right)^{\frac{1}{2}\,(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg((b+a\,i\,(m-2\,k))\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+1),\,-\frac{\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,(m-2\,k)\,p)}\Bigg)+$$

$$2\,\sqrt{-\frac{\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{d+i\,(m-2\,k)\,p}}\;(d+i\,(m-2\,k)\,p)\,\Gamma\Bigg($$

$$\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+a\,i\,(m-2\,k)+2\,(d+i\,(m-2\,k)\,p)\,\sqrt{z}\right)^2}{4\,(d+i\,(m-2\,k)\,p)}\Bigg)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-\nu-1}\,i^{\nu}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{-\frac{(b+c\,(2\,k-\nu))^2}{4\,(d+f\,(2\,k-\nu))}+e+g\,(2\,k-\nu)+\frac{i\,\pi\,\nu}{2}}\,(d+f\,(2\,k-\nu))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(2\,k-\nu))^{-h-j+2\,n}\left(b+c\,(2\,k-\nu)+2\,(d+f\,(2\,k-\nu))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{d+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}$$

$$\left((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\right)+2\,\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{d+f\,(2\,k-v)}}$$

$$\left.(d+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\right)\right)+$$

$$e^{-\frac{(b+c\,(v-2\,k))^2}{4\,(d+f\,(v-2\,k))}+e+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}}\,(d+f\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+c\,(v-2\,k))^{-h-j+2\,n}$$

$$\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+j}\left(-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\right.\right.$$

$$\left.-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\right)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}}$$

$$\left.\left.(d+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\,i^v\sum_{k=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}(-1)^k\binom{m}{k}\sum_{s=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^s\binom{v}{s}\left(e^{-\frac{(b+a\,i\,(2\,k-m)+c\,(2\,s-v))^2}{4\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))}+e+i\,(2\,k-m)\,q+g\,(2\,s-v)+\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\right.$$

$$(d+i\,(2\,k-m)\,p+f\,(2\,s-v))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+a\,i\,(2\,k-m)+c\,(2\,s-v))^{-h-j+2\,n}$$

$$\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left((b+a\,i\,(2\,k-m)+c\,(2\,s-v))\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v)))\right)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))$$
$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v)))\right)\sqrt{\left(-\left(b+a\,i\,(2\,k-m)+c\,(2\,s-v)+\right.\right.}$$
$$\left.\left.\left.2\,(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d+i\,(2\,k-m)\,p+f\,(2\,s-v))\right)\right)+$$
$$e^{-\frac{(b+a\,i\,(m-2\,k)+c\,(2\,s-v))^2}{4\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))}+e+i\,(m-2\,k)\,q+g\,(2\,s-v)+\frac{i\,\pi\,v}{2}-\frac{i\,m\,\pi}{2}}\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))^{-2\,n-2}$$
$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+a\,i\,(m-2\,k)+c\,(2\,s-v))^{-h-j+2\,n}$$
$$\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^{h+j}$$
$$\left(-\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$
$$\left((b+a\,i\,(m-2\,k)+c\,(2\,s-v))\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v)))\right)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))$$
$$\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v)))\right)\sqrt{\left(-\left(b+a\,i\,(m-2\,k)+c\,(2\,s-v)+\right.\right.}$$
$$\left.\left.\left.2\,(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\,\sqrt{z}\right)^2\Big/(d+i\,(m-2\,k)\,p+f\,(2\,s-v))\right)\right)+$$
$$e^{-\frac{(b+a\,i\,(2\,k-m)+c\,(v-2\,s))^2}{4\,(d+i\,(2\,k-m)\,p+f\,(v-2\,s))}+e+i\,(2\,k-m)\,q+g\,(v-2\,s)-\frac{i\,\pi\,v}{2}+\frac{i\,m\,\pi}{2}}\,(d+i\,(2\,k-m)\,p+f\,(v-2\,s))^{-2\,n-2}$$
$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(b+a\,i\,(2\,k-m)+c\,(v-2\,s))^{-h-j+2\,n}$$
$$\left(b+a\,i\,(2\,k-m)+c\,(v-2\,s)+2\,(d+i\,(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\right)^{h+j}$$
$$\left(-\left(b+a\,i\,(2\,k-m)+c\,(v-2\,s)+2\,(d+i\,(2\,k-m)\,p+f\,(v-2\,s))\,\sqrt{z}\right)^2\Big/\right.$$

$$(d+i(2k-m)p+f(v-2s))^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+a\,i(2k-m)+c(v-2s))\left(b+a\,i(2k-m)+c(v-2s)+2(d+i(2k-m)p+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),-\left(b+a\,i(2k-m)+c(v-2s)+2(d+i(2k-m)p+f(v-2s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4(d+i(2k-m)p+f(v-2s)))\right)+2(d+i(2k-m)p+f(v-2s))$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),-\left(b+a\,i(2k-m)+c(v-2s)+2(d+i(2k-m)p+f(v-2s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4(d+i(2k-m)p+f(v-2s)))\right)\sqrt{\Big(-\big(b+a\,i(2k-m)+c(v-2s)+}$$

$$\overline{2(d+i(2k-m)p+f(v-2s))\sqrt{z}\big)^2\Big/(d+i(2k-m)p+f(v-2s))\Big)}\Bigg)+$$

$$e^{-\frac{(b+a\,i(m-2k)+c(v-2s))^2}{4(d+i(m-2k)p+f(v-2s))}+e+i(m-2k)q+g(v-2s)-\frac{i\pi v}{2}-\frac{i m\pi}{2}}(d+i(m-2k)p+f(v-2s))^{-2n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}4^j(b+a\,i(m-2k)+c(v-2s))^{-h-j+2n}$$

$$\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)^{h+j}$$

$$\left(-\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(d+i(m-2k)p+f(v-2s))\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\Bigg((b+a\,i(m-2k)+c(v-2s))\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)$$

$$\Gamma\!\left(\frac{1}{2}(h+j+1),-\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4(d+i(m-2k)p+f(v-2s)))\right)+2(d+i(m-2k)p+f(v-2s))$$

$$\Gamma\!\left(\frac{1}{2}(h+j+2),-\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)^2\Big/\right.$$

$$\left.(4(d+i(m-2k)p+f(v-2s)))\right)$$

$$\sqrt{\Big(-\left(b+a\,i(m-2k)+c(v-2s)+2(d+i(m-2k)p+f(v-2s))\sqrt{z}\right)^2\Big/}$$

$$\overline{(d+i(m-2k)p+f(v-2s))\Big)}\Bigg)\Bigg)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Involving cos, exp and power

Involving $z^{\alpha-1}\,e^{p z}\cos(c\,z)\sinh^{\nu}(a\,z)$

01.19.21.3356.01

$$\int z^{\alpha-1} e^{p z} \cos(c z) \sinh^{\nu}(a z)\, dz = -i^{\nu} 2^{-\nu-1} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} (\Gamma(\alpha, (-i c - p) z) ((-i c - p) z)^{-\alpha} + ((i c - p) z)^{-\alpha} \Gamma(\alpha, (i c - p) z)) (1 - \nu \bmod 2) - 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Big((-1)^{\nu} \Gamma(\alpha, (-i c - 2 a k - p + a \nu) z) ((-i c - 2 a k - p + a \nu) z)^{-\alpha} + (-1)^{\nu} ((i c - 2 a k - p + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - 2 a k - p + a \nu) z) + ((-i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c + 2 a k - p - a \nu) z) + ((i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c + 2 a k - p - a \nu) z)\Big) /; \nu \in \mathbb{N}^+$$

01.19.21.3357.01

$$\int z^{n} e^{p z} \cos(c z) \sinh^{\nu}(a z)\, dz = \frac{1}{2} \left(1 - e^{2 a z}\right)^{-\nu} n! \sinh^{\nu}(a z) \Bigg(e^{(-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\Big(\frac{-i c + p - a \nu}{2 a}, \ldots, \frac{-i c + p - a \nu}{2 a}, -\nu; \frac{-i c + p - a \nu}{2 a} + 1, \ldots, \frac{-i c + p - a \nu}{2 a} + 1; e^{2 a z}\Big) + e^{(i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\Big(\frac{i c + p - a \nu}{2 a}, \ldots, \frac{i c + p - a \nu}{2 a}, -\nu; \frac{i c + p - a \nu}{2 a} + 1, \ldots, \frac{i c + p - a \nu}{2 a} + 1; e^{2 a z}\Big)\Bigg) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos(c z + d) \sinh^{\nu}(a z)$

01.19.21.3358.01

$$\int z^{\alpha-1} e^{p z} \cos(d + c z) \sinh^{\nu}(a z)\, dz = -i^{\nu} 2^{-\nu-1} e^{-i d} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} \Big(e^{2 i d} \Gamma(\alpha, (-i c - p) z) ((-i c - p) z)^{-\alpha} + ((i c - p) z)^{-\alpha} \Gamma(\alpha, (i c - p) z)\Big) (1 - \nu \bmod 2) - 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-i d} \binom{\nu}{k} \Big(e^{2 i d + i \pi \nu} \Gamma(\alpha, (-i c - 2 a k - p + a \nu) z) ((-i c - 2 a k - p + a \nu) z)^{-\alpha} + e^{i \pi \nu} ((i c - 2 a k - p + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - 2 a k - p + a \nu) z) + e^{2 i d} ((-i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (-i c + 2 a k - p - a \nu) z) + ((i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c + 2 a k - p - a \nu) z)\Big) /; \nu \in \mathbb{N}^+$$

01.19.21.3359.01

$$\int z^{n} e^{p z} \cos(d + c z) \sinh^{\nu}(a z)\, dz = \frac{1}{2} \left(1 - e^{2 a z}\right)^{-\nu} n! \sinh^{\nu}(a z) \Bigg(e^{-i d + (-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\Big(\frac{-i c + p - a \nu}{2 a}, \ldots, \frac{-i c + p - a \nu}{2 a}, -\nu; \frac{-i c + p - a \nu}{2 a} + 1, \ldots, \frac{-i c + p - a \nu}{2 a} + 1; e^{2 a z}\Big) + e^{i d + (i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - a \nu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\Big(\frac{i c + p - a \nu}{2 a}, \ldots, \frac{i c + p - a \nu}{2 a}, -\nu; \frac{i c + p - a \nu}{2 a} + 1, \ldots, \frac{i c + p - a \nu}{2 a} + 1; e^{2 a z}\Big)\Bigg) /; n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos(c z) \sinh^{\nu}(a z + b)$

01.19.21.3360.01

$$\int z^{\alpha-1} e^{p z} \cos(c z) \sinh^{\nu}(b + a z)\, dz = -i^{\nu}\, 2^{-\nu-1} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} (\Gamma(\alpha, (-i c - p) z) ((-i c - p) z)^{-\alpha} + ((i c - p) z)^{-\alpha} \Gamma(\alpha, (i c - p) z)) (1 - \nu \bmod 2) - 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-2 b k - b \nu} \binom{\nu}{k} \Big(e^{4 b k + i \pi \nu} \Gamma(\alpha, (-i c - 2 a k - p + a \nu) z) ((-i c - 2 a k - p + a \nu) z)^{-\alpha} + e^{4 b k + i \pi \nu} ((i c - 2 a k - p + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - 2 a k - p + a \nu) z) + e^{2 b \nu} \big(\Gamma(\alpha, (-i c + 2 a k - p - a \nu) z) ((-i c + 2 a k - p - a \nu) z)^{-\alpha} + ((i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c + 2 a k - p - a \nu) z)\big)\Big) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3361.01

$$\int z^n e^{p z} \cos(d + c z) \sinh^{\nu}(b + a z)\, dz = \frac{1}{2} \left(1 - e^{2 (b + a z)}\right)^{-\nu} n!\, \sinh^{\nu}(b + a z) \left(e^{-i d + (-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\!\left(\frac{-i c + p - a \nu}{2 a}, \ldots, \frac{-i c + p - a \nu}{2 a}, -\nu; \frac{-i c + p - a \nu}{2 a} + 1, \ldots, \frac{-i c + p - a \nu}{2 a} + 1; e^{2 (b + a z)}\right) + e^{i d + (i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - a \nu)^{-j-1}}{(n-j)!}\, {}_{j+2}F_{j+1}\!\left(\frac{i c + p - a \nu}{2 a}, \ldots, \frac{i c + p - a \nu}{2 a}, -\nu; \frac{i c + p - a \nu}{2 a} + 1, \ldots, \frac{i c + p - a \nu}{2 a} + 1; e^{2 (b + a z)}\right)\right) /;\ n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{p z} \cos(c z + d) \sinh^{\nu}(a z + b)$

01.19.21.3362.01

$$\int z^{\alpha-1} e^{p z} \cos(d + c z) \sinh^{\nu}(b + a z)\, dz = -i^{\nu}\, 2^{-\nu-1} e^{-i d} z^{\alpha} \binom{\nu}{\frac{\nu}{2}} \left(e^{2 i d}\, \Gamma(\alpha, (-i c - p) z) ((-i c - p) z)^{-\alpha} + ((i c - p) z)^{-\alpha} \Gamma(\alpha, (i c - p) z)\right) (1 - \nu \bmod 2) - 2^{-\nu-1} z^{\alpha} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-i d - 2 b k - b \nu} \binom{\nu}{k} \Big(e^{2 i d + 4 b k + i \pi \nu} \Gamma(\alpha, (-i c - 2 a k - p + a \nu) z) ((-i c - 2 a k - p + a \nu) z)^{-\alpha} + e^{4 b k + i \pi \nu} ((i c - 2 a k - p + a \nu) z)^{-\alpha} \Gamma(\alpha, (i c - 2 a k - p + a \nu) z) + e^{2 b \nu} \big(e^{2 i d}\, \Gamma(\alpha, (-i c + 2 a k - p - a \nu) z) ((-i c + 2 a k - p - a \nu) z)^{-\alpha} + ((i c + 2 a k - p - a \nu) z)^{-\alpha} \Gamma(\alpha, (i c + 2 a k - p - a \nu) z)\big)\Big) /;\ \nu \in \mathbb{N}^+$$

01.19.21.3363.01

$$\int z^n e^{p z} \cos(d + c z) \sinh^\nu(b + a z) \, dz = \frac{1}{2} \left(1 - e^{2(b+a z)}\right)^{-\nu} n! \sinh^\nu(b + a z) \left(e^{-i d + (-i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (-i c + p - a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(\frac{-i c + p - a \nu}{2 a}, \ldots, \frac{-i c + p - a \nu}{2 a}, -\nu; \frac{-i c + p - a \nu}{2 a} + 1, \ldots, \frac{-i c + p - a \nu}{2 a} + 1; e^{2(b+a z)}\right) + e^{i d + (i c + p) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (i c + p - a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(\frac{i c + p - a \nu}{2 a}, \ldots, \frac{i c + p - a \nu}{2 a}, -\nu; \frac{i c + p - a \nu}{2 a} + 1, \ldots, \frac{i c + p - a \nu}{2 a} + 1; e^{2(b+a z)}\right)\right) /; n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos(b z^r) \sinh^\nu(c z)$

01.19.21.3364.01

$$\int z^n e^{p z^2} \cos(b z^2) \sinh^\nu(c z)\, dz = 2^{-\nu-2} (-i^\nu) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, z^{n+1}$$

$$\left(\Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) \left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left((i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p) z^2\right)\right) -$$

$$2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \frac{1}{\sqrt{-i b + p}\, \sqrt{i b + p}} (-1)^k e^{\frac{1}{4}\left(-\frac{c^2 (\nu-2k)^2}{-i b+p} - \frac{c^2 (\nu-2k)^2}{i b+p}\right)} \binom{\nu}{k}$$

$$\left((-1)^\nu e^{\frac{c^2 (\nu-2k)^2}{4 (i b+p)}} \sqrt{i b + p} \sum_{q=0}^{n} 2^{q-n} (-i b + p)^{-n-\frac{1}{2}} (c (\nu - 2k))^{n-q} (2 c k - c \nu + 2 (-i b + p) z)^{q+1}\right.$$

$$\left(-\frac{(2 c k - c \nu + 2 (-i b + p) z)^2}{-i b + p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 c k - c \nu + 2 (-i b + p) z)^2}{4 (-i b + p)}\right) +$$

$$e^{\frac{c^2 (\nu-2k)^2}{4 (i b+p)}} \sqrt{i b + p} \sum_{q=0}^{n} (-i b + p)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right)\right)^{n-q} (c (\nu - 2k) + 2 (-i b + p) z)^{q+1}$$

$$\left(-\frac{(c (\nu - 2k) + 2 (-i b + p) z)^2}{-i b + p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c (\nu - 2k) + 2 (-i b + p) z)^2}{4 (-i b + p)}\right) +$$

$$e^{\frac{c^2 (\nu-2k)^2}{4 (-i b+p)}} \sqrt{-i b + p} \left((-1)^\nu \sum_{q=0}^{n} 2^{q-n} (i b + p)^{-n-\frac{1}{2}} (c (\nu - 2k))^{n-q} (2 c k - c \nu + 2 (i b + p) z)^{q+1}\right.$$

$$\left(-\frac{(2 c k - c \nu + 2 (i b + p) z)^2}{i b + p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 c k - c \nu + 2 (i b + p) z)^2}{4 (i b + p)}\right) +$$

$$\sum_{q=0}^{n} (i b + p)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right)\right)^{n-q} (c (\nu - 2k) + 2 (i b + p) z)^{q+1} \left(-\frac{(c (\nu - 2k) + 2 (i b + p) z)^2}{i b + p}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c (\nu - 2k) + 2 (i b + p) z)^2}{4 (i b + p)}\right)\right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p \sqrt{z}} \cos\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz =$$

$$2^{-2n-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu e^{\frac{(-i b+p)^2}{4 c (\nu-2k)}} (-c (\nu - 2k))^{-2n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b + p)^{-h-j+2n}\right.$$

$$\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}\left(\frac{\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+p)\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(-i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$(-1)^v\,e^{\frac{(i\,b+p)^2}{4\,c\,(v-2\,k)}}\,(-c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b+p)^{-h-j+2\,n}\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((i\,b+p)\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,\frac{\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,\frac{\left(i\,b+p-2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{-\frac{(-i\,b+p)^2}{4\,c\,(v-2\,k)}}\,(c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b+p)^{-h-j+2\,n}\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}$$

$$\left((-i\,b+p)\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)+\right.$$

$$\left.2\,c\,(v-2\,k)\sqrt{-\frac{\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+p+2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)+$$

$$e^{-\frac{(i b+p)^2}{4 c (v-2 k)}} (c (v-2 k))^{-2 n-2} \sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (i b+p)^{-h-j+2 n} \left(i b+p+2 c (v-2 k) \sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i b+p+2 c (v-2 k) \sqrt{z}\right)^2}{c (v-2 k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j}$$

$$\left((i b+p) \left(i b+p+2 c (v-2 k) \sqrt{z}\right) \Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i b+p+2 c (v-2 k) \sqrt{z}\right)^2}{4 c (v-2 k)}\right)+\right.$$

$$\left.\left.2 c (v-2 k) \sqrt{-\frac{\left(i b+p+2 c (v-2 k) \sqrt{z}\right)^2}{c (v-2 k)}} \, \Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i b+p+2 c (v-2 k) \sqrt{z}\right)^2}{4 c (v-2 k)}\right)\right)\right)-$$

$$\left(\frac{i}{2}\right)^{v} z^{n+1} \binom{v}{\frac{v}{2}} \left(\Gamma\left(2 (n+1), (-i b-p) \sqrt{z}\right) \left((-i b-p) \sqrt{z}\right)^{-2 (n+1)} + \left((i b-p) \sqrt{z}\right)^{-2 (n+1)}\right.$$

$$\left.\Gamma\left(2 (n+1), (i b-p) \sqrt{z}\right)\right) (1-v \bmod 2) \;/;\; v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{p z^r} \cos(b z) \sinh^v(c z)$

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$$\int z^n e^{p z^2} \cos(b z) \sinh^\nu(c z)\, dz = 2^{-\nu-2} e^{\frac{b^2}{4p}} (-i^\nu) \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)$$
$$\left(\sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (-i b + 2 p z)^{q+1} \left(-\frac{(-i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b + 2 p z)^2}{4 p}\right) + \right.$$
$$\left. \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (i b + 2 p z)^{q+1} \left(-\frac{(i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + 2 p z)^2}{4 p}\right)\right) p^{-n-1} -$$
$$\frac{1}{\sqrt{p}} \left(2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k e^{-\frac{c^2 (\nu-2k)^2 - b^2}{2 p}} \binom{\nu}{k} \left(e^{\frac{(i b - 2 c k + c \nu)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (i b + 2 c k - c \nu)^{n-q} (-i b - 2 c k + c \nu + 2 p z)^{q+1}\right.\right.$$
$$\left(-\frac{(-i b - 2 c k + c \nu + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b - 2 c k + c \nu + 2 p z)^2}{4 p}\right) +$$
$$e^{\frac{(i b + 2 c k - c \nu)^2}{4 p}} \sum_{q=0}^{n} p^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right) - \frac{i b}{2}\right)^{n-q} (i b - 2 c k + c \nu + 2 p z)^{q+1}$$
$$\left(-\frac{(i b - 2 c k + c \nu + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b - 2 c k + c \nu + 2 p z)^2}{4 p}\right) +$$
$$(-1)^\nu e^{\frac{(i b - 2 c k + c \nu)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (-i b - 2 c k + c \nu)^{n-q} (i b + 2 c k - c \nu + 2 p z)^{q+1}$$
$$\left(-\frac{(i b + 2 c k - c \nu + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + 2 c k - c \nu + 2 p z)^2}{4 p}\right) +$$
$$(-1)^\nu e^{\frac{(i b + 2 c k - c \nu)^2}{4 p}} \sum_{q=0}^{n} 2^{q-n} p^{-n-\frac{1}{2}} (i b + c(\nu - 2k))^{n-q} \left(-\frac{(i b + c(\nu - 2k) - 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$
$$\left.\left. (-i b + 2 c k - c \nu + 2 p z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + c(\nu - 2k) - 2 p z)^2}{4 p}\right)\right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p \sqrt{z}} \cos(b z) \sinh^\nu(c z)\, dz = 2^{-2n-\nu-2} e^{-\frac{i p^2}{4 b}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) (i b)^{-2n-2}$$
$$\left(e^{\frac{i p^2}{2 b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2 i b \sqrt{z}\right)^{h+k} \left(\frac{i \left(p + 2 i b \sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \left(p \left(p + 2 i b \sqrt{z}\right)\right.\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)+2\sqrt{\frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{b}}\ b\,i\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(p+2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,i\,b\sqrt{z}\right)^{h+k}\left(-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(p\left(p-2\,i\,b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ -\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)-$$

$$2\,i\,b\sqrt{-\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{b}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(p-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-2\,n-\nu-2}\sum_{u=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^u\binom{\nu}{u}\Bigg(e^{\frac{p^2}{4\,i\,b+8\,c\,u-4\,c\,\nu}}\,(-i\,b-2\,c\,u+c\,\nu)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{-i\,b-2\,c\,u+c\,\nu}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{-4\,i\,b+4\,c\,(\nu-2\,u)}\Bigg)+2\sqrt{-\frac{\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{-i\,b-2\,c\,u+c\,\nu}}\ (-i\,b-2\,c\,u+c\,\nu)\,\Gamma\Bigg($$

$$\frac{1}{2}(h+k+2),\ -\frac{\left(p+2\,(-i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{-4\,i\,b+4\,c\,(\nu-2\,u)}\Bigg)\Bigg)\Bigg)+(-1)^{\nu}\,e^{\frac{p^2}{4\,i\,b-8\,c\,u+4\,c\,\nu}}\,(-i\,b+2\,c\,u-c\,\nu)^{-2\,(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,(i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^{h+k}\left(\frac{\left(p-2\,(i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{i\,b-2\,c\,u+c\,\nu}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\Bigg(p\left(p-2\,(i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{\left(p-2\,(i\,b-2\,c\,u+c\,\nu)\sqrt{z}\right)^2}{4\,(i\,b-2\,c\,u+c\,\nu)}\right)-2\,(i\,b-2\,c\,u+$$

$$c\,v)\sqrt{\frac{\left(p-2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{i\,b-2\,c\,u+c\,v}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(p-2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{4\,(i\,b-2\,c\,u+c\,v)}\right)\Bigg)+$$

$$e^{\frac{p^2}{-4\,i\,b+8\,c\,u-4\,c\,v}}\,(i\,b-2\,c\,u+c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{i\,b-2\,c\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+k+1),\,-\frac{\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{4\,(i\,b-2\,c\,u+c\,v)}\Bigg)+2\sqrt{-\frac{\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{i\,b-2\,c\,u+c\,v}}$$

$$(i\,b-2\,c\,u+c\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(p+2\,(i\,b-2\,c\,u+c\,v)\sqrt{z}\right)^2}{4\,(i\,b-2\,c\,u+c\,v)}\right)\Bigg)+$$

$$(-1)^v\,e^{\frac{p^2}{-4\,i\,b-8\,c\,u+4\,c\,v}}\,(i\,b+2\,c\,u-c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)^2}{-i\,b-2\,c\,u+c\,v}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+k+1),\,\frac{\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)^2}{-4\,i\,b-8\,c\,u+4\,c\,v}\Bigg)+2\sqrt{\frac{\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)^2}{-i\,b-2\,c\,u+c\,v}}$$

$$(i\,b+2\,c\,u-c\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(p+2\,(i\,b+2\,c\,u-c\,v)\sqrt{z}\right)^2}{-4\,i\,b-8\,c\,u+4\,c\,v}\right)\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\land n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos\left(b\,z^r\right)\sinh^v(c\,z)$

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$$\int z^n e^{p z} \cos(b z^2) \sinh^\nu(c z)\, dz = -i^\nu 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\frac{1}{\sqrt{i b}} e^{\frac{i p^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p + 2 i b z)^{q+1} \left(\frac{i (p + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + 2 i b z)^2}{4 b} \right) + \frac{1}{\sqrt{-i b}} e^{-\frac{i p^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (-p)^{n-q} (p - 2 i b z)^{q+1} \left(-\frac{i (p - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (p - 2 i b z)^2}{4 b} \right) \right) - 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{i b}} e^{\frac{i (2 c k + p - c \nu)^2}{4 b} + i \pi \nu} \sum_{q=0}^{n} 2^{q-n} (i b)^{-n-\frac{1}{2}} (c(\nu - 2 k) - p)^{n-q} (2 c k + p - c \nu + 2 i b z)^{q+1} \left(\frac{i (2 c k + p - c \nu + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + c (2 k - \nu) + 2 i b z)^2}{4 b} \right) + \frac{1}{\sqrt{i b}} e^{\frac{i (p + c(\nu - 2 k))^2}{4 b}} \sum_{q=0}^{n} (i b)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right) - \frac{p}{2} \right)^{n-q} (p + c(\nu - 2 k) + 2 i b z)^{q+1} \left(\frac{i (p + c (\nu - 2 k) + 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{i (p + c(\nu - 2 k) + 2 i b z)^2}{4 b} \right) + \frac{1}{\sqrt{-i b}} e^{-\frac{i (p + c(\nu - 2 k))^2}{4 b}} \sum_{q=0}^{n} (-i b)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right) - \frac{p}{2} \right)^{n-q} \left(-\frac{i (-2 c k + p + c \nu - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} (p + c(\nu - 2 k) - 2 i b z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (-2 c k + p + c \nu - 2 i b z)^2}{4 b} \right) + \frac{1}{\sqrt{-i b}} e^{i \pi \nu - \frac{i (2 c k + p - c \nu)^2}{4 b}} \sum_{q=0}^{n} 2^{q-n} (-i b)^{-n-\frac{1}{2}} (c(\nu - 2 k) - p)^{n-q} (2 c k + p - c \nu - 2 i b z)^{q+1} \left(-\frac{i (2 c k + p - c \nu - 2 i b z)^2}{b} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (2 c k + p - c \nu - 2 i b z)^2}{4 b} \right) \right) /;\ \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{p z} \cos\left(b \sqrt{z}\right) \sinh^\nu(c z)\, dz = 2^{-2 n - \nu - 2} e^{\frac{b^2}{4 p}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \left(\sum_{j=0}^{n} \sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b)^{-h-j+2 n} \left(-i b + 2 p \sqrt{z}\right)^{h+j} \left(-\frac{\left(-i b + 2 p \sqrt{z}\right)^2}{p} \right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h} \binom{n}{j} \left(2 p \sqrt{-\frac{\left(-i b + 2 p \sqrt{z}\right)^2}{p}} \right. \right.$$

$$\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right) - i\,b\left(-i\,b+2\,p\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg) +$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,p\sqrt{z}\right)^{h+j}\left(-\frac{\left(i\,b+2\,p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,p\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right) + 2\sqrt{-\frac{\left(i\,b+2\,p\sqrt{z}\right)^2}{p}}\;p\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(i\,b+2\,p\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)$$

$$p^{-2\,n-2} + 2^{-2\,n-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{\frac{b^2}{4(p+c(\nu-2\,k))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2\,n}\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{p+c\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2\,(p+c\,(\nu-2\,k))$$

$$\sqrt{-\frac{\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{p+c\,(\nu-2\,k)}}\;\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{4\,(p+c\,(\nu-2\,k))}\right) - i$$

$$b\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(-i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{4\,(p+c\,(\nu-2\,k))}\right)\Bigg)\Bigg)\Bigg)$$

$$(p+c\,(\nu-2\,k))^{-2\,n-2} + e^{\frac{b^2}{4(p+c(\nu-2\,k))}}\Bigg(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2\,n}\left(i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{p+c\,(\nu-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{4\,(p+c\,(\nu-2\,k))}\right) + 2\sqrt{-\frac{\left(i\,b+2\,(p+c\,(\nu-2\,k))\sqrt{z}\right)^2}{p+c\,(\nu-2\,k)}}$$

$$(p+c(v-2k))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2(p+c(v-2k))\sqrt{z}\right)^2}{4(p+c(v-2k))}\right)\Bigg)\Bigg)(p+c(v-2k))^{-2n-2}+$$

$$(-1)^v\,e^{\frac{b^2}{4(p-c(v-2k))}}\,(p-c(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b)^{-h-j+2n}\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(2(p-c(v-2k))$$

$$\sqrt{-\frac{\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\right)-$$

$$i\,b\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,-\frac{\left(-i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\right)\Bigg)+$$

$$(-1)^v\,e^{\frac{b^2}{4(p-c(v-2k))}}\,(p-c(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b)^{-h-j+2n}\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\Bigg(b\,i\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+j+1),\,-\frac{\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\Bigg)+2\sqrt{-\frac{\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}}$$

$$(p-c(v-2k))\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,-\frac{\left(i\,b+2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\right)\Bigg)\Bigg)\,/;\,v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p z}\cos(b\,z)\sinh^v(c\,z^r)$

01.19.21.3370.01

$$\int z^n e^{pz}\cos(bz)\sinh^\nu(cz^2)\,dz = -2^{-\nu-1} i^\nu \binom{\nu}{\frac{\nu}{2}} (E_{-n}((-ib-p)z)+E_{-n}((ib-p)z))(1-\nu \bmod 2) z^{n+1} -$$

$$2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(\frac{1}{\sqrt{c(\nu-2k)}} e^{\frac{(-ib+p)^2}{c(8k-4\nu)}}\sum_{q=0}^n 2^{q-n}(ib-p)^{n-q}(c(\nu-2k))^{-n-\frac{1}{2}}(-ib+p+2c(\nu-2k)z)^{q+1}$$

$$\left(\frac{(-ib+p+2c(\nu-2k)z)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(-ib+p+2c(\nu-2k)z)^2}{c(8k-4\nu)}\right)+$$

$$\frac{1}{\sqrt{c(\nu-2k)}} e^{\frac{(ib+p)^2}{c(8k-4\nu)}}\sum_{q=0}^n 2^{q-n}(-ib-p)^{n-q}(c(\nu-2k))^{-n-\frac{1}{2}}(ib+p+2c(\nu-2k)z)^{q+1}$$

$$\left(\frac{(ib+p+2c(\nu-2k)z)^2}{c(2k-\nu)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(ib+p+2c(\nu-2k)z)^2}{c(8k-4\nu)}\right)+$$

$$\frac{1}{\sqrt{c(2k-\nu)}} e^{i\pi\nu-\frac{(-ib+p)^2}{4(2ck-c\nu)}}\sum_{q=0}^n 2^{q-n}(ib-p)^{n-q}(c(2k-\nu))^{-n-\frac{1}{2}}(-ib+p+4ckz-2c\nu z)^{q+1}$$

$$\left(-\frac{(-ib+p+4ckz-2c\nu z)^2}{2ck-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(-ib+p+4ckz-2c\nu z)^2}{4(2ck-c\nu)}\right)+$$

$$\frac{1}{\sqrt{c(2k-\nu)}} e^{i\pi\nu-\frac{(ib+p)^2}{4(2ck-c\nu)}}\sum_{q=0}^n 2^{q-n}(-ib-p)^{n-q}(c(2k-\nu))^{-n-\frac{1}{2}}(ib+p+4ckz-2c\nu z)^{q+1}$$

$$\left(-\frac{(ib+p+4ckz-2c\nu z)^2}{2ck-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(ib+p+4ckz-2c\nu z)^2}{4(2ck-c\nu)}\right)\Bigg)\ /;\ \nu\in\mathbb{N}^+\land n\in\mathbb{N}$$

01.19.21.3371.01

$$\int z^n e^{pz}\cos(bz)\sinh^\nu\left(c\sqrt{z}\right)dz =$$

$$i^{-\nu}2^{-\nu-2}\Bigg(-2\binom{\nu}{\frac{\nu}{2}}\left(-(-ib-p)^{-n-1}\Gamma(n+1,(-ib-p)z)-(ib-p)^{-n-1}\Gamma(n+1,(ib-p)z)\right)(\nu \bmod 2-1)+i^{-\nu}4^{-n}$$

$$\sum_{u=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^u\binom{\nu}{u}\Bigg((-1)^\nu e^{-\frac{c^2(\nu-2u)^2}{4(-ib+p)}}\Bigg(\sum_{k=0}^n\sum_{h=0}^k(-1)^{k-h}4^k(c(\nu-2u))^{-h-k+2n}\left(\frac{\left(2\sqrt{z}(b+ip)+ci(\nu-2u)\right)^2}{-ib+p}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(2\sqrt{z}(-ib+p)+c(\nu-2u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\Bigg(c(\nu-2u)\left(2\sqrt{z}(-ib+p)+c(\nu-2u)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(2\sqrt{z}\,(b+i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)+2\sqrt{\frac{\left(2\sqrt{z}\,(b+i\,p)+c\,i\,(v-2\,u)\right)^2}{-i\,b+p}}$$

$$(-i\,b+p)\,\Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(2\sqrt{z}\,(b+i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)\Bigg)(-i\,b+p)^{-2\,(n+1)}+$$

$$e^{-\frac{c^2\,(v-2\,u)^2}{4\,(-i\,b+p)}}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\sqrt{z}\,(-b-i\,p)+c\,i\,(v-2\,u)\right)^2}{-i\,b+p}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(2\,(-i\,b+p)\sqrt{z}-c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(2\,(-i\,b+p)\sqrt{\frac{\left(2\sqrt{z}\,(-b-i\,p)+c\,i\,(v-2\,u)\right)^2}{-i\,b+p}}\;\Gamma\left(\frac{1}{2}\right.\right.$$

$$\left.(h+k+2), \frac{\left(2\sqrt{z}\,(-b-i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)-c\,(v-2\,u)\left(2\,(-i\,b+p)\sqrt{z}-c\,(v-2\,u)\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(2\sqrt{z}\,(-b-i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(-i\,b+p)}\right)\Bigg)\Bigg)(-i\,b+p)^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,u)^2}{4\,(i\,b+p)}}$$

$$(i\,b+p)^{-2\,(n+1)}\left((-1)^v\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\sqrt{z}\,(i\,p-b)+c\,i\,(v-2\,u)\right)^2}{i\,b+p}\right)^{\frac{1}{2}(-h-k-1)}\right.$$

$$\left(2\sqrt{z}\,(i\,b+p)+c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(2\,(i\,b+p)\sqrt{\frac{\left(2\sqrt{z}\,(i\,p-b)+c\,i\,(v-2\,u)\right)^2}{i\,b+p}}\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(2\sqrt{z}\,(i\,p-b)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)-i\,c\,(v-2\,u)$$

$$\left(2\sqrt{z}\,(i\,p-b)+c\,i\,(v-2\,u)\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(2\sqrt{z}\,(i\,p-b)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)\Bigg)\Bigg)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,\sqrt{z}\,\,(b-i\,p)+c\,i\,(v-2\,u)\right)^2}{i\,b+p}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\left(2\,(i\,b+p)\,\sqrt{z}\,-c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}\left(2\,(i\,b+p)\,\sqrt{\frac{\left(2\,\sqrt{z}\,\,(b-i\,p)+c\,i\,(v-2\,u)\right)^2}{i\,b+p}}\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,\,(b-i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)-c\,(v-2\,u)\left(2\,(i\,b+p)\,\sqrt{z}\,-c\,(v-2\,u)\right)$$

$$\left.\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,\,(b-i\,p)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b+p)}\right)\right)\Bigg)\Bigg)\Bigg)\Bigg)\;/;\;v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z^r}\cos(b\,z)\sinh^v(c\,z^r)$

01.19.21.3372.01

$$\int z^n e^{p z^2} \cos(b z) \sinh^\nu(c z^2)\, dz = -2^{-\nu-2} e^{\frac{b^2}{4p}} i^\nu \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2)\, p^{-n-1}$$

$$\left(\sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (-i b + 2 p z)^{q+1} \left(-\frac{(-i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b + 2 p z)^2}{4 p}\right) +\right.$$

$$\left.\sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (i b + 2 p z)^{q+1} \left(-\frac{(i b + 2 p z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + 2 p z)^2}{4 p}\right)\right) -$$

$$2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k e^{\frac{b^2 p}{2(2 c k + p - c \nu)(p + c(\nu - 2k))}} \binom{\nu}{k} \left(e^{-\frac{b^2}{4(2 c k + p - c \nu)}} \sqrt{2 c k + p - c \nu}\right.\right.$$

$$\left(\sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (-2 c k + p + c \nu)^{-n-\frac{1}{2}} (-i b + 2(-2 c k + p + c \nu) z)^{q+1}\right.$$

$$\left(-\frac{(-i b + 2(-2 c k + p + c \nu) z)^2}{-2 c k + p + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b + 2(-2 c k + p + c \nu) z)^2}{4(-2 c k + p + c \nu)}\right) +$$

$$\sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (-2 c k + p + c \nu)^{-n-\frac{1}{2}} (i b + 2(-2 c k + p + c \nu) z)^{q+1}$$

$$\left.\left(-\frac{(i b + 2(-2 c k + p + c \nu) z)^2}{-2 c k + p + c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + 2(-2 c k + p + c \nu) z)^2}{4(-2 c k + p + c \nu)}\right)\right) +$$

$$(-1)^\nu e^{-\frac{b^2}{4(p + c(\nu - 2k))}} \sqrt{p + c(\nu - 2k)} \sum_{q=0}^{n} 2^{q-n} (i b)^{n-q} (2 c k + p - c \nu)^{-n-\frac{1}{2}} (-i b + 2(2 c k + p - c \nu) z)^{q+1}$$

$$\left(-\frac{(-i b + 2(2 c k + p - c \nu) z)^2}{2 c k + p - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b + 2(2 c k + p - c \nu) z)^2}{4(2 c k + p - c \nu)}\right) +$$

$$(-1)^\nu e^{-\frac{b^2}{4(-2 c k + p + c \nu)}} \sqrt{-2 c k + p + c \nu} \sum_{q=0}^{n} 2^{q-n} (-i b)^{n-q} (2 c k + p - c \nu)^{-n-\frac{1}{2}} (i b + 2(2 c k + p - c \nu) z)^{q+1}$$

$$\left.\left.\left(-\frac{(i b + 2(2 c k + p - c \nu) z)^2}{2 c k + p - c \nu}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i b + 2(2 c k + p - c \nu) z)^2}{4(2 c k + p - c \nu)}\right)\right)\right) \Big/$$

$$\left(\sqrt{2 c k + p - c \nu} \sqrt{p + c(\nu - 2k)}\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3373.01

$$\int z^n e^{p\sqrt{z}} \cos(b z) \sinh^\nu\left(c\sqrt{z}\right) dz ==$$

$$i^{-\nu} 2^{-2n-\nu-2} (-1)^n b^{-2n-2} \left(e^{\frac{i p^2}{4 b}} \binom{\nu}{\frac{\nu}{2}} (\nu \bmod 2 - 1) \left(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2 i b \sqrt{z}\right)^{h+k} \right.\right.$$

$$\left(\frac{i\left(p+2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k} \left(p\left(p+2 i b \sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), \frac{i\left(p+2 i b\sqrt{z}\right)^2}{4 b}\right) + \right.$$

$$\left.\left. 2\sqrt{\frac{i\left(p+2 i b\sqrt{z}\right)^2}{b}}\; b\, i\, \Gamma\left(\frac{1}{2}(h+k+2), \frac{i\left(p+2 i b\sqrt{z}\right)^2}{4 b}\right)\right)\right) +$$

$$e^{-\frac{i p^2}{2 b}} \sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p - 2 i b\sqrt{z}\right)^{h+k} \left(-\frac{i\left(p-2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left(p\left(p-2 i b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(p-2 i b\sqrt{z}\right)^2}{4 b}\right) - \right.$$

$$\left.\left.\left. 2 i b \sqrt{-\frac{i\left(p-2 i b\sqrt{z}\right)^2}{b}}\; \Gamma\left(\frac{1}{2}(h+k+2), -\frac{i\left(p-2 i b\sqrt{z}\right)^2}{4 b}\right)\right)\right)\right) -$$

$$i^{-\nu} \sum_{u=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor} (-1)^u \binom{\nu}{u} \left(e^{-\frac{i(p-c(\nu-2u))^2}{4 b}} \sum_{k=0}^{n}\sum_{h=0}^{k} (-1)^{k-h} 4^k (p - c(\nu-2u))^{-h-k+2n} \left(p - c(\nu - 2u) - 2 i b\sqrt{z}\right)^{h+k} \right.$$

$$\left(-\frac{i\left(p-c(\nu-2u)-2 i b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h}\binom{n}{k}$$

$$\left((p-c(\nu-2u))\left(p-c(\nu-2u)-2 i b\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+k+1), -\frac{i\left(p-c(\nu-2u)-2 i b\sqrt{z}\right)^2}{4 b}\right) - \right.$$

$$2\,i\,b\sqrt{-\frac{i\left(p-c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(p-c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^2}{4\,b}\right)\Bigg)+$$

$$e^{\frac{i\,(p+2\,c\,u-c\,v)^2}{4\,b}}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-c\,(v-2\,u))^{-h-k+2\,n}\left(p-c\,(v-2\,u)+2\,i\,b\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p-c\,(v-2\,u)+2\,i\,b\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((p-c\,(v-2\,u))\left(p-c\,(v-2\,u)+2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(2\sqrt{z}\;b-i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)+$$

$$2\,b\,i\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(2\sqrt{z}\;b-i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)\sqrt{\frac{i\left(p-c\,(v-2\,u)+2\,i\,b\sqrt{z}\right)^2}{b}}\Bigg)+$$

$$e^{i\left(\pi\,v-\frac{(p+c\,(v-2\,u))^2}{4\,b}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+c\,(v-2\,u))^{-h-k+2\,n}\left(p+c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(2\sqrt{z}\;b+i\,p+c\,i\,(v-2\,u)\right)^2}{b}\right)^{\frac{1}{2}\,(-h-k-1)}\binom{k}{h}\binom{n}{k}$$

$$\Bigg((p+c\,(v-2\,u))\left(p+c\,(v-2\,u)-2\,i\,b\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(2\sqrt{z}\;b+i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)-$$

$$2\,i\,b\sqrt{\frac{i\left(2\sqrt{z}\;b+i\,p+c\,i\,(v-2\,u)\right)^2}{b}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(2\sqrt{z}\;b+i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)\Bigg)+$$

$$e^{\frac{1}{4}\,i\left(4\,\pi\,v-\frac{(i\,p-2\,i\,c\,u+i\,c\,v)^2}{b}\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+c\,(v-2\,u))^{-h-k+2\,n}\left(p+c\,(v-2\,u)+2\,i\,b\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+c\,(v-2\,u)+2\,i\,b\,\sqrt{z}\right)^2}{b}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\left((p+c\,(v-2\,u))\left(p+c\,(v-2\,u)+2\,i\,b\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(-2\,\sqrt{z}\,b+i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)+2\,b\,i\,\Gamma\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\left.-\frac{i\left(-2\,\sqrt{z}\,b+i\,p+c\,i\,(v-2\,u)\right)^2}{4\,b}\right)\sqrt{\frac{i\left(p+c\,(v-2\,u)+2\,i\,b\,\sqrt{z}\right)^2}{b}}\right)\Bigg)\Bigg)\,/;\,v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n\,e^{p\,z}\cos(b\,z^r)\sinh^v(c\,z^r)$

01.19.21.3374.01

$$\int z^n e^{pz}\cos(bz^2)\sinh^\nu(cz^2)\,dz = -i^\nu 2^{-\nu-2}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)$$

$$\Bigg(\frac{1}{\sqrt{ib}} e^{\frac{ip^2}{4b}} \sum_{q=0}^{n} 2^{q-n}(ib)^{-n-\frac{1}{2}}(-p)^{n-q}(p+2ibz)^{q+1}\left(\frac{i(p+2ibz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{i(p+2ibz)^2}{4b}\right)+$$

$$\frac{1}{\sqrt{-ib}} e^{-\frac{ip^2}{4b}} \sum_{q=0}^{n} 2^{q-n}(-ib)^{-n-\frac{1}{2}}(-p)^{n-q}(p-2ibz)^{q+1}\left(-\frac{i(p-2ibz)^2}{b}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{i(p-2ibz)^2}{4b}\right)\Bigg)-$$

$$2^{-\nu-2}\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(\frac{1}{\sqrt{ib-2ck+c\nu}} e^{\frac{p^2}{-4ib+8ck-4c\nu}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(ib-2ck+c\nu)^{-n-\frac{1}{2}}(p+2(ib-2ck+c\nu)z)^{q+1}$$

$$\left(-\frac{(p+2(ib-2ck+c\nu)z)^2}{ib-2ck+c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(p+2(ib-2ck+c\nu)z)^2}{-4ib+8ck-4c\nu}\right)+$$

$$\frac{1}{\sqrt{-ib+2ck-c\nu}} e^{\frac{p^2}{4ib-8ck+4c\nu}+i\pi\nu}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(-ib+2ck-c\nu)^{-n-\frac{1}{2}}(p+2(-ib+2ck-c\nu)z)^{q+1}$$

$$\left(-\frac{(p+2(-ib+2ck-c\nu)z)^2}{-ib+2ck-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(p+2(-ib+2ck-c\nu)z)^2}{-4ib+8ck-4c\nu}\right)+$$

$$\frac{1}{\sqrt{-ib-2ck+c\nu}} e^{\frac{p^2}{4ib+8ck-4c\nu}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(-ib-2ck+c\nu)^{-n-\frac{1}{2}}(p+2(-ib-2ck+c\nu)z)^{q+1}$$

$$\left(\frac{(p+2(-ib-2ck+c\nu)z)^2}{ib+2ck-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, \frac{(p+2(-ib-2ck+c\nu)z)^2}{4ib+8ck-4c\nu}\right)+$$

$$\frac{1}{\sqrt{ib+2ck-c\nu}} e^{\frac{p^2}{-4ib-8ck+4c\nu}+i\pi\nu}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(ib+2ck-c\nu)^{-n-\frac{1}{2}}(p+2(ib+2ck-c\nu)z)^{q+1}$$

$$\left(-\frac{(p+2(ib+2ck-c\nu)z)^2}{ib+2ck-c\nu}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2}, -\frac{(p+2(ib+2ck-c\nu)z)^2}{4ib+8ck-4c\nu}\right)\Bigg)\Bigg/;\ \nu\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.19.21.3375.01

$$\int z^n e^{pz}\cos\left(b\sqrt{z}\right)\sinh^\nu\left(c\sqrt{z}\right)dz =$$

$$2^{-2n-\nu-2}i^{-\nu}\binom{\nu}{\frac{\nu}{2}}(1-\nu \bmod 2)\Bigg(e^{\frac{b^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(-ib)^{-h-i+2n}\left(-ib+2p\sqrt{z}\right)^{h+i}\left(-\frac{\left(-ib+2p\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(2\,p\,\sqrt{-\frac{\left(-i\,b+2\,p\,\sqrt{z}\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(-i\,b+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)-\right.$$

$$\left.i\,b\left(-i\,b+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(-i\,b+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)+$$

$$e^{\frac{b^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b)^{-h-i+2\,n}\left(i\,b+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(i\,b+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\left(b\,i\left(i\,b+2\,p\,\sqrt{z}\right)\right.$$

$$\left.\left.\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(i\,b+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,\sqrt{-\frac{\left(i\,b+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(i\,b+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)$$

$$p^{-2\,(n+1)}+2^{-2\,n-\nu-2}\,i^{-\nu}\left(\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{\frac{i\,\pi\,\nu}{2}-\frac{(-i\,b+c\,(\nu-2\,k))^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b+c\,(\nu-2\,k))^{-h-i+2\,n}\right.\right.$$

$$\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((-i\,b+c\,(\nu-2\,k))\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(-i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{\frac{i\,\pi\,\nu}{2}-\frac{(i\,b+c\,(\nu-2\,k))^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b+c\,(\nu-2\,k))^{-h-i+2\,n}\left(i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\,b+c\,(\nu-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((i\,b+c\,(v-2\,k))\left(i\,b+c\,(v-2\,k)+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(i\,b+c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(i\,b+c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(-i\,b-c\,(v-2\,k))^2}{4\,p}-\frac{i\,\pi\,v}{2}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b-c\,(v-2\,k))^{-h-i+2\,n}\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((-i\,b-c\,(v-2\,k))\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\right.$$

$$\left.\sqrt{-\frac{\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(-i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)+$$

$$e^{-\frac{(i\,b-c\,(v-2\,k))^2}{4\,p}-\frac{i\,\pi\,v}{2}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b-c\,(v-2\,k))^{-h-i+2\,n}\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((i\,b-c\,(v-2\,k))\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)+2\,\sqrt{-\frac{\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{p}}$$

$$\left.\left.\left.\left.p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(i\,b-c\,(v-2\,k)+2\,p\,\sqrt{z}\right)^2}{4\,p}\right)\right)\right)\right)\right)p^{-2\,(n+1)}\;/;\;v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\cos\!\left(b\,z^r\right)\sinh^v\!\left(c\,z^r\right)$

01.19.21.3376.01

$$\int z^{\alpha-1} e^{p z^r} \cos(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{2^{-\nu-1} z^\alpha}{r} \Bigg(i^\nu \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{\alpha}{r}, (-i b - p) z^r\right) ((-i b - p) z^r)^{-\frac{\alpha}{r}} + ((i b - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - p) z^r\right)\right) (1 - \nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-i b - 2 c k - p + c \nu) z^r\right) ((-i b - 2 c k - p + c \nu) z^r)^{-\frac{\alpha}{r}} + (-1)^\nu ((i b - 2 c k - p + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b - 2 c k - p + c \nu) z^r\right) + ((-i b + 2 c k - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-i b + 2 c k - p - c \nu) z^r\right) + ((i b + 2 c k - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i b + 2 c k - p - c \nu) z^r\right)\right) \Bigg) /; \nu \in \mathbb{N}^+$$

01.19.21.3377.01

$$\int z^n e^{p z^2} \cos(b z^2) \sinh^\nu(c z^2)\, dz = 2^{-\nu-2} (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(\frac{n+1}{2}, (-i b - p) z^2\right) \left((-i b - p) z^2\right)^{\frac{1}{2}(-n-1)} + \left((i b - p) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p) z^2\right)\right) (1 - \nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(\frac{n+1}{2}, (-i b - p + c (\nu - 2 k)) z^2\right) \left((-i b - p + c (\nu - 2 k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i \pi \nu} \left((i b - p + c (\nu - 2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p + c (\nu - 2 k)) z^2\right) + e^{\frac{i \pi \nu}{2}} \left((-i b - p - c (\nu - 2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-i b - p - c (\nu - 2 k)) z^2\right) + e^{\frac{i \pi \nu}{2}} \left((i b - p - c (\nu - 2 k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i b - p - c (\nu - 2 k)) z^2\right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3378.01

$$\int z^n e^{p \sqrt{z}} \cos\left(b \sqrt{z}\right) \sinh^\nu\left(c \sqrt{z}\right) dz = -(2 i)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(2 (n+1), (-i b - p + c (\nu - 2 k)) \sqrt{z}\right) (-i b - p + c (\nu - 2 k))^{-2 (n+1)} + e^{-\frac{1}{2} i \pi \nu} (i b - p + c (\nu - 2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (i b - p + c (\nu - 2 k)) \sqrt{z}\right) + e^{\frac{i \pi \nu}{2}} (-i b - p - c (\nu - 2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (-i b - p - c (\nu - 2 k)) \sqrt{z}\right) + e^{\frac{i \pi \nu}{2}} (i b - p - c (\nu - 2 k))^{-2 (n+1)} \Gamma\left(2 (n+1), (i b - p - c (\nu - 2 k)) \sqrt{z}\right)\right) - (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(\Gamma\left(2 (n+1), (-i b - p) \sqrt{z}\right) (-i b - p)^{-2 (n+1)} + (i b - p)^{-2 (n+1)} \Gamma\left(2 (n+1), (i b - p) \sqrt{z}\right)\right) (1 - \nu \bmod 2) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r+e} \cos(a z^r+q) \sinh^\nu(c z^r+g)$

01.19.21.3379.01

$$\int z^{\alpha-1} e^{b z^r+e} \cos(a z^r+q) \sinh^\nu(c z^r+g)\, dz = -\frac{i^\nu 2^{-\nu-1} z^\alpha}{r} \left(\binom{\nu}{\frac{\nu}{2}} \left(e^{e+i q} \Gamma\left(\frac{\alpha}{r}, (-b-i a) z^r\right) ((-b-i a) z^r)^{-\frac{\alpha}{r}} + e^{e-i q} ((i a-b) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (i a-b) z^r\right)\right) (1-\nu \bmod 2) + \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e+2 g k+i q-g \nu+\frac{i \pi \nu}{2}} \Gamma\left(\frac{\alpha}{r}, (-b-i a-2 c k+c \nu) z^r\right) ((-b-i a-2 c k+c \nu) z^r)^{-\frac{\alpha}{r}} + e^{e+2 g k-i q-g \nu+\frac{i \pi \nu}{2}} ((-b+i a-2 c k+c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+i a-2 c k+c \nu) z^r\right) + e^{e-2 g k+i q+g \nu-\frac{i \pi \nu}{2}} ((-b-i a+2 c k-c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-i a+2 c k-c \nu) z^r\right) + e^{e-2 g k-i q+g \nu-\frac{i \pi \nu}{2}} ((-b+i a+2 c k-c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+i a+2 c k-c \nu) z^r\right)\right)\right) /; \nu \in \mathbb{N}^+$$

01.19.21.3380.01

$$\int z^n e^{b z^2+e} \cos(a z^2+q) \sinh^\nu(c z^2+g)\, dz = 2^{-\nu-2} (-i^{-\nu}) \binom{\nu}{\frac{\nu}{2}} \left(e^{e+i q} \Gamma\left(\frac{n+1}{2}, (-b-i a) z^2\right) ((-b-i a) z^2)^{\frac{1}{2}(-n-1)} + e^{e-i q} ((i a-b) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (i a-b) z^2\right)\right) (1-\nu \bmod 2) z^{n+1} - i^{-\nu} 2^{-\nu-2} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e+i q-g(\nu-2k)-\frac{i \pi \nu}{2}} \Gamma\left(\frac{n+1}{2}, (-b-i a+c(\nu-2k)) z^2\right) ((-b-i a+c(\nu-2k)) z^2)^{\frac{1}{2}(-n-1)} + e^{e-i q-g(\nu-2k)-\frac{i \pi \nu}{2}} ((-b+i a+c(\nu-2k)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+i a+c(\nu-2k)) z^2\right) + e^{e+i q+\frac{i \pi \nu}{2}+g(\nu-2k)} ((-b-i a-c(\nu-2k)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i a-c(\nu-2k)) z^2\right) + e^{e-i q+\frac{i \pi \nu}{2}+g(\nu-2k)} ((-b+i a-c(\nu-2k)) z^2)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b+i a-c(\nu-2k)) z^2\right)\right) /; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3381.01

$$\int z^n e^{\sqrt{z}\, b+e} \cos\left(\sqrt{z}\, a+q\right) \sinh^{\nu}\left(\sqrt{z}\, c+g\right) dz = -(2 i)^{-\nu} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Big(e^{e+i q-g(\nu-2k)-\frac{i\pi\nu}{2}} \Gamma\left(2(n+1), (-b-i a+c(\nu-2k))\sqrt{z}\right) (-b-i a+c(\nu-2k))^{-2(n+1)} + e^{e-i q-g(\nu-2k)-\frac{i\pi\nu}{2}} (-b+i a+c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b+i a+c(\nu-2k))\sqrt{z}\right) + e^{e+i q+\frac{i\pi\nu}{2}+g(\nu-2k)} (-b-i a-c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b-i a-c(\nu-2k))\sqrt{z}\right) + e^{e-i q+\frac{i\pi\nu}{2}+g(\nu-2k)} (-b+i a-c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b+i a-c(\nu-2k))\sqrt{z}\right) \Big) - (2 i)^{-\nu} \binom{\nu}{\frac{\nu}{2}} \left(e^{e+i q} \Gamma\left(2(n+1), (-b-i a)\sqrt{z}\right) (-b-i a)^{-2(n+1)} + (i a-b)^{-2(n+1)} e^{e-i q} \Gamma\left(2(n+1), (i a-b)\sqrt{z}\right) \right) (1-\nu \bmod 2) \;/;\; \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \cos\left(a z^r+p z+q\right) \sinh^{\nu}\left(c z^r+f z+g\right)$

01.19.21.3382.01

$$\int z^n e^{b z^2+d z+e} \cos\left(a z^2+p z+q\right) \sinh^{\nu}\left(c z^2+f z+g\right) dz = -i^{\nu} 2^{-\nu-2} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \Bigg(e^{-\frac{(d-i p)^2}{4(b-i a)}+e-i q} (b-i a)^{-n-1} \sum_{j=0}^{n} 2^{j-n} (i p-d)^{n-j} (d-i p+2(b-i a)z)^{j+1} \left(-\frac{(d-i p+2(b-i a)z)^2}{b-i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-i p+2(b-i a)z)^2}{4(b-i a)}\right) + (b+i a)^{-n-1} e^{-\frac{(d+i p)^2}{4(b+i a)}+e+i q} \sum_{j=0}^{n} 2^{j-n} (-d-i p)^{n-j} (d+i p+2(b+i a)z)^{j+1} \left(-\frac{(d+i p+2(b+i a)z)^2}{b+i a}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+i p+2(b+i a)z)^2}{4(b+i a)}\right) \Bigg) - 2^{-\nu-2} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg((-1)^{\nu} e^{-\frac{(d-i p+f(2k-\nu))^2}{4(b-i a+c(2k-\nu))}+e-i q+g(2k-\nu)} (b-i a+c(2k-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d+i p-f(2k-\nu))^{n-j} (d-i p+f(2k-\nu)+2(b-i a+c(2k-\nu))z)^{j+1} \left(-\frac{(d-i p+f(2k-\nu)+2(b-i a+c(2k-\nu))z)^2}{b-i a+c(2k-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d-i p+f(2k-\nu)+2(b-i a+c(2k-\nu))z)^2}{4(b-i a+c(2k-\nu))}\right) + (-1)^{\nu} e^{-\frac{(d+i p+f(2k-\nu))^2}{4(b+i a+c(2k-\nu))}+e+i q+g(2k-\nu)}$$

$$(b+i\,a+c\,(2\,k-v))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-i\,p-f\,(2\,k-v))^{n-j}\,(d+i\,p+f\,(2\,k-v)+2\,(b+i\,a+c\,(2\,k-v))\,z)^{j+1}$$

$$\left(-\frac{(d+i\,p+f\,(2\,k-v)+2\,(b+i\,a+c\,(2\,k-v))\,z)^2}{b+i\,a+c\,(2\,k-v)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(d+i\,p+f\,(2\,k-v)+2\,(b+i\,a+c\,(2\,k-v))\,z)^2}{4\,(b+i\,a+c\,(2\,k-v))}\right)+e^{-\frac{(d-i\,p+f\,(v-2\,k))^2}{4\,(b-i\,a+c\,(v-2\,k))}+e-i\,q+g\,(v-2\,k)}$$

$$(b-i\,a+c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d+i\,p-f\,(v-2\,k))^{n-j}\,(d-i\,p+f\,(v-2\,k)+2\,(b-i\,a+c\,(v-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(d-i\,p+f\,(v-2\,k)+2\,(b-i\,a+c\,(v-2\,k))\,z)^2}{b-i\,a+c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\Gamma\!\left(\frac{j+1}{2},-\frac{(d-i\,p+f\,(v-2\,k)+2\,(b-i\,a+c\,(v-2\,k))\,z)^2}{4\,(b-i\,a+c\,(v-2\,k))}\right)+e^{-\frac{(d+i\,p+f\,(v-2\,k))^2}{4\,(b+i\,a+c\,(v-2\,k))}+e+i\,q+g\,(v-2\,k)}$$

$$(b+i\,a+c\,(v-2\,k))^{-n-1}\sum_{j=0}^{n}2^{j-n}\,(-d-i\,p-f\,(v-2\,k))^{n-j}\,(d+i\,p+f\,(v-2\,k)+2\,(b+i\,a+c\,(v-2\,k))\,z)^{j+1}$$

$$\left(-\frac{(d+i\,p+f\,(v-2\,k)+2\,(b+i\,a+c\,(v-2\,k))\,z)^2}{b+i\,a+c\,(v-2\,k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$

$$\left.\Gamma\!\left(\frac{j+1}{2},-\frac{(d+i\,p+f\,(v-2\,k)+2\,(b+i\,a+c\,(v-2\,k))\,z)^2}{4\,(b+i\,a+c\,(v-2\,k))}\right)\right)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

01.19.21.3383.01

$$\int z^n\,e^{\sqrt{z}\,b+d\,z+e}\cos\!\left(\sqrt{z}\,a+p\,z+q\right)\sinh^{v}\!\left(\sqrt{z}\,c+f\,z+g\right)dz=$$

$$i^v\,2^{-2\,n-v-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\left(e^{-\frac{(b+i\,a)^2}{4\,(d+i\,p)}+e+i\,q}\,(d+i\,p)^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a)^{-h-i+2\,n}\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^{h+i}\right.$$

$$\left(-\frac{\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^2}{d+i\,p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((b+i\,a)\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)\right.$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),-\frac{\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)+2\sqrt{-\frac{\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^2}{d+i\,p}}$$

$$(d+i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+i\,a+2\,(d+i\,p)\sqrt{z}\right)^2}{4\,(d+i\,p)}\right)\Bigg)+e^{-\frac{(b-i\,a)^2}{4\,(d-i\,p)}+e-i\,q}\,(d-i\,p)^{-2\,n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a)^{-h-i+2\,n}\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^{h+i}\left(-\frac{\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^2}{d-i\,p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b-i\,a)\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)+$$

$$2\sqrt{-\frac{\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^2}{d-i\,p}}\;(d-i\,p)\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-i\,a+2\,(d-i\,p)\sqrt{z}\right)^2}{4\,(d-i\,p)}\right)\Bigg)\Bigg)+$$

$$2^{-2\,n-v-2}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg((-1)^v\,e^{-\frac{(b+i\,a+c\,(2\,k-v))^2}{4\,(d+i\,p+f\,(2\,k-v))}+e+i\,q+g\,(2\,k-v)}\,(d+i\,p+f\,(2\,k-v))^{-2\,n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+i\,a+c\,(2\,k-v))^{-h-i+2\,n}\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)^2}{d+i\,p+f\,(2\,k-v)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+i\,a+c\,(2\,k-v))\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+i+1),\,-\frac{\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(d+i\,p+f\,(2\,k-v))}\Bigg)+$$

$$2\,(d+i\,p+f\,(2\,k-v))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)^2}{4\,(d+i\,p+f\,(2\,k-v))}\right)$$

$$\sqrt{-\frac{\left(b+i\,a+c\,(2\,k-v)+2\,(d+i\,p+f\,(2\,k-v))\sqrt{z}\right)^2}{d+i\,p+f\,(2\,k-v)}}\Bigg)+$$

$$(-1)^{v}\, e^{-\frac{(b-i a+c(2k-v))^2}{4(d-i p+f(2k-v))}+e-i q+g(2k-v)}\,(d-i p+f(2k-v))^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^{i}\,(b-i a+c(2k-v))^{-h-i+2n}$$

$$\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)^2}{d-i p+f(2k-v)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b-i a+c(2k-v))\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+i+1),\,-\frac{\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)^2}{4(d-i p+f(2k-v))}\Bigg)+$$

$$2(d-i p+f(2k-v))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)^2}{4(d-i p+f(2k-v))}\right)$$

$$\sqrt{-\frac{\left(b-i a+c(2k-v)+2(d-i p+f(2k-v))\sqrt{z}\right)^2}{d-i p+f(2k-v)}}\Bigg)+$$

$$e^{-\frac{(b+i a+c(v-2k))^2}{4(d+i p+f(v-2k))}+e+i q+g(v-2k)}\,(d+i p+f(v-2k))^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^{i}\,(b+i a+c(v-2k))^{-h-i+2n}$$

$$\left(b+i a+c(v-2k)+2(d+i p+f(v-2k))\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+i a+c(v-2k)+2(d+i p+f(v-2k))\sqrt{z}\right)^2}{d+i p+f(v-2k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+i a+c(v-2k))\left(b+i a+c(v-2k)+2(d+i p+f(v-2k))\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}(h+i+1),\,-\frac{\left(b+i a+c(v-2k)+2(d+i p+f(v-2k))\sqrt{z}\right)^2}{4(d+i p+f(v-2k))}\Bigg)+$$

$$2(d+i p+f(v-2k))\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+i a+c(v-2k)+2(d+i p+f(v-2k))\sqrt{z}\right)^2}{4(d+i p+f(v-2k))}\right)$$

$$\sqrt{-\frac{\left(b+i\,a+c\,(v-2\,k)+2\,(d+i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+i\,p+f\,(v-2\,k)}}\Bigg)+$$

$$e^{-\frac{(b-i\,a+c\,(v-2\,k))^2}{4\,(d-i\,p+f\,(v-2\,k))}+e-i\,q+g\,(v-2\,k)}\,(d-i\,p+f\,(v-2\,k))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b-i\,a+c\,(v-2\,k))^{-h-i+2\,n}$$

$$\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d-i\,p+f\,(v-2\,k)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b-i\,a+c\,(v-2\,k))\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg($$

$$\frac{1}{2}\,(h+i+1),\,-\frac{\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d-i\,p+f\,(v-2\,k))}\Bigg)+$$

$$2\,(d-i\,p+f\,(v-2\,k))\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d-i\,p+f\,(v-2\,k))}\right)$$

$$\sqrt{-\frac{\left(b-i\,a+c\,(v-2\,k)+2\,(d-i\,p+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d-i\,p+f\,(v-2\,k)}}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\bigwedge v\in\mathbb{N}^+$$

Involving powers of cos, exp and power

Involving $z^{\alpha-1}\,e^{p\,z}\,\cos^{\mu}(c\,z)\,\sinh^{\nu}(a\,z)$

01.19.21.3384.01

$$\int z^{\alpha-1} e^{p z} \cos^m(c z) \sinh^\nu(a z) \, dz = -i^\nu 2^{-m-\nu} z^\alpha (-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z) (1 - m \bmod 2) (1 - \nu \bmod 2) - i^\nu 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} (\Gamma(\alpha, (i c m - p - 2 i c s) z) ((i c m - p - 2 i c s) z)^{-\alpha} + ((-p - i c (m - 2 s)) z)^{-\alpha} \Gamma(\alpha, (-p - i c (m - 2 s)) z)) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma(\alpha, (-2 a k - p + a \nu) z) ((-2 a k - p + a \nu) z)^{-\alpha} + ((-p - a (\nu - 2 k)) z)^{-\alpha} \Gamma(\alpha, (-p - a (\nu - 2 k)) z)\right) - 2^{-m-\nu} z^\alpha \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} \left((-1)^\nu \Gamma(\alpha, (-2 a k - i c m - p + 2 i c s + a \nu) z) ((-2 a k - i c m - p + 2 i c s + a \nu) z)^{-\alpha} + (-1)^\nu ((-2 a k + i c m - p - 2 i c s + a \nu) z)^{-\alpha} \Gamma(\alpha, (-2 a k + i c m - p - 2 i c s + a \nu) z) + \left(\Gamma(\alpha, (2 a k - i c m - p + 2 i c s - a \nu) z) ((2 a k - i c m - p + 2 i c s - a \nu) z)^{-\alpha} + ((2 a k + i c m - p - 2 i c s - a \nu) z)^{-\alpha} \Gamma(\alpha, (2 a k + i c m - p - 2 i c s - a \nu) z)\right)\right) /; m \in \mathbb{N}^+ \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.3385.01

$$\int z^n e^{p z} \cos^\mu(c z) \sinh^\nu(a z) \, dz = 2^{-\nu} i^{-\nu} e^{p z} \left(1 + e^{2 i c z}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n! (1 - \nu \bmod 2) \cos^\mu(c z) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + c \mu}{2 c}, \ldots, -\frac{i p + c \mu}{2 c}, -\mu; 1 - \frac{i p + c \mu}{2 c}, \ldots, 1 - \frac{i p + c \mu}{2 c}; -e^{2 i c z}\right) + 2^{-\nu} i^{-\nu} \left(1 + e^{2 i c z}\right)^{-\mu} n! \cos^\mu(c z) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \left(e^{(p - a (\nu - 2 k)) z - \frac{i \pi \nu}{2}} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, \ldots, -\frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, -\mu; 1 - \frac{i p - i a (\nu - 2 k) + c \mu}{2 c}, \ldots, 1 - \frac{i p - i a (\nu - 2 k) + c \mu}{2 c}; -e^{2 i c z}\right) + e^{\frac{i \pi \nu}{2} + (p + a (\nu - 2 k)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a (\nu - 2 k) - i c \mu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(-\frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, \ldots, -\frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, -\mu; 1 - \frac{i p + i a (\nu - 2 k) + c \mu}{2 c}, \ldots, 1 - \frac{i p + i a (\nu - 2 k) + c \mu}{2 c}; -e^{2 i c z}\right)\right) /; n \in \mathbb{N} \bigwedge \nu \in \mathbb{N}^+$$

01.19.21.3386.01

$$\int z^n e^{p z} \cos^m(c z) \sinh^\nu(a z) \, dz = 2^{-m} e^{p z} \binom{m}{\frac{m}{2}} n! \, (1 - m \bmod 2) \sinh^\nu(a z) \left(1 - e^{2 a z}\right)^{-\nu} \left(\sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(\frac{p - a\nu}{2a}, \ldots, \frac{p - a\nu}{2a}, -\nu; \frac{p - a\nu}{2a} + 1, \ldots, \frac{p - a\nu}{2a} + 1; e^{2 a z}\right)\right) + 2^{-m} n! \sinh^\nu(a z) \left(1 - e^{2 a z}\right)^{-\nu} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{(p - i c (m - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - i c (m - 2 s) - a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(\frac{p - i c (m - 2 s) - a \nu}{2a}, \ldots, \frac{p - i c (m - 2 s) - a \nu}{2a}, -\nu; \frac{p - i c (m - 2 s) - a \nu}{2a} + 1, \ldots, \frac{p - i c (m - 2 s) - a \nu}{2a} + 1; e^{2 a z}\right) + e^{(p + c i (m - 2 s)) z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + c i (m - 2 s) - a \nu)^{-j-1}}{(n-j)!} \, {}_{j+2}F_{j+1}\left(\frac{p + i c (m - 2 s) - a \nu}{2a}, \ldots, \frac{p + i c (m - 2 s) - a \nu}{2a}, -\nu; \frac{p + i c (m - 2 s) - a \nu}{2a} + 1, \ldots, \frac{p + i c (m - 2 s) - a \nu}{2a} + 1; e^{2 a z}\right)\right) /; n \in \mathbb{N} \land m \in \mathbb{N}^+$$

Involving $z^{\alpha-1} e^{p z} \cos^\mu(c z + d) \sinh^\nu(a z)$

01.19.21.3387.01

$$\int z^{\alpha-1} e^{p z} \cos^m(d + c z) \sinh^\nu(a z) \, dz = -i^\nu 2^{-m-\nu} z^\alpha (-p z)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -p z) (1 - m \bmod 2) (1 - \nu \bmod 2) - i^\nu 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d (m - 2 s)} \binom{m}{s} \left(\Gamma(\alpha, (i c m - p - 2 i c s) z) ((i c m - p - 2 i c s) z)^{-\alpha} + e^{2 i d (m - 2 s)} ((-p - i c (m - 2 s)) z)^{-\alpha} \Gamma(\alpha, (-p - i c (m - 2 s)) z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma(\alpha, (-2 a k - p + a \nu) z) ((-2 a k - p + a \nu) z)^{-\alpha} + ((-p - a (\nu - 2 k)) z)^{-\alpha} \Gamma(\alpha, (-p - a (\nu - 2 k)) z)\right) - 2^{-m-\nu} z^\alpha \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{-i d m - 2 i d s} \binom{m}{s} \left(e^{2 i d m + i \pi \nu} \Gamma(\alpha, (-2 a k - i c m - p + 2 i c s + a \nu) z) ((-2 a k - i c m - p + 2 i c s + a \nu) z)^{-\alpha} + e^{4 i d s + i \pi \nu} ((-2 a k + i c m - p - 2 i c s + a \nu) z)^{-\alpha} \Gamma(\alpha, (-2 a k + i c m - p - 2 i c s + a \nu) z) + \left(e^{2 i d m} \Gamma(\alpha, (2 a k - i c m - p + 2 i c s - a \nu) z) ((2 a k - i c m - p + 2 i c s - a \nu) z)^{-\alpha} + e^{4 i d s} ((2 a k + i c m - p - 2 i c s - a \nu) z)^{-\alpha} \Gamma(\alpha, (2 a k + i c m - p - 2 i c s - a \nu) z)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3388.01

$$\int z^n e^{pz}\cos^{\mu}(d+cz)\sinh^{\nu}(az)\,dz = 2^{-\nu} i^{-\nu} e^{pz}\left(1+e^{2i(d+cz)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\cos^{\mu}(d+cz)$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip+c\mu}{2c},\ldots,-\frac{ip+c\mu}{2c},-\mu;1-\frac{ip+c\mu}{2c},\ldots,1-\frac{ip+c\mu}{2c};-e^{2i(d+cz)}\right)+$$
$$2^{-\nu} i^{-\nu}\left(1+e^{2i(d+cz)}\right)^{-\mu} n!\cos^{\mu}(d+cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{-\frac{1}{2}i\pi\nu+(p-a(\nu-2k))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip-ia(\nu-2k)+c\mu}{2c},\right.$$
$$\left.-\mu;1-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip-ia(\nu-2k)+c\mu}{2c};-e^{2i(d+cz)}\right)+e^{\frac{i\pi\nu}{2}+(p+a(\nu-2k))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip+ia(\nu-2k)+c\mu}{2c},\right.$$
$$\left.\left.-\mu;1-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip+ia(\nu-2k)+c\mu}{2c};-e^{2i(d+cz)}\right)\right)\Bigg/;\ n\in\mathbb{N}\land\nu\in\mathbb{N}^+$$

01.19.21.3389.01

$$\int z^n e^{pz}\cos^{m}(d+cz)\sinh^{\nu}(az)\,dz = 2^{-m} e^{pz}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^{\nu}(az)\left(1-e^{2az}\right)^{-\nu}$$
$$\left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p-a\nu}{2a},\ldots,\frac{p-a\nu}{2a},-\nu;\frac{p-a\nu}{2a}+1,\ldots,\frac{p-a\nu}{2a}+1;e^{2az}\right)\right)+$$
$$2^{-m} n!\sinh^{\nu}(az)\left(1-e^{2az}\right)^{-\nu}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{(p-ic(m-2s))z-id(m-2s)}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic(m-2s)-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p-ic(m-2s)-a\nu}{2a},\ldots,\frac{p-ic(m-2s)-a\nu}{2a},\right.$$
$$\left.-\nu;\frac{p-ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p-ic(m-2s)-a\nu}{2a}+1;e^{2az}\right)+e^{di(m-2s)+(p+ci(m-2s))z}$$
$$\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+ci(m-2s)-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p+ic(m-2s)-a\nu}{2a},\ldots,\frac{p+ic(m-2s)-a\nu}{2a},\right.$$
$$\left.\left.-\nu;\frac{p+ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p+ic(m-2s)-a\nu}{2a}+1;e^{2az}\right)\right)\Bigg/;\ n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1} e^{pz}\cos^{\mu}(cz)\sinh^{\nu}(az+b)$

01.19.21.3390.01

$$\int z^{\alpha-1} e^{pz} \cos^m(cz) \sinh^\nu(b+az)\,dz = -i^\nu 2^{-m-\nu} z^\alpha (-pz)^{-\alpha} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(\alpha, -pz)(1 - m \bmod 2)(1 - \nu \bmod 2) - i^\nu 2^{-m-\nu} z^\alpha \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} \binom{m}{s} \left(\Gamma(\alpha, (icm - p - 2ics)z)((icm - p - 2ics)z)^{-\alpha} + ((-p - ic(m-2s))z)^{-\alpha} \Gamma(\alpha, (-p - ic(m-2s))z)\right) - 2^{-m-\nu} z^\alpha \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k e^{-2bk-b\nu} \binom{\nu}{k} \left(e^{4bk+i\pi\nu} \Gamma(\alpha, (-2ak - p + a\nu)z)((-2ak - p + a\nu)z)^{-\alpha} + e^{2b\nu}((-p - a(\nu-2k))z)^{-\alpha} \Gamma(\alpha, (-p - a(\nu-2k))z)\right) - 2^{-m-\nu} z^\alpha \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\lfloor \frac{m-1}{2} \rfloor} e^{-2bk-b\nu} \binom{m}{s} \left(e^{4bk+i\pi\nu} \Gamma(\alpha, (-2ak - icm - p + 2ics + a\nu)z)((-2ak - icm - p + 2ics + a\nu)z)^{-\alpha} + e^{4bk+i\pi\nu}((-2ak + icm - p - 2ics + a\nu)z)^{-\alpha} \Gamma(\alpha, (-2ak + icm - p - 2ics + a\nu)z) + e^{2b\nu}\left(\Gamma(\alpha, (2ak - icm - p + 2ics - a\nu)z)((2ak - icm - p + 2ics - a\nu)z)^{-\alpha} + ((2ak + icm - p - 2ics - a\nu)z)^{-\alpha} \Gamma(\alpha, (2ak + icm - p - 2ics - a\nu)z)\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3391.01

$$\int z^n e^{pz} \cos^\mu(cz) \sinh^\nu(b+az)\,dz = 2^{-\nu} i^{-\nu} e^{pz} \left(1 + e^{2icz}\right)^{-\mu} \binom{\nu}{\frac{\nu}{2}} n!\,(1 - \nu \bmod 2) \cos^\mu(cz) \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - ic\mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{ip + c\mu}{2c}, \ldots, -\frac{ip + c\mu}{2c}, -\mu; 1 - \frac{ip + c\mu}{2c}, \ldots, 1 - \frac{ip + c\mu}{2c}; -e^{2icz}\right) + 2^{-\nu} i^{-\nu} \left(1 + e^{2icz}\right)^{-\mu} n!\, \cos^\mu(cz) \sum_{k=0}^{\lfloor \frac{\nu-1}{2} \rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i\pi\nu - b(\nu-2k) + (p - a(\nu-2k))z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p - a(\nu-2k) - ic\mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{ip - ia(\nu-2k) + c\mu}{2c}, \ldots, -\frac{ip - ia(\nu-2k) + c\mu}{2c}, -\mu; 1 - \frac{ip - ia(\nu-2k) + c\mu}{2c}, \ldots, 1 - \frac{ip - ia(\nu-2k) + c\mu}{2c}; -e^{2icz}\right) + e^{\frac{i\pi\nu}{2} + b(\nu-2k) + (p + a(\nu-2k))z} \sum_{j=0}^{n} \frac{(-1)^j z^{n-j} (p + a(\nu-2k) - ic\mu)^{-j-1}}{(n-j)!} {}_{j+2}F_{j+1}\left(-\frac{ip + ia(\nu-2k) + c\mu}{2c}, \ldots, -\frac{ip + ia(\nu-2k) + c\mu}{2c}, -\mu; 1 - \frac{ip + ia(\nu-2k) + c\mu}{2c}, \ldots, 1 - \frac{ip + ia(\nu-2k) + c\mu}{2c}; -e^{2icz}\right)\right) /; n \in \mathbb{N} \land \nu \in \mathbb{N}^+$$

01.19.21.3392.01

$$\int z^n e^{pz}\cos^m(cz)\sinh^\nu(b+az)\,dz = 2^{-m}e^{pz}\binom{m}{\frac{m}{2}}n!\,(1-m\bmod 2)\sinh^\nu(b+az)\left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p-a\nu}{2a},\ldots,\frac{p-a\nu}{2a},-\nu;\frac{p-a\nu}{2a}+1,\ldots,\frac{p-a\nu}{2a}+1;e^{2(b+az)}\right)\right)\left(1-e^{2(b+az)}\right)^{-\nu}+2^{-m}n!\sinh^\nu(b+az)\left(1-e^{2(b+az)}\right)^{-\nu}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{(p-ic(m-2s))z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic(m-2s)-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p-ic(m-2s)-a\nu}{2a},\ldots,\frac{p-ic(m-2s)-a\nu}{2a},-\nu;\frac{p-ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p-ic(m-2s)-a\nu}{2a}+1;e^{2(b+az)}\right)+e^{(p+ci(m-2s))z}\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+ci(m-2s)-a\nu)^{-j-1}}{(n-j)!}\,{}_{j+2}F_{j+1}\left(\frac{p+ic(m-2s)-a\nu}{2a},\ldots,\frac{p+ic(m-2s)-a\nu}{2a},-\nu;\frac{p+ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p+ic(m-2s)-a\nu}{2a}+1;e^{2(b+az)}\right)\right)\;/;\;n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^{\alpha-1}e^{pz}\cos^\mu(cz+d)\sinh^\nu(az+b)$

01.19.21.3393.01

$$\int z^{\alpha-1}e^{pz}\cos^m(cz+d)\sinh^\nu(az+b)\,dz = -i^\nu 2^{-m-\nu}z^\alpha(-pz)^{-\alpha}\binom{m}{\frac{m}{2}}\binom{\nu}{\frac{\nu}{2}}\Gamma(\alpha,-pz)(1-m\bmod 2)(1-\nu\bmod 2)-i^\nu 2^{-m-\nu}z^\alpha\binom{\nu}{\frac{\nu}{2}}(1-\nu\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-id(m-2s)}\binom{m}{s}\left(\Gamma(\alpha,(icm-p-2ics)z)((icm-p-2ics)z)^{-\alpha}+e^{2id(m-2s)}((-p-ic(m-2s))z)^{-\alpha}\Gamma(\alpha,(-p-ic(m-2s))z)\right)-2^{-m-\nu}z^\alpha\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k e^{-2bk-b\nu}\binom{\nu}{k}\left(e^{4bk+i\pi\nu}\Gamma(\alpha,(-2ak-p+a\nu)z)((-2ak-p+a\nu)z)^{-\alpha}+e^{2b\nu}((-p-a(\nu-2k))z)^{-\alpha}\Gamma(\alpha,(-p-a(\nu-2k))z)\right)-2^{-m-\nu}z^\alpha\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}e^{-2bk-idm-2ids-b\nu}\binom{m}{s}\left(e^{4bk+2idm+i\pi\nu}\Gamma(\alpha,(-2ak-icm-p+2ics+a\nu)z)((-2ak-icm-p+2ics+a\nu)z)^{-\alpha}+e^{4bk+4ids+i\pi\nu}((-2ak+icm-p-2ics+a\nu)z)^{-\alpha}\Gamma(\alpha,(-2ak+icm-p-2ics+a\nu)z)+e^{2b\nu}\left(e^{2idm}\Gamma(\alpha,(2ak-icm-p+2ics-a\nu)z)((2ak-icm-p+2ics-a\nu)z)^{-\alpha}+e^{4ids}((2ak+icm-p-2ics-a\nu)z)^{-\alpha}\Gamma(\alpha,(2ak+icm-p-2ics-a\nu)z)\right)\right)\;/;\;m\in\mathbb{N}^+\land\nu\in\mathbb{N}^+$$

01.19.21.3394.01

$$\int z^n e^{pz}\cos^\mu(d+cz)\sinh^\nu(b+az)\,dz = 2^{-\nu} i^{-\nu} e^{pz}\left(1+e^{2i(d+cz)}\right)^{-\mu}\binom{\nu}{\frac{\nu}{2}} n!\,(1-\nu \bmod 2)\cos^\mu(d+cz) \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{ip+c\mu}{2c},\ldots,-\frac{ip+c\mu}{2c},-\mu;1-\frac{ip+c\mu}{2c},\ldots,1-\frac{ip+c\mu}{2c};-e^{2i(d+cz)}\right)+ 2^{-\nu} i^{-\nu}\left(1+e^{2i(d+cz)}\right)^{-\mu} n!\cos^\mu(d+cz)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\left(e^{-\frac{1}{2}i\pi\nu-b(\nu-2k)+(p-a(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip-ia(\nu-2k)+c\mu}{2c},-\mu; 1-\frac{ip-ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip-ia(\nu-2k)+c\mu}{2c};-e^{2i(d+cz)}\right)+e^{\frac{i\pi\nu}{2}+b(\nu-2k)+(p+a(\nu-2k))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+a(\nu-2k)-ic\mu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,-\frac{ip+ia(\nu-2k)+c\mu}{2c}, -\mu;1-\frac{ip+ia(\nu-2k)+c\mu}{2c},\ldots,1-\frac{ip+ia(\nu-2k)+c\mu}{2c};-e^{2i(d+cz)}\right)\right)\;/;\; n\in\mathbb{N}\land \nu\in\mathbb{N}^+$$

01.19.21.3395.01

$$\int z^n e^{pz}\cos^m(d+cz)\sinh^\nu(b+az)\,dz = 2^{-m} e^{pz}\binom{m}{\frac{m}{2}} n!\,(1-m \bmod 2)\sinh^\nu(b+az) \left(\sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-a\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(\frac{p-a\nu}{2a},\ldots,\frac{p-a\nu}{2a},-\nu;\frac{p-a\nu}{2a}+1,\ldots,\frac{p-a\nu}{2a}+1;e^{2(b+az)}\right)\right)\left(1-e^{2(b+az)}\right)^{-\nu}+ 2^{-m} n!\sinh^\nu(b+az)\left(1-e^{2(b+az)}\right)^{-\nu}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{(p-ic(m-2s))z-id(m-2s)} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p-ic(m-2s)-a\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(\frac{p-ic(m-2s)-a\nu}{2a},\ldots,\frac{p-ic(m-2s)-a\nu}{2a},-\nu; \frac{p-ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p-ic(m-2s)-a\nu}{2a}+1;e^{2(b+az)}\right)+e^{di(m-2s)+(p+ci(m-2s))z} \sum_{j=0}^{n}\frac{(-1)^j z^{n-j}(p+ci(m-2s)-a\nu)^{-j-1}}{(n-j)!}\;{}_{j+2}F_{j+1}\!\left(\frac{p+ic(m-2s)-a\nu}{2a},\ldots,\frac{p+ic(m-2s)-a\nu}{2a}, -\nu;\frac{p+ic(m-2s)-a\nu}{2a}+1,\ldots,\frac{p+ic(m-2s)-a\nu}{2a}+1;e^{2(b+az)}\right)\right)\;/;\; n\in\mathbb{N}\land m\in\mathbb{N}^+$$

Involving $z^n e^{p z^r}\cos^m(b z^r)\sinh^\nu(c z)$

01.19.21.3396.01

$$\int z^n e^{p z^2} \cos^m(b z^2) \sinh^\nu(c z)\, dz = -2^{-m-\nu-1} i^\nu z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2)(1 - \nu \bmod 2) \left(-p z^2\right)^{\frac{1}{2}(-n-1)} - i^\nu 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{n+1}{2}, (i b m - p - 2 i b s) z^2\right) \left((i b m - p - 2 i b s) z^2\right)^{\frac{1}{2}(-n-1)} + \left((-p - i b (m - 2 s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-p - i b (m - 2 s)) z^2\right)\right) - 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} \left((-1)^k e^{\frac{1}{4}\left(-\frac{c^2 (\nu-2k)^2}{-i b m + p + 2 i b s} - \frac{c^2 (\nu-2k)^2}{p + b i (m - 2 s)}\right)} \binom{\nu}{k} \left(e^{\frac{c^2 (\nu-2k)^2}{4(p + b i (m-2s))} + i \pi \nu} \sqrt{p + b i (m - 2 s)} \sum_{q=0}^{n} 2^{q-n} (-i b m + p + 2 i b s)^{-n-\frac{1}{2}} (c(\nu - 2k))^{n-q} (2 c k - c \nu + 2(-i b m + p + 2 i b s) z)^{q+1} \left(-\frac{(2 c k - c \nu + 2(-i b m + p + 2 i b s) z)^2}{-i b m + p + 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 c k - c \nu + 2(-i b m + p + 2 i b s) z)^2}{4(-i b m + p + 2 i b s)}\right) + e^{\frac{c^2 (\nu-2k)^2}{4(i b m + p - 2 i b s)}} \sqrt{i b m + p - 2 i b s} \sum_{q=0}^{n} (-i b m + p + 2 i b s)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right)\right)^{n-q} (c(\nu - 2k) + 2(-i b m + p + 2 i b s) z)^{q+1} \left(-\frac{(c(\nu - 2k) + 2(-i b m + p + 2 i b s) z)^2}{-i b m + p + 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(\nu - 2k) + 2(-i b m + p + 2 i b s) z)^2}{4(-i b m + p + 2 i b s)}\right) + e^{\frac{c^2 (\nu-2k)^2}{4(-i b m + p + 2 i b s)}} \sqrt{-i b m + p + 2 i b s} \left(e^{i \pi \nu} \sum_{q=0}^{n} 2^{q-n} (i b m + p - 2 i b s)^{-n-\frac{1}{2}} (c(\nu - 2k))^{n-q} (2 c k - c \nu + 2(i b m + p - 2 i b s) z)^{q+1} \left(-\frac{(2 c k - c \nu + 2(i b m + p - 2 i b s) z)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 c k - c \nu + 2(i b m + p - 2 i b s) z)^2}{4(i b m + p - 2 i b s)}\right) + \sum_{q=0}^{n} (i b m + p - 2 i b s)^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right)\right)^{n-q} (c(\nu - 2k) + 2(i b m + p - 2 i b s) z)^{q+1} \left(-\frac{(c(\nu - 2k) + 2(i b m + p - 2 i b s) z)^2}{i b m + p - 2 i b s}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(c(\nu - 2k) + 2(i b m + p - 2 i b s) z)^2}{4(i b m + p - 2 i b s)}\right)\right)\right)\right) \Big/$$

$$\left(\sqrt{p+b\,i\,(m-2\,s)}\,\sqrt{-i\,b\,m+p+2\,i\,b\,s}\right)-2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\,e^{-\frac{c^2(v-2k)^2}{4p}}\,p^{-n-1}\binom{v}{k}\left((-1)^v\sum_{q=0}^{n}2^{q-n}\,(c\,(v-2\,k))^{n-q}\,(2\,c\,k-c\,v+2\,p\,z)^{q+1}\right.$$

$$\left(-\frac{(2\,c\,k-c\,v+2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\!\left(\frac{q+1}{2},\,-\frac{(2\,c\,k-c\,v+2\,p\,z)^2}{4\,p}\right)+$$

$$\sum_{q=0}^{n}\left(c\left(k-\frac{v}{2}\right)\right)^{n-q}(c\,(v-2\,k)+2\,p\,z)^{q+1}\left(-\frac{(c\,(v-2\,k)+2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}$$

$$\left.\Gamma\!\left(\frac{q+1}{2},\,-\frac{(c\,(v-2\,k)+2\,p\,z)^2}{4\,p}\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.19.21.3397.01

$$\int z^n\,e^{p\sqrt{z}}\cos^m\!\left(b\sqrt{z}\right)\sinh^v(c\,z)\,dz=$$

$$-2^{-m-v+1}\,i^v\,z^{n+1}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma\!\left(2\,(n+1),\,-p\sqrt{z}\right)(1-m\bmod 2)\,(1-v\bmod 2)\left(-p\sqrt{z}\right)^{-2\,(n+1)}-$$

$$i^v\,2^{-m-v+1}\,z^{n+1}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\Gamma\!\left(2\,(n+1),\,(i\,b\,m-p-2\,i\,b\,s)\sqrt{z}\right)\left((i\,b\,m-p-2\,i\,b\,s)\sqrt{z}\right)^{-2\,(n+1)}+\right.$$

$$\left.\left((-p-i\,b\,(m-2\,s))\sqrt{z}\right)^{-2\,(n+1)}\Gamma\!\left(2\,(n+1),\,(-p-i\,b\,(m-2\,s))\sqrt{z}\right)\right)+$$

$$2^{-m-2\,n-v-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left((-1)^v\,e^{\frac{p^2}{4\,c\,(v-2\,k)}}\,(-c\,(v-2\,k))^{-2\,n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,p^{-h-j+2\,n}\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\,\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)-\right.$$

$$\left.\left.2\,c\,(v-2\,k)\sqrt{\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{c\,(v-2\,k)}}\,\Gamma\!\left(\frac{1}{2}(h+j+2),\,\frac{\left(p-2\,c\,(v-2\,k)\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)\right)+e^{-\frac{p^2}{4\,c\,(v-2\,k)}}$$

$$(c\,(v-2\,k))^{-2\,n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,p^{-h-j+2\,n}\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}\left(-\frac{\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(p\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)+\right.$$

$$\left.\left.2\,c\,(v-2\,k)\sqrt{-\frac{\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(p+2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)\right)\right)+$$

$$2^{-m-2\,n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^{k}\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left((-1)^{v}\,e^{\frac{(p+b\,i\,(m-2\,s))^{2}}{4\,c\,(v-2\,k)}}\,(-c\,(v-2\,k))^{-2\,n-2}\right.$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(p+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p+b\,i\,(m-2\,s))\right.$$

$$\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,\frac{\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)-$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{c\,(v-2\,k)}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(p+b\,i\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{4\,c\,(v-2\,k)}\right)\right)+(-1)^{v}\,e^{\frac{(p-i\,b\,(m-2\,s))^{2}}{4\,c\,(v-2\,k)}}\,(-c\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^{j}\,(p-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(p-i\,b\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{h+j}$$

$$\left(\frac{\left(p-i\,b\,(m-2\,s)-2\,c\,(v-2\,k)\sqrt{z}\right)^{2}}{c\,(v-2\,k)}\right)^{\frac{1}{2}(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-i\,b\,(m-2\,s))\right.$$

$$\left(p - i\, b\,(m-2\,s) - 2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ \frac{\left(p - i\, b\,(m-2\,s) - 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right) -$$

$$2\,c\,(v-2\,k)\sqrt{\frac{\left(p - i\, b\,(m-2\,s) - 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.\frac{\left(p - i\, b\,(m-2\,s) - 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right) + e^{-\frac{(p+b\,i\,(m-2\,s))^2}{4\,c\,(v-2\,k)}}\ (c\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p+b\,i\,(m-2\,s))^{-h-j+2\,n}\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p+b\,i\,(m-2\,s))\right.$$

$$\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+j+1),\ -\frac{\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right) +$$

$$2\,c\,(v-2\,k)\sqrt{-\frac{\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\ \Gamma\!\left(\frac{1}{2}\,(h+j+2),\right.$$

$$\left.\left.-\frac{\left(p + b\,i\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right) + e^{-\frac{(p-i\,b\,(m-2\,s))^2}{4\,c\,(v-2\,k)}}\ (c\,(v-2\,k))^{-2\,n-2}$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(p-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(p - i\,b\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(p - i\,b\,(m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-j-1)}\binom{j}{h}\binom{n}{j}\left((p-i\,b\,(m-2\,s))\right.$$

$$\left(p - i\, b\, (m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}(h+j+1),\, -\frac{\left(p - i\, b\, (m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right) +$$

$$2\,c\,(v-2\,k)\sqrt{-\frac{\left(p - i\, b\, (m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{c\,(v-2\,k)}}\;\Gamma\!\left(\frac{1}{2}(h+j+2),\right.$$

$$\left.\left.\left. -\frac{\left(p - i\, b\, (m-2\,s) + 2\,c\,(v-2\,k)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,k)}\right)\right)\right) /;\, m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

Involving $z^n\, e^{p\, z^r} \cos^m(b\, z) \sinh^v(c\, z)$

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$$\int z^n\, e^{p\, z^2} \cos^m(b\, z) \sinh^v(c\, z)\, dz =$$

$$-i^v\, 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, p^{-n-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{\frac{b^2 (m-2\,s)^2}{4\,p}} \binom{m}{s} \left(\sum_{q=0}^{n} 2^{q-n}\, (i\, b\, (m-2\,s))^{n-q}\, (-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^{q+1}\right.$$

$$\left(-\frac{(-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, -\frac{(-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^2}{4\,p}\right) + \sum_{q=0}^{n} \left(i\, b \left(s - \frac{m}{2}\right)\right)^{n-q}$$

$$\left.(b\, i\, (m-2\,s) + 2\,p\,z)^{q+1} \left(-\frac{(b\, i\, (m-2\,s) + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, -\frac{(b\, i\, (m-2\,s) + 2\,p\,z)^2}{4\,p}\right)\right) +$$

$$2^{-m-v-1} (-i^v)\, z^{n+1} \left(-p\, z^2\right)^{\frac{1}{2}(-n-1)} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\!\left(\frac{n+1}{2},\, -p\, z^2\right) (1 - m \bmod 2)\, (1 - v \bmod 2) -$$

$$2^{-m-v-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k\, e^{-\frac{c^2 (v-2\,k)^2}{4\,p}}\, p^{-n-1} \binom{v}{k} \left((-1)^v \sum_{q=0}^{n} 2^{q-n}\, (c\, (v-2\,k))^{n-q}\right.$$

$$(2\,c\,k - c\,v + 2\,p\,z)^{q+1} \left(-\frac{(2\,c\,k - c\,v + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, -\frac{(2\,c\,k - c\,v + 2\,p\,z)^2}{4\,p}\right) +$$

$$\left.\sum_{q=0}^{n} \left(c \left(k - \frac{v}{2}\right)\right)^{n-q} (c\, (v-2\,k) + 2\,p\,z)^{q+1} \left(-\frac{(c\, (v-2\,k) + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\!\left(\frac{q+1}{2},\, -\frac{(c\, (v-2\,k) + 2\,p\,z)^2}{4\,p}\right)\right) -$$

$$\frac{i^v\, 2^{-m-v-1}}{\sqrt{p}} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k\, e^{-\frac{-b^2 (m-2\,s)^2 + c^2 (v-2\,k)^2 + i\, p\, \pi\, v}{2\,p}} \binom{v}{k} \left(e^{\frac{(-2\,c\,k + i\, b\, m - 2\, i\, b\, s + c\, v)^2}{4\,p}} \sum_{q=0}^{n} 2^{q-n}\, p^{-n-\frac{1}{2}}\, (2\,c\,k + i\, b\, m - 2\, i\, b\, s - c\, v)^{n-q}\right.$$

$$(-2\,c\,k - i\,b\,m + 2\,i\,b\,s + c\,v + 2\,p\,z)^{q+1} \left(-\frac{(-2\,c\,k - i\,b\,m + 2\,i\,b\,s + c\,v + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2},\right.$$

$$\left. -\frac{(-2\,c\,k - i\,b\,m + 2\,i\,b\,s + c\,v + 2\,p\,z)^2}{4\,p}\right) + e^{\frac{(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)^2}{4\,p}} \sum_{q=0}^{n} p^{-n-\frac{1}{2}} \left(\left(k - \frac{v}{2}\right) c + b\,i \left(s - \frac{m}{2}\right)\right)^{n-q}$$

$$(-2\,c\,k + i\,b\,m - 2\,i\,b\,s + c\,v + 2\,p\,z)^{q+1} \left(-\frac{(-2\,c\,k + i\,b\,m - 2\,i\,b\,s + c\,v + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2\,c\,k + i\,b\,m - 2\,i\,b\,s + c\,v + 2\,p\,z)^2}{4\,p}\right) +$$

$$e^{\frac{(-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v)^2}{4\,p} + i\,\pi\,v} \sum_{q=0}^{n} 2^{q-n}\, p^{-n-\frac{1}{2}} (-2\,c\,k - i\,b\,m + 2\,i\,b\,s + c\,v)^{n-q} (2\,c\,k + i\,b\,m - 2\,i\,b\,s - c\,v + 2\,p\,z)^{q+1}$$

$$\left(-\frac{(2\,c\,k + i\,b\,m - 2\,i\,b\,s - c\,v + 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2\,c\,k + i\,b\,m - 2\,i\,b\,s - c\,v + 2\,p\,z)^2}{4\,p}\right) +$$

$$e^{\frac{(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)^2}{4\,p} + i\,\pi\,v} \sum_{q=0}^{n} 2^{q-n}\, p^{-n-\frac{1}{2}} (b\,i\,(m - 2\,s) + c\,(v - 2\,k))^{n-q}$$

$$\left(-\frac{(i\,b\,m - 2\,i\,b\,s + c\,(v - 2\,k) - 2\,p\,z)^2}{p}\right)^{\frac{1}{2}(-q-1)} (2\,c\,k - i\,b\,m + 2\,i\,b\,s - c\,v + 2\,p\,z)^{q+1}$$

$$\left.\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(i\,b\,m - 2\,i\,b\,s + c\,(v - 2\,k) - 2\,p\,z)^2}{4\,p}\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n\, e^{p\sqrt{z}} \cos^m(b\,z) \sinh^v(c\,z)\, dz = -2^{-m-v+1}\, i^v \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2\,(n+1), -p\sqrt{z}\right) (1 - m \bmod 2)\,(1 - v \bmod 2)\, p^{-2\,(n+1)} +$$

$$2^{-m-2\,n-v-1}\, i^v \binom{v}{\frac{v}{2}} (1 - v \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{\frac{p^2}{4\,i\,b\,m-8\,i\,b\,s}} (i\,b\,(m - 2\,s))^{-2\,(n+1)} (i\,b\,(2\,s - m))^{-2\,n} \binom{m}{s} \left(e^{\frac{p^2}{4\,i\,b\,s-2\,i\,b\,m}} (i\,b\,(2\,s - m))^{2\,n} \right.$$

$$\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h}\, 4^k\, p^{-h-k+2\,n} \left(p + 2\,b\,i\,(m - 2\,s)\sqrt{z}\right)^{h+k} \left(\frac{i\left(p + 2\,b\,i\,(m - 2\,s)\sqrt{z}\right)^2}{b\,(m - 2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h} \binom{n}{k} \left(p\left(p + 2\,b\,i\,(m - 2\,s)\sqrt{z}\right) \Gamma\left(\frac{1}{2}(h + k + 1), -\frac{i\left(p + 2\,b\,i\,(m - 2\,s)\sqrt{z}\right)^2}{b\,(8\,s - 4\,m)}\right) + \right.$$

$$2\,b\,i\sqrt{-\frac{i\left(p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}}\;(m-2\,s)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\Bigg)+$$

$$(i\,b\,(m-2\,s))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+$$

$$2\,b\,i\,(2\,s-m)\sqrt{\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)\Bigg)\Bigg)-$$

$$2^{-m-2\,n-\nu-1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{u=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^u\,e^{\frac{p^2}{8\,c\,u-4\,c\,\nu}}\left(-c^2\,(\nu-2\,u)^2\right)^{-2\,n-1}\binom{\nu}{u}$$

$$\Bigg((-c\,(\nu-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^{h+k}\left(-\frac{\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{c\,(\nu-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{4\,c\,(\nu-2\,u)}\right)+$$

$$2\,c\,(\nu-2\,u)\sqrt{-\frac{\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{c\,(\nu-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(p+2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{4\,c\,(\nu-2\,u)}\right)\Bigg)+(-1)^\nu$$

$$e^{\frac{p^2}{2\,c\,\nu-4\,c\,u}}\,(c\,(\nu-2\,u))^{2\,n}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^{h+k}\left(\frac{\left(p-2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{c\,(\nu-2\,u)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,c\,(\nu-2\,u)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(p-2\,c\,(\nu-2\,u)\,\sqrt{z}\right)^2}{4\,c\,(\nu-2\,u)}\right)-$$

$$2\,c\,(v-2\,u)\sqrt{\frac{\left(p-2\,c\,(v-2\,u)\,\sqrt{z}\right)^2}{c\,(v-2\,u)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(p-2\,c\,(v-2\,u)\,\sqrt{z}\right)^2}{4\,c\,(v-2\,u)}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{u=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^u\binom{v}{u}\Bigg(e^{\frac{p^2}{4\,i\,b\,m-8\,i\,b\,s+8\,c\,u-4\,c\,v}}\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)^{-2\,(n+1)}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(-\frac{\left(p+2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,(-i\,b\,m+2\,i\,b\,s-\right.$$

$$\left.2\,c\,u+c\,v)\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,-\frac{\left(p+2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{-4\,b\,i\,m+8\,i\,b\,s+4\,c\,(v-2\,u)}\right)+$$

$$2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,-\frac{\left(p+2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{-4\,b\,i\,m+8\,i\,b\,s+4\,c\,(v-2\,u)}\right)$$

$$\sqrt{-\frac{\left(p+2\,(-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{-i\,b\,m+2\,i\,b\,s-2\,c\,u+c\,v}}\Bigg)+(-1)^v\,e^{\frac{p^2}{4\,i\,b\,m-8\,i\,b\,s-8\,c\,u+4\,c\,v}}$$

$$(-i\,b\,m+2\,i\,b\,s+2\,c\,u-c\,v)^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p-2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^{h+k}$$

$$\left(\frac{\left(p-2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}\binom{n}{k}\Bigg(p\left(p-2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\right.$$

$$\left.\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(p-2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{4\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)}\right)-$$

$$2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\sqrt{\frac{\left(p-2\,(i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v)\,\sqrt{z}\right)^2}{i\,b\,m-2\,i\,b\,s-2\,c\,u+c\,v}}$$

$$\Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(p-2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^2}{4(i b m-2 i b s-2 c u+c v)}\right)\Bigg)\Bigg)+$$

$$e^{\frac{p^2}{-4 b i m+8 i b s+8 c u-4 c v}}(i b m-2 i b s-2 c u+c v)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k p^{-h-k+2n}$$

$$\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^{h+k}\left(-\frac{\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^2}{i b m-2 i b s-2 c u+c v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^2}{4(i b m-2 i b s-2 c u+c v)}\Bigg)+2(i b m-2 i b s-2 c u+c v)\Gamma\Bigg(\frac{1}{2}(h+k+2),$$

$$-\frac{\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^2}{4(i b m-2 i b s-2 c u+c v)}\Bigg)\sqrt{-\frac{\left(p+2(i b m-2 i b s-2 c u+c v)\sqrt{z}\right)^2}{i b m-2 i b s-2 c u+c v}}\Bigg)+$$

$$(-1)^{v}e^{\frac{p^2}{-4 b i m+8 i b s-8 c u+4 c v}}(i b m-2 i b s+2 c u-c v)^{-2(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k p^{-h-k+2n}$$

$$\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)^{h+k}\left(\frac{\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)^2}{-i b m+2 i b s-2 c u+c v}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1), \frac{\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)^2}{-4 b i m+8 i b s-8 c u+4 c v}\right)+$$

$$2(i b m-2 i b s+2 c u-c v)\Gamma\left(\frac{1}{2}(h+k+2), \frac{\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)^2}{-4 b i m+8 i b s-8 c u+4 c v}\right)$$

$$\sqrt{\frac{\left(p+2(i b m-2 i b s+2 c u-c v)\sqrt{z}\right)^2}{-i b m+2 i b s-2 c u+c v}}\Bigg)\Bigg)\ /;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n e^{p z} \cos^m(b z^r) \sinh^\nu(c z)$

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$$\int z^n e^{p z} \cos^m(b z^2) \sinh^\nu(c z)\, dz = -2^{-m-\nu} i^\nu \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -p z)(1 - m \bmod 2)(1 - \nu \bmod 2)(-p)^{-n-1} - 2^{-m-\nu} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} ((-1)^\nu E_{-n}((-2 c k - p + c \nu) z) + E_{-n}((-p - c(\nu - 2k)) z)) - 2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{i b (m - 2s)}} e^{i \pi \nu - \frac{i (2 c k + p - c \nu)^2}{b (8 s - 4 m)}} \sum_{q=0}^n 2^{q-n} (i b (m - 2s))^{-n-\frac{1}{2}} (c(\nu - 2k) - p)^{n-q} (2 c k + p - c \nu + 2 b i (m - 2s) z)^{q+1} \left(\frac{i (2 c k + p - c \nu + 2 b i (m - 2s) z)^2}{b (m - 2s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (p + c(2k - \nu) + 2 b i (m - 2s) z)^2}{b (8 s - 4 m)} \right) + \frac{1}{\sqrt{i b (m - 2s)}} e^{-\frac{i (p + c(\nu - 2k))^2}{b (8 s - 4 m)}} \sum_{q=0}^n (i b (m - 2s))^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right) - \frac{p}{2} \right)^{n-q} (p + c(\nu - 2k) + 2 b i (m - 2s) z)^{q+1} \left(\frac{i (p + c(\nu - 2k) + 2 b i (m - 2s) z)^2}{b (m - 2s)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{i (p + c(\nu - 2k) + 2 b i (m - 2s) z)^2}{b (8 s - 4 m)} \right) + \frac{1}{\sqrt{i b (2s - m)}} e^{-\frac{i (p + c(\nu - 2k))^2}{4 b (m - 2s)}} \sum_{q=0}^n (i b (2s - m))^{-n-\frac{1}{2}} \left(c\left(k - \frac{\nu}{2}\right) - \frac{p}{2} \right)^{n-q} \left(-\frac{(-2 c k + p + c \nu - 2 i b m z + 4 i b s z)^2}{2 i b s - i b m} \right)^{\frac{1}{2}(-q-1)} (p + c(\nu - 2k) - 2 i b m z + 4 i b s z)^{q+1} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-2 c k + p + c \nu - 2 i b m z + 4 i b s z)^2}{4 (2 i b s - i b m)} \right) + \frac{1}{\sqrt{i b (2s - m)}} e^{i \pi \nu - \frac{i (2 c k + p - c \nu)^2}{4 b (m - 2s)}} \sum_{q=0}^n 2^{q-n} (i b (2s - m))^{-n-\frac{1}{2}} (c(\nu - 2k) - p)^{n-q} (2 c k + p - c \nu - 2 i b m z + 4 i b s z)^{q+1} \left(-\frac{(2 c k + p - c \nu - 2 i b m z + 4 i b s z)^2}{2 i b s - i b m} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(2 c k + p - c \nu - 2 i b m z + 4 i b s z)^2}{4 (2 i b s - i b m)} \right) \right) - i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\frac{1}{\sqrt{i b (2s - m)}} e^{\frac{p^2}{4 i b m - 8 i b s}} \sum_{q=0}^n 2^{q-n} (-p)^{n-q} (i b (2s - m))^{-n-\frac{1}{2}} \right.$$

$$(p-2\,i\,b\,m\,z+4\,i\,b\,s\,z)^{q+1}\left(\frac{i\,(p-2\,i\,b\,m\,z+4\,i\,b\,s\,z)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,\frac{i\,(p-2\,i\,b\,m\,z+4\,i\,b\,s\,z)^2}{b\,(8\,s-4\,m)}\right)+$$

$$\frac{1}{\sqrt{i\,b\,(m-2\,s)}}\,e^{\frac{p^2}{8\,i\,b\,s-4\,i\,b\,m}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(i\,b\,(m-2\,s))^{-n-\frac{1}{2}}\,(p+2\,b\,i\,(m-2\,s)\,z)^{q+1}$$

$$\left.\left(\frac{i\,(p+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\,-\frac{i\,(p+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(8\,s-4\,m)}\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\,z}\cos^m\!\left(b\sqrt{z}\right)\sinh^v(c\,z)\,dz=$$

$$-2^{-m-v}\,i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(1-m\bmod 2)\,(1-v\bmod 2)\,(-p)^{-n-1}-2^{-m-v}\,z^{n+1}\binom{m}{\frac{m}{2}}(1-m\bmod 2)$$

$$\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Big((-1)^v\,\Gamma(n+1,\,(-2\,c\,k-p+c\,v)\,z)\,((-2\,c\,k-p+c\,v)\,z)^{-n-1}+((-p-c\,(v-2\,k))\,z)^{-n-1}$$

$$\Gamma(n+1,\,(-p-c\,(v-2\,k))\,z)\Big)+2^{-m-2\,n-v-1}\,i^v\,p^{-2\,n-2}\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}e^{\frac{b^2\,(m-2\,s)^2}{4\,p}}$$

$$\left(\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}\right.$$

$$\binom{j}{h}\binom{n}{j}\left(2\,p\sqrt{-\frac{\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{p}}\;\Gamma\left(\frac{1}{2}\,(h+j+2),\,-\frac{\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.i\,b\,(m-2\,s)\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\,p\sqrt{z}-i\,b\,(m-2\,s)\right)^2}{4\,p}\right)\right)\right)+$$

$$\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2\,s))^{-h-j+2\,n}\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)\right)^{h+j}\left(-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)\right)^2}{p}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(b\,i\,(m-2\,s)\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)\right)\Gamma\left(\frac{1}{2}\,(h+j+1),\,-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)\right)^2}{4\,p}\right)+\right.$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\,p+b\,i\,(m-2s)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+j+2),-\frac{\left(2\sqrt{z}\,p+b\,i\,(m-2s)\right)^2}{4p}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{\frac{b^2(m-2s)^2}{4(p+c(v-2k))}}\,(p+c(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(-i\,b\,(m-2s))^{-h-j+2n}$$

$$\left(2(p+c(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^{h+j}\left(-\frac{\left(2(p+c(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{p+c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(2(p+c(v-2k))\sqrt{-\frac{\left(2(p+c(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{p+c(v-2k)}}\;\Gamma\!\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(2(p+c(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{4(p+c(v-2k))}\Bigg)-i\,b\,(m-2s)\big(2(p+c(v-2k))\sqrt{z}-$$

$$i\,b\,(m-2s)\big)\,\Gamma\!\left(\frac{1}{2}(h+j+1),-\frac{\left(2(p+c(v-2k))\sqrt{z}-i\,b\,(m-2s)\right)^2}{4(p+c(v-2k))}\right)\Bigg)+$$

$$e^{\frac{b^2(m-2s)^2}{4(p+c(v-2k))}}\,(p+c(v-2k))^{-2n-2}\sum_{j=0}^{n}\sum_{h=0}^{j}(-1)^{j-h}\,4^j\,(i\,b\,(m-2s))^{-h-j+2n}\big(b\,i\,(m-2s)+$$

$$2(p+c(v-2k))\sqrt{z}\big)^{h+j}\left(-\frac{\left(b\,i\,(m-2s)+2(p+c(v-2k))\sqrt{z}\right)^2}{p+c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\Bigg(b\,i\,(m-2s)\left(b\,i\,(m-2s)+2(p+c(v-2k))\sqrt{z}\right)\Gamma\!\Bigg(\frac{1}{2}(h+j+1),$$

$$-\frac{\left(b\,i\,(m-2s)+2(p+c(v-2k))\sqrt{z}\right)^2}{4(p+c(v-2k))}\Bigg)+2(p+c(v-2k))\,\Gamma\!\Bigg(\frac{1}{2}(h+j+2),$$

$$-\frac{\left(b\,i\,(m-2s)+2(p+c(v-2k))\sqrt{z}\right)^2}{4(p+c(v-2k))}\Bigg)\sqrt{-\frac{\left(b\,i\,(m-2s)+2(p+c(v-2k))\sqrt{z}\right)^2}{p+c(v-2k)}}\;\Bigg)+$$

$$(-1)^v e^{\frac{b^2 (m-2s)^2}{4(p-c(v-2k))}} (p-c(v-2k))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (-i b(m-2s))^{-h-j+2n}$$

$$\left(2(p-c(v-2k))\sqrt{z} - i b(m-2s)\right)^{h+j} \left(-\frac{\left(2(p-c(v-2k))\sqrt{z} - i b(m-2s)\right)^2}{p-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)}$$

$$\binom{j}{h}\binom{n}{j}\left(2(p-c(v-2k))\sqrt{-\frac{\left(2(p-c(v-2k))\sqrt{z} - i b(m-2s)\right)^2}{p-c(v-2k)}}\;\Gamma\left(\frac{1}{2}(h+j+2),\right.\right.$$

$$\left.-\frac{\left(2(p-c(v-2k))\sqrt{z} - i b(m-2s)\right)^2}{4(p-c(v-2k))}\right) - i b(m-2s)\left(2(p-c(v-2k))\sqrt{z} -\right.$$

$$\left.\left.i b(m-2s)\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(2(p-c(v-2k))\sqrt{z} - i b(m-2s)\right)^2}{4(p-c(v-2k))}\right)\right) + (-1)^v e^{\frac{b^2(m-2s)^2}{4(p-c(v-2k))}}$$

$$(p-c(v-2k))^{-2n-2} \sum_{j=0}^{n}\sum_{h=0}^{j} (-1)^{j-h} 4^j (i b(m-2s))^{-h-j+2n} \left(b i(m-2s) + 2(p-c(v-2k))\sqrt{z}\right)^{h+j}$$

$$\left(-\frac{\left(b i(m-2s) + 2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}\right)^{\frac{1}{2}(-h-j-1)} \binom{j}{h}\binom{n}{j}\left(b i(m-2s)\left(b i(m-2s) +\right.\right.$$

$$\left.2(p-c(v-2k))\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+j+1), -\frac{\left(b i(m-2s) + 2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\right) +$$

$$2(p-c(v-2k))\,\Gamma\left(\frac{1}{2}(h+j+2), -\frac{\left(b i(m-2s) + 2(p-c(v-2k))\sqrt{z}\right)^2}{4(p-c(v-2k))}\right)$$

$$\left.\left.\sqrt{-\frac{\left(b i(m-2s) + 2(p-c(v-2k))\sqrt{z}\right)^2}{p-c(v-2k)}}\right)\right) /;\, m \in \mathbb{N}^+ \land v \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^n e^{p z} \cos^m(b z) \sinh^v(c z^r)$

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$$\int z^n e^{p z} \cos^m(b z) \sinh^\nu(c z^2)\, dz = -2^{-m-\nu} i^\nu \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma(n+1, -p z) (1 - m \bmod 2)(1 - \nu \bmod 2)(-p)^{-n-1} - i^\nu 2^{-m-\nu} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) z^{n+1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} (E_{-n}((i b m - p - 2 i b s) z) + E_{-n}((-p - i b (m - 2 s)) z)) - 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{c(\nu - 2k)}} e^{\frac{p^2}{8 c k - 4 c \nu}} \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (c(\nu - 2k))^{-n-\frac{1}{2}} (p + 2 c (\nu - 2k) z)^{q+1} \left(\frac{(p + 2 c (\nu - 2k) z)^2}{c (2k - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p + 2 c(\nu - 2k) z)^2}{c(8k - 4\nu)} \right) + \frac{1}{\sqrt{c(2k - \nu)}} e^{\frac{p^2}{4 c \nu - 8 c k}} (-1)^\nu \sum_{q=0}^{n} 2^{q-n} (-p)^{n-q} (c(2k - \nu))^{-n-\frac{1}{2}} (p + 4 c k z - 2 c \nu z)^{q+1} \left(-\frac{(p + 4 c k z - 2 c \nu z)^2}{c(2k - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(p + 4 c k z - 2 c \nu z)^2}{c(8k - 4\nu)} \right) \right) -$$

$$2^{-m-\nu-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(\frac{1}{\sqrt{c(\nu - 2k)}} e^{\frac{(-i b m + p + 2 i b s)^2}{c(8k - 4\nu)}} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2s) - p)^{n-q} (c(\nu - 2k))^{-n-\frac{1}{2}} (p + b i (2s - m) + 2 c (\nu - 2k) z)^{q+1} \left(\frac{(p + b i (2s - m) + 2 c (\nu - 2k) z)^2}{c(2k - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p + b i (2s - m) + 2 c(\nu - 2k) z)^2}{c(8k - 4\nu)} \right) + \frac{1}{\sqrt{c(\nu - 2k)}} e^{\frac{(p + b i (m - 2s))^2}{c(8k - 4\nu)}} \sum_{q=0}^{n} 2^{q-n} (-i b m - p + 2 i b s)^{n-q} (c(\nu - 2k))^{-n-\frac{1}{2}} (p + b i (m - 2s) + 2 c (\nu - 2k) z)^{q+1} \left(\frac{(p + b i (m - 2s) + 2 c (\nu - 2k) z)^2}{c(2k - \nu)} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, \frac{(p + b i (m - 2s) + 2 c (\nu - 2k) z)^2}{c(8k - 4\nu)} \right) + \frac{1}{\sqrt{c(2k - \nu)}} e^{i \pi \nu - \frac{(-i b m + p + 2 i b s)^2}{4(2 c k - c \nu)}} \sum_{q=0}^{n} 2^{q-n} (i b (m - 2s) - p)^{n-q} (c(2k - \nu))^{-n-\frac{1}{2}} (-i b m + p + 2 i b s + 4 c k z - 2 c \nu z)^{q+1} \left(-\frac{(-i b m + p + 2 i b s + 4 c k z - 2 c \nu z)^2}{2 c k - c \nu} \right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i b m + p + 2 i b s + 4 c k z - 2 c \nu z)^2}{4(2 c k - c \nu)} \right) +$$

$$\frac{1}{\sqrt{c\,(2\,k-v)}}\,e^{i\,\pi\,v-\frac{(i\,b\,m+p-2\,i\,b\,s)^2}{4\,(2\,c\,k-c\,v)}}\sum_{q=0}^{n}2^{q-n}\,(-i\,b\,m-p+2\,i\,b\,s)^{n-q}\,(c\,(2\,k-v))^{-n-\frac{1}{2}}$$

$$(i\,b\,m+p-2\,i\,b\,s+4\,c\,k\,z-2\,c\,v\,z)^{q+1}\left(-\frac{(i\,b\,m+p-2\,i\,b\,s+4\,c\,k\,z-2\,c\,v\,z)^2}{2\,c\,k-c\,v}\right)^{\frac{1}{2}(-q-1)}$$

$$\left.\binom{n}{q}\,\Gamma\!\left(\frac{q+1}{2},\,-\frac{(i\,b\,m+p-2\,i\,b\,s+4\,c\,k\,z-2\,c\,v\,z)^2}{4\,(2\,c\,k-c\,v)}\right)\right)/;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

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$$\int z^n\,e^{p\,z}\cos^m(b\,z)\sinh^v\!\left(c\,\sqrt{z}\right)dz = i^{-v}\,2^{-m-v-1}\left(\frac{2\,(-p)^{-n}\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,\,-p\,z)\,(m \bmod 2-1)\,(v \bmod 2-1)}{p}-\right.$$

$$2\binom{v}{\frac{v}{2}}(v \bmod 2-1)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Big(-\Gamma(n+1,\,(-p-i\,b\,(2\,s-m))\,z)\,(i\,b\,m-p-2\,i\,b\,s)^{-n-1}-(i\,b\,(2\,s-m)-p)^{-n-1}$$

$$\Gamma(n+1,\,(-i\,b\,m-p+2\,i\,b\,s)\,z)\Big)+4^{-n}\,i^{-v}\,p^{-2\,(n+1)}\binom{m}{\frac{m}{2}}(m \bmod 2-1)\sum_{u=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^u\,e^{-\frac{c^2\,(v-2\,u)^2}{4\,p}}\binom{v}{u}$$

$$\left((-1)^v\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,i\,\sqrt{z}\,p+c\,i\,(v-2\,u)\right)^2}{p}\right)^{\frac{1}{2}(-h-k-1)}\left(2\,\sqrt{z}\,p+c\,(v-2\,u)\right)^{h+k}\right.$$

$$\binom{k}{h}\binom{n}{k}\left(i\,c\,(v-2\,u)\left(2\,i\,\sqrt{z}\,p+c\,i\,(v-2\,u)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,i\,\sqrt{z}\,p+c\,i\,(v-2\,u)\right)^2}{4\,p}\right)-\right.$$

$$\left.\left.2\,p\,\sqrt{\frac{\left(2\,i\,\sqrt{z}\,p+c\,i\,(v-2\,u)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,i\,\sqrt{z}\,p+c\,i\,(v-2\,u)\right)^2}{4\,p}\right)\right)\right)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(i\,c\,(v-2\,u)-2\,i\,p\,\sqrt{z}\right)^2}{p}\right)^{\frac{1}{2}(-h-k-1)}\left(2\,p\,\sqrt{z}-c\,(v-2\,u)\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\left(i\,c\,(v-2\,u)\left(i\,c\,(v-2\,u)-2\,i\,p\,\sqrt{z}\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(i\,c\,(v-2\,u)-2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)-2\right.$$

$$p\sqrt{\frac{\left(i\,c\,(v-2\,u)-2\,i\,p\,\sqrt{z}\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(i\,c\,(v-2\,u)-2\,i\,p\,\sqrt{z}\right)^2}{4\,p}\right)\Bigg)\Bigg)\Bigg)+$$

$$4^{-n}\,i^{-v}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{u=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^u\binom{v}{u}\Bigg(e^{-\frac{c^2\,(v-2\,u)^2}{4\,(i\,b\,m+p-2\,i\,b\,s)}}\Bigg((-1)^v\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c\,(v-2\,u))^{-h-k+2\,n}\,\Big(2\,\sqrt{z}\,\,(i\,b\,m+p-$$

$$2\,i\,b\,s)+c\,(v-2\,u)\Big)^{h+k}\left(\frac{\left(2\,\sqrt{z}\,\,(-b\,m+i\,p+2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{i\,b\,m+p-2\,i\,b\,s}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(2\,(i\,b\,m+p-2\,i\,b\,s)\sqrt{\frac{\left(2\,\sqrt{z}\,\,(-b\,m+i\,p+2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{i\,b\,m+p-2\,i\,b\,s}}$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,\,(-b\,m+i\,p+2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b\,m+p-2\,i\,b\,s)}\right)-$$

$$i\,c\,(v-2\,u)\left(2\,\sqrt{z}\,\,(-b\,m+i\,p+2\,b\,s)+c\,i\,(v-2\,u)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,\,(-b\,m+i\,p+2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b\,m+p-2\,i\,b\,s)}\right)\Bigg)+$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(-c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,\sqrt{z}\,\,(b\,m-i\,p-2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{i\,b\,m+p-2\,i\,b\,s}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(2\,(i\,b\,m+p-2\,i\,b\,s)\,\sqrt{z}\,-c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,(i\,b\,m+p-2\,i\,b\,s)\sqrt{\frac{\left(2\,\sqrt{z}\,\,(b\,m-i\,p-2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{i\,b\,m+p-2\,i\,b\,s}}\;\Gamma\Bigg(\frac{1}{2}\,(h+k+2),$$

$$\frac{\left(2\,\sqrt{z}\,\,(b\,m-i\,p-2\,b\,s)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b\,m+p-2\,i\,b\,s)}\Bigg)-c\,(v-2\,u)\left(2\,(i\,b\,m+p-2\,i\,b\,s)\,\sqrt{z}\,-\right.$$

$$c\,(v-2\,u)\Big)\,\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,\left(b\,m-i\,p-2\,b\,s\right)+c\,i\,(v-2\,u)\right)^2}{4\,(i\,b\,m+p-2\,i\,b\,s)}\right)\Bigg)\Bigg)$$

$$(i\,b\,m+p-2\,i\,b\,s)^{-2\,(n+1)}+e^{-\frac{c^2\,(v-2\,u)^2}{4\,(p+b\,i\,(2\,s-m))}}\,(p+b\,i\,(2\,s-m))^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k$$

$$(-c\,(v-2\,u))^{-h-k+2\,n}\left(\frac{\left(2\,\sqrt{z}\,\left(-b\,m-i\,p+2\,b\,s\right)+c\,i\,(v-2\,u)\right)^2}{p+b\,i\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-k-1)}$$

$$\left(2\,(p+b\,i\,(2\,s-m))\,\sqrt{z}\,-c\,(v-2\,u)\right)^{h+k}\binom{k}{h}\binom{n}{k}$$

$$\Bigg(2\,(p+b\,i\,(2\,s-m))\,\sqrt{\frac{\left(2\,\sqrt{z}\,\left(-b\,m-i\,p+2\,b\,s\right)+c\,i\,(v-2\,u)\right)^2}{p+b\,i\,(2\,s-m)}}\;\Gamma\!\left(\frac{1}{2}\,(h+k+2),\right.$$

$$\left.\frac{\left(2\,\sqrt{z}\,\left(-b\,m-i\,p+2\,b\,s\right)+c\,i\,(v-2\,u)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)-c\,(v-2\,u)\left(2\,(p+b\,i\,(2\,s-m))\,\sqrt{z}\,-\right.$$

$$\left.c\,(v-2\,u)\right)\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,\left(-b\,m-i\,p+2\,b\,s\right)+c\,i\,(v-2\,u)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)\Bigg)+$$

$$(-1)^{v}\,e^{-\frac{c^2\,(v-2\,u)^2}{4\,(p+b\,i\,(2\,s-m))}}\,(p+b\,i\,(2\,s-m))^{-2\,(n+1)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(c\,(v-2\,u))^{-h-k+2\,n}$$

$$\left(\frac{\left(2\,\sqrt{z}\,\left(i\,p+b\,(m-2\,s)\right)+c\,i\,(v-2\,u)\right)^2}{p+b\,i\,(2\,s-m)}\right)^{\frac{1}{2}\,(-h-k-1)}\left(2\,\sqrt{z}\,\left(p+b\,i\,(2\,s-m)\right)+c\,(v-2\,u)\right)^{h+k}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(c\,(v-2\,u)\left(2\,\sqrt{z}\,\left(p+b\,i\,(2\,s-m)\right)+c\,(v-2\,u)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+k+1),\,\frac{\left(2\,\sqrt{z}\,\left(i\,p+b\,(m-2\,s)\right)+c\,i\,(v-2\,u)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)+$$

$$2\,(p+b\,i\,(2\,s-m))\,\Gamma\!\left(\frac{1}{2}\,(h+k+2),\,\frac{\left(2\,\sqrt{z}\,\left(i\,p+b\,(m-2\,s)\right)+c\,i\,(v-2\,u)\right)^2}{4\,(p+b\,i\,(2\,s-m))}\right)$$

Involving $z^n e^{p z^r} \cos^m(b z) \sinh^v(c z^r)$

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$$\int z^n e^{p z^2} \cos^m(b z) \sinh^v(c z^2)\, dz = -i^v 2^{-m-v-1} \binom{v}{\frac{v}{2}} (1 - v \bmod 2)\, p^{-n-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{\frac{b^2 (m-2s)^2}{4p}} \binom{m}{s} \left(\sum_{q=0}^{n} 2^{q-n} (i\, b\, (m-2s))^{n-q} (-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^{q+1} \left(-\frac{(-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(-i\, b\, m + 2\, i\, b\, s + 2\, p\, z)^2}{4\, p}\right) + \sum_{q=0}^{n} 2^{q-n} (i\, b\, (2s - m))^{n-q} (b\, i\, (m-2s) + 2\, p\, z)^{q+1} \left(-\frac{(b\, i\, (m-2s) + 2\, p\, z)^2}{p}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b\, i\, (m-2s) + 2\, p\, z)^2}{4\, p}\right)\right) - 2^{-m-v-1} i^v z^{n+1} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} E_{\frac{1}{2}-\frac{n}{2}}(-p z^2) (1 - m \bmod 2) (1 - v \bmod 2) - 2^{-m-v-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v \Gamma\left(\frac{n+1}{2}, (-2\, c\, k - p + c\, v) z^2\right) \left((-2\, c\, k - p + c\, v) z^2\right)^{\frac{1}{2}(-n-1)} + \left((-p - c\,(v - 2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-p - c\,(v-2k)) z^2\right)\right) - 2^{-m-v-1} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} \left((-1)^k e^{\frac{b^2 p (m-2s)^2}{2(2ck+p-cv)(p+c(v-2k))}} \binom{m}{s} \binom{v}{k} \left(e^{-\frac{b^2 (m-2s)^2}{4(2ck+p-cv)}} \sqrt{2\, c\, k + p - c\, v} \left(\sum_{q=0}^{n} 2^{q-n} (i\, b\, (m-2s))^{n-q} (-2\, c\, k + p + c\, v)^{-n-\frac{1}{2}} (b\, i\, (2s - m) + 2\, (-2\, c\, k + p + c\, v) z)^{q+1} \left(-\frac{(b\, i\, (2s-m) + 2\, (-2\, c\, k + p + c\, v) z)^2}{-2\, c\, k + p + c\, v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b\, i\, (2s-m) + 2\, (-2\, c\, k + p + c\, v) z)^2}{4\, (-2\, c\, k + p + c\, v)}\right) + \sum_{q=0}^{n} \left(i\, b \left(s - \frac{m}{2}\right)\right)^{n-q} (-2\, c\, k + p + c\, v)^{-n-\frac{1}{2}} (b\, i\, (m-2s) + 2\, (-2\, c\, k + p + c\, v) z)^{q+1} \left(-\frac{(b\, i\, (m-2s) + 2\, (-2\, c\, k + p + c\, v) z)^2}{-2\, c\, k + p + c\, v}\right)^{\frac{1}{2}(-q-1)} \binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b\, i\, (m-2s) + 2\, (-2\, c\, k + p + c\, v) z)^2}{4\, (-2\, c\, k + p + c\, v)}\right)\right) +$$

$$(-1)^v e^{-\frac{b^2 (m-2s)^2}{4(p+c(v-2k))}} \sqrt{p+c(v-2k)} \sum_{q=0}^{n} 2^{q-n} (i b (m-2s))^{n-q} (2ck+p-cv)^{-n-\frac{1}{2}}$$

$$(b i (2s-m) + 2(2ck+p-cv) z)^{q+1} \left(-\frac{(b i (2s-m) + 2(2ck+p-cv) z)^2}{2ck+p-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (2s-m) + 2(2ck+p-cv) z)^2}{4(2ck+p-cv)}\right) +$$

$$(-1)^v e^{-\frac{b^2 (m-2s)^2}{4(-2ck+p+cv)}} \sqrt{-2ck+p+cv} \sum_{q=0}^{n} \left(i b \left(s - \frac{m}{2}\right)\right)^{n-q} (2ck+p-cv)^{-n-\frac{1}{2}}$$

$$(b i (m-2s) + 2(2ck+p-cv) z)^{q+1} \left(-\frac{(b i (m-2s) + 2(2ck+p-cv) z)^2}{2ck+p-cv}\right)^{\frac{1}{2}(-q-1)}$$

$$\binom{n}{q} \Gamma\left(\frac{q+1}{2}, -\frac{(b i (m-2s) + 2(2ck+p-cv) z)^2}{4(2ck+p-cv)}\right)\Bigg)\Bigg)\Bigg) \Big/$$

$$\left(\sqrt{2ck+p-cv} \sqrt{p+c(v-2k)}\right) /; m \in \mathbb{N}^+ \bigwedge v \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}$$

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$$\int z^n e^{p\sqrt{z}} \cos^m(bz) \sinh^v\left(c\sqrt{z}\right) dz ==$$

$$i^{-v} 2^{-m-v-1} \Bigg(-4 \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (m \bmod 2 - 1)(v \bmod 2 - 1) p^{-2(n+1)} + 4 i^{-v} \binom{m}{\frac{m}{2}} (m \bmod 2 - 1)$$

$$\sum_{u=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^u \binom{v}{u} \left(\Gamma\left(2(n+1), (c(v-2u)-p)\sqrt{z}\right) (c(v-2u)-p)^{-2(n+1)} + (-1)^v (-p-c(v-2u))^{-2(n+1)}\right.$$

$$\left.\Gamma\left(2(n+1), (-p-c(v-2u))\sqrt{z}\right)\right) + 2^{-2n} \binom{v}{\frac{v}{2}} (v \bmod 2 - 1)$$

$$\sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} e^{\frac{i p^2}{4bm-8bs}} \left(b^2 (m-2s)^2\right)^{-2n-1} \binom{m}{s} \Bigg(\Bigg(\sum_{k=0}^{n} \sum_{h=0}^{k} (-1)^{k-h} 4^k p^{-h-k+2n} \left(p + 2bi(m-2s)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-k-1)} \binom{k}{h} \binom{n}{k} \Bigg(p\left(p+2bi(m-2s)\sqrt{z}\right) \Gamma\Bigg(\frac{1}{2}(h+k+1),$$

$$-\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{b(8s-4m)}\Bigg) + 2bi\sqrt{-\frac{i\left(p+2bi(m-2s)\sqrt{z}\right)^2}{b(2s-m)}} (m-2s)$$

$$\Gamma\left(\frac{1}{2}(h+k+2),\ -\frac{i\left(p+2\,b\,i\,(m-2\,s)\,\sqrt{z}\,\right)^2}{b\,(8\,s-4\,m)}\right)\Bigg)\Bigg)\Bigg)(i\,b\,(2\,s-m))^{2\,n}+e^{\frac{i\,p^2}{4\,b\,s-2\,b\,m}}\,(i\,b\,(m-2\,s))^{2\,n}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,p^{-h-k+2\,n}\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^{h+k}\left(\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg(p\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(8\,s-4\,m)}\right)+$$

$$2\,b\,i\,(2\,s-m)\sqrt{\frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(2\,s-m)}}\ \Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(p+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(8\,s-4\,m)}\right)\Bigg)\Bigg)\Bigg)-\frac{1}{b^2}$$

$$\Bigg(i^{-v}\,4^{-n}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\frac{1}{(m-2\,s)^2}\Bigg(\binom{m}{s}\sum_{u=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^u\binom{v}{u}\Bigg(e^{\frac{i\,(p-c\,(v-2\,u))^2}{b\,(8\,s-4\,m)}}\Bigg(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p-c\,(v-2\,u))^{-h-k+2\,n}\,\Big(p-c\,(v-2\,u)+$$

$$2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\Big)^{h+k}\left(\frac{i\left(p-c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\Bigg((p-c\,(v-2\,u))\left(p-c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\ \frac{i\left(p-c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(8\,s-4\,m)}\right)+$$

$$2\,b\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}(h+k+2),\ \frac{i\left(p-c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(8\,s-4\,m)}\right)$$

$$\sqrt{\frac{i\left(p-c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\,\right)^2}{b\,(2\,s-m)}}\ \Bigg)\Bigg)$$

$$(i\,b\,(2\,s-m))^{-2\,n}+e^{i\left(\frac{(p+c\,(v-2\,u))^2}{b\,(8\,s-4\,m)}+\pi\,v\right)}\left(\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+c\,(v-2\,u))^{-h-k+2\,n}\right.$$

$$\left(-\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}\right)^{\frac{1}{2}(-h-k-1)}\left(p+c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\right.$$

$$\left.\sqrt{z}\right)^{h+k}\binom{k}{h}\binom{n}{k}\left((p+c\,(v-2\,u))\left(p+c\,(v-2\,u)+2\,b\,i\,(2\,s-m)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,-\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+$$

$$2\,b\,i\,(2\,s-m)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,-\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)$$

$$\left.\left.\sqrt{-\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(2\,s-m)}}\right)\right)(i\,b\,(2\,s-m))^{-2\,n}+$$

$$(i\,b\,(m-2\,s))^{-2\,n}\left(e^{\frac{1}{4}i\left(\frac{(i\,p-2\,i\,c\,u+i\,c\,v)^2}{2\,b\,s-b\,m}+4\,\pi\,v\right)}\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}\,4^k\,(p+c\,(v-2\,u))^{-h-k+2\,n}\left(p+c\,(v-2\,u)+\right.\right.$$

$$\left.2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^{h+k}\left(\frac{i\left(p+c\,(v-2\,u)+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-h-k-1)}$$

$$\binom{k}{h}\binom{n}{k}\left((p+c\,(v-2\,u))\left(p+c\,(v-2\,u)+2\,b\,i\,(m-2\,s)\,\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}\,(h+k+1),\,\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)+$$

$$2\,b\,i\,(m-2\,s)\,\Gamma\left(\frac{1}{2}\,(h+k+2),\,\frac{i\left(i\,p+c\,i\,(v-2\,u)+2\,b\,(2\,s-m)\,\sqrt{z}\right)^2}{b\,(8\,s-4\,m)}\right)$$

$$\left.\sqrt{\frac{i\left(p+c(v-2u)+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}\right)+e^{\frac{(p+2cu-cv)^2}{8ibs-4ibm}}$$

$$\sum_{k=0}^{n}\sum_{h=0}^{k}(-1)^{k-h}4^k(p-c(v-2u))^{-h-k+2n}\left(p-c(v-2u)+2bi(m-2s)\sqrt{z}\right)^{h+k}$$

$$\left(\frac{i\left(p-c(v-2u)+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}\right)^{\frac{1}{2}(-h-k-1)}\binom{k}{h}$$

$$\binom{n}{k}\left((p-c(v-2u))\left(p-c(v-2u)+2bi(m-2s)\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+k+1),\frac{i\left(-ip+ci(v-2u)+2b(m-2s)\sqrt{z}\right)^2}{b(8s-4m)}\right)+$$

$$2bi(m-2s)\Gamma\left(\frac{1}{2}(h+k+2),\frac{i\left(-ip+ci(v-2u)+2b(m-2s)\sqrt{z}\right)^2}{b(8s-4m)}\right)$$

$$\left.\left.\left.\left.\left.\left.\sqrt{\frac{i\left(p-c(v-2u)+2bi(m-2s)\sqrt{z}\right)^2}{b(m-2s)}}\right)\right)\right)\right)\right)\right)\;/;\;m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^n e^{pz}\cos^m(bz^r)\sinh^v(cz^r)$

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$$\int z^n e^{pz}\cos^m(bz^2)\sinh^v(cz^2)\,dz = -2^{-m-v}i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,-pz)(1-m\bmod 2)(1-v\bmod 2)(-p)^{-n-1}-i^v 2^{-m-v-1}\binom{v}{\frac{v}{2}}$$

$$(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(\frac{1}{\sqrt{ib(2s-m)}}\left(e^{\frac{p^2}{4ibm-8ibs}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(ib(2s-m))^{-n-\frac{1}{2}}(p-2ibmz+4ibsz)^{q+1}\right.\right.$$

$$\left.\left(\frac{i(p-2ibmz+4ibsz)^2}{b(2s-m)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{i(p-2ibmz+4ibsz)^2}{b(8s-4m)}\right)\right)+$$

$$\frac{1}{\sqrt{ib(m-2s)}}\left(e^{\frac{p^2}{8ibs-4ibm}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(ib(m-2s))^{-n-\frac{1}{2}}(p+2bi(m-2s)z)^{q+1}\right.$$

$$\left(\frac{i\,(p+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(m-2\,s)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{i\,(p+2\,b\,i\,(m-2\,s)\,z)^2}{b\,(8\,s-4\,m)}\right)\Bigg)\Bigg)-$$

$$2^{-m-v-1}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg(\Bigg(e^{\frac{p^2}{8\,c\,k+4\,i\,b\,m-8\,i\,b\,s-4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-2\,c\,k-i\,b\,m+2\,i\,b\,s+c\,v)^{-n-\frac{1}{2}}$$

$$(p+2\,(-2\,c\,k-i\,b\,m+2\,i\,b\,s+c\,v)\,z)^{q+1}\left(\frac{(p+2\,(-2\,c\,k-i\,b\,m+2\,i\,b\,s+c\,v)\,z)^2}{2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},\frac{(p+2\,(-2\,c\,k-i\,b\,m+2\,i\,b\,s+c\,v)\,z)^2}{8\,c\,k+4\,i\,b\,m-8\,i\,b\,s-4\,c\,v}\Bigg)\Bigg)\Bigg/\sqrt{-2\,c\,k-i\,b\,m+2\,i\,b\,s+c\,v}\,+$$

$$\Bigg(e^{\frac{p^2}{8\,c\,k-4\,i\,b\,m+8\,i\,b\,s-4\,c\,v}}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v)^{-n-\frac{1}{2}}\,(p+2\,(-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v)\,z)^{q+1}$$

$$\left(-\frac{(p+2\,(-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v)\,z)^2}{-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg(\frac{q+1}{2},$$

$$\frac{(p+2\,(-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v)\,z)^2}{8\,c\,k-4\,i\,b\,m+8\,i\,b\,s-4\,c\,v}\Bigg)\Bigg)\Bigg/\sqrt{-2\,c\,k+i\,b\,m-2\,i\,b\,s+c\,v}\,+$$

$$\Bigg(e^{\frac{p^2}{-8\,c\,k+4\,i\,b\,m-8\,i\,b\,s+4\,c\,v}+i\,\pi\,v}\sum_{q=0}^{n}2^{q-n}\,(-p)^{n-q}\,(2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v)^{-n-\frac{1}{2}}$$

$$(p+2\,(2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v)\,z)^{q+1}\left(-\frac{(p+2\,(2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v)\,z)^2}{2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},-\frac{(p+2\,(2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v)\,z)^2}{8\,c\,k-4\,i\,b\,m+8\,i\,b\,s-4\,c\,v}\Bigg)\Bigg)\Bigg/\sqrt{2\,c\,k-i\,b\,m+2\,i\,b\,s-c\,v}\,+$$

$$\Bigg(e^{\frac{p^2}{-8\,c\,k-4\,i\,b\,m+8\,i\,b\,s+4\,c\,v}+i\,\pi\,v}\,\mathrm{Sum}\Bigg(2^{q-n}\,(-p)^{n-q}\,(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)^{-n-\frac{1}{2}}$$

$$(p+2\,(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)\,z)^{q+1}\left(-\frac{(p+2\,(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)\,z)^2}{2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\Bigg($$

$$\frac{q+1}{2},-\frac{(p+2\,(2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v)\,z)^2}{8\,c\,k+4\,i\,b\,m-8\,i\,b\,s-4\,c\,v}\Bigg),\{q,0,n\}\Bigg)\Bigg)\Bigg/\sqrt{2\,c\,k+i\,b\,m-2\,i\,b\,s-c\,v}\Bigg)-$$

$$2^{-m-v-1}\binom{m}{\frac{m}{2}}(1-m \bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\left(\frac{1}{\sqrt{c(v-2k)}}\,e^{\frac{p^2}{8ck-4cv}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(c(v-2k))^{-n-\frac{1}{2}}\right.$$

$$(p+2c(v-2k)z)^{q+1}\left(\frac{(p+2c(v-2k)z)^2}{c(2k-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},\frac{(p+2c(v-2k)z)^2}{c(8k-4v)}\right)+$$

$$\frac{(-1)^v}{\sqrt{c(2k-v)}}\,e^{\frac{p^2}{4cv-8ck}}\sum_{q=0}^{n}2^{q-n}(-p)^{n-q}(c(2k-v))^{-n-\frac{1}{2}}(p+4ckz-2cvz)^{q+1}$$

$$\left.\left(-\frac{(p+4ckz-2cvz)^2}{c(2k-v)}\right)^{\frac{1}{2}(-q-1)}\binom{n}{q}\Gamma\left(\frac{q+1}{2},-\frac{(p+4ckz-2cvz)^2}{c(8k-4v)}\right)\right)/;\ m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

01.19.21.3407.01

$$\int z^n e^{pz}\cos^m\left(b\sqrt{z}\right)\sinh^v\left(c\sqrt{z}\right)dz = 2^{-m-v}\left(-i^{-v}\right)\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}\Gamma(n+1,-pz)(1-m \bmod 2)(1-v \bmod 2)(-p)^{-n-1}+$$

$$2^{-m-2n-v-1}\,i^{-v}\,p^{-2(n+1)}\binom{v}{\frac{v}{2}}(1-v \bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}$$

$$\left(e^{\frac{b^2(m-2s)^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(-i\,b(m-2s))^{-h-i+2n}\left(2p\sqrt{z}-i\,b(m-2s)\right)^{h+i}\left(-\frac{\left(2p\sqrt{z}-i\,b(m-2s)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\right.$$

$$\binom{i}{h}\binom{n}{i}\left(2p\sqrt{-\frac{\left(2p\sqrt{z}-i\,b(m-2s)\right)^2}{p}}\;\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2p\sqrt{z}-i\,b(m-2s)\right)^2}{4p}\right)-\right.$$

$$\left.i\,b(m-2s)\left(2p\sqrt{z}-i\,b(m-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2p\sqrt{z}-i\,b(m-2s)\right)^2}{4p}\right)\right)+$$

$$e^{\frac{b^2(m-2s)^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}4^i(i\,b(m-2s))^{-h-i+2n}\left(2\sqrt{z}\,p+b\,i(m-2s)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\,p+b\,i(m-2s)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\left(b\,i(m-2s)\left(2\sqrt{z}\,p+b\,i(m-2s)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\,p+b\,i(m-2s)\right)^2}{4p}\right)+\right.$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2s)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2s)\right)^2}{4p}\right)\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\,i^{-v}\,p^{-2(n+1)}\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\Bigg(e^{-\frac{c^2(v-2k)^2}{4p}-\frac{i\pi v}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-c\,(v-2k))^{-h-i+2n}\left(2p\sqrt{z}\;-c\,(v-2k)\right)^{h+i}\left(-\frac{\left(2p\sqrt{z}\;-c\,(v-2k)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg(2p\sqrt{-\frac{\left(2p\sqrt{z}\;-c\,(v-2k)\right)^2}{p}}\;\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(2p\sqrt{z}\;-c\,(v-2k)\right)^2}{4p}\right)-$$

$$c\,(v-2k)\left(2p\sqrt{z}\;-c\,(v-2k)\right)\Gamma\!\left(\frac{1}{2}(h+i+1),-\frac{\left(2p\sqrt{z}\;-c\,(v-2k)\right)^2}{4p}\right)\Bigg)+$$

$$e^{\frac{i\pi v}{2}-\frac{c^2(v-2k)^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c\,(v-2k))^{-h-i+2n}\left(2\sqrt{z}\;p+c\,(v-2k)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\;p+c\,(v-2k)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg(c\,(v-2k)\left(2\sqrt{z}\;p+c\,(v-2k)\right)\Gamma\!\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\;p+c\,(v-2k)\right)^2}{4p}\right)+$$

$$2\sqrt{-\frac{\left(2\sqrt{z}\;p+c\,(v-2k)\right)^2}{p}}\;p\,\Gamma\!\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\;p+c\,(v-2k)\right)^2}{4p}\right)\Bigg)\Bigg)+$$

$$2^{-m-2n-v-1}\,i^{-v}\,p^{-2(n+1)}\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{\frac{i\pi v}{2}-\frac{(c(v-2k)-i\,b(m-2s))^2}{4p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(c\,(v-2k)-i\,b\,(m-2s))^{-h-i+2n}$$

$$\left(2\sqrt{z}\;p-i\,b\,(m-2s)+c\,(v-2k)\right)^{h+i}\left(-\frac{\left(2\sqrt{z}\;p-i\,b\,(m-2s)+c\,(v-2k)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((c\,(v-2\,k)-i\,b\,(m-2\,s))\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)+c\,(v-2\,k)\right)$$

$$\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,p}\right)+2\,p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\right.$$

$$\left.-\frac{\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,p}\right)\sqrt{-\frac{\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)+c\,(v-2\,k)\right)^2}{p}}\;\Bigg)+$$

$$e^{\frac{i\,\pi\,v}{2}-\frac{(b\,i\,(m-2\,s)+c\,(v-2\,k))^2}{4\,p}}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b\,i\,(m-2\,s)+c\,(v-2\,k))^{-h-i+2\,n}\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)^{h+i}$$

$$\left(-\frac{\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b\,i\,(m-2\,s)+c\,(v-2\,k))$$

$$\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,p}\right)+$$

$$2\,p\,\Gamma\!\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)^2}{4\,p}\right)$$

$$\sqrt{-\frac{\left(2\,\sqrt{z}\;p+b\,i\,(m-2\,s)+c\,(v-2\,k)\right)^2}{p}}\;\Bigg)+e^{-\frac{(-i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,p}-\frac{i\,\pi\,v}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(-i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-i+2\,n}\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)^{h+i}$$

$$\left(-\frac{\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)^2}{p}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((-i\,b\,(m-2\,s)-c\,(v-2\,k))$$

$$\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)\Gamma\!\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(2\,\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,p}\right)+$$

$$2\,p\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,p}\right)$$

$$\left.\sqrt{-\frac{\left(2\sqrt{z}\;p-i\,b\,(m-2\,s)-c\,(v-2\,k)\right)^2}{p}}\right)+e^{-\frac{(i\,b\,(m-2\,s)-c\,(v-2\,k))^2}{4\,p}-\frac{i\,\pi\,v}{2}}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(i\,b\,(m-2\,s)-c\,(v-2\,k))^{-h-i+2\,n}\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)^{h+i}$$

$$\left(-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)^2}{p}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((i\,b\,(m-2\,s)-c\,(v-2\,k))$$

$$\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)\Gamma\left(\frac{1}{2}(h+i+1),-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,p}\right)+$$

$$2\,p\,\Gamma\left(\frac{1}{2}(h+i+2),-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)^2}{4\,p}\right)$$

$$\left.\left.\sqrt{-\frac{\left(2\sqrt{z}\;p+b\,i\,(m-2\,s)-c\,(v-2\,k)\right)^2}{p}}\right)\right)\,/;\,m\in\mathbb{N}^+\bigwedge v\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

Involving $z^{\alpha-1}\,e^{p\,z^r}\cos^m(b\,z^r)\sinh^v(c\,z^r)$

01.19.21.3408.01

$$\int z^{\alpha-1} e^{p z^r} \cos^m(b z^r) \sinh^\nu(c z^r)\, dz = -\frac{2^{-m-\nu}\, i^\nu z^\alpha\, (1 - m \bmod 2)\,(1-\nu \bmod 2)\,(-p z^r)^{-\frac{\alpha}{r}}}{r} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{\alpha}{r}, -p z^r\right) -$$

$$\frac{i^\nu 2^{-m-\nu} z^\alpha}{r} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(\Gamma\left(\frac{\alpha}{r}, (-2 b i j + i b m - p) z^r\right) ((-2 b i j + i b m - p) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left. ((2 i b j - i b m - p) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b j - i b m - p) z^r\right)\right) -$$

$$\frac{2^{-m-\nu} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-2 c k - p + c \nu) z^r\right) ((-2 c k - p + c \nu) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$\left. ((2 c k - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 c k - p - c \nu) z^r\right)\right) - \frac{2^{-m-\nu} z^\alpha}{r}$$

$$\sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left((-1)^\nu \Gamma\left(\frac{\alpha}{r}, (-2 b i j - 2 c k + i b m - p + c \nu) z^r\right) ((-2 b i j - 2 c k + i b m - p + c \nu) z^r)^{-\frac{\alpha}{r}} + \right.$$

$$(-1)^\nu ((2 i b j - 2 c k - i b m - p + c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b j - 2 c k - i b m - p + c \nu) z^r\right) +$$

$$((-2 b i j + 2 c k + i b m - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-2 b i j + 2 c k + i b m - p - c \nu) z^r\right) +$$

$$\left. ((2 i b j + 2 c k - i b m - p - c \nu) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (2 i b j + 2 c k - i b m - p - c \nu) z^r\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+$$

01.19.21.3409.01

$$\int z^n e^{p z^2} \cos^m(b z^2) \sinh^\nu(c z^2)\, dz = 2^{-m-\nu-1} (-i^{-\nu}) z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -p z^2\right) (1 - m \bmod 2) (1 - \nu \bmod 2) \left(-p z^2\right)^{\frac{1}{2}(-n-1)} -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(\frac{n+1}{2}, (i b (m-2s) - p) z^2\right) \left((i b (m-2s) - p) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. \left((-p - i b (m-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-p - i b (m-2s)) z^2\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(\frac{n+1}{2}, (c(\nu-2k) - p) z^2\right) \left((c(\nu-2k) - p) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{\frac{i \pi \nu}{2}} \left((-p - c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-p - c(\nu-2k)) z^2\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(\frac{n+1}{2}, (-p + b i (m-2s) + c(\nu-2k)) z^2\right)\right.$$
$$\left((-p + b i (m-2s) + c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{-\frac{1}{2} i \pi \nu} \left((-p - i b (m-2s) + c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (-p - i b (m-2s) + c(\nu-2k)) z^2\right) + e^{\frac{i \pi \nu}{2}} \left((-p + b i (m-2s) - c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\Gamma\left(\frac{n+1}{2}, (-p + b i (m-2s) - c(\nu-2k)) z^2\right) + e^{\frac{i \pi \nu}{2}} \left((-p - i b (m-2s) - c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\left.\Gamma\left(\frac{n+1}{2}, (-p - i b (m-2s) - c(\nu-2k)) z^2\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

01.19.21.3410.01

$$\int z^n e^{p\sqrt{z}} \cos^m\left(b\sqrt{z}\right) \sinh^\nu\left(c\sqrt{z}\right) dz = 2^{-m-\nu+1} (-i^{-\nu}) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -p\sqrt{z}\right) (1 - m \bmod 2) (1 - \nu \bmod 2)\, p^{-2(n+1)} -$$
$$i^{-\nu} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1 - \nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(\Gamma\left(2(n+1), (i b (m-2s) - p)\sqrt{z}\right) (i b (m-2s) - p)^{-2(n+1)} + \right.$$
$$\left. (-p - i b (m-2s))^{-2(n+1)} \Gamma\left(2(n+1), (-p - i b (m-2s))\sqrt{z}\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1 - m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(2(n+1), (c(\nu-2k) - p)\sqrt{z}\right) (c(\nu-2k) - p)^{-2(n+1)} + \right.$$
$$\left. e^{\frac{i\pi\nu}{2}} (-p - c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-p - c(\nu-2k))\sqrt{z}\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{1}{2} i \pi \nu} \Gamma\left(2(n+1), (-p + b i (m-2s) + c(\nu-2k))\sqrt{z}\right)\right.$$
$$(-p + b i (m-2s) + c(\nu-2k))^{-2(n+1)} + e^{-\frac{1}{2} i \pi \nu} (-p - i b (m-2s) + c(\nu-2k))^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-p - i b (m-2s) + c(\nu-2k))\sqrt{z}\right) + e^{\frac{i\pi\nu}{2}} (-p + b i (m-2s) - c(\nu-2k))^{-2(n+1)}$$
$$\Gamma\left(2(n+1), (-p + b i (m-2s) - c(\nu-2k))\sqrt{z}\right) + e^{\frac{i\pi\nu}{2}} (-p - i b (m-2s) - c(\nu-2k))^{-2(n+1)}$$
$$\left.\Gamma\left(2(n+1), (-p - i b (m-2s) - c(\nu-2k))\sqrt{z}\right)\right) /;\ m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

Involving $z^{\alpha-1} e^{b z^r + e} \cos^m\left(a z^r + q\right) \sinh^\nu\left(c z^r + g\right)$

01.19.21.3411.01

$$\int z^{\alpha-1} e^{b z^r+e} \cos^m(a z^r+q) \sinh^v(c z^r+g)\, dz = -\frac{i^v 2^{-m-v} e^e z^\alpha (1-m \bmod 2)(1-v \bmod 2)(-b z^r)^{-\frac{\alpha}{r}}}{r} \binom{m}{\frac{m}{2}} \binom{v}{\frac{v}{2}} \Gamma\left(\frac{\alpha}{r}, -b z^r\right) -$$
$$\frac{i^v 2^{-m-v} z^\alpha}{r} \binom{v}{\frac{v}{2}} (1-v \bmod 2) \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left(e^{e+2 i j q - i m q} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a j + i a m) z^r\right) ((-b-2 i a j + i a m) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. e^{e-2 i j q + i m q} ((-b+2 i a j - i a m) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 i a j - i a m) z^r\right)\right) -$$
$$\frac{2^{-m-v} z^\alpha}{r} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \left((-1)^v e^{e+2 g k - g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 c k + c v) z^r\right) ((-b-2 c k + c v) z^r)^{-\frac{\alpha}{r}} + \right.$$
$$\left. e^{e-2 g k + g v} ((-b+2 c k - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 c k - c v) z^r\right)\right) -$$
$$\frac{2^{-m-v} z^\alpha}{r} \sum_{k=0}^{\left\lfloor \frac{v-1}{2} \right\rfloor} (-1)^k \binom{v}{k} \sum_{j=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{j} \left((-1)^v e^{e+2 g k + 2 i j q - i m q - g v} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a j - 2 c k + i a m + c v) z^r\right) \right.$$
$$((-b-2 i a j - 2 c k + i a m + c v) z^r)^{-\frac{\alpha}{r}} + (-1)^v e^{e+2 g k - 2 i j q + i m q - g v}$$
$$((-b+2 i a j - 2 c k - i a m + c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 i a j - 2 c k - i a m + c v) z^r\right) + e^{e-2 g k + 2 i j q - i m q + g v}$$
$$((-b-2 i a j + 2 c k + i a m - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b-2 i a j + 2 c k + i a m - c v) z^r\right) + e^{e-2 g k - 2 i j q + i m q + g v}$$
$$\left. ((-b+2 i a j + 2 c k - i a m - c v) z^r)^{-\frac{\alpha}{r}} \Gamma\left(\frac{\alpha}{r}, (-b+2 i a j + 2 c k - i a m - c v) z^r\right)\right) /;\ m \in \mathbb{N}^+ \land v \in \mathbb{N}^+$$

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$$\int z^n e^{b z^2+e} \cos^m(a z^2+q) \sinh^\nu(c z^2+g)\, dz = 2^{-m-\nu-1} e^e (-i^{-\nu}) z^{n+1} \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(\frac{n+1}{2}, -b z^2\right) (1-m \bmod 2)(1-\nu \bmod 2) \left(-b z^2\right)^{\frac{1}{2}(-n-1)} -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{e-i q (m-2s)} \Gamma\left(\frac{n+1}{2}, (i a (m-2s)-b) z^2\right) \left((i a (m-2s)-b) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{e+i q (m-2s)} \left((-b-i a (m-2s)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i a (m-2s)) z^2\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e-g(\nu-2k)-\frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, (c(\nu-2k)-b) z^2\right) \left((c(\nu-2k)-b) z^2\right)^{\frac{1}{2}(-n-1)} + \right.$$
$$\left. e^{e+\frac{i\pi\nu}{2}+g(\nu-2k)} \left((-b-c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-c(\nu-2k)) z^2\right)\right) -$$
$$i^{-\nu} 2^{-m-\nu-1} z^{n+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{e-i q (m-2s)-g(\nu-2k)-\frac{i\pi\nu}{2}} \Gamma\left(\frac{n+1}{2}, (-b+a i (m-2s)+c(\nu-2k)) z^2\right) \right.$$
$$\left((-b+a i (m-2s)+c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} + e^{e+i q (m-2s)-g(\nu-2k)-\frac{i\pi\nu}{2}}$$
$$\left((-b-i a (m-2s)+c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2}, (-b-i a (m-2s)+c(\nu-2k)) z^2\right) +$$
$$e^{e-i q (m-2s)+\frac{i\pi\nu}{2}+g(\nu-2k)} \left((-b+a i (m-2s)-c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)} \Gamma\left(\frac{n+1}{2},\right.$$
$$\left.(-b+a i (m-2s)-c(\nu-2k)) z^2\right) + e^{e+i q (m-2s)+\frac{i\pi\nu}{2}+g(\nu-2k)} \left((-b-i a (m-2s)-c(\nu-2k)) z^2\right)^{\frac{1}{2}(-n-1)}$$
$$\left.\Gamma\left(\frac{n+1}{2}, (-b-i a (m-2s)-c(\nu-2k)) z^2\right)\right) /; m \in \mathbb{N}^+ \land \nu \in \mathbb{N}^+ \land n \in \mathbb{N}$$

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$$\int z^n e^{\sqrt{z}\, b+e} \cos^m\left(\sqrt{z}\, a+q\right) \sinh^\nu\left(\sqrt{z}\, c+g\right) dz = 2^{-m-\nu+1} e^e \left(-i^{-\nu}\right) \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} \Gamma\left(2(n+1), -b\sqrt{z}\right) (1-m \bmod 2)(1-\nu \bmod 2)\, b^{-2(n+1)} - i^{-\nu} 2^{-m-\nu+1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{e-i q(m-2s)} \Gamma\left(2(n+1), (i a(m-2s)-b)\sqrt{z}\right) (i a(m-2s)-b)^{-2(n+1)} + e^{e+i q(m-2s)} (-b-i a(m-2s))^{-2(n+1)} \Gamma\left(2(n+1), (-b-i a(m-2s))\sqrt{z}\right)\right) - i^{-\nu} 2^{-m-\nu+1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \left(e^{e-g(\nu-2k)-\frac{i\pi\nu}{2}} \Gamma\left(2(n+1), (c(\nu-2k)-b)\sqrt{z}\right) (c(\nu-2k)-b)^{-2(n+1)} + e^{e+\frac{i\pi\nu}{2}+g(\nu-2k)} (-b-c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b-c(\nu-2k))\sqrt{z}\right)\right) - i^{-\nu} 2^{-m-\nu+1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{e-i q(m-2s)-g(\nu-2k)-\frac{i\pi\nu}{2}} \Gamma\left(2(n+1), (-b+a i(m-2s)+c(\nu-2k))\sqrt{z}\right) (-b+a i(m-2s)+c(\nu-2k))^{-2(n+1)} + e^{e+i q(m-2s)-g(\nu-2k)-\frac{i\pi\nu}{2}} (-b-i a(m-2s)+c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b-i a(m-2s)+c(\nu-2k))\sqrt{z}\right) + e^{e-i q(m-2s)+\frac{i\pi\nu}{2}+g(\nu-2k)} (-b+a i(m-2s)-c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b+a i(m-2s)-c(\nu-2k))\sqrt{z}\right) + e^{e+i q(m-2s)+\frac{i\pi\nu}{2}+g(\nu-2k)} (-b-i a(m-2s)-c(\nu-2k))^{-2(n+1)} \Gamma\left(2(n+1), (-b-i a(m-2s)-c(\nu-2k))\sqrt{z}\right)\right) /;\, m \in \mathbb{N}^+ \wedge \nu \in \mathbb{N}^+ \wedge n \in \mathbb{N}$$

Involving $z^n e^{b z^r+d z+e} \cos^m\left(a z^r+p z+q\right) \sinh^\nu\left(c z^r+f z+g\right)$

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$$\int z^n e^{b z^2+d z+e} \cos^m\left(a z^2+p z+q\right) \sinh^\nu\left(c z^2+f z+g\right) dz = -2^{-m-\nu-1} i^\nu \binom{m}{\frac{m}{2}} \binom{\nu}{\frac{\nu}{2}} (1-m \bmod 2)(1-\nu \bmod 2)\, b^{-n-1} e^{e-\frac{d^2}{4b}} \sum_{j=0}^{n} 2^{j-n} (-d)^{n-j} (d+2bz)^{j+1} \left(-\frac{(d+2bz)^2}{b}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+2bz)^2}{4b}\right) - i^\nu 2^{-m-\nu-1} \binom{\nu}{\frac{\nu}{2}} (1-\nu \bmod 2) \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \left(e^{-\frac{(d+i p(2s-m))^2}{4(b+a i(2s-m))}+e+i q(2s-m)} (b+a i(2s-m))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-i p(2s-m))^{n-j} (d+i p(2s-m)+2(b+a i(2s-m))z)^{j+1} \left(-\frac{(d+i p(2s-m)+2(b+a i(2s-m))z)^2}{b+a i(2s-m)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+i p(2s-m)+2(b+a i(2s-m))z)^2}{4(b+a i(2s-m))}\right) + \right.$$

$$e^{-\frac{(d+i p (m-2 s))^2}{4 (b+a i (m-2 s))}+e+i q (m-2 s)} (b+a i (m-2 s))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-i p (m-2 s))^{n-j}$$

$$(d+i p (m-2 s)+2 (b+a i (m-2 s)) z)^{j+1} \left(-\frac{(d+i p (m-2 s)+2 (b+a i (m-2 s)) z)^2}{b+a i (m-2 s)}\right)^{\frac{1}{2}(-j-1)}$$

$$\binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+i p (m-2 s)+2 (b+a i (m-2 s)) z)^2}{4 (b+a i (m-2 s))}\right)\Bigg) -$$

$$i^{\nu} 2^{-m-\nu-1} \binom{m}{\frac{m}{2}} (1-m \bmod 2) \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \Bigg(e^{-\frac{(d+f (2 k-\nu))^2}{4 (b+c (2 k-\nu))}+e+g (2 k-\nu)+\frac{i \pi \nu}{2}} (b+c (2 k-\nu))^{-n-1}$$

$$\sum_{j=0}^{n} 2^{j-n} (-d-f (2 k-\nu))^{n-j} (d+f (2 k-\nu)+2 (b+c (2 k-\nu)) z)^{j+1}$$

$$\left(-\frac{(d+f (2 k-\nu)+2 (b+c (2 k-\nu)) z)^2}{b+c (2 k-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f (2 k-\nu)+2 (b+c (2 k-\nu)) z)^2}{4 (b+c (2 k-\nu))}\right) +$$

$$e^{-\frac{(d+f (\nu-2 k))^2}{4 (b+c (\nu-2 k))}+e+g (\nu-2 k)-\frac{i \pi \nu}{2}} (b+c (\nu-2 k))^{-n-1} \sum_{j=0}^{n} 2^{j-n} (-d-f (\nu-2 k))^{n-j} (d+f (\nu-2 k)+2 (b+c (\nu-2 k)) z)^{j+1}$$

$$\left(-\frac{(d+f (\nu-2 k)+2 (b+c (\nu-2 k)) z)^2}{b+c (\nu-2 k)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j} \Gamma\left(\frac{j+1}{2}, -\frac{(d+f (\nu-2 k)+2 (b+c (\nu-2 k)) z)^2}{4 (b+c (\nu-2 k))}\right)\Bigg) -$$

$$i^{\nu} 2^{-m-\nu-1} \sum_{k=0}^{\left\lfloor \frac{\nu-1}{2} \right\rfloor} (-1)^k \binom{\nu}{k} \sum_{s=0}^{\left\lfloor \frac{m-1}{2} \right\rfloor} \binom{m}{s} \Bigg(e^{-\frac{(d+i p (2 s-m)+f (2 k-\nu))^2}{4 (b+a i (2 s-m)+c (2 k-\nu))}+e+i q (2 s-m)+g (2 k-\nu)+\frac{i \pi \nu}{2}} (b+a i (2 s-m)+c (2 k-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n}$$

$$(-d-i p (2 s-m)-f (2 k-\nu))^{n-j} (d+i p (2 s-m)+f (2 k-\nu)+2 (b+a i (2 s-m)+c (2 k-\nu)) z)^{j+1}$$

$$\left(-\frac{(d+i p (2 s-m)+f (2 k-\nu)+2 (b+a i (2 s-m)+c (2 k-\nu)) z)^2}{b+a i (2 s-m)+c (2 k-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d+i p (2 s-m)+f (2 k-\nu)+2 (b+a i (2 s-m)+c (2 k-\nu)) z)^2}{4 (b+a i (2 s-m)+c (2 k-\nu))}\right) +$$

$$e^{-\frac{(d+i p (m-2 s)+f (2 k-\nu))^2}{4 (b+a i (m-2 s)+c (2 k-\nu))}+e+i q (m-2 s)+g (2 k-\nu)+\frac{i \pi \nu}{2}} (b+a i (m-2 s)+c (2 k-\nu))^{-n-1} \sum_{j=0}^{n} 2^{j-n}$$

$$(-d-i p (m-2 s)-f (2 k-\nu))^{n-j} (d+i p (m-2 s)+f (2 k-\nu)+2 (b+a i (m-2 s)+c (2 k-\nu)) z)^{j+1}$$

$$\left(-\frac{(d+i p (m-2 s)+f (2 k-\nu)+2 (b+a i (m-2 s)+c (2 k-\nu)) z)^2}{b+a i (m-2 s)+c (2 k-\nu)}\right)^{\frac{1}{2}(-j-1)} \binom{n}{j}$$

$$\Gamma\left(\frac{j+1}{2}, -\frac{(d+i p (m-2 s)+f (2 k-\nu)+2 (b+a i (m-2 s)+c (2 k-\nu)) z)^2}{4 (b+a i (m-2 s)+c (2 k-\nu))}\right) +$$

$$e^{-\frac{(d+i\,p\,(2s-m)+f\,(v-2k))^2}{4\,(b+a\,i\,(2s-m)+c\,(v-2k))}+e+i\,q\,(2s-m)+g\,(v-2k)-\frac{i\pi v}{2}}\,(b+a\,i\,(2s-m)+c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$
$$(-d-i\,p\,(2s-m)-f\,(v-2k))^{n-j}\,(d+i\,p\,(2s-m)+f\,(v-2k)+2\,(b+a\,i\,(2s-m)+c\,(v-2k))\,z)^{j+1}$$
$$\left(-\frac{(d+i\,p\,(2s-m)+f\,(v-2k)+2\,(b+a\,i\,(2s-m)+c\,(v-2k))\,z)^2}{b+a\,i\,(2s-m)+c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}$$
$$\Gamma\left(\frac{j+1}{2},\,-\frac{(d+i\,p\,(2s-m)+f\,(v-2k)+2\,(b+a\,i\,(2s-m)+c\,(v-2k))\,z)^2}{4\,(b+a\,i\,(2s-m)+c\,(v-2k))}\right)+$$
$$e^{-\frac{(d+i\,p\,(m-2s)+f\,(v-2k))^2}{4\,(b+a\,i\,(m-2s)+c\,(v-2k))}+e+i\,q\,(m-2s)+g\,(v-2k)-\frac{i\pi v}{2}}\,(b+a\,i\,(m-2s)+c\,(v-2k))^{-n-1}\sum_{j=0}^{n}2^{j-n}$$
$$(-d-i\,p\,(m-2s)-f\,(v-2k))^{n-j}\,(d+i\,p\,(m-2s)+f\,(v-2k)+2\,(b+a\,i\,(m-2s)+c\,(v-2k))\,z)^{j+1}$$
$$\left(-\frac{(d+i\,p\,(m-2s)+f\,(v-2k)+2\,(b+a\,i\,(m-2s)+c\,(v-2k))\,z)^2}{b+a\,i\,(m-2s)+c\,(v-2k)}\right)^{\frac{1}{2}(-j-1)}\binom{n}{j}\Gamma\left(\frac{j+1}{2},\right.$$
$$\left.\left.-\frac{(d+i\,p\,(m-2s)+f\,(v-2k)+2\,(b+a\,i\,(m-2s)+c\,(v-2k))\,z)^2}{4\,(b+a\,i\,(m-2s)+c\,(v-2k))}\right)\right)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

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$$\int z^n\,e^{\sqrt{z}\,b+d\,z+e}\cos^m\left(\sqrt{z}\,a+p\,z+q\right)\sinh^v\left(\sqrt{z}\,c+f\,z+g\right)dz=2^{-m-2n-v-1}\,e^{e-\frac{b^2}{4d}}\,i^v\binom{m}{\frac{m}{2}}\binom{v}{\frac{v}{2}}(1-m\bmod 2)$$
$$(1-v\bmod 2)\,d^{-2n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,b^{-h-i+2n}\left(b+2d\sqrt{z}\right)^{h+i}\left(-\frac{\left(b+2d\sqrt{z}\right)^2}{d}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$
$$\left(b\left(b+2d\sqrt{z}\right)\Gamma\left(\frac{1}{2}(h+i+1),\,-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)+2\sqrt{-\frac{\left(b+2d\sqrt{z}\right)^2}{d}}\;d\,\Gamma\left(\frac{1}{2}(h+i+2),\,-\frac{\left(b+2d\sqrt{z}\right)^2}{4d}\right)\right)+$$
$$2^{-m-2n-v-1}\,i^v\binom{v}{\frac{v}{2}}(1-v\bmod 2)\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\left(e^{-\frac{(b+a\,i\,(2s-m))^2}{4\,(d+i\,p\,(2s-m))}+e+i\,q\,(2s-m)}\,(d+i\,p\,(2s-m))^{-2n-2}\right.$$
$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(2s-m))^{-h-i+2n}\left(b+a\,i\,(2s-m)+2\,(d+i\,p\,(2s-m))\sqrt{z}\right)^{h+i}$$
$$\left(-\frac{\left(b+a\,i\,(2s-m)+2\,(d+i\,p\,(2s-m))\sqrt{z}\right)^2}{d+i\,p\,(2s-m)}\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}\left((b+a\,i\,(2s-m))\left(b+a\,i\,(2s-m)+\right.\right.$$

$$2\,(d+i\,p\,(2\,s-m))\,\sqrt{z}\Big)\,\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+a\,i\,(2\,s-m)+2\,(d+i\,p\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(d+i\,p\,(2\,s-m))}\right)+$$

$$2\,(d+i\,p\,(2\,s-m))\,\Gamma\left(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+a\,i\,(2\,s-m)+2\,(d+i\,p\,(2\,s-m))\,\sqrt{z}\right)^2}{4\,(d+i\,p\,(2\,s-m))}\right)$$

$$\sqrt{-\frac{\left(b+a\,i\,(2\,s-m)+2\,(d+i\,p\,(2\,s-m))\,\sqrt{z}\right)^2}{d+i\,p\,(2\,s-m)}}\Bigg)+e^{-\frac{(b+a\,i\,(m-2\,s))^2}{4\,(d+i\,p\,(m-2\,s))}+e+i\,q\,(m-2\,s)}$$

$$(d+i\,p\,(m-2\,s))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(m-2\,s))^{-h-i+2\,n}\left(b+a\,i\,(m-2\,s)+2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+a\,i\,(m-2\,s)+2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{d+i\,p\,(m-2\,s)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}\Bigg((b+a\,i\,(m-2\,s))\left(b+a\,i\,(m-2\,s)+\right.$$

$$2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\Big)\,\Gamma\left(\frac{1}{2}\,(h+i+1),\,-\frac{\left(b+a\,i\,(m-2\,s)+2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(d+i\,p\,(m-2\,s))}\right)+$$

$$2\,\sqrt{-\frac{\left(b+a\,i\,(m-2\,s)+2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{d+i\,p\,(m-2\,s)}}\,(d+i\,p\,(m-2\,s))\,\Gamma\Bigg($$

$$\left.\left.\left.\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+a\,i\,(m-2\,s)+2\,(d+i\,p\,(m-2\,s))\,\sqrt{z}\right)^2}{4\,(d+i\,p\,(m-2\,s))}\right)\right)\right)+$$

$$2^{-m-2\,n-\nu-1}\,i^\nu\binom{m}{\frac{m}{2}}(1-m\bmod 2)\sum_{k=0}^{\left\lfloor\frac{\nu-1}{2}\right\rfloor}(-1)^k\binom{\nu}{k}\Bigg(e^{-\frac{(b+c\,(2\,k-\nu))^2}{4\,(d+f\,(2\,k-\nu))}+e+g\,(2\,k-\nu)+\frac{i\,\pi\,\nu}{2}}\,(d+f\,(2\,k-\nu))^{-2\,n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c\,(2\,k-\nu))^{-h-i+2\,n}\left(b+c\,(2\,k-\nu)+2\,(d+f\,(2\,k-\nu))\,\sqrt{z}\right)^{h+i}$$

$$\left(-\frac{\left(b+c\,(2\,k-\nu)+2\,(d+f\,(2\,k-\nu))\,\sqrt{z}\right)^2}{d+f\,(2\,k-\nu)}\right)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+c\,(2\,k-v))\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+i+1),$$

$$-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{d+f\,(2\,k-v)}}$$

$$(d+f\,(2\,k-v))\,\Gamma\Bigg(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+c\,(2\,k-v)+2\,(d+f\,(2\,k-v))\,\sqrt{z}\right)^2}{4\,(d+f\,(2\,k-v))}\Bigg)\Bigg)+$$

$$e^{-\frac{(b+c\,(v-2\,k))^2}{4\,(d+f\,(v-2\,k))}+e+g\,(v-2\,k)-\frac{i\,\pi\,v}{2}}\,(d+f\,(v-2\,k))^{-2\,n-2}\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+c\,(v-2\,k))^{-h-i+2\,n}$$

$$\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^{h+i}\left(-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}\right)^{\frac{1}{2}\,(-h-i-1)}$$

$$\binom{i}{h}\binom{n}{i}\Bigg((b+c\,(v-2\,k))\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)\Gamma\Bigg(\frac{1}{2}\,(h+i+1),$$

$$-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\Bigg)+2\,\sqrt{-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{d+f\,(v-2\,k)}}$$

$$(d+f\,(v-2\,k))\,\Gamma\Bigg(\frac{1}{2}\,(h+i+2),\,-\frac{\left(b+c\,(v-2\,k)+2\,(d+f\,(v-2\,k))\,\sqrt{z}\right)^2}{4\,(d+f\,(v-2\,k))}\Bigg)\Bigg)\Bigg)+$$

$$2^{-m-2\,n-v-1}\,i^v\sum_{k=0}^{\left\lfloor\frac{v-1}{2}\right\rfloor}(-1)^k\binom{v}{k}\sum_{s=0}^{\left\lfloor\frac{m-1}{2}\right\rfloor}\binom{m}{s}\Bigg(e^{-\frac{(b+a\,i\,(2\,s-m)+c\,(2\,k-v))^2}{4\,(d+i\,p\,(2\,s-m)+f\,(2\,k-v))}+e+i\,q\,(2\,s-m)+g\,(2\,k-v)+\frac{i\,\pi\,v}{2}}\,(d+i\,p\,(2\,s-m)+f\,(2\,k-v))^{-2\,n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(2\,s-m)+c\,(2\,k-v))^{-h-i+2\,n}$$

$$\left(b+a\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d+i\,p\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^{h+i}$$

$$\Bigg(-\left(b+a\,i\,(2\,s-m)+c\,(2\,k-v)+2\,(d+i\,p\,(2\,s-m)+f\,(2\,k-v))\,\sqrt{z}\right)^2\Big/$$

$$(d+i\,p\,(2\,s-m)+f\,(2\,k-v))\Bigg)^{\frac{1}{2}\,(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\left((b+a\,i\,(2s-m)+c\,(2k-v))\left(b+a\,i\,(2s-m)+c\,(2k-v)+2\,(d+i\,p\,(2s-m)+f\,(2k-v))\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}(h+i+1),\, -\left(b+a\,i\,(2s-m)+c\,(2k-v)+2\,(d+i\,p\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,p\,(2s-m)+f\,(2k-v)))\right)+2\,(d+i\,p\,(2s-m)+f\,(2k-v))$$
$$\Gamma\left(\frac{1}{2}(h+i+2),\, -\left(b+a\,i\,(2s-m)+c\,(2k-v)+2\,(d+i\,p\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,p\,(2s-m)+f\,(2k-v)))\right)\sqrt{\left(-\left(b+a\,i\,(2s-m)+c\,(2k-v)+\right.\right.}$$
$$\left.\left.\left.2\,(d+i\,p\,(2s-m)+f\,(2k-v))\sqrt{z}\right)^2\Big/(d+i\,p\,(2s-m)+f\,(2k-v))\right)\right)+$$
$$e^{-\frac{(b+a\,i\,(m-2s)+c\,(2k-v))^2}{4\,(d+i\,p\,(m-2s)+f\,(2k-v))}+e+i\,q\,(m-2s)+g\,(2k-v)+\frac{i\,\pi\,v}{2}}\,(d+i\,p\,(m-2s)+f\,(2k-v))^{-2n-2}$$
$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(m-2s)+c\,(2k-v))^{-h-i+2n}$$
$$\left(b+a\,i\,(m-2s)+c\,(2k-v)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^{h+i}$$
$$\left(-\left(b+a\,i\,(m-2s)+c\,(2k-v)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(d+i\,p\,(m-2s)+f\,(2k-v))\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$
$$\left((b+a\,i\,(m-2s)+c\,(2k-v))\left(b+a\,i\,(m-2s)+c\,(2k-v)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)\right.$$
$$\Gamma\left(\frac{1}{2}(h+i+1),\, -\left(b+a\,i\,(m-2s)+c\,(2k-v)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,p\,(m-2s)+f\,(2k-v)))\right)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))$$
$$\Gamma\left(\frac{1}{2}(h+i+2),\, -\left(b+a\,i\,(m-2s)+c\,(2k-v)+2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(4\,(d+i\,p\,(m-2s)+f\,(2k-v)))\right)\sqrt{\left(-\left(b+a\,i\,(m-2s)+c\,(2k-v)+\right.\right.}$$
$$\left.\left.\left.2\,(d+i\,p\,(m-2s)+f\,(2k-v))\sqrt{z}\right)^2\Big/(d+i\,p\,(m-2s)+f\,(2k-v))\right)\right)+$$
$$e^{-\frac{(b+a\,i\,(2s-m)+c\,(v-2k))^2}{4\,(d+i\,p\,(2s-m)+f\,(v-2k))}+e+i\,q\,(2s-m)+g\,(v-2k)-\frac{i\,\pi\,v}{2}}\,(d+i\,p\,(2s-m)+f\,(v-2k))^{-2n-2}$$
$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(2s-m)+c\,(v-2k))^{-h-i+2n}$$
$$\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^{h+i}$$
$$\left(-\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2\Big/\right.$$
$$\left.(d+i\,p\,(2s-m)+f\,(v-2k))\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$
$$\left((b+a\,i\,(2s-m)+c\,(v-2k))\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)\right.$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d+i\,p\,(2s-m)+f\,(v-2k)))\right)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))$$

$$\Gamma\left(\frac{1}{2}(h+i+2), -\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d+i\,p\,(2s-m)+f\,(v-2k)))\right)\sqrt{\left(-\left(b+a\,i\,(2s-m)+c\,(v-2k)+2\,(d+i\,p\,(2s-m)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d+i\,p\,(2s-m)+f\,(v-2k))\right)}\Bigg)+$$

$$e^{-\frac{(b+a\,i\,(m-2s)+c\,(v-2k))^2}{4\,(d+i\,p\,(m-2s)+f\,(v-2k))}+e+i\,q\,(m-2s)+g\,(v-2k)-\frac{i\pi v}{2}}\,(d+i\,p\,(m-2s)+f\,(v-2k))^{-2n-2}$$

$$\sum_{i=0}^{n}\sum_{h=0}^{i}(-1)^{i-h}\,4^i\,(b+a\,i\,(m-2s)+c\,(v-2k))^{-h-i+2n}$$

$$\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^{h+i}$$

$$\left(-\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d+i\,p\,(m-2s)+f\,(v-2k))\right)^{\frac{1}{2}(-h-i-1)}\binom{i}{h}\binom{n}{i}$$

$$\Bigg((b+a\,i\,(m-2s)+c\,(v-2k))\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)$$

$$\Gamma\left(\frac{1}{2}(h+i+1), -\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d+i\,p\,(m-2s)+f\,(v-2k)))\right)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))$$

$$\Gamma\left(\frac{1}{2}(h+i+2), -\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (4\,(d+i\,p\,(m-2s)+f\,(v-2k)))\right)$$

$$\sqrt{\left(-\left(b+a\,i\,(m-2s)+c\,(v-2k)+2\,(d+i\,p\,(m-2s)+f\,(v-2k))\sqrt{z}\right)^2 \Big/ (d+i\,p\,(m-2s)+f\,(v-2k))\right)}\Bigg)\Bigg)\,/;\,n\in\mathbb{N}\land m\in\mathbb{N}^+\land v\in\mathbb{N}^+$$

Definite integration

For the direct function itself

01.19.21.0014.01

$$\int_a^b \frac{\sinh(t)}{t}\,dt = \text{Shi}(b)-\text{Shi}(a)$$

Involving the direct function

01.19.21.0015.01

$$\int_0^1 \sinh(n\,t)\sinh(m\,t)\,dt = \frac{m\sinh(m+n)-m\sinh(m-n)-n\sinh(m-n)-n\sinh(m+n)}{2\,(m-n)\,(m+n)}$$

01.19.21.0016.01

$$\int_0^1 \sinh^2(n\,t)\,dt = \frac{\sinh(2\,n) - 2\,n}{4\,n}$$

01.19.21.0017.01

$$\int_0^\infty e^{a\,t}\sinh(t)\,dt = \frac{1}{a^2-1} \;/;\; \mathrm{Re}(a) < -1$$

01.19.21.0018.01

$$\int_0^\infty e^{a\,t}\sinh(b\,t)\,dt = \frac{b}{a^2-b^2} \;/;\; \mathrm{Re}(a) < -|\mathrm{Re}(b)|$$

Involving related functions

01.19.21.0019.01

$$\int_0^1 \cosh(n\,t)\sinh(m\,t)\,dt = \frac{m}{(n-m)\,(m+n)} + \frac{n\cosh(m+n) - m\cosh(m-n) - n\cosh(m-n) - m\cosh(m+n)}{2\,(n-m)\,(m+n)}$$

Integral transforms

Laplace transforms

01.19.22.0001.01

$$\mathcal{L}_t[\sinh(t)]\,(z) = \frac{1}{z^2-1}$$

Summation

Finite summation

01.19.23.0001.01

$$\sum_{k=0}^{n} \sinh(a\,k) = \mathrm{csch}\left(\frac{a}{2}\right)\sinh\left(\frac{a\,(n+1)}{2}\right)\sinh\left(\frac{a\,n}{2}\right)$$

01.19.23.0002.01

$$\sum_{k=0}^{n} (-1)^k \sinh(a\,k) = \frac{1 - (-e^{-a})^n + e^a\,((-e^a)^n - 1)}{2\,(1+e^a)}$$

01.19.23.0003.01

$$\sum_{k=0}^{n} \sinh(a\,k + z) = \mathrm{csch}\left(\frac{a}{2}\right)\sinh\left(\frac{1}{2}\,a\,(n+1)\right)\sinh\left(\frac{a\,n}{2} + z\right)$$

01.19.23.0004.01

$$\sum_{k=0}^{n} (-1)^k \sinh(a\,k + z) = \frac{e^{-z}\left(-(-e^{-a})^n - e^a + e^{a+2\,z}\,(-e^a)^n + e^{2\,z}\right)}{2\,(1+e^a)}$$

01.19.23.0005.01

$$\sum_{k=1}^{n} \sinh((2\,k-1)\,a) = \mathrm{csch}(a)\sinh^2(a\,n)$$

01.19.23.0006.01

$$\sum_{k=1}^{n}(-1)^k \sinh((2k-1)a) = \frac{e^a\left(\left(-e^{2a}\right)^n-\left(-e^{-2a}\right)^n\right)}{2\left(1+e^{2a}\right)}$$

01.19.23.0007.01

$$\sum_{k=1}^{n}k\sinh(k a) = \frac{1}{4}\operatorname{csch}^2\left(\frac{a}{2}\right)(n\sinh((n+1)a)-(n+1)\sinh(n a))$$

01.19.23.0008.01

$$\sum_{k=1}^{n}z^k\sinh(k a) = \frac{z\left((z\sinh(a n)-\sinh(a(n+1)))z^n+\sinh(a)\right)}{z^2-2\cosh(a)z+1}$$

Infinite summation

01.19.23.0009.01

$$\sum_{k=1}^{\infty}e^{-k a}\sinh(k x) = \frac{1}{2-2e^{a+x}}+\frac{e^x}{2e^a-2e^x} /; \operatorname{Re}(a)>|\operatorname{Re}(x)|$$

01.19.23.0010.01

$$\sum_{k=1}^{\infty}z^k\sinh(k x) = \frac{z\sinh(x)}{z^2-2\cosh(x)z+1} /; |z|<1$$

01.19.23.0011.01

$$\sum_{k=1}^{\infty}\frac{z^k\sinh(k x)}{k} = \tanh^{-1}\left(\frac{z\sinh(x)}{1-z\cosh(x)}\right) /; 0<\operatorname{Im}(x)<2\pi \land |z|<1$$

01.19.23.0012.01

$$\sum_{k=1}^{\infty}\frac{\sinh(k x)}{k!} = e^{\cosh(x)}\sinh(\sinh(x))$$

01.19.23.0013.01

$$\sum_{k=1}^{\infty}\frac{z^k\sinh(k x)}{k!} = e^{z\cosh(x)}\sinh(z\sinh(x))$$

Products

Finite products

01.19.24.0001.01

$$\prod_{k=1}^{n-1}\sinh\left(\frac{i\pi k}{n}+z\right) = \left(\frac{i}{2}\right)^{n-1}\frac{\sinh(n z)}{\sinh(z)} /; n\in\mathbb{N}^+$$

01.19.24.0002.01

$$\prod_{k=1}^{n-1}\sinh\left(\frac{2i\pi k}{n}+z\right) = i^{-n}(-2)^{1-n}\left(\cos\left(\frac{n\pi}{2}-i n z\right)-\cos\left(\frac{n\pi}{2}\right)\right)\operatorname{csch}(z) /; n\in\mathbb{N}^+$$

Infinite products

01.19.24.0003.01

$$\prod_{k=1}^{\infty}\left(1+\frac{4}{3}\sinh^2\left(\frac{z}{3^k}\right)\right) = \frac{\sinh(z)}{z}$$

Representations through more general functions

Through hypergeometric functions

Involving ${}_0F_1$

01.19.26.0001.01

$$\sinh(z) = z\,{}_0F_1\left(;\frac{3}{2};\frac{z^2}{4}\right)$$

01.19.26.0002.01

$$\sinh(z) = i\,{}_0F_1\left(;\frac{1}{2};\frac{1}{4}\left(z-\frac{i\pi}{2}\right)^2\right)$$

01.19.26.0004.01

$$\sinh^2(z) = -\frac{1}{2}\,{}_0F_1\left(;\frac{1}{2};\left(z-\frac{i\pi}{2}\right)^2\right)-\frac{1}{2}$$

01.19.26.0086.01

$$\sinh^3(z) = \frac{3i}{4}\,{}_0F_1\left(;\frac{1}{2};-\frac{1}{4}\left(iz-\frac{\pi}{2}\right)^2\right)+\frac{i}{4}\,{}_0F_1\left(;\frac{1}{2};-\frac{9}{4}\left(iz-\frac{\pi}{2}\right)^2\right)$$

Involving ${}_pF_q$

01.19.26.0087.01

$$\sinh(z) = {}_3F_2\left(\frac{iz}{\pi},\frac{iz}{\pi},\frac{iz}{\pi};1,1;-1\right)z+\frac{2z^3}{\pi^2}\,{}_3F_2\left(\frac{iz}{\pi}+1,\frac{iz}{\pi}+1,\frac{iz}{\pi}+1;2,2;-1\right)$$

Brychkov Yu.A. (2005)

01.19.26.0003.01

$$\sinh^2(z) = z^2\,{}_1F_2\left(1;2,\frac{3}{2};z^2\right)$$

Through Meijer G

Classical cases for the direct function itself

01.19.26.0005.01

$$\sinh(z) = \frac{\sqrt{\pi}}{2}\,z\,G_{0,2}^{1,0}\left(-\frac{z^2}{4}\,\middle|\,0,-\tfrac{1}{2}\right)$$

01.19.26.0006.01

$$\sinh(z) = -\frac{\sqrt{-\pi z^2}}{z}\,G_{0,2}^{1,0}\left(-\frac{z^2}{4}\,\middle|\,\tfrac{1}{2},0\right)$$

01.19.26.0007.01

$$\sinh(z) = i\sqrt{\pi}\, G_{0,2}^{1,0}\left(-\frac{z^2}{4} \,\middle|\, \frac{1}{2}, 0\right) /;\ \mathrm{Im}(z) > 0$$

Classical cases for powers of cosh

01.19.26.0008.01

$$\sinh^n\left(\sqrt{z}\right) = (-1)^{n/2}\, 2^{-n-1}\left((-1)^n + 1\right)\binom{n}{\frac{n}{2}} +$$
$$2^{1-n}\pi^{3/2}\sum_{k=0}^{\left\lfloor\frac{n-1}{2}\right\rfloor}(-1)^{k+n}\binom{n}{k} G_{1,3}^{1,0}\left(\frac{1}{4} z (n-2k)^2 \,\middle|\, \begin{array}{c} \frac{1}{4}(1+(-1)^n) \\ \frac{1}{4}(1-(-1)^n), \frac{1}{4}(1+(-1)^n), \frac{1}{4}(1+(-1)^n) \end{array}\right) /;\ n \in \mathbb{N}^+$$

Classical cases involving exp

01.19.26.0009.01

$$e^{-z}\sinh(z) = \frac{1}{2} G_{1,2}^{1,1}\left(2z \,\middle|\, \begin{array}{c} 1 \\ 1, 0 \end{array}\right)$$

01.19.26.0079.01

$$e^{z}\sinh(z) = -\frac{\pi}{2} G_{2,3}^{1,1}\left(2z \,\middle|\, \begin{array}{c} 1, \frac{1}{2} \\ 1, 0, \frac{1}{2} \end{array}\right)$$

Classical cases involving sin

01.19.26.0080.01

$$\sin\left(\sqrt[4]{z}\right)\sinh\left(\sqrt[4]{z}\right) = \sqrt{2}\,\pi^{3/2} G_{0,4}^{1,0}\left(\frac{z}{64} \,\middle|\, \frac{1}{2}, 0, \frac{1}{4}, \frac{3}{4}\right)$$

Classical cases involving cos

01.19.26.0081.01

$$\cos\left(\sqrt[4]{z}\right)\sinh\left(\sqrt[4]{z}\right) = -\sqrt{2}\,\pi^{3/2} G_{1,5}^{2,0}\left(\frac{z}{64} \,\middle|\, \begin{array}{c} 0 \\ \frac{1}{4}, \frac{3}{4}, 0, 0, \frac{1}{2} \end{array}\right)$$

Classical cases involving $\sinh^{-1}$in the arguments

01.19.26.0010.01

$$\sinh\left(\nu \sinh^{-1}\left(\sqrt{z}\right)\right) = \frac{\nu}{2\sqrt{\pi}} \cos\left(\frac{\pi\nu}{2}\right) G_{2,2}^{1,2}\left(z \,\middle|\, \begin{array}{c} \frac{\nu}{2}+1, 1-\frac{\nu}{2} \\ \frac{1}{2}, 0 \end{array}\right)$$

01.19.26.0011.01

$$\frac{\sinh\left(\nu \sinh^{-1}\left(\sqrt{z}\right)\right)}{\sqrt{z+1}} = \frac{1}{\sqrt{\pi}} \sin\left(\frac{\pi\nu}{2}\right) G_{2,2}^{1,2}\left(z \,\middle|\, \begin{array}{c} \frac{\nu+1}{2}, \frac{1-\nu}{2} \\ \frac{1}{2}, 0 \end{array}\right)$$

Classical cases involving csch^{-1} in the arguments

01.19.26.0012.01

$$\sinh\left(\nu\, \mathrm{csch}^{-1}\left(\sqrt{z}\right)\right) = \frac{\nu}{2\sqrt{\pi}} \cos\left(\frac{\pi\nu}{2}\right) G_{2,2}^{2,1}\left(z \,\middle|\, \begin{array}{c} \frac{1}{2}, 1 \\ \frac{\nu}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.19.26.0013.01

$$\frac{\sinh\left(\nu\,\operatorname{csch}^{-1}\left(\sqrt{z}\right)\right)}{\sqrt{z+1}} = \frac{1}{\sqrt{\pi}}\sin\left(\frac{\pi\,\nu}{2}\right)G_{2,2}^{2,1}\left(z\,\middle|\,\begin{array}{c}0,\frac{1}{2}\\ \frac{\nu}{2},-\frac{\nu}{2}\end{array}\right)\text{/; } z\notin(-1,0)$$

Classical cases involving $\cosh^{-1}$ in the arguments and unit step θ

01.19.26.0014.01

$$\theta(|z|-1)\sinh\left(\nu\cosh^{-1}\left(\sqrt{z}\right)\right) = \frac{\sqrt{\pi}\,\nu}{2}G_{2,2}^{0,2}\left(z\,\middle|\,\begin{array}{c}1-\frac{\nu}{2},\frac{\nu}{2}+1\\ 0,\frac{1}{2}\end{array}\right)$$

Classical cases involving sech^{-1} in the arguments and unit step θ

01.19.26.0015.01

$$\theta(1-|z|)\sinh\left(\nu\operatorname{sech}^{-1}\left(\sqrt{z}\right)\right) = \frac{\sqrt{\pi}\,\nu}{2}G_{2,2}^{2,0}\left(z\,\middle|\,\begin{array}{c}1,\frac{1}{2}\\ \frac{\nu}{2},-\frac{\nu}{2}\end{array}\right)\text{/; } z\notin(-1,0)$$

Classical cases involving $\tanh^{-1}$ in the arguments and unit step θ

01.19.26.0016.01

$$\theta(1-|z|)\sinh\left(\nu\tanh^{-1}\left(\sqrt{1-z}\right)\right) = \frac{\sqrt{\pi}\,\nu}{2}G_{2,2}^{2,0}\left(z\,\middle|\,\begin{array}{c}\frac{1}{2},1\\ -\frac{\nu}{2},\frac{\nu}{2}\end{array}\right)\text{/; } z\notin(-1,0)$$

01.19.26.0017.01

$$\theta(|z|-1)\sinh\left(\nu\tanh^{-1}\left(\sqrt{1-\frac{1}{z}}\right)\right) = \frac{\sqrt{\pi}\,\nu}{2}G_{2,2}^{0,2}\left(z\,\middle|\,\begin{array}{c}1-\frac{\nu}{2},\frac{\nu+2}{2}\\ 0,\frac{1}{2}\end{array}\right)\text{/; } z\notin(-\infty,-1)$$

Classical cases involving $\tanh^{-1}$ in the arguments and Abs

01.19.26.0018.01

$$|1-x|^{\nu}\sinh\left(\nu\tanh^{-1}\left(\frac{2\sqrt{x}}{x+1}\right)\right) = -\frac{\sqrt{\pi}}{\Gamma(-\nu)}\Gamma\left(\nu+\frac{1}{2}\right)G_{2,2}^{1,1}\left(x\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)\text{/; } x>0$$

Classical cases involving $\coth^{-1}$ in the arguments and Abs

01.19.26.0019.01

$$|1-x|^{\nu}\sinh\left(\nu\coth^{-1}\left(\frac{1+x}{2\sqrt{x}}\right)\right) = -\frac{\sqrt{\pi}}{\Gamma(-\nu)}\Gamma\left(\nu+\frac{1}{2}\right)G_{2,2}^{1,1}\left(x\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)\text{/; } x>0$$

Classical cases involving $\tanh^{-1}$ in the arguments and sgn

01.19.26.0020.01

$$((1-z)\operatorname{sgn}(1-|z|))^{\nu}\sinh\left(\nu\tanh^{-1}\left(\frac{2\sqrt{z}}{z+1}\right)\right) = -\frac{\sqrt{\pi}}{\Gamma(-\nu)}\Gamma\left(\nu+\frac{1}{2}\right)G_{2,2}^{1,1}\left(z\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)\text{/; } z\notin(-1,0)$$

Classical cases involving $\coth^{-1}$ in the arguments and sgn

01.19.26.0021.01

$$((1-z)\operatorname{sgn}(1-|z|))^{\nu}\sinh\left(\nu\coth^{-1}\left(\frac{1+z}{2\sqrt{z}}\right)\right) = -\frac{\sqrt{\pi}}{\Gamma(-\nu)}\Gamma\left(\nu+\frac{1}{2}\right)G_{2,2}^{1,1}\left(z\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)\text{/; } z\notin(-1,0)$$

Classical cases involving Bessel *I*

01.19.26.0022.01

$$\sinh\left(\sqrt{z}\right) I_\nu\left(\sqrt{z}\right) = -\frac{\pi}{\sqrt{2}} \sec\left(\frac{\pi\nu}{2}\right) G_{3,5}^{1,2}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4}, 0 \\ \frac{\nu+1}{2}, 0, -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu}{2} \end{matrix}\right)$$

Classical cases involving cos, *I*

01.19.26.0082.01

$$\cosh\left(\sqrt{z}\right) I_{-\nu}\left(\sqrt{z}\right) + \sinh\left(\sqrt{z}\right) I_\nu\left(\sqrt{z}\right) = \sqrt{2}\,\pi\, G_{2,4}^{2,0}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{\nu}{2}, \frac{1-\nu}{2} \end{matrix}\right)$$

01.19.26.0023.01

$$\cosh\left(\sqrt{z}\right) I_{-\nu}\left(\sqrt{z}\right) - \sinh\left(\sqrt{z}\right) I_\nu\left(\sqrt{z}\right) = \frac{\cos(\pi\nu)}{\sqrt{2}\,\pi} G_{2,4}^{2,2}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{\nu}{2}, \frac{1-\nu}{2} \end{matrix}\right)$$

01.19.26.0088.01

$$\sinh(z)\, I_{-\nu}\left(\sqrt{z}\right) - \cosh(z)\, I_\nu\left(\sqrt{z}\right) = -\frac{\cos(\pi\nu)}{\sqrt{2}\,\pi} G_{2,4}^{2,2}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

01.19.26.0089.01

$$\cosh(z)\, I_\nu\left(\sqrt{z}\right) + \sinh(z)\, I_{-\nu}\left(\sqrt{z}\right) = \sqrt{2}\,\pi\, G_{2,4}^{2,0}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

Classical cases involving Bessel *K*

01.19.26.0024.01

$$\sinh\left(\sqrt{z}\right) K_\nu\left(\sqrt{z}\right) = \frac{1}{2\sqrt{2}} G_{2,4}^{2,2}\left(z \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2}, \frac{\nu}{2} \end{matrix}\right)$$

Classical cases involving parabolic cylinder function *D*

01.19.26.0090.01

$$\sinh(z)\, D_\nu\left(2\sqrt{z}\right) = \frac{2^{-\frac{\nu}{2}-2}}{\sqrt{\pi}\,\Gamma(-\nu)} G_{1,2}^{2,1}\left(2z \,\middle|\, \begin{matrix} \frac{\nu}{2}+1 \\ 0, \frac{1}{2} \end{matrix}\right) - 2^{\frac{\nu}{2}-1} G_{1,2}^{2,0}\left(2z \,\middle|\, \begin{matrix} \frac{1-\nu}{2} \\ 0, \frac{1}{2} \end{matrix}\right)$$

01.19.26.0091.01

$$\sinh(z)\, D_\nu\left(-2\sqrt{z}\right) = \frac{2^{-\frac{1}{2}(\nu+1)}\pi^{3/2}}{\Gamma(-\nu)} G_{3,4}^{2,1}\left(2z \,\middle|\, \begin{matrix} \frac{\nu}{2}+1, \frac{1}{8}, \frac{5}{8} \\ 0, \frac{1}{2}, \frac{1}{8}, \frac{5}{8} \end{matrix}\right) - 2^{\frac{\nu}{2}-1} G_{2,3}^{2,1}\left(2z \,\middle|\, \begin{matrix} \frac{1-\nu}{2}, \frac{\nu+1}{2} \\ 0, \frac{1}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

01.19.26.0092.01

$$\sinh(z)\left(D_\nu\left(-2\sqrt{z}\right) + D_\nu\left(2\sqrt{z}\right)\right) = \frac{2^{-\frac{1}{2}(\nu+1)}\pi^{3/2}}{\Gamma(-\nu)} G_{2,3}^{1,1}\left(2z \,\middle|\, \begin{matrix} \frac{\nu}{2}+1, \frac{1}{4} \\ 0, \frac{1}{2}, \frac{1}{4} \end{matrix}\right) - 2^{\nu/2}\cos\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\left(2z \,\middle|\, \begin{matrix} \frac{1-\nu}{2} \\ 0, \frac{1}{2} \end{matrix}\right)$$

01.19.26.0093.01

$$\sinh(z)\left(D_\nu\left(2\sqrt{z}\right) - D_\nu\left(-2\sqrt{z}\right)\right) = \frac{2^{-\frac{1}{2}(\nu+1)}\pi^{3/2}}{\Gamma(-\nu)} G_{2,3}^{1,1}\left(2z \,\middle|\, \begin{matrix} \frac{\nu}{2}+1, \frac{1}{4} \\ \frac{1}{2}, 0, \frac{1}{4} \end{matrix}\right) - 2^{\nu/2}\sin\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\left(2z \,\middle|\, \begin{matrix} \frac{1-\nu}{2} \\ \frac{1}{2}, 0 \end{matrix}\right)$$

01.19.26.0094.01

$$\sinh(z^2)\,D_\nu(2z) = \frac{2^{-\frac{\nu}{2}-2}}{\sqrt{\pi}\,\Gamma(-\nu)}\,G_{1,2}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1\\ 0,\frac{1}{2}\end{matrix}\right) - 2^{\frac{\nu}{2}-1}\,G_{1,2}^{2,0}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0095.01

$$\sinh(z^2)\,D_\nu(-2z) = \frac{2^{-\frac{1}{2}(\nu+1)}\,\pi^{3/2}}{\Gamma(-\nu)}\,G_{3,4}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{8},\frac{5}{8}\\ 0,\frac{1}{2},\frac{1}{8},\frac{5}{8}\end{matrix}\right) - 2^{\frac{\nu}{2}-1}\,G_{2,3}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2},\frac{\nu+1}{2}\\ 0,\frac{1}{2},\frac{\nu+1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0096.01

$$\sinh(z^2)\,(D_\nu(-2z)+D_\nu(2z)) = \frac{2^{-\frac{1}{2}(\nu+1)}\,\pi^{3/2}}{\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{4}\\ 0,\frac{1}{2},\frac{1}{4}\end{matrix}\right) - 2^{\nu/2}\cos\!\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0097.01

$$\sinh(z^2)\,(D_\nu(2z)-D_\nu(-2z)) = \frac{2^{-\frac{1}{2}(\nu+1)}\,\pi^{3/2}}{\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{4}\\ \frac{1}{2},0,\frac{1}{4}\end{matrix}\right) - 2^{\nu/2}\sin\!\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ \frac{1}{2},0\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

Classical cases involving exp and Hermite *H*

01.19.26.0098.01

$$e^{-z}\sinh(z)\,H_\nu\!\left(\sqrt{2z}\right) = \frac{1}{4\sqrt{\pi}\,\Gamma(-\nu)}\,G_{1,2}^{2,1}\!\left(z\,\middle|\,\begin{matrix}\frac{\nu}{2}+1\\ 0,\frac{1}{2}\end{matrix}\right) - 2^{\nu-1}\,G_{1,2}^{2,0}\!\left(2z\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)$$

01.19.26.0099.01

$$e^{-z}\sinh(z)\,H_\nu\!\left(-\sqrt{2z}\right) = \frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{3,4}^{2,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{8},\frac{5}{8}\\ 0,\frac{1}{2},\frac{1}{8},\frac{5}{8}\end{matrix}\right) - 2^{\nu-1}\,G_{2,3}^{2,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{1-\nu}{2},\frac{\nu+1}{2}\\ 0,\frac{1}{2},\frac{\nu+1}{2}\end{matrix}\right)$$

01.19.26.0100.01

$$e^{-z}\sinh(z)\left(H_\nu\!\left(-\sqrt{2z}\right)+H_\nu\!\left(\sqrt{2z}\right)\right) = \frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{4}\\ 0,\frac{1}{2},\frac{1}{4}\end{matrix}\right) - 2^{\nu}\cos\!\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)$$

01.19.26.0101.01

$$e^{-z}\sinh(z)\left(H_\nu\!\left(\sqrt{2z}\right)-H_\nu\!\left(-\sqrt{2z}\right)\right) = \frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{4}\\ \frac{1}{2},0,\frac{1}{4}\end{matrix}\right) - 2^{\nu}\sin\!\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ \frac{1}{2},0\end{matrix}\right)$$

01.19.26.0102.01

$$e^{-z^2}\sinh(z^2)\,H_\nu\!\left(\sqrt{2}\,z\right) = \frac{1}{4\sqrt{\pi}\,\Gamma(-\nu)}\,G_{1,2}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1\\ 0,\frac{1}{2}\end{matrix}\right) - 2^{\nu-1}\,G_{1,2}^{2,0}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0103.01

$$e^{-z^2}\sinh(z^2)\,H_\nu\!\left(-\sqrt{2}\,z\right) = \frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{3,4}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{8},\frac{5}{8}\\ 0,\frac{1}{2},\frac{1}{8},\frac{5}{8}\end{matrix}\right) - 2^{\nu-1}\,G_{2,3}^{2,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2},\frac{\nu+1}{2}\\ 0,\frac{1}{2},\frac{\nu+1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0104.01

$$e^{-z^2}\sinh(z^2)\left(H_\nu\!\left(-\sqrt{2}\,z\right)+H_\nu\!\left(\sqrt{2}\,z\right)\right) = \frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\frac{1}{4}\\ 0,\frac{1}{2},\frac{1}{4}\end{matrix}\right) - 2^{\nu}\cos\!\left(\frac{\pi\nu}{2}\right) G_{1,2}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\frac{1}{2}\end{matrix}\right)\;/;\; -\frac{\pi}{2} < \arg(z) \le \frac{\pi}{2}$$

01.19.26.0105.01

$$e^{-z^2}\sinh(z^2)\left(H_\nu(\sqrt{2}\,z)-H_\nu(-\sqrt{2}\,z)\right)=\frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\ \frac{1}{4}\\ \frac{1}{2},\ 0,\ \frac{1}{4}\end{matrix}\right)-2^\nu\sin\!\left(\frac{\pi\nu}{2}\right)G_{1,2}^{1,1}\!\left(2z^2\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ \frac{1}{2},\ 0\end{matrix}\right)\ /;\ -\frac{\pi}{2}<\arg(z)\le\frac{\pi}{2}$$

Classical cases involving ${}_0F_1$

01.19.26.0025.01

$$\sinh(z)\,{}_0F_1\!\left(;b;\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,\pi\csc\!\left(\frac{b\pi}{2}\right)\Gamma(b)\,G_{3,5}^{1,2}\!\left(z^2\,\middle|\,\begin{matrix}\frac{3-2b}{4},\ \frac{5-2b}{4},\ \frac{1-b}{2}\\ \frac{1}{2},\ 0,\ \frac{1-b}{2},\ 1-b,\ \frac{3}{2}-b\end{matrix}\right)\ /;\ -\frac{\pi}{2}<\arg(z)\le\frac{\pi}{2}$$

01.19.26.0106.01

$$\sinh(z)\,{}_0F_1\!\left(;b;\frac{z^2}{4}\right)=-\frac{2^{b-\frac{3}{2}}\,\Gamma(b)}{z}\,G_{2,4}^{1,2}\!\left(-z^2\,\middle|\,\begin{matrix}\frac{5}{4}-\frac{b}{2},\ \frac{7}{4}-\frac{b}{2}\\ 1,\ \frac{1}{2},\ \frac{3}{2}-b,\ 2-b\end{matrix}\right)$$

01.19.26.0107.01

$$\sinh(z)\,{}_0F_1\!\left(;b;\frac{z^2}{4}\right)=\frac{2^{2b-3}\,\Gamma(b)}{\sqrt{\pi}}\left(\pi\csc(b\pi)\,G_{2,3}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b,\ 1-b\\ 0,\ 2-2b,\ 1-b\end{matrix}\right)-G_{1,2}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b\\ 0,\ 2-2b\end{matrix}\right)\right)$$

01.19.26.0108.01

$$\sinh(a+z)\,{}_0F_1\!\left(;b;\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,i\,\Gamma(b)\,G_{3,5}^{2,2}\!\left(-z^2\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\ \frac{1}{4}(5-2b),\ \frac{ia}{\pi}+1\\ 0,\ \frac{1}{2},\ 1-b,\ \frac{3}{2}-b,\ \frac{ia}{\pi}+1\end{matrix}\right)\ /;\ -\pi<\arg(z)\le 0$$

01.19.26.0083.01

$$\sinh(a+z)\,{}_0F_1\!\left(;b;\frac{z^2}{4}\right)=\frac{2^{2b-3}\,\Gamma(b)}{\sqrt{\pi}}\left(e^a\,\pi\csc(b\pi)\,G_{2,3}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b,\ 1-b\\ 0,\ 2-2b,\ 1-b\end{matrix}\right)-e^{-a}\,G_{1,2}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b\\ 0,\ 2-2b\end{matrix}\right)\right)$$

01.19.26.0026.01

$$\sinh\!\left(2\sqrt{z}\right)\,{}_0F_1(;b;z)=-2^{b-\frac{3}{2}}\,\pi\csc\!\left(\frac{b\pi}{2}\right)\Gamma(b)\,G_{3,5}^{1,2}\!\left(4z\,\middle|\,\begin{matrix}\frac{3-2b}{4},\ \frac{5-2b}{4},\ \frac{1-b}{2}\\ \frac{1}{2},\ 0,\ \frac{1-b}{2},\ 1-b,\ \frac{3}{2}-b\end{matrix}\right)$$

01.19.26.0109.01

$$\sinh\!\left(a+2\sqrt{z}\right){}_0F_1(;b;z)=\frac{2^{2b-3}\,e^{-a}\,\Gamma(b)}{\sqrt{\pi}}\left(-G_{1,2}^{1,1}\!\left(4\sqrt{z}\,\middle|\,\begin{matrix}\frac{3}{2}-b\\ 0,\ 2-2b\end{matrix}\right)+e^{2a}\,\pi\csc(b\pi)\,G_{2,3}^{1,1}\!\left(4\sqrt{z}\,\middle|\,\begin{matrix}\frac{3}{2}-b,\ 1-b\\ 0,\ 2-2b,\ 1-b\end{matrix}\right)\right)$$

Classical cases involving ${}_0\tilde{F}_1$

01.19.26.0027.01

$$\sinh(z)\,{}_0\tilde{F}_1\!\left(;b;\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,\pi\csc\!\left(\frac{b\pi}{2}\right)G_{3,5}^{1,2}\!\left(z^2\,\middle|\,\begin{matrix}\frac{3-2b}{4},\ \frac{5-2b}{4},\ \frac{1-b}{2}\\ \frac{1}{2},\ 0,\ \frac{1-b}{2},\ 1-b,\ \frac{3}{2}-b\end{matrix}\right)\ /;\ -\frac{\pi}{2}<\arg(z)\le\frac{\pi}{2}$$

01.19.26.0110.01

$$\sinh(z)\,{}_0\tilde{F}_1\!\left(;b;\frac{z^2}{4}\right)=-\frac{2^{b-\frac{3}{2}}}{z}\,G_{2,4}^{1,2}\!\left(-z^2\,\middle|\,\begin{matrix}\frac{5}{4}-\frac{b}{2},\ \frac{7}{4}-\frac{b}{2}\\ 1,\ \frac{1}{2},\ \frac{3}{2}-b,\ 2-b\end{matrix}\right)$$

01.19.26.0111.01

$$\sinh(z)\,{}_0\tilde{F}_1\!\left(;b;\frac{z^2}{4}\right)=\frac{2^{2b-3}}{\sqrt{\pi}}\left(\pi\csc(b\pi)\,G_{2,3}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b,\ 1-b\\ 0,\ 2-2b,\ 1-b\end{matrix}\right)-G_{1,2}^{1,1}\!\left(2z\,\middle|\,\begin{matrix}\frac{3}{2}-b\\ 0,\ 2-2b\end{matrix}\right)\right)$$

01.19.26.0112.01

$$\sinh(a+z)\,{}_0\tilde{F}_1\left(;b;\frac{z^2}{4}\right)=2^{b-\frac{3}{2}}\,i\,G_{3,5}^{2,2}\left(-z^2\,\middle|\,\begin{array}{c}\frac{1}{4}(3-2b),\,\frac{1}{4}(5-2b),\,\frac{i a}{\pi}+1\\ 0,\,\frac{1}{2},\,1-b,\,\frac{3}{2}-b,\,\frac{i a}{\pi}+1\end{array}\right)/;\,-\pi<\arg(z)\leq 0$$

01.19.26.0084.01

$$\sinh(a+z)\,{}_0\tilde{F}_1\left(;b;\frac{z^2}{4}\right)=\frac{2^{2b-3}}{\sqrt{\pi}}\left(e^a\,\pi\csc(b\pi)\,G_{2,3}^{1,1}\left(2z\,\middle|\,\begin{array}{c}\frac{3}{2}-b,\,1-b\\ 0,\,2-2b,\,1-b\end{array}\right)-e^{-a}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}\frac{3}{2}-b\\ 0,\,2-2b\end{array}\right)\right)$$

01.19.26.0028.01

$$\sinh\left(2\sqrt{z}\right)\,{}_0\tilde{F}_1(;b;z)=-2^{b-\frac{3}{2}}\,\pi\csc\left(\frac{b\pi}{2}\right)G_{3,5}^{1,2}\left(4z\,\middle|\,\begin{array}{c}\frac{3-2b}{4},\,\frac{5-2b}{4},\,\frac{1-b}{2}\\ \frac{1}{2},\,0,\,\frac{1-b}{2},\,1-b,\,\frac{3}{2}-b\end{array}\right)$$

01.19.26.0113.01

$$\sinh\left(a+2\sqrt{z}\right)\,{}_0\tilde{F}_1(;b;z)=\frac{2^{2b-3}\,e^{-a}}{\sqrt{\pi}}\left(e^{2a}\,\pi\csc(b\pi)\,G_{2,3}^{1,1}\left(4\sqrt{z}\,\middle|\,\begin{array}{c}\frac{3}{2}-b,\,1-b\\ 0,\,2-2b,\,1-b\end{array}\right)-G_{1,2}^{1,1}\left(4\sqrt{z}\,\middle|\,\begin{array}{c}\frac{3}{2}-b\\ 0,\,2-2b\end{array}\right)\right)$$

Classical cases involving exp and ${}_1F_1$

01.19.26.0114.01

$$e^{-z}\sinh(z)\,{}_1F_1(a;b;2z)=\frac{\pi\,\Gamma(b)}{2\,\Gamma(a)}\,G_{2,3}^{1,1}\left(2z\,\middle|\,\begin{array}{c}1-a,\,\frac{1}{2}\\ 0,\,1-b,\,\frac{1}{2}\end{array}\right)-\frac{\Gamma(b)}{2\,\Gamma(b-a)}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}a-b+1\\ 0,\,1-b\end{array}\right)$$

Classical cases involving exp and ${}_1\tilde{F}_1$

01.19.26.0115.01

$$e^{-z}\sinh(z)\,{}_1\tilde{F}_1(a;b;2z)=\frac{\pi}{2\,\Gamma(a)}\,G_{2,3}^{1,1}\left(2z\,\middle|\,\begin{array}{c}1-a,\,\frac{1}{2}\\ 0,\,1-b,\,\frac{1}{2}\end{array}\right)-\frac{1}{2\,\Gamma(b-a)}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}a-b+1\\ 0,\,1-b\end{array}\right)$$

Classical cases involving exp and hypergeometric U

01.19.26.0116.01

$$e^{-z}\sinh(z)\,U(a,b,2z)=\frac{1}{2\,\Gamma(a)\,\Gamma(a-b+1)}\,G_{1,2}^{2,1}\left(2z\,\middle|\,\begin{array}{c}1-a\\ 0,\,1-b\end{array}\right)-\frac{1}{2}\,G_{1,2}^{2,0}\left(2z\,\middle|\,\begin{array}{c}a-b+1\\ 0,\,1-b\end{array}\right)$$

Classical cases involving exp and Laguerre L

01.19.26.0117.01

$$e^{-z}\sinh(z)\,L_\nu(2z)=\frac{1}{2}\,\Gamma(\nu+1)\,G_{1,2}^{1,0}\left(2z\,\middle|\,\begin{array}{c}\nu+1\\ 0,\,0\end{array}\right)-\frac{1}{2\,\Gamma(\nu+1)}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}-\nu\\ 0,\,0\end{array}\right)$$

01.19.26.0118.01

$$e^{-z}\sinh(z)\,L_\nu^\lambda(2z)=\frac{1}{2}\,\Gamma(\lambda+\nu+1)\,G_{1,2}^{1,0}\left(2z\,\middle|\,\begin{array}{c}\nu+1\\ 0,\,-\lambda\end{array}\right)-\frac{1}{2\,\Gamma(\nu+1)}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}-\lambda-\nu\\ 0,\,-\lambda\end{array}\right)$$

Classical cases involving WhittakerM M

01.19.26.0119.01

$$\sinh(z)\,M_{\nu,\mu}(2z)=\frac{1}{2}\,\Gamma(2\mu+1)\left(\frac{\pi}{\Gamma\left(\mu-\nu+\frac{1}{2}\right)}\,G_{2,3}^{1,1}\left(2z\,\middle|\,\begin{array}{c}\nu+1,\,\mu+1\\ \mu+\frac{1}{2},\,\frac{1}{2}-\mu,\,\mu+1\end{array}\right)-\frac{1}{\Gamma\left(\mu+\nu+\frac{1}{2}\right)}\,G_{1,2}^{1,1}\left(2z\,\middle|\,\begin{array}{c}1-\nu\\ \mu+\frac{1}{2},\,\frac{1}{2}-\mu\end{array}\right)\right)$$

Classical cases involving WhittakerW W

01.19.26.0120.01

$$\sinh(z)\, W_{\nu,\mu}(2\, z) = \frac{1}{2\, \Gamma\left(-\mu - \nu + \frac{1}{2}\right) \Gamma\left(\mu - \nu + \frac{1}{2}\right)}\, G_{1,2}^{2,1}\left(2\, z \,\middle|\, \begin{matrix} \nu + 1 \\ \mu + \frac{1}{2}, \frac{1}{2} - \mu \end{matrix}\right) - \frac{1}{2}\, G_{1,2}^{2,0}\left(2\, z \,\middle|\, \begin{matrix} 1 - \nu \\ \mu + \frac{1}{2}, \frac{1}{2} - \mu \end{matrix}\right)$$

Generalized cases for the direct function itself

01.19.26.0029.01

$$\sinh(z) = -i \sqrt{\pi}\, G_{0,2}^{1,0}\left(\frac{i\, z}{2}, \frac{1}{2} \,\middle|\, \frac{1}{2}, 0\right)$$

01.19.26.0121.01

$$\operatorname{sinsinh}(z) = \sqrt{2\, \pi^3}\, G_{1,3}^{1,0}\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{3}{4} \\ \frac{1}{2}, \frac{3}{4}, 0 \end{matrix}\right)$$

01.19.26.0122.01

$$\sinh(a + z) = -i \sqrt{\pi}\, G_{1,3}^{2,0}\left(\frac{i\, z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{i\, a}{\pi} \\ 0, \frac{1}{2}, \frac{i\, a}{\pi} \end{matrix}\right)$$

Generalized cases for powers of sinh

01.19.26.0030.01

$$\sinh^n(z) = (-1)^{n/2}\, 2^{-n-1}\, ((-1)^n + 1) \binom{n}{\frac{n}{2}} +$$

$$2^{1-n}\, \pi^{3/2} \sum_{k=0}^{\left\lfloor \frac{n-1}{2} \right\rfloor} (-1)^{k+n} \binom{n}{k} G_{1,3}^{1,0}\left(\frac{1}{2}\, z\, (n - 2\, k), \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4} (1 + (-1)^n) \\ \frac{1}{4} (1 - (-1)^n), \frac{1}{4} (1 + (-1)^n), \frac{1}{4} (1 + (-1)^n) \end{matrix}\right) /;\, n \in \mathbb{N}^+$$

01.19.26.0085.01

$$\sinh^{2\, n}(z) = 2^{1-2\, n}\, \pi^{3/2} \sum_{k=0}^{n-1} (-1)^{k-1} \binom{2\, n}{k} G_{2,4}^{1,1}\left((n - k)\, z, \frac{1}{2} \,\middle|\, \begin{matrix} 1, \frac{1}{2} \\ 1, 0, \frac{1}{2}, \frac{1}{2} \end{matrix}\right) /;\, n \in \mathbb{N}^+$$

Generalized cases involving cos

01.19.26.0031.01

$$\sinh(z) \cos(z) = -\sqrt{2}\, \pi^{3/2}\, G_{1,5}^{2,0}\left(\frac{z}{2\sqrt{2}}, \frac{1}{4} \,\middle|\, \begin{matrix} 0 \\ \frac{1}{4}, \frac{3}{4}, 0, 0, \frac{1}{2} \end{matrix}\right)$$

Generalized cases involving sin

01.19.26.0032.01

$$\sinh(z) \sin(z) = \sqrt{2}\, \pi^{3/2}\, G_{0,4}^{1,0}\left(\frac{z}{2\sqrt{2}}, \frac{1}{4} \,\middle|\, \frac{1}{2}, 0, \frac{1}{4}, \frac{3}{4}\right)$$

Generalized cases involving $\sinh^{-1}$ in the arguments

01.19.26.0033.01

$$\sinh\left(\nu \sinh^{-1}(z)\right) = \frac{\nu \cos\left(\frac{\pi\, \nu}{2}\right)}{2\sqrt{\pi}}\, G_{2,2}^{1,2}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{\nu}{2} + 1, 1 - \frac{\nu}{2} \\ \frac{1}{2}, 0 \end{matrix}\right)$$

01.19.26.0034.01

$$\frac{\sinh\left(\nu \sinh^{-1}(z)\right)}{\sqrt{z^2+1}} = \frac{\sin\left(\frac{\pi \nu}{2}\right)}{\sqrt{\pi}} G_{2,2}^{1,2}\left(z, \frac{1}{2} \middle| \begin{array}{c} \frac{\nu+1}{2}, \frac{1-\nu}{2} \\ \frac{1}{2}, 0 \end{array}\right)$$

Generalized cases involving csch^{-1} in the arguments

01.19.26.0035.01

$$\sinh\left(\nu \operatorname{csch}^{-1}(z)\right) = \frac{\nu \cos\left(\frac{\pi \nu}{2}\right)}{2\sqrt{\pi}} G_{2,2}^{2,1}\left(z, \frac{1}{2} \middle| \begin{array}{c} \frac{1}{2}, 1 \\ \frac{\nu}{2}, -\frac{\nu}{2} \end{array}\right)$$

01.19.26.0036.01

$$\frac{\sinh\left(\nu \operatorname{csch}^{-1}(z)\right)}{\sqrt{z^2+1}} = \frac{\sin\left(\frac{\pi \nu}{2}\right)}{\sqrt{\pi}} G_{2,2}^{2,1}\left(z, \frac{1}{2} \middle| \begin{array}{c} 0, \frac{1}{2} \\ \frac{\nu}{2}, -\frac{\nu}{2} \end{array}\right) /; \operatorname{Re}(z) > 0$$

Generalized cases involving $\cosh^{-1}$ in the arguments and unit step θ

01.19.26.0037.01

$$\theta(|z|-1) \sinh\left(\nu \cosh^{-1}(z)\right) = \frac{\sqrt{\pi}\, \nu}{2} G_{2,2}^{0,2}\left(z, \frac{1}{2} \middle| \begin{array}{c} 1-\frac{\nu}{2}, \frac{\nu}{2}+1 \\ 0, \frac{1}{2} \end{array}\right)$$

Generalized cases involving sech^{-1} in the arguments and unit step θ

01.19.26.0038.01

$$\theta(1-|z|) \sinh\left(\nu \operatorname{sech}^{-1}(z)\right) = \frac{\sqrt{\pi}\, \nu}{2} G_{2,2}^{2,0}\left(z, \frac{1}{2} \middle| \begin{array}{c} 1, \frac{1}{2} \\ \frac{\nu}{2}, -\frac{\nu}{2} \end{array}\right)$$

Generalized cases involving $\tanh^{-1}$ in the arguments and unit step θ

01.19.26.0039.01

$$\theta(|z|-1) \sinh\left(\nu \tanh^{-1}\left(\frac{\sqrt{z^2-1}}{z}\right)\right) = \frac{\sqrt{\pi}\, \nu}{2} G_{2,2}^{0,2}\left(z, \frac{1}{2} \middle| \begin{array}{c} 1-\frac{\nu}{2}, \frac{\nu+2}{2} \\ 0, \frac{1}{2} \end{array}\right) /; \operatorname{Re}(z) > 0$$

Generalized cases involving $\tanh^{-1}$ in the arguments and Abs

01.19.26.0040.01

$$\left|1-x^2\right|^{\nu} \sinh\left(\nu \tanh^{-1}\left(\frac{2x}{x^2+1}\right)\right) = -\frac{\sqrt{\pi}\, \Gamma\left(\nu+\frac{1}{2}\right)}{\Gamma(-\nu)} G_{2,2}^{1,1}\left(x, \frac{1}{2} \middle| \begin{array}{c} \nu+\frac{1}{2}, \nu+1 \\ \frac{1}{2}, 0 \end{array}\right) /; x > 0$$

Generalized cases involving $\coth^{-1}$ in the arguments and Abs

01.19.26.0041.01

$$\left|1-x^2\right|^{\nu} \sinh\left(\nu \coth^{-1}\left(\frac{x^2+1}{2x}\right)\right) = -\frac{\sqrt{\pi}\, \Gamma\left(\nu+\frac{1}{2}\right)}{\Gamma(-\nu)} G_{2,2}^{1,1}\left(x, \frac{1}{2} \middle| \begin{array}{c} \nu+\frac{1}{2}, \nu+1 \\ \frac{1}{2}, 0 \end{array}\right) /; x > 0$$

Generalized cases involving $\tanh^{-1}$ in the arguments and sgn

01.19.26.0042.01

$$\left(\left(1-z^2\right)\operatorname{sgn}(1-|z|)\right)^{\nu}\sinh\left(\nu\tanh^{-1}\left(\frac{2z}{z^2+1}\right)\right)=-\frac{\sqrt{\pi}\,\Gamma\left(\nu+\frac{1}{2}\right)}{\Gamma(-\nu)}G_{2,2}^{1,1}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)/;\operatorname{Re}(z)>0$$

Generalized cases involving $\coth^{-1}$ in the arguments and sgn

01.19.26.0043.01

$$\left(\left(1-z^2\right)\operatorname{sgn}(1-|z|)\right)^{\nu}\sinh\left(\nu\coth^{-1}\left(\frac{z^2+1}{2z}\right)\right)=-\frac{\sqrt{\pi}\,\Gamma\left(\nu+\frac{1}{2}\right)}{\Gamma(-\nu)}G_{2,2}^{1,1}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\nu+\frac{1}{2},\nu+1\\ \frac{1}{2},0\end{array}\right)/;\operatorname{Re}(z)>0$$

Generalized cases involving Ai

01.19.26.0044.01

$$\sinh(z)\operatorname{Ai}\left(\left(\frac{3}{2}\right)^{2/3}z^{2/3}\right)=-\sqrt[6]{\frac{2}{3}}\,\pi\,G_{2,4}^{2,0}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{5}{12},\frac{11}{12}\\ \frac{1}{2},\frac{5}{6},0,\frac{1}{3}\end{array}\right)$$

01.19.26.0123.01

$$\sinh\left(\frac{2z^{3/2}}{3}\right)\operatorname{Ai}(z)=-\sqrt[6]{\frac{2}{3}}\,\pi\,G_{2,4}^{2,0}\left(\left(\frac{2}{3}\right)^{2/3}z,\frac{1}{3}\,\middle|\,\begin{array}{c}\frac{5}{12},\frac{11}{12}\\ \frac{1}{2},\frac{5}{6},0,\frac{1}{3}\end{array}\right)$$

Generalized cases involving Ai′

01.19.26.0045.01

$$\sinh(z)\operatorname{Ai}'\left(\left(\frac{3}{2}\right)^{2/3}z^{2/3}\right)=-\frac{1}{4\pi}\sqrt[6]{\frac{3}{2}}\,G_{2,4}^{2,2}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{7}{12},\frac{13}{12}\\ \frac{1}{2},\frac{7}{6},0,\frac{2}{3}\end{array}\right)$$

01.19.26.0124.01

$$\sinh\left(\frac{2z^{3/2}}{3}\right)\operatorname{Ai}'(z)=-\frac{1}{4\pi}\sqrt[6]{\frac{3}{2}}\,G_{2,4}^{2,2}\left(\left(\frac{2}{3}\right)^{2/3}z,\frac{1}{3}\,\middle|\,\begin{array}{c}\frac{7}{12},\frac{13}{12}\\ \frac{1}{2},\frac{7}{6},0,\frac{2}{3}\end{array}\right)$$

Generalized cases involving Bi

01.19.26.0046.01

$$\sinh(z)\operatorname{Bi}\left(\left(\frac{3}{2}\right)^{2/3}z^{2/3}\right)=-\sqrt[6]{\frac{2}{3}}\,\pi\,G_{4,6}^{2,2}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{5}{12},\frac{11}{12},\frac{1}{6},\frac{2}{3}\\ \frac{1}{2},\frac{5}{6},0,\frac{1}{6},\frac{1}{3},\frac{2}{3}\end{array}\right)$$

01.19.26.0125.01

$$\sinh\left(\frac{2z^{3/2}}{3}\right)\operatorname{Bi}(z)=-\sqrt[6]{\frac{2}{3}}\,\pi\,G_{4,6}^{2,2}\left(\left(\frac{2}{3}\right)^{2/3}z,\frac{1}{3}\,\middle|\,\begin{array}{c}\frac{5}{12},\frac{11}{12},\frac{1}{6},\frac{2}{3}\\ \frac{1}{2},\frac{5}{6},0,\frac{1}{6},\frac{1}{3},\frac{2}{3}\end{array}\right)$$

Generalized cases involving Bi′

01.19.26.0047.01

$$\sinh(z)\operatorname{Bi}'\left(\left(\frac{3}{2}\right)^{2/3}z^{2/3}\right)=\sqrt[6]{\frac{3}{2}}\,\pi\,G_{4,6}^{2,2}\left(z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{7}{12},\frac{13}{12},\frac{5}{6},\frac{4}{3}\\ \frac{1}{2},\frac{7}{6},0,\frac{2}{3},\frac{5}{6},\frac{4}{3}\end{array}\right)$$

01.19.26.0126.01

$$\sinh\left(\frac{2 z^{3/2}}{3}\right) \mathrm{Bi}'(z) = \sqrt[6]{\frac{3}{2}}\, \pi\, G_{4,6}^{2,2}\left(\left(\frac{2}{3}\right)^{2/3} z, \frac{1}{3} \,\middle|\, \begin{matrix} \frac{7}{12}, \frac{13}{12}, \frac{5}{6}, \frac{4}{3} \\ \frac{1}{2}, \frac{7}{6}, 0, \frac{2}{3}, \frac{5}{6}, \frac{4}{3} \end{matrix}\right)$$

Generalized cases involving Bessel *I*

01.19.26.0048.01

$$\sinh(z)\, I_\nu(z) = -\frac{\pi \sec\left(\frac{\pi \nu}{2}\right)}{\sqrt{2}}\, G_{3,5}^{1,2}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4}, 0 \\ \frac{\nu+1}{2}, 0, -\frac{\nu}{2}, \frac{1-\nu}{2}, \frac{\nu}{2} \end{matrix}\right)$$

01.19.26.0127.01

$$\sinh(a+z)\, I_\nu(z) = -\frac{i z^\nu}{\sqrt{2}}\, G_{3,5}^{2,2}\left(i z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}(1-2\nu), \frac{1}{4}(3-2\nu), \frac{i a}{\pi} \\ 0, \frac{1}{2}, \frac{i a}{\pi}, \frac{1}{2}-\nu, -\nu \end{matrix}\right)$$

Generalized cases involving cos, *I*

01.19.26.0128.01

$$\cosh(z)\, I_{-\nu}(z) + \sinh(z)\, I_\nu(z) = \sqrt{2}\, \pi\, G_{2,4}^{2,0}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{\nu}{2}, \frac{1-\nu}{2} \end{matrix}\right)$$

01.19.26.0049.01

$$\cosh(z)\, I_{-\nu}(z) - \sinh(z)\, I_\nu(z) = \frac{\cos(\pi \nu)}{\sqrt{2}\, \pi}\, G_{2,4}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ -\frac{\nu}{2}, \frac{\nu+1}{2}, \frac{\nu}{2}, \frac{1-\nu}{2} \end{matrix}\right)$$

01.19.26.0129.01

$$\sinh(z)\, I_{-\nu}(z) - \cosh(z)\, I_\nu(z) = -\frac{\cos(\pi \nu)}{\sqrt{2}\, \pi}\, G_{2,4}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

01.19.26.0130.01

$$\cosh(z)\, I_\nu(z) + \sinh(z)\, I_{-\nu}(z) = \sqrt{2}\, \pi\, G_{2,4}^{2,0}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{\nu}{2}, \frac{1-\nu}{2}, -\frac{\nu}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

Generalized cases involving Bessel *K*

01.19.26.0050.01

$$\sinh(z)\, K_\nu(z) = \frac{1}{2\sqrt{2}}\, G_{2,4}^{2,2}\left(z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4}, \frac{3}{4} \\ \frac{1-\nu}{2}, \frac{\nu+1}{2}, -\frac{\nu}{2}, \frac{\nu}{2} \end{matrix}\right)$$

Generalized cases involving parabolic cylinder function *D*

01.19.26.0131.01

$$\sinh\left(z^2\right) D_\nu(2 z) = \frac{2^{-\frac{\nu}{2}-2}}{\sqrt{\pi}\, \Gamma(-\nu)}\, G_{1,2}^{2,1}\left(\sqrt{2}\, z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{\nu}{2}+1 \\ 0, \frac{1}{2} \end{matrix}\right) - 2^{\frac{\nu}{2}-1}\, G_{1,2}^{2,0}\left(\sqrt{2}\, z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1-\nu}{2} \\ 0, \frac{1}{2} \end{matrix}\right)$$

01.19.26.0132.01

$$\sinh\left(z^2\right) D_\nu(-2 z) = \frac{2^{-\frac{1}{2}(\nu+1)}\, \pi^{3/2}}{\Gamma(-\nu)}\, G_{3,4}^{2,1}\left(\sqrt{2}\, z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{\nu}{2}+1, \frac{1}{8}, \frac{5}{8} \\ 0, \frac{1}{2}, \frac{1}{8}, \frac{5}{8} \end{matrix}\right) - 2^{\frac{\nu}{2}-1}\, G_{2,3}^{2,1}\left(\sqrt{2}\, z, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1-\nu}{2}, \frac{\nu+1}{2} \\ 0, \frac{1}{2}, \frac{\nu+1}{2} \end{matrix}\right)$$

01.19.26.0133.01

$$\sinh(z^2)\,(D_\nu(-2z)+D_\nu(2z))=\frac{2^{-\frac{1}{2}(\nu+1)}\,\pi^{3/2}}{\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\,\frac{1}{4}\\ 0,\,\frac{1}{2},\,\frac{1}{4}\end{matrix}\right)-2^{\nu/2}\cos\!\left(\frac{\pi\nu}{2}\right)G_{1,2}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\,\frac{1}{2}\end{matrix}\right)$$

01.19.26.0134.01

$$\sinh(z^2)\,(D_\nu(2z)-D_\nu(-2z))=\frac{2^{-\frac{1}{2}(\nu+1)}\,\pi^{3/2}}{\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\,\frac{1}{4}\\ \frac{1}{2},\,0,\,\frac{1}{4}\end{matrix}\right)-2^{\nu/2}\sin\!\left(\frac{\pi\nu}{2}\right)G_{1,2}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ \frac{1}{2},\,0\end{matrix}\right)$$

Generalized cases involving exp and Hermite H

01.19.26.0135.01

$$e^{-z^2}\sinh(z^2)\,H_\nu(\sqrt{2}\,z)=\frac{1}{4\sqrt{\pi}\,\Gamma(-\nu)}\,G_{1,2}^{2,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1\\ 0,\,\frac{1}{2}\end{matrix}\right)-2^{\nu-1}\,G_{1,2}^{2,0}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\,\frac{1}{2}\end{matrix}\right)$$

01.19.26.0136.01

$$e^{-z^2}\sinh(z^2)\,H_\nu(-\sqrt{2}\,z)=\frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{3,4}^{2,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\,\frac{1}{8},\,\frac{5}{8}\\ 0,\,\frac{1}{2},\,\frac{1}{8},\,\frac{5}{8}\end{matrix}\right)-2^{\nu-1}\,G_{2,3}^{2,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2},\,\frac{\nu+1}{2}\\ 0,\,\frac{1}{2},\,\frac{\nu+1}{2}\end{matrix}\right)$$

01.19.26.0137.01

$$e^{-z^2}\sinh(z^2)\left(H_\nu(-\sqrt{2}\,z)+H_\nu(\sqrt{2}\,z)\right)=\frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\,\frac{1}{4}\\ 0,\,\frac{1}{2},\,\frac{1}{4}\end{matrix}\right)-2^{\nu}\cos\!\left(\frac{\pi\nu}{2}\right)G_{1,2}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ 0,\,\frac{1}{2}\end{matrix}\right)$$

01.19.26.0138.01

$$e^{-z^2}\sinh(z^2)\left(H_\nu(\sqrt{2}\,z)-H_\nu(-\sqrt{2}\,z)\right)=\frac{\pi^{3/2}}{\sqrt{2}\,\Gamma(-\nu)}\,G_{2,3}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{\nu}{2}+1,\,\frac{1}{4}\\ \frac{1}{2},\,0,\,\frac{1}{4}\end{matrix}\right)-2^{\nu}\sin\!\left(\frac{\pi\nu}{2}\right)G_{1,2}^{1,1}\!\left(\sqrt{2}\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1-\nu}{2}\\ \frac{1}{2},\,0\end{matrix}\right)$$

Generalized cases involving ${}_0F_1$

01.19.26.0139.01

$$\sinh(z)\,{}_0F_1\!\left(;b;\,\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,\pi\csc\!\left(\frac{b\pi}{2}\right)\Gamma(b)\,G_{3,5}^{1,2}\!\left(z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\,\frac{1}{4}(5-2b),\,\frac{1-b}{2}\\ \frac{1}{2},\,0,\,\frac{1-b}{2},\,1-b,\,\frac{3}{2}-b\end{matrix}\right)$$

01.19.26.0140.01

$$\sinh(z)\,{}_0F_1\!\left(;b;\,\frac{z^2}{4}\right)=-\frac{2^{b-\frac{3}{2}}\,\Gamma(b)}{z}\,G_{2,4}^{1,2}\!\left(i\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{5}{4}-\frac{b}{2},\,\frac{7}{4}-\frac{b}{2}\\ 1,\,\frac{1}{2},\,\frac{3}{2}-b,\,2-b\end{matrix}\right)$$

01.19.26.0141.01

$$\sinh(a+z)\,{}_0F_1\!\left(;b;\,\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,i\,\Gamma(b)\,G_{3,5}^{2,2}\!\left(i\,z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\,\frac{1}{4}(5-2b),\,\frac{i\,a}{\pi}\\ 0,\,\frac{1}{2},\,1-b,\,\frac{3}{2}-b,\,\frac{i\,a}{\pi}\end{matrix}\right)$$

Generalized cases involving ${}_0\tilde{F}_1$

01.19.26.0142.01

$$\sinh(z)\,{}_0\tilde{F}_1\!\left(;b;\,\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,\pi\csc\!\left(\frac{b\pi}{2}\right)G_{3,5}^{1,2}\!\left(z,\,\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1}{4}(3-2b),\,\frac{1}{4}(5-2b),\,\frac{1-b}{2}\\ \frac{1}{2},\,0,\,\frac{1-b}{2},\,1-b,\,\frac{3}{2}-b\end{matrix}\right)$$

01.19.26.0143.01

$$\sinh(z)\,{}_0\tilde{F}_1\left(;b;\frac{z^2}{4}\right)=-\frac{2^{b-\frac{3}{2}}}{z}\,G_{2,4}^{1,2}\left(i\,z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{5}{4}-\frac{b}{2},\frac{7}{4}-\frac{b}{2}\\1,\frac{1}{2},\frac{3}{2}-b,2-b\end{array}\right)$$

01.19.26.0144.01

$$\sinh(a+z)\,{}_0\tilde{F}_1\left(;b;\frac{z^2}{4}\right)=-2^{b-\frac{3}{2}}\,i\,G_{3,5}^{2,2}\left(i\,z,\frac{1}{2}\,\middle|\,\begin{array}{c}\frac{1}{4}(3-2\,b),\frac{1}{4}(5-2\,b),\frac{i\,a}{\pi}\\0,\frac{1}{2},1-b,\frac{3}{2}-b,\frac{i\,a}{\pi}\end{array}\right)$$

Through other functions

Involving Bessel functions

01.19.26.0051.01

$$\sinh(z)=-i\sqrt{\frac{\pi\,i\,z}{2}}\;J_{\frac{1}{2}}(i\,z)$$

01.19.26.0052.01

$$\sinh(z)=\sqrt{\frac{\pi\,z}{2}}\;I_{\frac{1}{2}}(z)$$

01.19.26.0053.01

$$\sinh(z)=-i\sqrt{\frac{\pi\,i\,z}{2}}\;Y_{-\frac{1}{2}}(i\,z)$$

01.19.26.0054.01

$$\sinh(z)=\frac{1}{\sqrt{2\,\pi}}\left(\sqrt{-z}\;K_{-\frac{1}{2}}(-z)-\sqrt{z}\;K_{-\frac{1}{2}}(z)\right)$$

Involving Jacobi functions

01.19.26.0055.01

$$\sinh(z)=-i\,\mathrm{cd}\left(\frac{\pi}{2}-i\,z\,\middle|\,0\right)$$

01.19.26.0056.01

$$\sinh(z)=-i\,\mathrm{cn}\left(\frac{\pi}{2}-i\,z\,\middle|\,0\right)$$

01.19.26.0057.01

$$\sinh(z)=\frac{i}{\mathrm{cn}\left(\frac{\pi\,i}{2}-z\,\middle|\,1\right)}$$

01.19.26.0058.01

$$\sinh(z)=\frac{1}{\mathrm{cs}(z\mid 1)}$$

01.19.26.0059.01

$$\sinh(z)=-\frac{i}{\mathrm{dc}\left(\frac{\pi}{2}-i\,z\,\middle|\,0\right)}$$

01.19.26.0060.01

$$\sinh(z) = \frac{i}{\operatorname{dn}\left(\frac{\pi i}{2} - z \,\middle|\, 1\right)}$$

01.19.26.0061.01

$$\sinh(z) = -\frac{i}{\operatorname{ds}(i z \mid 0)}$$

01.19.26.0062.01

$$\sinh(z) = \frac{1}{\operatorname{ds}(z \mid 1)}$$

01.19.26.0063.01

$$\sinh(z) = -\frac{i}{\operatorname{nc}\left(\frac{\pi}{2} - i z \,\middle|\, 0\right)}$$

01.19.26.0064.01

$$\sinh(z) = i \operatorname{nc}\left(\frac{\pi i}{2} - z \,\middle|\, 1\right)$$

01.19.26.0065.01

$$\sinh(z) = i \operatorname{nd}\left(\frac{\pi i}{2} - z \,\middle|\, 1\right)$$

01.19.26.0066.01

$$\sinh(z) = -\frac{i}{\operatorname{ns}(i z \mid 0)}$$

01.19.26.0067.01

$$\sinh(z) = \operatorname{sc}(z \mid 1)$$

01.19.26.0068.01

$$\sinh(z) = \operatorname{sd}(z \mid 1)$$

01.19.26.0069.01

$$\sinh(z) = -i \operatorname{sd}(i z \mid 0)$$

01.19.26.0070.01

$$\sinh(z) = -i \operatorname{sn}(i z \mid 0)$$

Involving Mathieu functions

01.19.26.0071.01

$$\sinh\left(\sqrt{a}\; z\right) = \frac{i}{\sqrt{a}} \operatorname{Ce}_z(a, 0, i z)$$

01.19.26.0072.01

$$\sinh\left(\sqrt{a}\; z\right) = -i \operatorname{Se}(a, 0, i z)$$

Involving some elliptic-type functions

01.19.26.0073.01

$$\sinh(z) = -i\, E(i z \mid 1) \;/;\; |\operatorname{Im}(z)| \leq \frac{\pi}{2}$$

01.19.26.0074.01

$$\sinh(z) = -i\sqrt{\frac{3}{2}}\, e^{\frac{z^2}{6}}\, \sigma\left(\sqrt{\frac{2}{3}}\, i\, z; 3, 1\right)$$

Involving some hypergeometric-type functions

01.19.26.0075.01

$$\sinh(\pi z) = -\frac{\pi i}{\Gamma(i z)\,\Gamma(1 - i z)}$$

01.19.26.0076.01

$$\sinh(z) = -i\sqrt{\frac{\pi i z}{2}}\, \boldsymbol{H}_{-\frac{1}{2}}(i z)$$

01.19.26.0077.01

$$\sinh(z) = \sqrt{\frac{\pi z}{2}}\, \boldsymbol{L}_{-\frac{1}{2}}(z)$$

01.19.26.0078.01

$$\sinh(n z) = \sinh(z)\, U_{n-1}(\cosh(z))$$

Representations through equivalent functions

With inverse function

01.19.27.0001.01

$$\sinh\left(\sinh^{-1}(z)\right) = z$$

01.19.27.0002.02

$$\sinh^{-1}(\sinh(z)) = z \;/;\; -\frac{\pi}{2} < \text{Im}(z) < \frac{\pi}{2} \bigvee \left(\text{Im}(z) = -\frac{\pi}{2} \bigwedge \text{Re}(z) \le 0\right) \bigvee \left(\text{Im}(z) = \frac{\pi}{2} \bigwedge \text{Re}(z) \ge 0\right)$$

01.19.27.0066.01

$$\sinh^{-1}(\sinh(z)) = -\pi i - z \;/;\; -\frac{3\pi}{2} < \text{Im}(z) < -\frac{\pi}{2} \bigvee \text{Im}(z) = -\frac{3\pi}{2} \bigwedge \text{Re}(z) \le 0 \bigvee \text{Im}(z) = -\frac{\pi}{2} \bigwedge \text{Re}(z) \ge 0$$

01.19.27.0067.01

$$\sinh^{-1}(\sinh(z)) = \pi i - z \;/;\; \frac{\pi}{2} < \text{Im}(z) < \frac{3\pi}{2} \bigvee \text{Im}(z) = \frac{\pi}{2} \bigwedge \text{Re}(z) \le 0 \bigvee \text{Im}(z) = \frac{3\pi}{2} \bigwedge \text{Re}(z) \ge 0$$

01.19.27.0068.01

$$\sinh^{-1}(\sinh(z)) = (-1)^k (z - \pi i k) \;/;$$
$$\left(k\pi - \frac{\pi}{2} < \text{Im}(z) < \pi k + \frac{\pi}{2} \bigvee \text{Im}(z) = k\pi - \frac{\pi}{2} \bigwedge \text{Re}(z) \le 0 \bigvee \text{Im}(z) = \pi k + \frac{\pi}{2} \bigwedge \text{Re}(z) \ge 0\right) \bigwedge k \in \mathbb{Z}$$

01.19.27.0003.01

$$\sinh^{-1}(\sinh(z)) = (-1)^{\left\lfloor -\frac{\text{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor} \left(\left(1 + (-1)^{\left\lfloor \frac{\text{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor -\frac{\text{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor}\right) \theta(-\text{Re}(z)) - 1\right)$$
$$\left(z + i\pi \left\lfloor -\frac{\text{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor + \frac{\pi i}{2}\left(2 - \left(1 + (-1)^{\left\lfloor \frac{\text{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor -\frac{\text{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor}\right) \theta(-\text{Re}(z))\right)\right)$$

01.19.27.0069.01

$$\sinh^{-1}(\sinh(z)) = \begin{cases} (-1)^{\left\lfloor \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \right\rfloor} \left(\pi\, i \left\lfloor \frac{2\,\mathrm{Im}(z)-\pi}{2\pi} \right\rfloor - z\right) & \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \in \mathbb{Z} \bigwedge \mathrm{Re}(z) \geq 0 \\ (-1)^{\left\lfloor \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \right\rfloor} \left(z - \pi\, i \left\lfloor \frac{2\,\mathrm{Im}(z)+\pi}{2\pi} \right\rfloor\right) & \text{True} \end{cases}$$

With related functions

Involving exp

01.19.27.0004.01

$$\sinh(z) = \frac{e^z - e^{-z}}{2}$$

Involving sin

01.19.27.0005.01

$$\sinh(z) = -i \sin(i\, z)$$

01.19.27.0006.01

$$\sinh(i\, z) = i \sin(z)$$

Involving cos

01.19.27.0007.01

$$\sinh(z) = -i \cos\left(\frac{\pi}{2} - i\, z\right)$$

01.19.27.0008.01

$$\sinh(z) = i \cos\left(\frac{\pi}{2} + i\, z\right)$$

01.19.27.0009.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} \sqrt{\frac{\cos(2\, i\, z) - 1}{2}} \;/;\; |\mathrm{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0010.01

$$\sinh(z) = -\frac{\sqrt{-z^2}}{z} \sqrt{\frac{1 - \cos(2\, i\, z)}{2}} \;/;\; |\mathrm{Im}(z)| < \pi$$

01.19.27.0011.01

$$\sinh(z) = i \sqrt{\frac{1 - \cos(2\, i\, z)}{2}} \;/;\; 0 < \mathrm{Im}(z) < \pi$$

01.19.27.0012.01

$$\sinh(z) = -i \sqrt{\frac{1 - \cos(2\, i\, z)}{2}} \; (-1)^{\left\lfloor -\frac{\mathrm{Im}(z)}{\pi} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi} \right\rfloor + \left\lfloor -\frac{\mathrm{Im}(z)}{\pi} \right\rfloor}\right) \theta(-\mathrm{Re}(z))\right)$$

01.19.27.0013.01

$$\sinh(z) = -\frac{\sqrt{-z^2}}{z} \sqrt{1 - \cos^2(i\, z)} \;/;\; |\mathrm{Im}(z)| < \pi$$

01.19.27.0014.01

$$\sinh(z) = i \sqrt{1 - \cos^2(i\, z)} \;/;\; 0 < \mathrm{Im}(z) < \pi$$

01.19.27.0015.01

$$\sinh(z) = -i\sqrt{1-\cos^2(i\,z)}\,(-1)^{\left\lfloor -\frac{\operatorname{Im}(z)}{\pi}\right\rfloor}\left(1-\left(1+(-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi}\right\rfloor+\left\lfloor -\frac{\operatorname{Im}(z)}{\pi}\right\rfloor}\right)\theta(-\operatorname{Re}(z))\right)$$

01.19.27.0016.01

$$\sinh^2(z) = \cos^2(i\,z) - 1$$

Involving tan

01.19.27.0017.01

$$\sinh(z) = -\frac{2\,i\tan\left(\frac{i\,z}{2}\right)}{\tan^2\left(\frac{i\,z}{2}\right)+1}$$

01.19.27.0018.01

$$\sinh(z) = -\frac{i\tan(i\,z)}{\sqrt{\tan^2(i\,z)+1}} \;/;\; |\operatorname{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0019.01

$$\sinh(z) = -i\,\frac{\tan(i\,z)}{\sqrt{1+\tan^2(i\,z)}}\,(-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi}+\frac{1}{2}\right\rfloor}\left(1-\left(1+(-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi}+\frac{1}{2}\right\rfloor+\left\lfloor -\frac{\operatorname{Im}(z)}{\pi}-\frac{1}{2}\right\rfloor}\right)\theta(-\operatorname{Re}(z))\right)$$

01.19.27.0020.01

$$\sinh^2(z) = -\frac{\tan^2(i\,z)}{\tan^2(i\,z)+1}$$

Involving cot

01.19.27.0021.01

$$\sinh(z) = -\frac{2\,i\cot\left(\frac{i\,z}{2}\right)}{\cot^2\left(\frac{i\,z}{2}\right)+1}$$

01.19.27.0022.01

$$\sinh(z) = \frac{i}{\sqrt{\cot^2(i\,z)+1}} \;/;\; 0 < \operatorname{Im}(z) < \pi$$

01.19.27.0023.01

$$\sinh(z) = -\frac{i}{\sqrt{1+\cot^2(i\,z)}}\,(-1)^{\left\lfloor -\frac{\operatorname{Im}(z)}{\pi}\right\rfloor}\left(1-\left(1+(-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi}\right\rfloor+\left\lfloor -\frac{\operatorname{Im}(z)}{\pi}\right\rfloor}\right)\theta(\operatorname{Re}(z))\right)$$

01.19.27.0024.01

$$\sinh^2(z) = -\frac{1}{\cot^2(i\,z)+1}$$

Involving csc

01.19.27.0025.01

$$\sinh(z) = -\frac{i}{\csc(i\,z)}$$

Involving sec

01.19.27.0026.01

$$\sinh(z) = -\frac{i}{\sec\left(\frac{\pi}{2} - i\,z\right)}$$

01.19.27.0027.01

$$\sinh(z) = \frac{i}{\sec\left(\frac{\pi}{2} + i\,z\right)}$$

01.19.27.0028.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} \frac{\sqrt{1 - \sec^2(i\,z)}}{\sec(i\,z)} \;/;\; \operatorname{Re}(z) \neq 0$$

01.19.27.0029.01

$$\sinh(z) = -\frac{\sqrt{-z^2}}{z} \frac{\sqrt{\sec^2(i\,z) - 1}}{\sec(i\,z)} \;/;\; |\operatorname{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0030.01

$$\sinh^2(z) = \frac{1 - \sec^2(i\,z)}{\sec^2(i\,z)}$$

Involving cosh

01.19.27.0031.01

$$\sinh(z) = i \cosh\left(\frac{\pi\,i}{2} - z\right)$$

01.19.27.0032.01

$$\sinh(z) = -i \cosh\left(\frac{\pi\,i}{2} + z\right)$$

01.19.27.0033.01

$$\sinh(z) = -\frac{\sqrt{-z^2}}{z} \sqrt{\frac{1 - \cosh(2\,z)}{2}} \;/;\; |\operatorname{Im}(z)| < \pi$$

01.19.27.0034.01

$$\sinh(z) = \sqrt{\frac{\cosh(2\,z) - 1}{2}} \;/;\; \operatorname{Re}(z) > 0 \bigwedge |\operatorname{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0035.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} \sqrt{\frac{\cosh(2\,z) - 1}{2}} \;/;\; |\operatorname{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0036.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} (-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor} \sqrt{\frac{\cosh(2\,z) - 1}{2}} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\operatorname{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor -\frac{\operatorname{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor}\right) \theta(\operatorname{Re}(z))\right) \;/;\; -\frac{2\,z - \pi\,i}{2\,\pi\,i} \notin \mathbb{N}^+$$

01.19.27.0037.01

$$\sinh(z) = -\frac{\sqrt{-z^2}}{z} \sqrt{1 - \cosh^2(z)} \;/;\; |\operatorname{Im}(z)| < \pi$$

01.19.27.0038.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} \sqrt{\cosh^2(z) - 1} \;/;\; |\mathrm{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0039.01

$$\sinh(z) = \frac{\sqrt{z^2}\sqrt{\cosh^2(z) - 1}}{z} (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi} + \frac{1}{2} \right\rfloor + \left\lfloor -\frac{\mathrm{Im}(z)}{\pi} - \frac{1}{2} \right\rfloor}\right) \theta(\mathrm{Re}(z))\right) /;\; -\frac{2z - \pi i}{2\pi i} \notin \mathbb{N}^+$$

01.19.27.0040.01

$$\sinh^2(z) = \frac{\cosh(2z) - 1}{2}$$

01.19.27.0041.01

$$\sinh^2(z) = \cosh^2(z) - 1$$

01.19.27.0042.01

$$\sinh^2(z) + \cosh^2(z) = \cosh(2z)$$

01.19.27.0043.01

$$\sinh^2(z) - \cosh^2(z) = -1$$

01.19.27.0044.01

$$\sinh(z) + i\cosh(z) = \sqrt{2}\,\sinh\left(z + \frac{i\pi}{4}\right)$$

01.19.27.0045.01

$$\sinh(z) - i\cosh(z) = \sqrt{2}\,\sinh\left(z - \frac{i\pi}{4}\right)$$

01.19.27.0046.01

$$\sinh(z) + \cosh(z) = e^z$$

01.19.27.0047.01

$$\sinh(z) - \cosh(z) = -e^{-z}$$

01.19.27.0048.01

$$a\sinh(z) + b\cosh(z) = \sqrt{1 - \frac{a^2}{b^2}}\; b\cosh\left(z + \tanh^{-1}\left(\frac{a}{b}\right)\right)$$

01.19.27.0049.01

$$\sinh\left(\frac{\pi i}{2} + z\right) = i\cosh(z)$$

01.19.27.0050.01

$$\sinh\left(\frac{\pi i}{2} - z\right) = i\cosh(z)$$

Involving tanh

01.19.27.0051.01

$$\sinh(z) = \frac{2\tanh\left(\frac{z}{2}\right)}{1 - \tanh^2\left(\frac{z}{2}\right)}$$

01.19.27.0052.01

$$\sinh(z) = \frac{\tanh(z)}{\sqrt{1-\tanh^2(z)}} \;/;\; |\mathrm{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0053.01

$$\sinh(z) = \frac{\tanh(z)}{\sqrt{1-\tanh^2(z)}} (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi}+\frac{1}{2} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi}+\frac{1}{2} \right\rfloor + \left\lfloor -\frac{\mathrm{Im}(z)}{\pi}-\frac{1}{2} \right\rfloor}\right) \theta(-\mathrm{Re}(z))\right)$$

01.19.27.0054.01

$$\sinh^2(z) = \frac{\tanh^2(z)}{1-\tanh^2(z)}$$

Involving coth

01.19.27.0055.01

$$\sinh(z) = \frac{2\coth\left(\frac{z}{2}\right)}{\coth^2\left(\frac{z}{2}\right)-1}$$

01.19.27.0056.01

$$\sinh(z) = \frac{1}{\sqrt{\coth^2(z)-1}} \;/;\; |\mathrm{Im}(z)| < \frac{\pi}{2} \bigwedge \mathrm{Re}(z) > 0$$

01.19.27.0057.01

$$\sinh(z) = \sqrt{\frac{1}{z^2}} \frac{z}{\sqrt{\coth^2(z)-1}} \;/;\; |\mathrm{Im}(z)| < \frac{\pi}{2} \bigwedge \mathrm{Re}(z) \neq 0$$

01.19.27.0058.01

$$\sinh(z) = \frac{\sqrt{z^2}}{z} \frac{1}{\sqrt{\coth^2(z)-1}} (-1)^{\left\lfloor \frac{\mathrm{Im}(z)}{\pi}+\frac{1}{2} \right\rfloor} \left(1 - \left(1 + (-1)^{\left\lfloor \frac{1}{2}+\frac{\mathrm{Im}(z)}{\pi} \right\rfloor + \left\lfloor -\frac{\mathrm{Im}(z)}{\pi}-\frac{1}{2} \right\rfloor}\right) \theta(-\mathrm{Re}(z))\right) \;/;\; \mathrm{Re}(z) \neq 0$$

01.19.27.0059.01

$$\sinh^2(z) = \frac{1}{\coth^2(z)-1}$$

Involving csch

01.19.27.0060.01

$$\sinh(z) = \frac{1}{\mathrm{csch}(z)}$$

Involving sech

01.19.27.0061.01

$$\sinh(z) = \frac{i}{\mathrm{sech}\left(\frac{\pi i}{2}-z\right)}$$

01.19.27.0062.01

$$\sinh(z) = -\frac{i}{\mathrm{sech}\left(\frac{\pi i}{2}+z\right)}$$

01.19.27.0063.01

$$\sinh(z) == -\frac{\sqrt{-z^2}}{z} \frac{\sqrt{\operatorname{sech}^2(z) - 1}}{\operatorname{sech}(z)} /; |\operatorname{Im}(z)| < \frac{\pi}{2}$$

01.19.27.0064.01

$$\sinh(z) == z \sqrt{\frac{1}{z^2}} \frac{\sqrt{1 - \operatorname{sech}^2(z)}}{\operatorname{sech}(z)} /; \operatorname{Re}(z) \neq 0$$

01.19.27.0065.01

$$\sinh^2(z) == \frac{1 - \operatorname{sech}^2(z)}{\operatorname{sech}^2(z)}$$

Inequalities

01.19.29.0001.01

$$\sinh(|z|) \geq |\sin(z)|$$

Zeros

01.19.30.0001.01

$$\sinh(z) == 0 /; z == \pi i k \bigwedge k \in \mathbb{Z}$$

Theorems

Bogoliubov transformation

Bogoliubov transformation of thermo field theory $a \longrightarrow \cosh(\alpha)\, a - \sinh(\alpha)\, \tilde{a}^+$, $\tilde{a} \longrightarrow \cosh(\alpha)\, \tilde{a} - \sinh(\alpha)\, a^+$, where a is the creation operator and $\tilde{a}$ is its tilde version, leaves the free Hamiltonian invariant.

History

V. Riccati (1757); D. Foncenex (1759); J.H. Lambert (1768).

The function sinh is encountered often in mathematics and the natural sciences.

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