FresnelC

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Notations

Traditional name

Fresnel integral C

Traditional notation

$C(z)$

Mathematica StandardForm notation

`FresnelC[z]`

Primary definition

06.33.02.0001.01

$$C(z) == \int_0^z \cos\left(\frac{\pi t^2}{2}\right) dt$$

Specific values

Values at fixed points

06.33.03.0001.01

$$C(0) == 0$$

Values at infinities

06.33.03.0002.01

$$C(\infty) == \frac{1}{2}$$

06.33.03.0003.01

$$C(-\infty) == -\frac{1}{2}$$

06.33.03.0004.01

$$C(i\,\infty) == \frac{i}{2}$$

06.33.03.0005.01

$$C(-i\,\infty) == -\frac{i}{2}$$

06.33.03.0006.01

$C(\tilde{\infty}) == ¿$

General characteristics

Domain and analyticity

$C(z)$ is an entire analytical function of z which is defined in the whole complex z-plane.

06.33.04.0001.01

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

Symmetries and periodicities

Parity

$C(z)$ is an odd function.

06.33.04.0002.01

$C(-z) == -C(z)$

Mirror symmetry

06.33.04.0003.01

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

Periodicity

No periodicity

Poles and essential singularities

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

06.33.04.0004.01

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

Branch points

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

06.33.04.0005.01

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

Branch cuts

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

06.33.04.0006.01

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

Series representations

Generalized power series

Expansions at generic point $z == z_0$

For the function itself

06.33.06.0011.01

$$C(z) \propto C(z_0) + \cos\left(\frac{\pi z_0^2}{2}\right)(z - z_0) - \frac{1}{2}\pi \sin\left(\frac{\pi z_0^2}{2}\right) z_0 (z - z_0)^2 + \ldots /; (z \to z_0)$$

06.33.06.0012.01

$$C(z) \propto C(z_0) + \cos\left(\frac{\pi z_0^2}{2}\right)(z - z_0) - \frac{1}{2}\pi \sin\left(\frac{\pi z_0^2}{2}\right) z_0 (z - z_0)^2 + O\left((z - z_0)^3\right)$$

06.33.06.0013.01

$$C(z) == C(z_0) + \sum_{k=1}^{\infty} \sum_{j=0}^{k-1} \frac{2^{j-k+1} \pi^j z_0^{2\,j-k+1}}{k\,(2\,j-k+1)!\,(k-j-1)!} \cos\left(\frac{1}{2}\pi\left(z_0^2 + j\right)\right)(z - z_0)^k$$

06.33.06.0014.01

$$C(z) == \pi^{3/2} \sum_{k=0}^{\infty} \frac{2^{2\,k-\frac{3}{2}} z_0^{1-k}}{k!} {}_3\tilde{F}_4\left(\frac{1}{4}, \frac{3}{4}, 1; \frac{2-k}{4}, \frac{3-k}{4}, 1 - \frac{k}{4}, \frac{5-k}{4}; -\frac{\pi^2 z_0^4}{16}\right)(z - z_0)^k$$

06.33.06.0015.01

$$C(z) \propto C(z_0)\,(1 + O(z - z_0))$$

Expansions at $z == 0$

For the function itself

06.33.06.0001.02

$$C(z) \propto z\left(1 - \frac{\pi^2 z^4}{40} + \frac{\pi^4 z^8}{3456} - \ldots\right) /; (z \to 0)$$

06.33.06.0016.01

$$C(z) \propto z\left(1 - \frac{\pi^2 z^4}{40} + \frac{\pi^4 z^8}{3456} - O\left(z^{12}\right)\right)$$

06.33.06.0002.01

$$C(z) == z \sum_{k=0}^{\infty} \frac{2^{-2\,k} \pi^{2\,k} \left(-z^4\right)^k}{(4\,k+1)\,(2\,k)!}$$

06.33.06.0003.01

$$C(z) == z\,{}_1F_2\left(\frac{1}{4}; \frac{1}{2}, \frac{5}{4}; -\frac{\pi^2 z^4}{16}\right)$$

06.33.06.0004.02

$$C(z) \propto z\left(1 + O\left(z^4\right)\right)$$

06.33.06.0017.01

$$C(z) == F_\infty(z) /;$$

$$\left(\left(F_n(z) == z \sum_{k=0}^{n} \frac{2^{-2k}\, \pi^{2k} \left(-z^4\right)^k}{(4k+1)\,(2k)!} == C(z) + \frac{(-1)^n\, 4^{-n-1}\, \pi^{2(n+1)}\, z^{4n+5}}{(4n+5)\,(2n+2)!}\, {}_2F_3\left(1,\, n+\frac{5}{4};\, n+\frac{3}{2},\, n+2,\, n+\frac{9}{4};\, -\frac{1}{16}\pi^2 z^4\right)\right) \bigwedge n \in \mathbb{N}\right)$$

Summed form of the truncated series expansion.

Asymptotic series expansions

06.33.06.0005.01

$$C(z) \propto \frac{\left(z^4\right)^{3/4}}{2z^3} + \frac{i}{2\pi z}\left(e^{-\frac{i\pi}{2}z^2}\, {}_2F_0\left(1,\, \frac{1}{2};\, ;\, \frac{2i}{\pi z^2}\right) - e^{\frac{i\pi}{2}z^2}\, {}_2F_0\left(1,\, \frac{1}{2};\, ;\, -\frac{2i}{\pi z^2}\right)\right) /;\, (|z| \to \infty)$$

06.33.06.0006.01

$$C(z) \propto \frac{\left(z^4\right)^{3/4}}{2z^3} + \frac{i}{2\pi z}\left(e^{-\frac{i\pi}{2}z^2}\left(1 + O\left(\frac{1}{z^2}\right)\right) - e^{\frac{i\pi}{2}z^2}\left(1 + O\left(\frac{1}{z^2}\right)\right)\right) /;\, (|z| \to \infty)$$

06.33.06.0007.01

$$C(z) \propto \frac{\left(z^4\right)^{3/4}}{2z^3} + \frac{1}{\pi z}\left(\sin\left(\frac{\pi z^2}{2}\right) {}_3F_0\left(\frac{1}{4},\, \frac{3}{4},\, 1;\, ;\, -\frac{16}{\pi^2 z^4}\right) - \frac{1}{\pi z^2}\cos\left(\frac{\pi z^2}{2}\right) {}_3F_0\left(\frac{3}{4},\, \frac{5}{4},\, 1;\, ;\, -\frac{16}{\pi^2 z^4}\right)\right) /;\, (|z| \to \infty)$$

06.33.06.0008.01

$$C(z) \propto \frac{\left(z^4\right)^{3/4}}{2z^3} - \frac{1}{\pi^2 z^3}\cos\left(\frac{\pi z^2}{2}\right)\left(1 + O\left(\frac{1}{z^4}\right)\right) + \frac{1}{\pi z}\sin\left(\frac{\pi z^2}{2}\right)\left(1 + O\left(\frac{1}{z^4}\right)\right) /;\, (|z| \to \infty)$$

Residue representations

06.33.06.0009.01

$$C(z) == \frac{\pi z^{3/4}}{\sqrt{2}\, \sqrt[4]{z^2}\, \sqrt[4]{-z}} \sum_{j=0}^{\infty} \text{res}_s\left(\frac{\left(-\frac{\pi^2}{16}z^4\right)^{-s}}{\Gamma(s+1)\,\Gamma\left(\frac{1}{4}-s\right)\Gamma(1-s)}\,\Gamma\left(s+\frac{1}{4}\right)\right)\left(-j-\frac{1}{4}\right)$$

06.33.06.0010.01

$$C(z) == \frac{\pi e^{-\frac{\pi i}{4}}}{\sqrt{2}} \sum_{j=0}^{\infty} \text{res}_s\left(\frac{\left(\frac{1}{2}e^{\frac{\pi i}{4}}\sqrt{\pi}\, z\right)^{-4s}}{\Gamma(s+1)\,\Gamma\left(\frac{1}{4}-s\right)\Gamma(1-s)}\,\Gamma\left(s+\frac{1}{4}\right)\right)\left(-j-\frac{1}{4}\right)$$

Integral representations

On the real axis

Of the direct function

06.33.07.0001.01

$$C(z) == \int_0^z \cos\left(\frac{\pi t^2}{2}\right) dt$$

06.33.07.0002.01

$$C(z) == \frac{1}{\sqrt{2\,\pi}} \int_0^{\frac{\pi z^2}{2}} \frac{\cos(t)}{\sqrt{t}}\, dt$$

Contour integral representations

06.33.07.0003.01

$$C(z) == \frac{\pi\, z^{3/4}}{\sqrt{2}\ \sqrt[4]{z^2}\ \sqrt[4]{-z}} \frac{1}{2\,\pi\, i} \int_{\mathcal{L}} \frac{\Gamma\left(s+\frac{1}{4}\right)}{\Gamma(s+1)\,\Gamma\left(\frac{1}{4}-s\right)\Gamma(1-s)} \left(-\frac{\pi^2}{16} z^4\right)^{-s} ds$$

06.33.07.0004.01

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

Differential equations

Ordinary linear differential equations and wronskians

For the direct function itself

06.33.13.0001.01

$$z\, w^{(3)}(z) - w''(z) + \pi^2\, z^3\, w'(z) == 0\ /;\ w(z) == C(z) \bigwedge w(0) == 0 \bigwedge w'(0) == 1 \bigwedge w^{(3)}(0) == 0$$

06.33.13.0002.01

$$z\, w^{(3)}(z) - w''(z) + \pi^2\, z^3\, w'(z) == 0\ /;\ w(z) == c_1\, C(z) + c_2\, S(z) + c_3$$

06.33.13.0003.01

$$W_z(1,\, C(z),\, S(z)) == \pi\, z$$

06.33.13.0004.01

$$w^{(3)}(z) - \left(\frac{g'(z)}{g(z)} + \frac{3\, g''(z)}{g'(z)}\right) w''(z) + \left(\pi^2\, g(z)^2\, g'(z)^2 + \frac{g''(z)}{g(z)} + \frac{3\, g''(z)^2 - g'(z)\, g^{(3)}(z)}{g'(z)^2}\right) w'(z)\, w(z) == 0\ /;$$
$$w(z) = c_1\, C(g(z)) + c_2\ S(g(z)) + c_3$$

06.33.13.0005.01

$$W_z(C(g(z)),\, S(g(z)),\, 1) == \pi\, g(z)\, g'(z)^3$$

06.33.13.0006.01

$$w^{(3)}(z) - \left(\frac{g'(z)}{g(z)} + \frac{3\,h'(z)}{h(z)} + \frac{3\,g''(z)}{g'(z)}\right) w''(z) +$$
$$\left(\pi^2\, g(z)^2\, g'(z)^2 + \frac{2\,h'(z)\,g'(z)}{h(z)\,g(z)} + \frac{6\,h'(z)^2}{h(z)^2} + \frac{6\,h'(z)\,g''(z)}{g'(z)\,h(z)} + \frac{g''(z)}{g(z)} + \frac{3\,g''(z)^2 - g'(z)\,g^{(3)}(z)}{g'(z)^2} - \frac{3\,h''(z)}{h(z)}\right) w'(z) +$$
$$\left(-\frac{6\,h'(z)^3}{h(z)^3} - \frac{2\,g'(z)\,h'(z)^2}{g(z)\,h(z)^2} - \frac{6\,g''(z)\,h'(z)^2}{h(z)^2\,g'(z)} + \frac{6\,h''(z)\,h'(z)}{h(z)^2} - \frac{3\,g''(z)^2\,h'(z)}{h(z)\,g'(z)^2} + \right.$$
$$\left. \frac{g'(z)\,h''(z) - h'(z)\,g''(z)}{g(z)\,h(z)} + \frac{3\,g''(z)\,h''(z) + h'(z)\,g^{(3)}(z)}{h(z)\,g'(z)} - \frac{\pi^2\, g(z)^2\, h'(z)\,g'(z)^2 + h^{(3)}(z)}{h(z)}\right)$$
$$w(z) = 0\ /;\ w(z) = c_1\, h(z)\, C(g(z)) + c_2\ h(z)\, S(g(z)) + c_3\, h(z)$$

06.33.13.0007.01

$$W_z(h(z)\, C(g(z)),\ h(z)\, S(g(z)),\ h(z)) == \pi\, g(z)\, h(z)^3\, g'(z)^3$$

06.33.13.0008.01

$$z^3\, w^{(3)}(z) + (-4\,r - 3\,s + 3)\, z^2\, w''(z) + \left(\left(a^4\,\pi^2\, z^{4\,r} + 3\right) r^2 + (8\,s - 4)\, r + 3\,(s-1)\,s + 1\right) z\, w'(z) -$$
$$s\left(\left(a^4\,\pi^2\, z^{4\,r} + 3\right) r^2 + 4\,s\,r + s^2\right) w(z) = 0\ /;\ w(z) = c_1\, z^s\, C(a\, z^r) + c_2\, z^s\, S(a\, z^r) + c_3\, z^s$$

06.33.13.0009.01

$$W_z(z^s\, C(a\, z^r),\ z^s\, S(a\, z^r),\ z^s) == a^4\,\pi\, r^3\, z^{4\,r+3\,s-3}$$

06.33.13.0010.01

$$w^{(3)}(z) + (-4\log(r) - 3\log(s))\, w''(z) + \left(\left(a^4\,\pi^2\, r^{4\,z} + 3\right)\log^2(r) + 8\log(s)\log(r) + 3\log^2(s)\right) w'(z) -$$
$$\log(s)\left(\left(a^4\,\pi^2\, r^{4\,z} + 3\right)\log^2(r) + 4\log(s)\log(r) + \log^2(s)\right) w(z) = 0\ /;\ w(z) = c_1\, s^z\, C(a\, r^z) + c_2\, s^z\, S(a\, r^z) + c_3\, s^z$$

06.33.13.0011.01

$$W_z(s^z\, C(a\, r^z),\ s^z\, S(a\, r^z),\ s^z) == a^4\,\pi\, r^{4\,z}\, s^{3\,z}\log^3(r)$$

Transformations

Transformations and argument simplifications

Argument involving basic arithmetic operations

06.33.16.0001.01

$$C(-z) == -C(z)$$

06.33.16.0002.01

$$C(i\,z) == i\,C(z)$$

06.33.16.0003.01

$$C(-i\,z) == -i\,C(z)$$

06.33.16.0004.01

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

Complex characteristics

Real part

06.33.19.0001.01

$$\operatorname{Re}(C(x+i\,y)) == \sum_{k=0}^{\infty} \frac{(-4)^k\,\pi^{2\,k-\frac{1}{2}}\,x^{4\,k+1}}{(4\,k+1)!}\,\Gamma\left(2\,k+\frac{1}{2}\right)\left(1+\frac{y^2}{x^2}\right)^{2\,k+\frac{1}{2}}\cos\left((4\,k+1)\tan^{-1}\left(\frac{y}{x}\right)\right)$$

06.33.19.0002.01

$$\operatorname{Re}(C(x+i\,y)) == \sum_{k=0}^{\infty}\sum_{j=0}^{2\,k} \frac{(-1)^{j+k}\,2^{2\,k}\,\pi^{2\,k-\frac{1}{2}}\,\Gamma\left(2\,k+\frac{1}{2}\right)y^{2\,j}\,x^{4\,k-2\,j+1}}{(2\,j)!\,(4\,k-2\,j+1)!}$$

06.33.19.0003.01

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

Imaginary part

06.33.19.0004.01

$$\operatorname{Im}(C(x+i\,y)) == \sum_{k=0}^{\infty} \frac{(-1)^k\,2^{2\,k}\,\pi^{2\,k-\frac{1}{2}}\,x^{4\,k+1}}{(4\,k+1)!}\,\Gamma\left(2\,k+\frac{1}{2}\right)\left(1+\frac{y^2}{x^2}\right)^{2\,k+\frac{1}{2}}\sin\left((4\,k+1)\tan^{-1}\left(\frac{y}{x}\right)\right)$$

06.33.19.0005.01

$$\operatorname{Im}(C(x+i\,y)) == \sum_{k=0}^{\infty}\sum_{j=0}^{2\,k} \frac{(-1)^{j+k}\,2^{2\,k}\,\pi^{2\,k-\frac{1}{2}}\,x^{4\,k-2\,j}\,y^{2\,j+1}\,\Gamma\left(2\,k+\frac{1}{2}\right)}{(2\,j+1)!\,(4\,k-2\,j)!}$$

06.33.19.0006.01

$$\operatorname{Im}(C(x+i\,y)) == \frac{x}{2\,y}\sqrt{-\frac{y^2}{x^2}}\left(C\left(x-x\sqrt{-\frac{y^2}{x^2}}\right)-C\left(x+x\sqrt{-\frac{y^2}{x^2}}\right)\right)$$

Absolute value

06.33.19.0007.01

$$|C(x+i\,y)| == \sqrt{C\left(x-x\sqrt{-\frac{y^2}{x^2}}\right)C\left(x+x\sqrt{-\frac{y^2}{x^2}}\right)}$$

Argument

06.33.19.0008.01

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

Conjugate value

06.33.19.0009.01

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

Differentiation

Low-order differentiation

06.33.20.0001.01

$$\frac{\partial C(z)}{\partial z} == \cos\left(\frac{\pi z^2}{2}\right)$$

06.33.20.0002.01

$$\frac{\partial^2 C(z)}{\partial z^2} == -\pi z \sin\left(\frac{\pi z^2}{2}\right)$$

Symbolic differentiation

06.33.20.0006.01

$$\frac{\partial^n C(z)}{\partial z^n} == C(z)\,\delta_n + \sum_{k=0}^{n-1}\frac{2^{k-n+1}\,\pi^k\,z^{2\,k-n+1}\,(n-1)!}{(2\,k-n+1)!\,(n-k-1)!}\cos\left(\frac{1}{2}\pi\left(z^2+k\right)\right)/;\ n\in\mathbb{N}$$

06.33.20.0003.01

$$\frac{\partial^n C(z)}{\partial z^n} == \delta_n\,C(z) + \sum_{k=0}^{n-1}\sum_{m=0}^{k}\frac{(-1)^m\,2^{2\,m-k}\,\pi^k\,z^{2\,k-n+1}}{(k-m)!\,(2\,m-n+1)!}\left(\frac{1}{2}\right)_m\cos\left(\frac{\pi}{2}\left(z^2-k\right)\right)/;\ n\in\mathbb{N}$$

06.33.20.0004.02

$$\frac{\partial^n C(z)}{\partial z^n} == 2^{2\,n-\frac{3}{2}}\,\pi^{3/2}\,z^{1-n}\,{}_3\tilde{F}_4\left(\frac{1}{4},\frac{3}{4},1;\frac{2-n}{4},\frac{3-n}{4},1-\frac{n}{4},\frac{5-n}{4};-\frac{\pi^2\,z^4}{16}\right)/;\ n\in\mathbb{N}$$

Fractional integro-differentiation

06.33.20.0005.02

$$\frac{\partial^\alpha C(z)}{\partial z^\alpha} == 2^{2\,\alpha-\frac{3}{2}}\,\pi^{3/2}\,z^{1-\alpha}\,{}_3\tilde{F}_4\left(\frac{1}{4},\frac{3}{4},1;\frac{2-\alpha}{4},\frac{3-\alpha}{4},1-\frac{\alpha}{4},\frac{5-\alpha}{4};-\frac{\pi^2\,z^4}{16}\right)$$

Integration

Indefinite integration

Involving only one direct function

06.33.21.0001.01

$$\int C(b+a\,z)\,dz == \frac{1}{a\,\pi}\left(\pi\,(b+a\,z)\,C(b+a\,z)-\sin\left(\frac{1}{2}\pi\,(b+a\,z)^2\right)\right)$$

06.33.21.0002.01

$$\int C(a\,z)\,dz == z\,C(a\,z) - \frac{\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)}{a\,\pi}$$

06.33.21.0003.01

$$\int C(z)\,dz == z\,C(z) - \frac{1}{\pi}\sin\left(\frac{\pi\,z^2}{2}\right)$$

Involving one direct function and elementary functions

Involving power function

Involving power

Linear argument

06.33.21.0004.01

$$\int z^{\alpha-1}\,C(a\,z)\,dz == \frac{1}{4\,\alpha}\,\pi^{-\frac{\alpha+1}{2}}\,z^{\alpha}\left(a^4\,z^4\right)^{-\frac{\alpha+1}{2}}$$
$$\left(4\,\pi^{\frac{\alpha+1}{2}}\,C(a\,z)\left(a^4\,z^4\right)^{\frac{\alpha+1}{2}} + 2^{\frac{\alpha+1}{2}}\,a\,z\left(\left(-i\,a^2\,z^2\right)^{\frac{\alpha+1}{2}}\,\Gamma\left(\frac{\alpha+1}{2},\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right) + \left(i\,a^2\,z^2\right)^{\frac{\alpha+1}{2}}\,\Gamma\left(\frac{\alpha+1}{2},\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)\right)$$

06.33.21.0005.01

$$\int z^{\alpha-1}\,C(z)\,dz ==$$
$$\frac{1}{4\,\alpha}\,\pi^{-\frac{\alpha+1}{2}}\,z^{\alpha}\left(z^4\right)^{-\frac{\alpha+1}{2}}\left(4\,\pi^{\frac{\alpha+1}{2}}\,C(z)\left(z^4\right)^{\frac{\alpha+1}{2}} + 2^{\frac{\alpha+1}{2}}\,z\left(\left(-i\,z^2\right)^{\frac{\alpha+1}{2}}\,\Gamma\left(\frac{\alpha+1}{2},\,\frac{1}{2}\,i\,\pi\,z^2\right) + \left(i\,z^2\right)^{\frac{\alpha+1}{2}}\,\Gamma\left(\frac{\alpha+1}{2},\,-\frac{1}{2}\,i\,\pi\,z^2\right)\right)\right)$$

06.33.21.0006.01

$$\int z\,C(z)\,dz == \frac{1}{2\,\pi}\left(\pi\,C(z)\,z^2 - \sin\left(\frac{\pi\,z^2}{2}\right)z + S(z)\right)$$

06.33.21.0007.01

$$\int \frac{C(a\,z)}{z}\,dz == \frac{1}{2}\,a\,z\left({}_2F_2\left(\frac{1}{2},\,\frac{1}{2};\,\frac{3}{2},\,\frac{3}{2};\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right) + {}_2F_2\left(\frac{1}{2},\,\frac{1}{2};\,\frac{3}{2},\,\frac{3}{2};\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)$$

06.33.21.0008.01

$$\int \frac{C(a\,z)}{z^2}\,dz == \frac{a}{2}\,\mathrm{Ci}\left(\frac{1}{2}\,a^2\,\pi\,z^2\right) - \frac{1}{z}\,C(a\,z)$$

Power arguments

06.33.21.0009.01

$$\int C\left(a\,\sqrt{z}\right)dz == \frac{\pi\,z\,C\left(a\,\sqrt{z}\right)a^2 - \sqrt{z}\,\sin\left(\frac{1}{2}\,a^2\,\pi\,z\right)a + S\left(a\,\sqrt{z}\right)}{a^2\,\pi}$$

06.33.21.0010.01

$$\int z^{\alpha-1}\, C(a\, z^r)\, dz == \frac{1}{4\,\alpha}\, \pi^{-\frac{r+\alpha}{2\,r}}\, z^{\alpha}\, \left(a^4\, z^{4\,r}\right)^{-\frac{r+\alpha}{2\,r}}$$
$$\left(2^{\frac{r+\alpha}{2\,r}}\, a \left(\left(-i\, a^2\, z^{2\,r}\right)^{\frac{r+\alpha}{2\,r}}\, \Gamma\left(\frac{r+\alpha}{2\,r}, \frac{1}{2}\, i\, a^2\, \pi\, z^{2\,r}\right) + \left(i\, a^2\, z^{2\,r}\right)^{\frac{r+\alpha}{2\,r}}\, \Gamma\left(\frac{r+\alpha}{2\,r}, -\frac{1}{2}\, i\, a^2\, \pi\, z^{2\,r}\right)\right) z^r + 4\,\pi^{\frac{r+\alpha}{2\,r}}\, \left(a^4\, z^{4\,r}\right)^{\frac{r+\alpha}{2\,r}}\, C(a\, z^r)\right)$$

06.33.21.0011.01

$$\int \frac{C\left(a\,\sqrt{z}\right)}{\sqrt{z}}\, dz == 2\,\sqrt{z}\; C\left(a\,\sqrt{z}\right) - \frac{2\,\sin\left(\frac{1}{2}\, a^2\, \pi\, z\right)}{a\,\pi}$$

Involving exponential function

Involving exp

06.33.21.0012.01

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

06.33.21.0013.01

$$\int e^{b\,z^2}\, C(a\, z)\, dz == \frac{a}{2\,b}\sum_{k=0}^{\infty} \frac{2^{-2\,k}\, \pi^{2\,k}\, (-1)^k\, a^{4\,k}\, b^{-2\,k}\, \Gamma\left(2\,k+1, -b\, z^2\right)}{(4\,k+1)\,(2\,k)!}$$

Involving exponential function and a power function

Involving exp and power

Linear arguments

06.33.21.0014.01

$$\int z^{\alpha-1}\, e^{b\,z}\, C(a\, z)\, dz == \frac{a\, z^{\alpha}\, (-b\, z)^{-\alpha}}{b}\sum_{k=0}^{\infty} \frac{(-1)^k\, 2^{-2\,k}\, \pi^{2\,k}\, a^{4\,k}\, b^{-4\,k}\, \Gamma(4\,k+\alpha+1, -b\, z)}{(4\,k+1)\,(2\,k)!}$$

06.33.21.0015.01

$$\int z^n\, e^{b\,z}\, C(a\, z)\, dz ==$$
$$a\, (-b)^{-n-1}\, n!\sum_{m=0}^{n} \frac{1}{m!}\, (-b)^m \left(-\left(-i\, a^2\right)^{-m-1}\, e^{-\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\, (-b)^{m-k}\, \pi^{\frac{1}{2}(k-2\,m-1)}\left(b - i\, a^2\, \pi\, z\right)^{k+1}\left(\frac{i\left(\pi\, z\, a^2 + b\, i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\right.$$
$$\binom{m}{k}\,\Gamma\left(\frac{k+1}{2}, \frac{i\left(\pi\, z\, a^2 + b\, i\right)^2}{2\, a^2\, \pi}\right) - \left(i\, a^2\right)^{-m-1}\, e^{\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\, (-b)^{m-k}\, \pi^{\frac{1}{2}(k-2\,m-1)}\left(i\,\pi\, z\, a^2 + b\right)^{k+1}$$
$$\left.\left(\frac{i\left(i\,\pi\, z\, a^2 + b\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\,\Gamma\left(\frac{k+1}{2}, \frac{i\left(i\,\pi\, z\, a^2 + b\right)^2}{2\, a^2\, \pi}\right)\right) - (-b)^{-n-1}\, C(a\, z)\,\Gamma(n+1, -b\, z)\;/;\; n \in \mathbb{N}$$

06.33.21.0016.01

$$\int z\, e^{b z}\, C(a z)\, dz ==$$

$$\frac{1}{2 a^2 b^2 \pi} e^{-\frac{i\left(\pi^2 z^2 a^4+b^2\right)}{2 a^2 \pi}} \left(i a b\, e^{\frac{i b^2}{2 a^2 \pi}+z b}\left(-1+e^{i a^2 \pi z^2}\right)+e^{\frac{1}{2} i a^2 \pi z^2}\left(2 e^{\frac{i b^2}{2 a^2 \pi}+z b} \pi (b z-1) C(a z) a^2-e^{\frac{i b^2}{a^2 \pi}}\left(i \pi a^2+b^2\right)\right.\right.$$
$$\left.\left.\left(C\left(\frac{b}{a \pi}+a i z\right)-i S\left(\frac{b}{a \pi}+a i z\right)\right)-\left(b^2-i a^2 \pi\right)\left(C\left(\frac{b}{a \pi}-i a z\right)+i S\left(\frac{b}{a \pi}-i a z\right)\right)\right)\right)$$

06.33.21.0017.01

$$\int z^2\, e^{b z}\, C(a z)\, dz == \frac{1}{4 a^4 b^3 \pi^2} e^{-\frac{i\left(\pi^2 z^2 a^4+b^2\right)}{2 a^2 \pi}} \left(2 a b\, e^{\frac{i b^2}{2 a^2 \pi}+z b} i\left(-b \pi z a^2+2 \pi a^2+b^2 i+e^{i a^2 \pi z^2}\left(b \pi z a^2-2 \pi a^2+b^2 i\right)\right)+\right.$$
$$2 e^{\frac{1}{2} i a^2 \pi z^2}\left(2 e^{\frac{i b^2}{2 a^2 \pi}+z b} \pi^2 (b z (b z-2)+2) C(a z) a^4+\left(-2 \pi^2 a^4-i b^2 \pi a^2+b^4\right)\left(C\left(\frac{i b}{a \pi}+a z\right)-i S\left(\frac{i b}{a \pi}+a z\right)\right)+\right.$$
$$\left.\left.e^{\frac{i b^2}{a^2 \pi}}\left(2 \pi^2 a^4-i b^2 \pi a^2-b^4\right)\left(i C\left(\frac{b}{a \pi}+a i z\right)+S\left(\frac{b}{a \pi}+a i z\right)\right)\right)\right)$$

06.33.21.0018.01

$$\int z^3\, e^{b z}\, C(a z)\, dz ==$$

$$\frac{1}{2 a^6 b^4 \pi^3} e^{-\frac{i\left(\pi^2 z^2 a^4+b^2\right)}{2 a^2 \pi}} \left(a b\, e^{\frac{i b^2}{2 a^2 \pi}+z b}\left(-6 i \pi^2 a^4-i b^2 \pi^2 z^2 a^4+3 b i \pi^2 z a^4-b^3 \pi z a^2+b^2 \pi a^2+b^4 i+e^{i a^2 \pi z^2}\right.\right.$$
$$\left.\left(6 i \pi^2 a^4-3 i b \pi^2 z a^4-b^3 \pi z a^2+b^2 \pi\left(a^2 i \pi z^2+1\right) a^2+b^4 (-i)\right)\right)+$$
$$e^{\frac{1}{2} i a^2 \pi z^2}\left(2 e^{\frac{i b^2}{2 a^2 \pi}+z b} \pi^3 (b z (b z (b z-3)+6)-6) C(a z) a^6+\left(6 \pi^3 a^6+3 b^2 i \pi^2 a^4+b^6 (-i)\right)\right.$$
$$\left.\left.\left(C\left(\frac{i b}{a \pi}+a z\right)-i S\left(\frac{i b}{a \pi}+a z\right)\right)+e^{\frac{i b^2}{a^2 \pi}}\left(-6 i \pi^3 a^6-3 b^2 \pi^2 a^4+b^6\right)\left(C\left(\frac{b}{a \pi}+a i z\right)-i S\left(\frac{b}{a \pi}+a i z\right)\right)\right)\right)$$

06.33.21.0019.01

$$\int z^{\alpha-1}\, e^{b z^2}\, C(a z)\, dz == \frac{1}{2} z^{\alpha}\left(-b z^2\right)^{-\frac{\alpha}{2}} C\left(a z\right)\Gamma\left(\frac{\alpha}{2}, 0, -b z^2\right)+\frac{i\left(a^4 z^4\right)^{-\frac{\alpha}{2}}}{a} \sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2 k+\alpha-3)} \pi^{\frac{1}{2}(-2 k-\alpha-1)} z^{-2 k+\alpha-1} a^{-4 k} b^k}{(2 k+\alpha) k!}$$
$$\left(\sqrt{-i a^2 z^2}\ \left(i a^2 z^2\right)^{k+\frac{\alpha}{2}} \Gamma\left(k+\frac{\alpha+1}{2}, -\frac{1}{2} i a^2 \pi z^2\right)-\sqrt{i a^2 z^2}\ \left(-i a^2 z^2\right)^{k+\frac{\alpha}{2}} \Gamma\left(k+\frac{\alpha+1}{2}, \frac{1}{2} i a^2 \pi z^2\right)\right)$$

06.33.21.0020.01

$$\int z\, e^{b z^2}\, C(a z)\, dz == \frac{1}{4 b \left(\pi^2 a^4 + 4 b^2\right)} \left(2 e^{b z^2} \left(\pi^2 a^4 + 4 b^2\right) C(a z) - a \sqrt{\pi} \left((1 - i) \sqrt{\frac{1}{2} i \pi a^2 + b}\ \left(2 b - i a^2 \pi\right) C\left(\sqrt[4]{-1}\ \sqrt{i a^2 + \frac{2 b}{\pi}}\ z \right) + \left(a^2 \pi - 2 i b\right) \sqrt{\pi a^2 + 2 b i}\ C\left(\sqrt{a^2 + \frac{2 b i}{\pi}}\ z \right) - (1 + i) \sqrt{\frac{1}{2} i \pi a^2 + b}\ \left(2 b - i a^2 \pi\right) S\left(\sqrt[4]{-1}\ \sqrt{i a^2 + \frac{2 b}{\pi}}\ z \right) - \left(i \pi a^2 + 2 b\right) \sqrt{\pi a^2 + 2 b i}\ S\left(\sqrt{a^2 + \frac{2 b i}{\pi}}\ z \right) \right) \right)$$

06.33.21.0021.01

$$\int z^3\, e^{b z^2}\, C(a z)\, dz == \frac{1}{8 b^2} \left(\frac{\sqrt{\pi}\ a \left(i \pi a^2 + 3 b\right) \operatorname{erfi}\left(\sqrt{\frac{1}{2} i \pi a^2 + b}\ z \right)}{2 \left(\frac{1}{2} i \pi a^2 + b\right)^{3/2}} + \frac{\sqrt{\pi}\ a \left(3 b - i a^2 \pi\right) \operatorname{erfi}\left(\sqrt{b - \frac{1}{2} i a^2 \pi}\ z \right)}{2 \left(b - \frac{1}{2} i a^2 \pi\right)^{3/2}} + 4 e^{b z^2} \left(b z^2 - 1\right) C(a z) - \frac{4 a b z e^{b z^2}}{\pi^2 a^4 + 4 b^2} \left(\pi \sin\left(\frac{1}{2} a^2 \pi z^2 \right) a^2 + 2 b \cos\left(\frac{1}{2} a^2 \pi z^2 \right) \right) \right)$$

Power arguments

06.33.21.0022.01

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

Involving trigonometric functions

Involving sin

Linear arguments

06.33.21.0023.01

$$\int \sin(b z)\, C(a z)\, dz == \frac{1}{2 b} \left(-2 \cos(b z)\, C(a z) + \cos\left(\frac{b^2}{2 a^2 \pi} \right) C\left(\frac{b}{a \pi} + a z \right) - \cos\left(\frac{b^2}{2 a^2 \pi} \right) C\left(\frac{b}{a \pi} - a z \right) + S\left(\frac{b}{a \pi} + a z \right) \sin\left(\frac{b^2}{2 a^2 \pi} \right) - S\left(\frac{b}{a \pi} - a z \right) \sin\left(\frac{b^2}{2 a^2 \pi} \right) \right)$$

06.33.21.0024.01

$$\int \sin\left(b\,z^2\right) C(a\,z)\,dz == -\frac{a}{4\,b}\sum_{k=0}^{\infty}\frac{2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-2\,k}\left(\Gamma\left(2\,k+1,\,-i\,b\,z^2\right)+\Gamma\left(2\,k+1,\,i\,b\,z^2\right)\right)}{(4\,k+1)\,(2\,k)!}$$

Power arguments

06.33.21.0025.01

$$\int \sin(b\,z)\,C\left(a\,\sqrt{z}\right)dz == \frac{1}{2\,b}\left(-2\cos(b\,z)\,C\left(a\,\sqrt{z}\right)+\frac{a\,C\left(\sqrt{a^2+\frac{2\,b}{\pi}}\,\sqrt{z}\right)}{\sqrt{a^2+\frac{2\,b}{\pi}}}+\frac{a\,C\left(\sqrt{a^2-\frac{2\,b}{\pi}}\,\sqrt{z}\right)}{\sqrt{a^2-\frac{2\,b}{\pi}}}\right)$$

Involving cos

Linear arguments

06.33.21.0026.01

$$\int \cos(b\,z)\,C(a\,z)\,dz == \frac{1}{2\,b}\left(-\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\frac{b}{a\,\pi}+a\,z\right)-\right.$$
$$\left.\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\frac{b}{a\,\pi}-a\,z\right)+C\left(\frac{b}{a\,\pi}+a\,z\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+C\left(\frac{b}{a\,\pi}-a\,z\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+2\,C(a\,z)\sin(b\,z)\right)$$

06.33.21.0027.01

$$\int \cos\left(b\,z^2\right) C(a\,z)\,dz == -\frac{i\,a}{4\,b}\sum_{k=0}^{\infty}\frac{2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-2\,k}\left(\Gamma\left(2\,k+1,\,-i\,b\,z^2\right)-\Gamma\left(2\,k+1,\,i\,b\,z^2\right)\right)}{(4\,k+1)\,(2\,k)!}$$

Power arguments

06.33.21.0028.01

$$\int \cos(b\,z)\,C\left(a\,\sqrt{z}\right)dz == \frac{1}{2\,b}\left(2\,C\left(a\,\sqrt{z}\right)\sin(b\,z)-\frac{a\,S\left(\sqrt{\frac{2\,b}{\pi}-a^2}\,\sqrt{z}\right)}{\sqrt{\frac{2\,b}{\pi}-a^2}}-\frac{a\,S\left(\sqrt{a^2+\frac{2\,b}{\pi}}\,\sqrt{z}\right)}{\sqrt{a^2+\frac{2\,b}{\pi}}}\right)$$

Involving trigonometric functions and a power function

Involving sin and power

Linear arguments

06.33.21.0029.01

$$\int z^{\alpha-1}\sin(b\,z)\,C(a\,z)\,dz == -\frac{a\,z^{\alpha}}{2\,b}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-4\,k}}{(4\,k+1)\,(2\,k)!}\left((-i\,b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,-i\,b\,z)+(i\,b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,i\,b\,z)\right)$$

06.33.21.0030.01

$$\int z^n \sin(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{i^n\,b^{-n-1}}{2}\left(i\,a\,n!\left((-1)^n\sum_{m=0}^{n}\frac{2^{m-1}\,a^{-2\,m-2}\,b^m\,\pi^{-m-1}}{m!}\,e^{-\frac{i\,b^2}{2\,a^2\,\pi}}\left(\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(i\,b)^{m-k}\,\pi^{\frac{k+1}{2}}\left(-\frac{i\left(b-a^2\,\pi\,z\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\right.\right.\right.$$

$$\left.\left(i\left(a^2\,\pi\,z-b\right)\right)^{k+1}\binom{m}{k}\Gamma\left(\frac{k+1}{2},-\frac{i\left(b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)-(-1)^m\,e^{\frac{i\,b^2}{a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(i\,b)^{m-k}$$

$$\left.\pi^{\frac{k+1}{2}}\left(-i\left(\pi\,z\,a^2+b\right)\right)^{k+1}\left(\frac{i\left(\pi\,z\,a^2+b\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(\pi\,z\,a^2+b\right)^2}{2\,a^2\,\pi}\right)\right)+$$

$$\sum_{m=0}^{n}\frac{2^{m-1}\,a^{-2\,m-2}\,b^m\,\pi^{-m-1}}{m!}\,e^{-\frac{i\,b^2}{2\,a^2\,\pi}}\left((-1)^m\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(-i\,b)^{m-k}\,\pi^{\frac{k+1}{2}}\left(i\left(\pi\,z\,a^2+b\right)\right)^{k+1}\right.$$

$$\left(-\frac{i\left(\pi\,z\,a^2+b\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},-\frac{i\left(\pi\,z\,a^2+b\right)^2}{2\,a^2\,\pi}\right)-e^{\frac{i\,b^2}{a^2\,\pi}}$$

$$\left.\left.\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(-i\,b)^{m-k}\,\pi^{\frac{k+1}{2}}\left(i\left(b-a^2\,\pi\,z\right)\right)^{k+1}\left(\frac{i\left(b-a^2\,\pi\,z\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)\right)\right)-$$

$$\left.C(a\,z)\left(\Gamma(n+1,-i\,b\,z)+(-1)^n\,\Gamma(n+1,i\,b\,z)\right)\right)/;\,n\in\mathbb{N}$$

06.33.21.0031.01

$$\int z\sin(b\,z)\,C(a\,z)\,dz == -\frac{1}{2\,a^2\,b^2\,\pi}\left(2\,\pi\,C(a\,z)\left(b\,z\cos(b\,z)-\sin(b\,z)\right)a^2-2\,b\cos(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a+\right.$$

$$\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\left(\pi\left(S\left(\frac{b}{a\,\pi}+a\,z\right)+S\left(\frac{b}{a\,\pi}-a\,z\right)\right)a^2+b^2\,C\left(\frac{b}{a\,\pi}+a\,z\right)+b^2\,C\left(\frac{b}{a\,\pi}-a\,z\right)\right)-$$

$$\left.\left.\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\left(\pi\,C\left(\frac{b}{a\,\pi}+a\,z\right)a^2+\pi\,C\left(\frac{b}{a\,\pi}-a\,z\right)a^2-b^2\left(S\left(\frac{b}{a\,\pi}+a\,z\right)+S\left(\frac{b}{a\,\pi}-a\,z\right)\right)\right)\right)\right)$$

06.33.21.0032.01

$$\int z^2 \sin(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{1}{2\,a^4\,b^3\,\pi^2}\left(2\,\pi^2\,C(a\,z)\left(\left(2-b^2\,z^2\right)\cos(b\,z)+2\,b\,z\sin(b\,z)\right)a^4+2\,b\,\pi\,(b\,z\cos(b\,z)-2\sin(b\,z))\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a^3-\right.$$

$$2\,b^3\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sin(b\,z)\,a+\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\left(a^2\,\pi\left(S\left(\frac{b}{a\,\pi}+a\,z\right)-S\left(\frac{b}{a\,\pi}-a\,z\right)\right)b^2+\left(b^4-2\,a^4\,\pi^2\right)C\left(\frac{b}{a\,\pi}+a\,z\right)\right)+$$

$$\left(-a^2\,\pi\,C\left(\frac{b}{a\,\pi}+a\,z\right)b^2-\left(b^4-2\,a^4\,\pi^2\right)\left(S\left(\frac{b}{a\,\pi}-a\,z\right)-S\left(\frac{b}{a\,\pi}+a\,z\right)\right)\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+$$

$$\left.C\left(\frac{b}{a\,\pi}-a\,z\right)\left(a^2\,b^2\,\pi\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)-\left(b^4-2\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)$$

06.33.21.0033.01

$$\int z^3 \sin(b\,z)\,C(a\,z)\,dz ==$$

$$-\frac{1}{2\,a^6\,b^4\,\pi^3}\left(\pi^3\,a^6\,C(a\,z)\left(2\left(b\,z\left(b^2\,z^2-6\right)\cos(b\,z)-3\left(b^2\,z^2-2\right)\sin(b\,z)\right)\right)+\left(2\,a^3\,b^3\,\pi\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)(\cos(b\,z)+b\,z\sin(b\,z))-\right.$$

$$2\,a\,b\left(\left(-6\,\pi^2\,a^4+b^2\,\pi^2\,z^2\,a^4+b^4\right)\cos(b\,z)-3\,a^4\,b\,\pi^2\,z\sin(b\,z)\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)+$$

$$C\left(\frac{b}{a\,\pi}+a\,z\right)\left(6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6+b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$

$$C\left(\frac{b}{a\,\pi}-a\,z\right)\left(6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6+b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)-$$

$$\left.\left.\left(S\left(\frac{b}{a\,\pi}+a\,z\right)+S\left(\frac{b}{a\,\pi}-a\,z\right)\right)\left(6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)-b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)\right)$$

06.33.21.0034.01

$$\int z^{\alpha-1}\sin\left(b\,z^2\right)C(a\,z)\,dz == \frac{1}{4}\left(-i\,z^{\alpha}\,C(a\,z)\left(\left(-i\,b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,-i\,b\,z^2\right)-\left(i\,b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,i\,b\,z^2\right)\right)-\right.$$

$$\frac{2\left(a^4\,z^4\right)^{-\frac{\alpha}{2}}}{a}\left(\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(-i\,b)^k}{(2\,k+\alpha)\,k!}\left(\sqrt{-i\,a^2\,z^2}\,\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\right.\right.$$

$$\left.\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)-\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(i\,b)^k}{(2\,k+\alpha)\,k!}$$

$$\left.\left.\left(\sqrt{-i\,a^2\,z^2}\,\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)\right)\right)$$

06.33.21.0035.01

$$\int z \sin\left(b z^2\right) C(a z)\, dz == \frac{1}{16 b \left(4 b^2 - a^4 \pi^2\right)} \left(-8 \left(4 b^2 - a^4 \pi^2\right) \cos\left(b z^2\right) C(a z) - 4 a \sqrt{\pi} \left(\left(a^2 \pi - 2 b\right) \sqrt{\pi a^2 + 2 b}\; C\left(\sqrt{a^2 + \frac{2 b}{\pi}}\; z \right) + \sqrt{a^2 \pi - 2 b}\; \left(\pi a^2 + 2 b\right) C\left(\sqrt{a^2 - \frac{2 b}{\pi}}\; z \right) \right) \right)$$

06.33.21.0036.01

$$\int z^3 \sin\left(b z^2\right) C(a z)\, dz == \frac{1}{16 b^2} \left(-8 \left(b z^2 \cos\left(b z^2\right) - \sin\left(b z^2\right)\right) C(a z) + a \left(-\frac{4 \sqrt{\pi} \left(\pi a^2 + 3 b\right) S\left(\sqrt{a^2 + \frac{2 b}{\pi}}\; z \right)}{\left(\pi a^2 + 2 b\right)^{3/2}} + \frac{4 \sqrt{\pi} \left(a^2 \pi - 3 b\right) S\left(\sqrt{a^2 - \frac{2 b}{\pi}}\; z \right)}{\left(a^2 \pi - 2 b\right)^{3/2}} + \frac{b}{z} \left(\sqrt{2 \pi} \left(\frac{\sqrt{i \left(a^2 \pi - 2 b\right) z^2}}{\left(a^2 \pi - 2 b\right)^2} + \frac{\sqrt{-i \left(\pi a^2 + 2 b\right) z^2}}{\left(\pi a^2 + 2 b\right)^2} + \frac{\sqrt{i \left(\pi a^2 + 2 b\right) z^2}}{\left(\pi a^2 + 2 b\right)^2} + \frac{\sqrt{i \left(2 b - a^2 \pi\right) z^2}}{\left(a^2 \pi - 2 b\right)^2} \right) + \frac{8 z^2}{a^4 \pi^2 - 4 b^2} \left(a^2 \pi \cos\left(b z^2\right) \sin\left(\frac{1}{2} a^2 \pi z^2\right) - 2 b \cos\left(\frac{1}{2} a^2 \pi z^2\right) \sin\left(b z^2\right) \right) \right) \right)$$

Power arguments

06.33.21.0037.01

$$\int \frac{\sin\left(b \sqrt{z}\right) C\left(a \sqrt{z}\right)}{\sqrt{z}}\, dz == \frac{1}{b} \left(\cos\left(\frac{b^2}{2 a^2 \pi} \right) \left(C\left(\sqrt{z}\; a + \frac{b}{a \pi} \right) - C\left(\frac{b}{a \pi} - a \sqrt{z} \right) \right) - 2 \cos\left(b \sqrt{z}\right) C\left(a \sqrt{z}\right) + \left(S\left(\sqrt{z}\; a + \frac{b}{a \pi} \right) - S\left(\frac{b}{a \pi} - a \sqrt{z} \right) \right) \sin\left(\frac{b^2}{2 a^2 \pi} \right) \right)$$

Involving cos and power

Linear arguments

06.33.21.0038.01

$$\int z^{\alpha - 1} \cos(b z)\, C(a z)\, dz == \frac{i a}{2 b} \sum_{k=0}^{\infty} \frac{1}{(4 k + 1)\,(2 k)!} \left(\left(-1\right)^k 2^{-2 k} \pi^{2 k} a^{4 k} b^{-4 k} \right) \left(z^{\alpha} \left(i b z\right)^{-\alpha} \Gamma(4 k + \alpha + 1, i b z) - z^{\alpha} \left(-i b z\right)^{-\alpha} \Gamma(4 k + \alpha + 1, -i b z) \right)$$

06.33.21.0039.01

$$\int z^n \cos(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{i^n\,b^{-n-1}}{2}\left(i\,C(a\,z)\left((-1)^n\,\Gamma(n+1,\,i\,b\,z)-\Gamma(n+1,\,-i\,b\,z)\right)-a\,n!\left(e^{-\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{m=0}^{n}\frac{a^{-2\,m-2}\,b^m}{m!}\left((-1)^m\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(-i\,b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\right.\right.\right.$$

$$\left.\left(i\left(\pi\,z\,a^2+b\right)\right)^{k+1}\left(-\frac{i\left(\pi\,z\,a^2+b\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(\pi\,z\,a^2+b\right)^2}{2\,a^2\,\pi}\right)-e^{\frac{i\,b^2}{a^2\,\pi}}$$

$$\left.\left.\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(-i\,b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(i\left(b-a^2\,\pi\,z\right)\right)^{k+1}\left(\frac{i\left(b-a^2\,\pi\,z\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)\right)\right)-$$

$$(-1)^n\,e^{-\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{m=0}^{n}\frac{(-1)^m\,a^{-2\,m-2}\,b^m}{m!}\left((-1)^m\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(i\,b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(-\frac{i\left(b-a^2\,\pi\,z\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\right.$$

$$\left(i\left(a^2\,\pi\,z-b\right)\right)^{k+1}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)-e^{\frac{i\,b^2}{a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(i\,b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}$$

$$\left.\left.\left(-i\left(\pi\,z\,a^2+b\right)\right)^{k+1}\left(\frac{i\left(\pi\,z\,a^2+b\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi\,z\,a^2+b\right)^2}{2\,a^2\,\pi}\right)\right)\right)\Big/;\,n\in\mathbb{N}$$

06.33.21.0040.01

$$\int z\cos(b\,z)\,C(a\,z)\,dz == \frac{1}{b^2}\left(\frac{1}{2\,a^2\,\pi}\left(\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\left(\pi\left(C\left(\frac{b}{a\,\pi}-a\,z\right)-C\left(\frac{b}{a\,\pi}+a\,z\right)\right)a^2+b^2\left(S\left(\frac{b}{a\,\pi}+a\,z\right)-S\left(\frac{b}{a\,\pi}-a\,z\right)\right)\right)+\right.\right.$$

$$\left.\left(\pi\left(S\left(\frac{b}{a\,\pi}-a\,z\right)-S\left(\frac{b}{a\,\pi}+a\,z\right)\right)a^2+b^2\left(C\left(\frac{b}{a\,\pi}-a\,z\right)-C\left(\frac{b}{a\,\pi}+a\,z\right)\right)\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$

$$\left.C(a\,z)\left(\cos(b\,z)+b\,z\sin(b\,z)\right)-\frac{b\sin(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)}{a\,\pi}\right)$$

06.33.21.0041.01

$$\int z^2\cos(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{1}{2\,a^4\,b^3\,\pi^2}\left(2\,\pi^2\,C(a\,z)\left(2\,b\,z\cos(b\,z)+\left(b^2\,z^2-2\right)\sin(b\,z)\right)a^4-2\,b\,\pi\left(2\cos(b\,z)+b\,z\sin(b\,z)\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a^3-2\,b^3\cos(b\,z)\right.$$

$$\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a+\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\left(a^2\,b^2\,\pi\left(C\left(\frac{b}{a\,\pi}+a\,z\right)+C\left(\frac{b}{a\,\pi}-a\,z\right)\right)-\left(b^4-2\,a^4\,\pi^2\right)\left(S\left(\frac{b}{a\,\pi}+a\,z\right)+S\left(\frac{b}{a\,\pi}-a\,z\right)\right)\right)+$$

$$\left.\left(a^2\,\pi\left(S\left(\frac{b}{a\,\pi}+a\,z\right)+S\left(\frac{b}{a\,\pi}-a\,z\right)\right)b^2+\left(b^4-2\,a^4\,\pi^2\right)\left(C\left(\frac{b}{a\,\pi}+a\,z\right)+C\left(\frac{b}{a\,\pi}-a\,z\right)\right)\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)$$

06.33.21.0042.01

$$\int z^3 \cos(b\,z)\, C(a\,z)\, dz ==$$

$$\frac{1}{2\,a^6\,b^4\,\pi^3}\left(2\,\pi^3\, C(a\,z)\left(3\left(b^2\,z^2-2\right)\cos(b\,z)+b\,z\left(b^2\,z^2-6\right)\sin(b\,z)\right)a^6+2\,b^3\,\pi\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)(\sin(b\,z)-b\,z\cos(b\,z))\,a^3-\right.$$

$$2\,b\left(3\,b\,\pi^2\,z\cos(b\,z)\,a^4+\left(-6\,\pi^2\,a^4+b^2\,\pi^2\,z^2\,a^4+b^4\right)\sin(b\,z)\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a+$$

$$\left(S\left(\frac{b}{a\,\pi}+a\,z\right)-S\left(\frac{b}{a\,\pi}-a\,z\right)\right)\left(6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6+b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$

$$C\left(\frac{b}{a\,\pi}-a\,z\right)\left(b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)-6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$

$$\left.C\left(\frac{b}{a\,\pi}+a\,z\right)\left(6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)-b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)$$

06.33.21.0043.01

$$\int z^{\alpha-1}\cos\left(b\,z^2\right)C(a\,z)\,dz ==$$

$$\frac{1}{4\,a}\left(2\,i\left(a^4\,z^4\right)^{-\frac{\alpha}{2}}\left(\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(-i\,b)^k}{(2\,k+\alpha)\,k!}\left(\sqrt{-i\,a^2\,z^2}\;\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\,\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\right.\right.\right.$$

$$\left.\left.\left.\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)+\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(i\,b)^k}{(2\,k+\alpha)\,k!}\right.\right.$$

$$\left.\left.\left(\sqrt{-i\,a^2\,z^2}\;\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\,\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)\right)+\right.$$

$$\left.a\,z^{\alpha}\,C(a\,z)\left(\left(-i\,b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,-i\,b\,z^2\right)+\left(i\,b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,i\,b\,z^2\right)\right)\right)$$

06.33.21.0044.01

$$\int z\cos\left(b\,z^2\right)C(a\,z)\,dz == \frac{1}{4\,b\left(4\,b^2-a^4\,\pi^2\right)}\left(\left(a^2\,\pi-2\,b\right)\left(a\,\sqrt{\pi}\;\sqrt{\pi\,a^2+2\,b}\;\;S\left(\sqrt{a^2+\frac{2\,b}{\pi}}\;\;z\right)-2\left(\pi\,a^2+2\,b\right)C(a\,z)\sin\left(b\,z^2\right)\right)-\right.$$

$$\left.a\,\sqrt{\pi}\;\sqrt{2\,b-a^2\,\pi}\;\left(\pi\,a^2+2\,b\right)S\left(\sqrt{\frac{2\,b}{\pi}-a^2}\;\;z\right)\right)$$

06.33.21.0045.01

$$\int z^3 \cos\left(b\,z^2\right) C(a\,z)\,dz == \frac{1}{32\,b^2}\left(2\,a\,i\,\sqrt{2\,\pi}\left(-\frac{\left(a^2\,\pi-3\,b\right)\operatorname{erfi}\left(\sqrt{\frac{1}{2}\,i\,a^2\,\pi-i\,b}\;z\right)}{\left(i\left(a^2\,\pi-2\,b\right)\right)^{3/2}}+\frac{\left(\pi\,a^2+3\,b\right)\operatorname{erfi}\left(\sqrt{-\frac{1}{2}\,i\,\pi\,a^2+b\,(-i)}\;z\right)}{\left(-i\left(\pi\,a^2+2\,b\right)\right)^{3/2}}+\right.\right.$$

$$\left.\left.\frac{\left(a^2\,\pi-3\,b\right)\operatorname{erfi}\left(\sqrt{i\,b-\frac{1}{2}\,i\,a^2\,\pi}\;z\right)}{\left(-i\left(a^2\,\pi-2\,b\right)\right)^{3/2}}-\frac{\left(\pi\,a^2+3\,b\right)\operatorname{erfi}\left(\sqrt{\frac{1}{2}\,i\,\pi\,a^2+b\,i}\;z\right)}{\left(i\left(\pi\,a^2+2\,b\right)\right)^{3/2}}\right)+\right.$$

$$\left.16\,C(a\,z)\left(b\sin\left(b\,z^2\right)z^2+\cos\left(b\,z^2\right)\right)-\frac{16\,a\,b\,z}{a^4\,\pi^2-4\,b^2}\left(\pi\sin\left(b\,z^2\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a^2+2\,b\cos\left(b\,z^2\right)\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)\right)$$

Power arguments

06.33.21.0046.01

$$\int \frac{\cos\left(b\,\sqrt{z}\right)C\left(a\,\sqrt{z}\right)}{\sqrt{z}}\,dz == \frac{1}{b}\left(-\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\sqrt{z}\;a+\frac{b}{a\,\pi}\right)-\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\frac{b}{a\,\pi}-a\,\sqrt{z}\right)+\right.$$

$$\left.C\left(\sqrt{z}\;a+\frac{b}{a\,\pi}\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+C\left(\frac{b}{a\,\pi}-a\,\sqrt{z}\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+2\,C\left(a\,\sqrt{z}\right)\sin\left(b\,\sqrt{z}\right)\right)$$

Involving exponential function and trigonometric functions

Involving exp and sin

06.33.21.0047.01

$$\int e^{b\,z}\sin(c\,z)\,C(a\,z)\,dz ==$$

$$\frac{1}{4}\left(\frac{1}{b+c\,i}e^{-\frac{i\,(b+c\,i)^2}{2\,a^2\,\pi}}\left(-C\left(\frac{b+c\,i}{a\,\pi}-i\,a\,z\right)+e^{\frac{i\,(b+c\,i)^2}{a^2\,\pi}}\left(C\left(\frac{b+i\left(\pi\,z\,a^2+c\right)}{a\,\pi}\right)-i\,S\left(\frac{b+i\left(\pi\,z\,a^2+c\right)}{a\,\pi}\right)\right)-i\,S\left(\frac{b+c\,i}{a\,\pi}-i\,a\,z\right)\right)-\right.$$

$$\frac{1}{b-i\,c}e^{-\frac{i\,(b-i\,c)^2}{2\,a^2\,\pi}}\left(i\,C\left(\frac{c+b\,i}{a\,\pi}+a\,z\right)+S\left(\frac{c+b\,i}{a\,\pi}+a\,z\right)+e^{\frac{i\,(b-i\,c)^2}{a^2\,\pi}}\left(C\left(\frac{b-i\,c}{a\,\pi}+a\,i\,z\right)-i\,S\left(\frac{b-i\,c}{a\,\pi}+a\,i\,z\right)\right)\right)+$$

$$\left.\frac{4\,e^{b\,z}\,C(a\,z)\,(b\sin(c\,z)-c\cos(c\,z))}{b^2+c^2}\right)$$

06.33.21.0048.01

$$\int e^{b z^2} \sin\left(c z^2\right) C(a z)\, dz ==$$

$$\frac{i a}{4} \sum_{k=0}^{\infty} \frac{(-1)^k 2^{-2k} \pi^{2k} a^{4k}}{(4k+1)(2k)!} \left((b - i c)^{-2k-1} \Gamma\left(2k+1, -(b - i c) z^2\right) - (b + c i)^{-2k-1} \Gamma\left(2k+1, -(b + c i) z^2\right)\right)$$

Involving exp and cos

06.33.21.0049.01

$$\int e^{b z} \cos(c z) C(a z)\, dz ==$$

$$\frac{1}{4}\left(\frac{1}{i b - c} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}} \left(C\left(\frac{b + c i}{a \pi} - i a z\right) - e^{\frac{i (b+c i)^2}{a^2 \pi}} \left(C\left(\frac{b + i \left(\pi z a^2 + c\right)}{a \pi}\right) - i S\left(\frac{b + i \left(\pi z a^2 + c\right)}{a \pi}\right)\right) + i S\left(\frac{b + c i}{a \pi} - i a z\right)\right) - \right.$$

$$\frac{1}{c + b i} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}} \left(i C\left(\frac{c + b i}{a \pi} + a z\right) + S\left(\frac{c + b i}{a \pi} + a z\right) + e^{\frac{i (b-i c)^2}{a^2 \pi}} \left(C\left(\frac{b - i c}{a \pi} + a i z\right) - i S\left(\frac{b - i c}{a \pi} + a i z\right)\right)\right) +$$

$$\left. \frac{4 e^{b z} C(a z) (b \cos(c z) + c \sin(c z))}{b^2 + c^2}\right)$$

06.33.21.0050.01

$$\int e^{b z^2} \cos\left(c z^2\right) C(a z)\, dz ==$$

$$\frac{a}{4} \sum_{k=0}^{\infty} \frac{(-1)^k 2^{-2k} \pi^{2k} a^{4k}}{(4k+1)(2k)!} \left((b - i c)^{-2k-1} \Gamma\left(2k+1, -(b - i c) z^2\right) + (b + c i)^{-2k-1} \Gamma\left(2k+1, -(b + c i) z^2\right)\right)$$

Involving power, exponential and trigonometric functions

Involving power, exp and sin

06.33.21.0051.01

$$\int z^{\alpha-1} e^{b z} \sin(c z) C(a z)\, dz == \frac{i a z^{\alpha}}{2} \sum_{k=0}^{\infty} \frac{(-1)^k 2^{-2k} \pi^{2k} a^{4k}}{(4k+1)(2k)!}$$

$$\left(((i c - b) z)^{-\alpha} (b - i c)^{-4k-1} \Gamma(4k + \alpha + 1, -(b - i c) z) - ((-b - i c) z)^{-\alpha} (b + c i)^{-4k-1} \Gamma(4k + \alpha + 1, -(b + c i) z)\right)$$

06.33.21.0052.01

$$\int z^n e^{b z} \sin(c z)\, C(a z)\, dz == \frac{i}{2}\left(C(a z)\left((-b-i c)^{-n-1}\,\Gamma(n+1,\,-(b+c i) z)-(i c-b)^{-n-1}\,\Gamma(n+1,\,i c z-b z)\right)+\right.$$

$$a\, n!\left((i c-b)^{-n-1}\sum_{m=0}^{n}\frac{(-(b-i c))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b-i c))^{m-k}\,\pi^{\frac{1}{2}(k-2 m-1)}\left((b-i c)-i a^2 \pi z\right)^{k+1}\right.\right.$$

$$\left(\frac{i\left(\pi z a^2+(b-i c) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi z a^2+(b-i c) i\right)^2}{2 a^2 \pi}\right)-$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b-i c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b-i c))^{m-k}\,\pi^{\frac{1}{2}(k-2 m-1)}\left(i \pi z a^2+(b-i c)\right)^{k+1}$$

$$\left.\left.\left(\frac{i\left(i \pi z a^2+(b-i c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(i \pi z a^2+(b-i c)\right)^2}{2 a^2 \pi}\right)\right)-\right.$$

$$(-b-i c)^{-n-1}\sum_{m=0}^{n}\frac{(-(b+c i))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b+c i))^{m-k}\,\pi^{\frac{1}{2}(k-2 m-1)}\right.$$

$$\left((b+c i)-i a^2 \pi z\right)^{k+1}\left(\frac{i\left(\pi z a^2+(b+c i) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi z a^2+(b+c i) i\right)^2}{2 a^2 \pi}\right)-$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b+c i)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b+c i))^{m-k}\,\pi^{\frac{1}{2}(k-2 m-1)}\left(i \pi z a^2+(b+c i)\right)^{k+1}$$

$$\left.\left.\left.\left.\left(\frac{i\left(i \pi z a^2+(b+c i)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(i \pi z a^2+(b+c i)\right)^2}{2 a^2 \pi}\right)\right)\right)\right)\Big/;\, n\in\mathbb{N}$$

06.33.21.0053.01

$$\int z\, e^{b z} \sin(c z)\, C(a z)\, dz ==$$

$$\frac{1}{4 a^2 \pi}\left(\frac{1}{\left(b^2+c^2\right)^2}\left(2 i \pi \left((b+c i)^2 e^{(b-i c) z}(b z-i c z-1)-(b-i c)^2 e^{(b+c i) z}(b z+c i z-1)\right) C(a z)\, a^2+\right.\right.$$

$$(b+c i)^2 e^{-\frac{i (b-i c)^2}{2 a^2 \pi}}\left(\pi a^2+(b-i c)^2 i\right)\left(i C\left(\frac{c+b i}{a \pi}+a z\right)+S\left(\frac{c+b i}{a \pi}+a z\right)\right)+$$

$$(b-i c)^2 e^{\frac{i (b+c i)^2}{2 a^2 \pi}}\left(i \pi a^2+(b+c i)^2\right)\left(i C\left(\frac{b+c i}{a \pi}+a i z\right)+S\left(\frac{b+c i}{a \pi}+a i z\right)\right)-$$

$$e^{\frac{i (b-i c)^2}{2 a^2 \pi}}(b+c i)^2\left(i (b-i c)^2-a^2 \pi\right)\left(C\left(\frac{b-i c}{a \pi}+a i z\right)-i S\left(\frac{b-i c}{a \pi}+a i z\right)\right)+(b-i c)^2 e^{-\frac{i (b+c i)^2}{2 a^2 \pi}}$$

$$\left.\left.\left((b+c i)^2-i a^2 \pi\right)\left(i C\left(\frac{b+c i}{a \pi}-i a z\right)-S\left(\frac{b+c i}{a \pi}-i a z\right)\right)\right)+\frac{4 a e^{b z}(c \cos(c z)-b \sin(c z)) \sin\left(\frac{1}{2} a^2 \pi z^2\right)}{b^2+c^2}\right)$$

06.33.21.0054.01

$$\int z^2\, e^{b z} \sin(c z)\, C(a z)\, dz ==$$

$$-\frac{i}{4 a^4 \pi^2}\left(\frac{1}{(b+c i)^3}\left(2 e^{(b+c i) z} \pi^2\left((b+c i) z (b z+c i z-2)+2\right) C(a z)\, a^4+e^{\frac{i (b+c i)^2}{2 a^2 \pi}}\left(2 \pi^2 a^4-i (b+c i)^2 \pi a^2-(b+c i)^4\right)\right.\right.$$

$$\left(i C\left(\frac{b+c i}{a \pi}+a i z\right)+S\left(\frac{b+c i}{a \pi}+a i z\right)\right)+e^{-\frac{i (b+c i)^2}{2 a^2 \pi}}$$

$$\left.\left(-2 \pi^2 a^4-i (b+c i)^2 \pi a^2+(b+c i)^4\right)\left(i C\left(\frac{b+c i}{a \pi}-i a z\right)-S\left(\frac{b+c i}{a \pi}-i a z\right)\right)\right)-$$

$$\frac{2 a e^{(b+c i) z}}{(b+c i)^2}\left(\pi (b z+c i z-2) \sin\left(\frac{1}{2} a^2 \pi z^2\right) a^2+(b+c i)^2 \cos\left(\frac{1}{2} a^2 \pi z^2\right)\right)-$$

$$\frac{1}{(b-i c)^3}\left(2 e^{(b-i c) z} \pi^2\left(b^2 z^2-c^2 z^2+2 c i z+2 b (-i c z-1) z+2\right) C(a z)\, a^4-\right.$$

$$2 (b-i c) e^{(b-i c) z}\left(\pi (b z-i c z-2) \sin\left(\frac{1}{2} a^2 \pi z^2\right) a^2+(b-i c)^2 \cos\left(\frac{1}{2} a^2 \pi z^2\right)\right) a+$$

$$e^{-\frac{i (b-i c)^2}{2 a^2 \pi}}\left(-2 \pi^2 a^4-i (b-i c)^2 \pi a^2+(b-i c)^4\right)\left(i C\left(\frac{-i \pi z a^2+b-i c}{a \pi}\right)-S\left(\frac{-i \pi z a^2+b-i c}{a \pi}\right)\right)+$$

$$\left.\left.e^{\frac{i (b-i c)^2}{2 a^2 \pi}}\left(2 \pi^2 a^4-i (b-i c)^2 \pi a^2-(b-i c)^4\right)\left(i C\left(\frac{b-i c}{a \pi}+a i z\right)+S\left(\frac{b-i c}{a \pi}+a i z\right)\right)\right)\right)$$

06.33.21.0055.01

$$\int z^3\, e^{b z} \sin(c z)\, C(a z)\, dz ==$$

$$\frac{i}{4 a^6 \pi^3} e^{-\frac{1}{2} i a^2 \pi z^2} \left(\frac{1}{(b - i c)^4} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}} \left(a (b - i c)\, e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} \left(-6 i \pi^2 a^4 - i (b - i c)^2 \pi^2 z^2 a^4 + 3 (c + b i) \pi^2 z a^4 - \right.\right.\right.$$
$$(b - i c)^3 \pi z a^2 + (b - i c)^2 \pi a^2 + (b - i c)^4 i + e^{i a^2 \pi z^2}$$
$$\left.\left.\left. \left(6 i \pi^2 a^4 - 3 i (b - i c) \pi^2 z a^4 - (b - i c)^3 \pi z a^2 + (b - i c)^2 \pi \left(a^2 i \pi z^2 + 1\right) a^2 + (b - i c)^4 (-i)\right)\right) + \right.\right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} \pi^3 ((b - i c) z ((b - i c) z (b z - i c z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left(6 \pi^3 a^6 + 3 (b - i c)^2 i \pi^2 a^4 + (b - i c)^6 (-i)\right) \left(C\left(\frac{\pi z a^2 + c + b i}{a \pi}\right) - i S\left(\frac{\pi z a^2 + c + b i}{a \pi}\right)\right) +$$
$$\left.\left. e^{\frac{i (b-i c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b - i c)^2 \pi^2 a^4 + (b - i c)^6\right) \left(C\left(\frac{b - i c}{a \pi} + a i z\right) - i S\left(\frac{b - i c}{a \pi} + a i z\right)\right)\right)\right) -$$

$$\frac{1}{(b + c i)^4} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}} \left(a (b + c i)\, e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b + c i)} \left(-6 i \pi^2 a^4 - i (b + c i)^2 \pi^2 z^2 a^4 + 3 (b + c i) i \pi^2 z a^4 - \right.\right.$$
$$(b + c i)^3 \pi z a^2 + (b + c i)^2 \pi a^2 + (b + c i)^4 i +$$
$$\left.\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 + 3 (c - i b) \pi^2 z a^4 - (b + c i)^3 \pi z a^2 + (b + c i)^2 \pi \left(a^2 i \pi z^2 + 1\right) a^2 + (b + c i)^4 (-i)\right)\right) + \right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b + c i)} \pi^3 ((b + c i) z ((b + c i) z (b z + c i z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left(6 \pi^3 a^6 + 3 (b + c i)^2 i \pi^2 a^4 + (b + c i)^6 (-i)\right) \left(C\left(\frac{i b - c}{a \pi} + a z\right) - i S\left(\frac{i b - c}{a \pi} + a z\right)\right) +$$
$$\left.\left. e^{\frac{i (b+c i)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b + c i)^2 \pi^2 a^4 + (b + c i)^6\right) \left(C\left(\frac{b + c i}{a \pi} + a i z\right) - i S\left(\frac{b + c i}{a \pi} + a i z\right)\right)\right)\right)\right)$$

06.33.21.0056.01

$$\int z^{\alpha - 1}\, e^{b z^2} \sin\left(c z^2\right) C(a z)\, dz ==$$

$$\frac{1}{4} \left(i z^{\alpha}\, C(a z) \left(\left(-(b - i c) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b - i c) z^2\right) - \left(-(b + c i) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b + c i) z^2\right)\right) - \right.$$
$$\frac{2 \left(a^4 z^4\right)^{-\frac{\alpha}{2}}}{a} \left(\sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2 k + \alpha - 3)}\, \pi^{\frac{1}{2}(-2 k - \alpha - 1)}\, z^{-2 k + \alpha - 1}\, a^{-4 k}\, (b - i c)^k}{(2 k + \alpha)\, k!} \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k + \frac{\alpha}{2}} \Gamma\left(\frac{\alpha + 1}{2} + k, -\frac{1}{2} i a^2 \pi z^2\right) - \right.\right.$$
$$\left.\left. \left(-i a^2 z^2\right)^{k + \frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha + 1}{2} + k, \frac{1}{2} i a^2 \pi z^2\right)\right) - \sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2 k + \alpha - 3)}\, \pi^{\frac{1}{2}(-2 k - \alpha - 1)}\, z^{-2 k + \alpha - 1}\, a^{-4 k}\, (b + c i)^k}{(2 k + \alpha)\, k!} \right.$$
$$\left.\left. \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k + \frac{\alpha}{2}} \Gamma\left(\frac{\alpha + 1}{2} + k, -\frac{1}{2} i a^2 \pi z^2\right) - \left(-i a^2 z^2\right)^{k + \frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha + 1}{2} + k, \frac{1}{2} i a^2 \pi z^2\right)\right)\right)\right)$$

06.33.21.0057.01

$$\int z\, e^{b z^2} \sin\left(c z^2\right) C(a z)\, dz ==$$

$$\frac{1}{16}\left(a\sqrt{2\pi}\, z\left(\frac{i}{(b-i c)\sqrt{\left(-i\pi a^2-2b+2c i\right)z^2}}-\frac{i}{(b+c i)\sqrt{i\left(\pi a^2-2c+2b i\right)z^2}}+\frac{i}{(b-i c)\sqrt{i\left(\pi a^2+2c+2b i\right)z^2}}-\right.\right.$$

$$\frac{i}{(b+c i)\sqrt{-\left(2b+i\left(\pi a^2+2c\right)\right)z^2}}+\frac{(1-i)\, C\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2c+2b i\right)z^2}}{\sqrt{2\pi}}\right)}{(b-i c)\sqrt{i\left(\pi a^2+2c+2b i\right)z^2}}-\frac{(1-i)\, C\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2\pi}{2}\right)i\right)z^2}}{\sqrt{\pi}}\right)}{(b+c i)\sqrt{i\left(\pi a^2-2c+2b i\right)z^2}}-$$

$$\frac{(1-i)\, C\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right)i\right)z^2}}{\sqrt{\pi}}\right)}{(b+c i)\sqrt{-\left(2b+i\left(\pi a^2+2c\right)\right)z^2}}+\frac{(1-i)\, C\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}}{\sqrt{\pi}}\right)}{(b-i c)\sqrt{\left(-i\pi a^2-2b+2c i\right)z^2}}-$$

$$\frac{(1+i)\, S\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2c+2b i\right)z^2}}{\sqrt{2\pi}}\right)}{(b-i c)\sqrt{i\left(\pi a^2+2c+2b i\right)z^2}}+\frac{(1+i)\, S\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2\pi}{2}\right)i\right)z^2}}{\sqrt{\pi}}\right)}{(b+c i)\sqrt{i\left(\pi a^2-2c+2b i\right)z^2}}+\frac{(1+i)\, S\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right)i\right)z^2}}{\sqrt{\pi}}\right)}{(b+c i)\sqrt{-\left(2b+i\left(\pi a^2+2c\right)\right)z^2}}-$$

$$\left.\left.\frac{(1+i)\, S\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}}{\sqrt{\pi}}\right)}{(b-i c)\sqrt{\left(-i\pi a^2-2b+2c i\right)z^2}}\right)+\frac{8\, e^{b z^2}\, C(a z)\left(b\sin\left(c z^2\right)-c\cos\left(c z^2\right)\right)}{b^2+c^2}\right)$$

Involving power, exp and cos

06.33.21.0058.01

$$\int z^{\alpha-1}\, e^{b z}\cos(c z)\, C(a z)\, dz == \frac{a z^{\alpha}}{2}\sum_{k=0}^{\infty}\frac{(-1)^k\, 2^{-2k}\, \pi^{2k}\, a^{4k}}{(4k+1)\,(2k)!}$$

$$\left((b+c i)^{-4k-1}\left((-b-i c)\, z\right)^{-\alpha}\Gamma(4k+\alpha+1,\, -(b+c i)\, z)+(b-i c)^{-4k-1}\left((i c-b)\, z\right)^{-\alpha}\Gamma(4k+\alpha+1,\, -(b-i c)\, z)\right)$$

06.33.21.0059.01

$$\int z^n e^{b z} \cos(c z)\, C(a z)\, dz == \frac{1}{2}\left(C(a z)\left(-\Gamma(n+1,\, i c z - b z)\,(i c - b)^{-n-1} - (-b - i c)^{-n-1}\,\Gamma(n+1,\, -(b + c i) z)\right) + \right.$$

$$a\, n!\left((i c - b)^{-n-1}\sum_{m=0}^{n}\frac{(-(b - i c))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b - i c))^{m-k}\,\pi^{\frac{1}{2}(k-2m-1)}\left((b - i c) - i a^2 \pi z\right)^{k+1}\right.\right.$$

$$\left.\left(\frac{i\left(\pi z a^2 + (b - i c) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\, \frac{i\left(\pi z a^2 + (b - i c) i\right)^2}{2 a^2 \pi}\right) -\right.$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b-i c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b - i c))^{m-k}\,\pi^{\frac{1}{2}(k-2m-1)}\left(i \pi z a^2 + (b - i c)\right)^{k+1}$$

$$\left.\left.\left.\left(\frac{i\left(i \pi z a^2 + (b - i c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\, \frac{i\left(i \pi z a^2 + (b - i c)\right)^2}{2 a^2 \pi}\right)\right) +\right.$$

$$(-b - i c)^{-n-1}\sum_{m=0}^{n}\frac{(-(b + c i))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b + c i))^{m-k}\,\pi^{\frac{1}{2}(k-2m-1)}\right.$$

$$\left((b + c i) - i a^2 \pi z\right)^{k+1}\left(\frac{i\left(\pi z a^2 + (b + c i) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\, \frac{i\left(\pi z a^2 + (b + c i) i\right)^2}{2 a^2 \pi}\right) -$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b+c i)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}}\,(-(b + c i))^{m-k}\,\pi^{\frac{1}{2}(k-2m-1)}\left(i \pi z a^2 + (b + c i)\right)^{k+1}$$

$$\left.\left.\left.\left.\left(\frac{i\left(i \pi z a^2 + (b + c i)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\, \frac{i\left(i \pi z a^2 + (b + c i)\right)^2}{2 a^2 \pi}\right)\right)\right)\right)\right) /;\, n \in \mathbb{N}$$

06.33.21.0060.01

$$\int z\, e^{b z} \cos(c z)\, C(a z)\, dz ==$$

$$-\frac{1}{4 a^2 \pi}\left(\frac{1}{(b+c i)^2}\left(-2 e^{(b+c i) z} \pi (b z + c i z - 1)\, C(a z)\, a^2 + 2 (b + c i)\, e^{(b+c i) z} \sin\left(\frac{1}{2} a^2 \pi z^2\right) a + e^{\frac{i (b+c i)^2}{2 a^2 \pi}} \left(i \pi a^2 + (b + c i)^2\right)\right.\right.$$
$$\left.\left(C\left(\frac{b + c i}{a \pi} + a i z\right) - i S\left(\frac{b + c i}{a \pi} + a i z\right)\right) + e^{-\frac{i (b+c i)^2}{2 a^2 \pi}} \left((b + c i)^2 - i a^2 \pi\right)\left(C\left(\frac{b + c i}{a \pi} - i a z\right) + i S\left(\frac{b + c i}{a \pi} - i a z\right)\right)\right) +$$
$$\frac{1}{(b - i c)^2}\left(-2 e^{(b-i c) z} \pi (b z - i c z - 1)\, C(a z)\, a^2 + 2 (b - i c)\, e^{(b-i c) z} \sin\left(\frac{1}{2} a^2 \pi z^2\right) a + e^{-\frac{i (b-i c)^2}{2 a^2 \pi}} \left((b - i c)^2 - i a^2 \pi\right)\right.$$
$$\left.\left.\left(C\left(\frac{b - i\left(\pi z a^2 + c\right)}{a \pi}\right) - S\left(\frac{c + b i}{a \pi} + a z\right)\right) + e^{\frac{i (b-i c)^2}{2 a^2 \pi}} \left(i \pi a^2 + (b - i c)^2\right)\left(C\left(\frac{b - i c}{a \pi} + a i z\right) - i S\left(\frac{b - i c}{a \pi} + a i z\right)\right)\right)\right)$$

06.33.21.0061.01

$$\int z^2\, e^{b z} \cos(c z)\, C(a z)\, dz == \frac{1}{8 a^4 \pi^2} e^{-\frac{1}{2} i a^2 \pi z^2}\left(\frac{1}{(b - i c)^3} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}}\right.$$
$$\left(2 a (b - i c)\, e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} i \left(-(b - i c) \pi z a^2 + 2 \pi a^2 + (b - i c)^2 i + e^{i a^2 \pi z^2}\left((b - i c) \pi z a^2 - 2 \pi a^2 + (b - i c)^2 i\right)\right) +\right.$$
$$2 e^{\frac{1}{2} i a^2 \pi z^2}\left(2 e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} \pi^2 \left((b - i c)\, z\, (b z - i c z - 2) + 2\right) C(a z)\, a^4 +\right.$$
$$\left(-2 \pi^2 a^4 - i (b - i c)^2 \pi a^2 + (b - i c)^4\right)\left(C\left(\frac{\pi z a^2 + c + b i}{a \pi}\right) - i S\left(\frac{\pi z a^2 + c + b i}{a \pi}\right)\right) +$$
$$\left.\left.e^{\frac{i (b-i c)^2}{a^2 \pi}} \left(2 \pi^2 a^4 - i (b - i c)^2 \pi a^2 - (b - i c)^4\right)\left(i C\left(\frac{b - i c}{a \pi} + a i z\right) + S\left(\frac{b - i c}{a \pi} + a i z\right)\right)\right)\right) + \frac{1}{(b + c i)^3} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}}$$
$$\left(2 a (b + c i)\, e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b+c i)} i \left(-(b + c i) \pi z a^2 + 2 \pi a^2 + (b + c i)^2 i + e^{i a^2 \pi z^2}\left((b + c i) \pi z a^2 - 2 \pi a^2 + (b + c i)^2 i\right)\right) +\right.$$
$$2 e^{\frac{1}{2} i a^2 \pi z^2}\left(2 e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b+c i)} \pi^2 \left((b + c i)\, z\, (b z + c i z - 2) + 2\right) C(a z)\, a^4 +\right.$$
$$\left(-2 \pi^2 a^4 - i (b + c i)^2 \pi a^2 + (b + c i)^4\right)\left(C\left(\frac{i b - c}{a \pi} + a z\right) - i S\left(\frac{i b - c}{a \pi} + a z\right)\right) +$$
$$\left.\left.\left.e^{\frac{i (b+c i)^2}{a^2 \pi}} \left(2 \pi^2 a^4 - i (b + c i)^2 \pi a^2 - (b + c i)^4\right)\left(i C\left(\frac{b + c i}{a \pi} + a i z\right) + S\left(\frac{b + c i}{a \pi} + a i z\right)\right)\right)\right)\right)$$

06.33.21.0062.01

$$\int z^3\, e^{b z} \cos(c z)\, C(a z)\, dz =$$

$$\frac{1}{4 a^6 \pi^3} e^{-\frac{1}{2} i a^2 \pi z^2} \left(\frac{1}{(b - i c)^4} e^{-\frac{i (b-i c)^2}{2 a^2 \pi}} \left(a (b - i c)\, e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} \left(-6 i \pi^2 a^4 - i (b - i c)^2 \pi^2 z^2 a^4 + 3 (c + b i) \pi^2 z a^4 - \right.\right.\right.$$
$$(b - i c)^3 \pi z a^2 + (b - i c)^2 \pi a^2 + (b - i c)^4 i + e^{i a^2 \pi z^2}$$
$$\left.\left.\left. \left(6 i \pi^2 a^4 - 3 i (b - i c) \pi^2 z a^4 - (b - i c)^3 \pi z a^2 + (b - i c)^2 \pi \left(a^2 i \pi z^2 + 1\right) a^2 + (b - i c)^4 (-i)\right)\right) + \right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{(b-i c)\left(2 \pi z a^2 + c + b i\right)}{2 a^2 \pi}} \pi^3 ((b - i c) z ((b - i c) z (b z - i c z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left(6 \pi^3 a^6 + 3 (b - i c)^2 i \pi^2 a^4 + (b - i c)^6 (-i)\right) \left(C\left(\frac{\pi z a^2 + c + b i}{a \pi}\right) - i S\left(\frac{\pi z a^2 + c + b i}{a \pi}\right)\right) +$$
$$\left.\left. e^{\frac{i (b-i c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b - i c)^2 \pi^2 a^4 + (b - i c)^6\right) \left(C\left(\frac{b - i c}{a \pi} + a i z\right) - i S\left(\frac{b - i c}{a \pi} + a i z\right)\right)\right)\right) +$$
$$\frac{1}{(b + c i)^4} e^{-\frac{i (b+c i)^2}{2 a^2 \pi}} \left(a (b + c i)\, e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b + c i)} \left(-6 i \pi^2 a^4 - i (b + c i)^2 \pi^2 z^2 a^4 + 3 (b + c i) i \pi^2 z a^4 - \right.\right.$$
$$(b + c i)^3 \pi z a^2 + (b + c i)^2 \pi a^2 + (b + c i)^4 i +$$
$$\left.\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 + 3 (c - i b) \pi^2 z a^4 - (b + c i)^3 \pi z a^2 + (b + c i)^2 \pi \left(a^2 i \pi z^2 + 1\right) a^2 + (b + c i)^4 (-i)\right)\right) + \right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{i (b+c i)^2}{2 a^2 \pi} + z (b + c i)} \pi^3 ((b + c i) z ((b + c i) z (b z + c i z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left(6 \pi^3 a^6 + 3 (b + c i)^2 i \pi^2 a^4 + (b + c i)^6 (-i)\right) \left(C\left(\frac{i b - c}{a \pi} + a z\right) - i S\left(\frac{i b - c}{a \pi} + a z\right)\right) +$$
$$\left.\left. \left. e^{\frac{i (b+c i)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b + c i)^2 \pi^2 a^4 + (b + c i)^6\right) \left(C\left(\frac{b + c i}{a \pi} + a i z\right) - i S\left(\frac{b + c i}{a \pi} + a i z\right)\right)\right)\right)\right)$$

06.33.21.0063.01

$$\int z^{\alpha - 1}\, e^{b z^2} \cos\left(c z^2\right) C(a z)\, dz =$$

$$\frac{1}{4} \left(z^\alpha\, C(a z) \left(\left(-(b + c i) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b + c i) z^2\right) + \left(-(b - i c) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b - i c) z^2\right)\right) + \right.$$
$$\frac{2 i \left(a^4 z^4\right)^{-\frac{\alpha}{2}}}{a} \left(\sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2 k + \alpha - 3)} \pi^{\frac{1}{2}(-2 k - \alpha - 1)} z^{-2 k + \alpha - 1} a^{-4 k} (b + c i)^k}{(2 k + \alpha)\, k!} \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k + \frac{\alpha}{2}} \Gamma\left(\frac{\alpha + 1}{2} + k, -\frac{1}{2} i a^2 \pi z^2\right) - \right.\right.$$
$$\left.\left. \left(-i a^2 z^2\right)^{k + \frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha + 1}{2} + k, \frac{1}{2} i a^2 \pi z^2\right)\right) + \sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2 k + \alpha - 3)} \pi^{\frac{1}{2}(-2 k - \alpha - 1)} z^{-2 k + \alpha - 1} a^{-4 k} (b - i c)^k}{(2 k + \alpha)\, k!} \right.$$
$$\left.\left. \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k + \frac{\alpha}{2}} \Gamma\left(\frac{\alpha + 1}{2} + k, -\frac{1}{2} i a^2 \pi z^2\right) - \left(-i a^2 z^2\right)^{k + \frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha + 1}{2} + k, \frac{1}{2} i a^2 \pi z^2\right)\right)\right)\right)$$

06.33.21.0064.01

$$\int z\, e^{b z^2} \cos\left(c z^2\right) C(a z)\, dz == \frac{1}{2\left(b^2+c^2\right)}\left(e^{b z^2} C(a z)\left(b \cos\left(c z^2\right)+c \sin\left(c z^2\right)\right)-\right.$$

$$\frac{1}{8} a \sqrt{\pi}\, z\left(b\left(\left((1+i) C\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}}{\sqrt{\pi}}\right)+(1-i) S\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}}{\sqrt{\pi}}\right)-1\right)\Big/\right.$$

$$\left(\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}\right)+\left((1+i) C\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2 c+2 b i\right) z^2}}{\sqrt{2 \pi}}\right)+\right.$$

$$\left.\left.(1-i) S\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2 c+2 b i\right) z^2}}{\sqrt{2 \pi}}\right)-1\right)\Big/\left(\sqrt{-\left(b-i\left(\frac{\pi a^2}{2}+c\right)\right) z^2}\right)+$$

$$c(-i)\left(\left((1+i) C\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}}{\sqrt{\pi}}\right)+(1-i) S\left(\frac{(1-i)\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}}{\sqrt{\pi}}\right)-1\right)\Big/\right.$$

$$\left(\sqrt{-\left(b+\left(\frac{\pi a^2}{2}+c\right) i\right) z^2}\right)+\left(-(1+i) C\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2 c+2 b i\right) z^2}}{\sqrt{2 \pi}}\right)-\right.$$

$$\left.\left.(1-i) S\left(\frac{(1-i)\sqrt{i\left(\pi a^2+2 c+2 b i\right) z^2}}{\sqrt{2 \pi}}\right)+1\right)\Big/\left(\sqrt{-\left(b-i\left(\frac{\pi a^2}{2}+c\right)\right) z^2}\right)+$$

$$b\left(\left((1+i) C\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2 \pi}{2}\right) i\right) z^2}}{\sqrt{\pi}}\right)+(1-i) S\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2 \pi}{2}\right) i\right) z^2}}{\sqrt{\pi}}\right)-1\right)\Big/\right.$$

$$\left(\sqrt{-\left(b+\left(c-\frac{a^2 \pi}{2}\right) i\right) z^2}\right)+\left((1+i) C\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2} i\left(a^2 \pi-2 c\right)\right) z^2}}{\sqrt{\pi}}\right)+\right.$$

$$(1-i)\,S\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}}{\sqrt{\pi}}\right)-1\Bigg)\Bigg/\left(\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}\right)-$$

$$ic\left(\left((1+i)\,C\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2\pi}{2}\right)i\right)z^2}}{\sqrt{\pi}}\right)+(1-i)\,S\left(\frac{(1-i)\sqrt{-\left(b+\left(c-\frac{a^2\pi}{2}\right)i\right)z^2}}{\sqrt{\pi}}\right)-1\right)\Bigg/$$

$$\left(\sqrt{-\left(b+\left(c-\frac{a^2\pi}{2}\right)i\right)z^2}\right)+\left(-(1+i)\,C\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}}{\sqrt{\pi}}\right)-\right.$$

$$\left.\left.(1-i)\,S\left(\frac{(1-i)\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}}{\sqrt{\pi}}\right)+1\right)\Bigg/\left(\sqrt{-\left(b+\frac{1}{2}i\left(a^2\pi-2c\right)\right)z^2}\right)\right)\Bigg)$$

Involving hyperbolic functions

Involving sinh

06.33.21.0065.01

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

06.33.21.0066.01

$$\int \sinh\left(b\,z^2\right)C(a\,z)\,dz == \frac{a}{4\,b}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-2\,k}\left(\Gamma\left(2\,k+1,\,-b\,z^2\right)+\Gamma\left(2\,k+1,\,b\,z^2\right)\right)}{(4\,k+1)\,(2\,k)\,!}$$

Involving cosh

06.33.21.0067.01

$$\int \cosh(b\,z)\,C(a\,z)\,dz == \frac{i}{2\,b}\left(\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\frac{i\,b}{a\,\pi}+a\,z\right)+\right.$$
$$\left.\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)S\left(\frac{i\,b}{a\,\pi}-a\,z\right)+C\left(\frac{i\,b}{a\,\pi}+a\,z\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)+C\left(\frac{i\,b}{a\,\pi}-a\,z\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)-2\,i\,C(a\,z)\sinh(b\,z)\right)$$

06.33.21.0068.01

$$\int \cosh\left(b\,z^2\right) C(a\,z)\,dz == \frac{a}{4\,b}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-2\,k}\left(\Gamma\left(2\,k+1,\,-b\,z^2\right)-\Gamma\left(2\,k+1,\,b\,z^2\right)\right)}{(4\,k+1)\,(2\,k)!}$$

Involving hyperbolic functions and a power function

Involving sinh and power

06.33.21.0069.01

$$\int z^{\alpha-1}\sinh(b\,z)\,C(a\,z)\,dz == \frac{a\,z^{\alpha}}{2\,b}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-4\,k}}{(4\,k+1)\,(2\,k)!}\left((b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,b\,z)+(-b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,-b\,z)\right)$$

06.33.21.0070.01

$$\int z^n\sinh(b\,z)\,C(a\,z)\,dz == -\frac{1}{2}\,b^{-n-1}$$
$$\left(i\,a\,n!\left((-1)^n\sum_{m=0}^{n}\frac{2^{m-1}\,a^{-2\,m-2}\,(i\,b)^m\,\pi^{-m-1}}{m!}\,e^{\frac{i\,b^2}{2\,a^2\,\pi}}\left(\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(-b)^{m-k}\,\pi^{\frac{k+1}{2}}\left(-\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\left(i\,\pi\,z\,a^2+b\right)^{k+1}\right.\right.\right.$$
$$\left.\left.\binom{m}{k}\,\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)-(-1)^m\,e^{-\frac{i\,b^2}{a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,(-b)^{m-k}\,\pi^{\frac{k+1}{2}}\left(b-i\,a^2\,\pi\,z\right)^{k+1}\right.\right.$$
$$\left.\left.\left(\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\,\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{2\,a^2\,\pi}\right)\right)+\sum_{m=0}^{n}\frac{2^{m-1}\,a^{-2\,m-2}\,(i\,b)^m\,\pi^{-m-1}}{m!}\,e^{\frac{i\,b^2}{2\,a^2\,\pi}}$$
$$\left((-1)^m\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,b^{m-k}\,\pi^{\frac{k+1}{2}}\left(i\,a^2\,\pi\,z-b\right)^{k+1}\left(-\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\,\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{2\,a^2\,\pi}\right)-\right.$$
$$e^{-\frac{i\,b^2}{a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{1}{2}(k-2\,m-1)}\,b^{m-k}\,\pi^{\frac{k+1}{2}}\left(-i\,\pi\,z\,a^2-b\right)^{k+1}\left(\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\,\Gamma\left(\frac{k+1}{2},\right.$$
$$\left.\left.\left.\left.\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)\right)\right)-C(a\,z)\left((-1)^n\,\Gamma(n+1,\,-b\,z)+\Gamma(n+1,\,b\,z)\right)\right)/;\,n\in\mathbb{N}$$

06.33.21.0071.01

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

06.33.21.0072.01

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

06.33.21.0073.01

$$\int z^3 \sinh(b\,z)\,C(a\,z)\,dz == \frac{i}{2\,a^6\,b^4\,\pi^3}\left(-2\,i\,\pi^3\,C(a\,z)\left(b\,z\left(b^2\,z^2+6\right)\cosh(b\,z)-3\left(b^2\,z^2+2\right)\sinh(b\,z)\right)a^6+2\,b^3\,i\,\pi\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)(b\,z\sinh(b\,z)-\cosh(b\,z))\,a^3-2\,i\,b\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\left(3\,b\,\pi^2\,z\sinh(b\,z)\,a^4+\left(-6\,\pi^2\,a^4-b^2\,\pi^2\,z^2\,a^4+b^4\right)\cosh(b\,z)\right)a+C\left(\frac{i\,b}{a\,\pi}+a\,z\right)\left(-6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6-b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+C\left(\frac{i\,b}{a\,\pi}-a\,z\right)\left(-6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6-b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)-\left(S\left(\frac{i\,b}{a\,\pi}+a\,z\right)+S\left(\frac{i\,b}{a\,\pi}-a\,z\right)\right)\left(6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)-b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)$$

06.33.21.0074.01

$$\int z^{\alpha-1}\sinh\left(b\,z^2\right)C(a\,z)\,dz == \frac{1}{4\,a}\left(a\,z^{\alpha}\,C(a\,z)\left(\left(-b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,-b\,z^2\right)-\left(b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,b\,z^2\right)\right)-2\,i\left(a^4\,z^4\right)^{-\frac{\alpha}{2}}\left(\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(-b)^k}{(2\,k+\alpha)\,k!}\left(\sqrt{-i\,a^2\,z^2}\,\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\,\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)-\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,b^k}{(2\,k+\alpha)\,k!}\left(\sqrt{-i\,a^2\,z^2}\,\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)-\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\,\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)\right)\right)$$

06.33.21.0075.01

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

$$\left.a\sqrt{\pi}\left(\left(a^2\,\pi-2\,i\,b\right)\sqrt{\pi\,a^2+2\,b\,i}\;\;C\left(\sqrt{a^2+\frac{2\,b\,i}{\pi}}\;\;z\right)+\sqrt{a^2\,\pi-2\,i\,b}\;\;\left(\pi\,a^2+2\,b\,i\right)C\left(\sqrt{a^2-\frac{2\,i\,b}{\pi}}\;\;z\right)\right)\right)$$

06.33.21.0076.01

$$\int z^3 \sinh\left(b\,z^2\right) C(a\,z)\,dz == \frac{i}{16\,b^2}\left(a\left(-\frac{4\sqrt{\pi}\;\left(\pi\,a^2+3\,b\,i\right)S\left(\sqrt{a^2+\frac{2\,b\,i}{\pi}}\;\;z\right)}{\left(\pi\,a^2+2\,b\,i\right)^{3/2}}+\frac{4\sqrt{\pi}\;\left(a^2\,\pi-3\,i\,b\right)S\left(\sqrt{a^2-\frac{2\,i\,b}{\pi}}\;\;z\right)}{\left(a^2\,\pi-2\,i\,b\right)^{3/2}}+\frac{i\,b}{z}\right.\right.$$

$$\left(\sqrt{2\,\pi}\left(\frac{\sqrt{i\left(\pi\,a^2+2\,b\,i\right)z^2}}{\left(\pi\,a^2+2\,b\,i\right)^2}+\frac{\sqrt{-\left(i\,\pi\,a^2+2\,b\right)z^2}}{\left(a^2\,\pi-2\,i\,b\right)^2}+\frac{\sqrt{\left(2\,b-i\,a^2\,\pi\right)z^2}}{\left(\pi\,a^2+2\,b\,i\right)^2}-\frac{\sqrt{\left(i\,\pi\,a^2+2\,b\right)z^2}}{\left(i\,\pi\,a^2+2\,b\right)^2}\right)+\frac{8\,z^2}{\pi^2\,a^4+4\,b^2}\right.$$

$$\left.\left.\left(\pi\cosh\left(b\,z^2\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)a^2+2\,b\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sinh\left(b\,z^2\right)\right)\right)-8\,i\,C(a\,z)\left(b\,z^2\cosh\left(b\,z^2\right)-\sinh\left(b\,z^2\right)\right)\right)$$

Involving cosh and power

06.33.21.0077.01

$$\int z^{\alpha-1}\cosh(b\,z)\,C(a\,z)\,dz == \frac{a}{2\,b}\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{-2\,k}\,\pi^{2\,k}\,a^{4\,k}\,b^{-4\,k}}{(4\,k+1)\,(2\,k)!}\left(z^{\alpha}\,(-b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,-b\,z)-z^{\alpha}\,(b\,z)^{-\alpha}\,\Gamma(4\,k+\alpha+1,\,b\,z)\right)$$

06.33.21.0078.01

$$\int z^n \cosh(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{1}{2}\,b^{-n-1}\left(C(a\,z)\,((-1)^n\,\Gamma(n+1,\,-b\,z)-\Gamma(n+1,\,b\,z))+a\,i\,n!\left(e^{\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{m=0}^{n}\frac{a^{-2\,m-2}\,(i\,b)^m}{m!}\left((-1)^m\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,b^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\right.\right.\right.$$

$$\left(i\left(\pi\,z\,a^2+b\,i\right)\right)^{k+1}\left(-\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{2\,a^2\,\pi}\right)-e^{-\frac{i\,b^2}{a^2\,\pi}}$$

$$\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,b^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(i\left(i\,b-a^2\,\pi\,z\right)\right)^{k+1}\left(\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)\Bigg)-$$

$$(-1)^n\,e^{\frac{i\,b^2}{2\,a^2\,\pi}}\sum_{m=0}^{n}\frac{(-1)^m\,a^{-2\,m-2}\,(i\,b)^m}{m!}\left((-1)^m\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(-b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(-\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\right.$$

$$\left(i\left(a^2\,\pi\,z-i\,b\right)\right)^{k+1}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,-\frac{i\left(i\,b-a^2\,\pi\,z\right)^2}{2\,a^2\,\pi}\right)-e^{-\frac{i\,b^2}{a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}\,(-b)^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}$$

$$\left.\left.\left.\left(-i\left(\pi\,z\,a^2+b\,i\right)\right)^{k+1}\left(\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{a^2}\right)^{\frac{1}{2}(-k-1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi\,z\,a^2+b\,i\right)^2}{2\,a^2\,\pi}\right)\right)\right)\right)\Big/;\,n\in\mathbb{N}$$

06.33.21.0079.01

$$\int z\cosh(b\,z)\,C(a\,z)\,dz ==$$

$$-\frac{1}{b^2}\left(\frac{1}{2\,a^2\,\pi}\left(-C\left(\frac{i\,b}{a\,\pi}+a\,z\right)\left(\pi\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)a^2+b^2\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+C\left(\frac{i\,b}{a\,\pi}-a\,z\right)\left(\pi\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)a^2+b^2\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+\right.\right.$$

$$\left.\left(S\left(\frac{i\,b}{a\,\pi}-a\,z\right)-S\left(\frac{i\,b}{a\,\pi}+a\,z\right)\right)\left(b^2\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)-a^2\,\pi\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)+$$

$$\left.\frac{b\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sinh(b\,z)}{a\,\pi}+C(a\,z)\,(\cosh(b\,z)-b\,z\sinh(b\,z))\right)$$

06.33.21.0080.01

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

06.33.21.0081.01

$$\int z^3 \cosh(b\,z)\, C(a\,z)\, dz ==$$
$$\frac{1}{2\,a^6\,b^4\,\pi^3}\left(2\,\pi^3\, C(a\,z)\left(b\,z\left(b^2\,z^2+6\right)\sinh(b\,z)-3\left(b^2\,z^2+2\right)\cosh(b\,z)\right)a^6-2\,b^3\,\pi\cos\left(\frac{1}{2}a^2\,\pi\,z^2\right)(b\,z\cosh(b\,z)-\sinh(b\,z))\,a^3-\right.$$
$$2\,b\sin\left(\frac{1}{2}a^2\,\pi\,z^2\right)\left(\left(6\,\pi^2\,a^4+b^2\,\pi^2\,z^2\,a^4-b^4\right)\sinh(b\,z)-3\,a^4\,b\,\pi^2\,z\cosh(b\,z)\right)a+$$
$$C\left(\frac{i\,b}{a\,\pi}-a\,z\right)\left(b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)-6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$
$$\left(S\left(\frac{i\,b}{a\,\pi}+a\,z\right)-S\left(\frac{i\,b}{a\,\pi}-a\,z\right)\right)\left(-6\,\pi^3\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)a^6-b^2\left(b^4-3\,a^4\,\pi^2\right)\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)+$$
$$\left.C\left(\frac{i\,b}{a\,\pi}+a\,z\right)\left(6\,a^6\,\pi^3\cos\left(\frac{b^2}{2\,a^2\,\pi}\right)-b^2\left(b^4-3\,a^4\,\pi^2\right)\sin\left(\frac{b^2}{2\,a^2\,\pi}\right)\right)\right)$$

06.33.21.0082.01

$$\int z^{\alpha-1}\cosh\left(b\,z^2\right)C(a\,z)\,dz ==$$
$$\frac{1}{4\,a}\left(2\,i\left(a^4\,z^4\right)^{-\frac{\alpha}{2}}\left(\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,b^k}{(2\,k+\alpha)\,k!}\left(\sqrt{-i\,a^2\,z^2}\;\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}i\,a^2\,\pi\,z^2\right)-\right.\right.\right.$$
$$\left.\left.\left.\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}i\,a^2\,\pi\,z^2\right)\right)+\sum_{k=0}^{\infty}\frac{2^{\frac{1}{2}(2\,k+\alpha-3)}\,\pi^{\frac{1}{2}(-2\,k-\alpha-1)}\,z^{-2\,k+\alpha-1}\,a^{-4\,k}\,(-b)^k}{(2\,k+\alpha)\,k!}\right.\right.$$
$$\left.\left.\left(\sqrt{-i\,a^2\,z^2}\;\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\Gamma\left(\frac{\alpha+1}{2}+k,\,-\frac{1}{2}i\,a^2\,\pi\,z^2\right)-\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}}\sqrt{i\,a^2\,z^2}\;\Gamma\left(\frac{\alpha+1}{2}+k,\,\frac{1}{2}i\,a^2\,\pi\,z^2\right)\right)\right)+\right.$$
$$\left.a\,z^{\alpha}\,C(a\,z)\left(\left(b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,b\,z^2\right)+\left(-b\,z^2\right)^{-\frac{\alpha}{2}}\Gamma\left(\frac{\alpha}{2},\,0,\,-b\,z^2\right)\right)\right)$$

06.33.21.0083.01

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

06.33.21.0084.01

$$\int z^3 \cosh\left(b z^2\right) C(a z)\, dz == -\frac{1}{32 b^2}\left(2 a i \sqrt{2 \pi}\left(-\frac{\left(\pi a^2 + 3 b i\right) \operatorname{erfi}\left(\sqrt{\frac{1}{2} i a^2 \pi - b}\ z\right)}{\left(i a^2 \pi - 2 b\right)^{3/2}} + \frac{\left(-\pi a^2 + 3 i b\right) \operatorname{erfi}\left(\sqrt{\frac{1}{2} i \pi a^2 + b}\ z\right)}{\left(i \pi a^2 + 2 b\right)^{3/2}} + \frac{\left(a^2 \pi - 3 i b\right) \operatorname{erfi}\left(\sqrt{-\frac{1}{2} i \pi a^2 - b}\ z\right)}{\left(-i \pi a^2 - 2 b\right)^{3/2}} + \frac{\left(\pi a^2 + 3 b i\right) \operatorname{erfi}\left(\sqrt{b - \frac{1}{2} i a^2 \pi}\ z\right)}{\left(2 b - i a^2 \pi\right)^{3/2}}\right) + \frac{16 a b z}{\pi^2 a^4 + 4 b^2}\left(\pi \sin\left(\frac{1}{2} a^2 \pi z^2\right) \sinh\left(b z^2\right) a^2 + 2 b \cos\left(\frac{1}{2} a^2 \pi z^2\right) \cosh\left(b z^2\right)\right) + 16 C(a z)\left(\cosh\left(b z^2\right) - b z^2 \sinh\left(b z^2\right)\right)\right)$$

Involving exponential function and hyperbolic functions

Involving exp and sinh

06.33.21.0085.01

$$\int e^{b z} \sinh(c z) C(a z)\, dz == \frac{1}{8}(1 + i)\left(\frac{1}{b + c}\left((2 - 2 i)\, e^{(b+c) z} C(a z) - (1 - i)\, e^{-\frac{i (b+c)^2}{2 a^2 \pi}}\left(i C\left(\frac{-i \pi z a^2 + b + c}{a \pi}\right) + e^{\frac{i (b+c)^2}{a^2 \pi}}\left(-i C\left(\frac{i \pi z a^2 + b + c}{a \pi}\right) - S\left(\frac{i \pi z a^2 + b + c}{a \pi}\right)\right) - S\left(\frac{-i \pi z a^2 + b + c}{a \pi}\right)\right)\right) - \frac{1}{b - c}\left((2 - 2 i)\, e^{(b-c) z} C(a z) - (1 + i)\, e^{-\frac{i (b-c)^2}{2 a^2 \pi}}\left(C\left(\frac{-i \pi z a^2 + b - c}{a \pi}\right) - e^{\frac{i (b-c)^2}{a^2 \pi}}\left(C\left(\frac{i \pi z a^2 + b - c}{a \pi}\right) - i S\left(\frac{i \pi z a^2 + b - c}{a \pi}\right)\right) + i S\left(\frac{-i \pi z a^2 + b - c}{a \pi}\right)\right)\right)\right)$$

06.33.21.0086.01

$$\int e^{b z^2} \sinh\left(c z^2\right) C(a z)\, dz == \frac{a}{4} \sum_{k=0}^{\infty} \frac{(-1)^k\, 2^{-2 k}\, \pi^{2 k}\, a^{4 k}}{(4 k + 1)\,(2 k)!}\left((b + c)^{-2 k-1}\, \Gamma\left(2 k + 1, -(b + c) z^2\right) - (b - c)^{-2 k-1}\, \Gamma\left(2 k + 1, -(b - c) z^2\right)\right)$$

Involving exp and cosh

06.33.21.0087.01

$$\int e^{b z} \cosh(c z)\, C(a z)\, dz == \frac{1}{8}(1+i)\left(\frac{1}{b-c}\left((2-2i)\, e^{(b-c) z}\, C(a z) - (1+i)\, e^{-\frac{i (b-c)^2}{2 a^2 \pi}}\left(-e^{\frac{i (b-c)^2}{a^2 \pi}}\, C\left(\frac{i \pi z a^2 + b - c}{a \pi}\right) + C\left(\frac{-i \pi z a^2 + b - c}{a \pi}\right) + i\left(e^{\frac{i (b-c)^2}{a^2 \pi}}\, S\left(\frac{i \pi z a^2 + b - c}{a \pi}\right) + S\left(\frac{-i \pi z a^2 + b - c}{a \pi}\right)\right)\right)\right) + \frac{1}{b+c}\left((2-2i)\, e^{(b+c) z}\, C(a z) - (1+i)\, e^{-\frac{i (b+c)^2}{2 a^2 \pi}}\left(-e^{\frac{i (b+c)^2}{a^2 \pi}}\, C\left(\frac{i \pi z a^2 + b + c}{a \pi}\right) + C\left(\frac{-i \pi z a^2 + b + c}{a \pi}\right) + i\left(e^{\frac{i (b+c)^2}{a^2 \pi}}\, S\left(\frac{i \pi z a^2 + b + c}{a \pi}\right) + S\left(\frac{-i \pi z a^2 + b + c}{a \pi}\right)\right)\right)\right)\right)$$

06.33.21.0088.01

$$\int e^{b z^2} \cosh\left(c z^2\right) C(a z)\, dz == \frac{a}{4}\sum_{k=0}^{\infty} \frac{(-1)^k\, 2^{-2k}\, \pi^{2k}\, a^{4k}}{(4k+1)\,(2k)!}\left((b+c)^{-2k-1}\, \Gamma\left(2k+1, -(b+c) z^2\right) + (b-c)^{-2k-1}\, \Gamma\left(2k+1, -(b-c) z^2\right)\right)$$

Involving power, exponential and hyperbolic functions

Involving power, exp and sinh

06.33.21.0089.01

$$\int z^{\alpha-1}\, e^{b z} \sinh(c z)\, C(a z)\, dz == \frac{a z^{\alpha}}{2}\sum_{k=0}^{\infty} \frac{(-1)^k\, 2^{-2k}\, \pi^{2k}\, a^{4k}}{(4k+1)\,(2k)!}\left(((-c-b) z)^{-\alpha}\, (b+c)^{-4k-1}\, \Gamma(4k+\alpha+1, -(b+c) z) - ((-b+c) z)^{-\alpha}\, (b-c)^{-4k-1}\, \Gamma(4k+\alpha+1, -(b-c) z)\right)$$

06.33.21.0090.01

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

$$a\,n!\left((-b-c)^{-n-1}\sum_{m=0}^{n}\frac{1}{m!}\left((-(b+c))^m\left(-\left(-i\,a^2\right)^{-m-1}e^{-\frac{i\,(b+c)^2}{2\,a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}(-(b+c))^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left((b+c)-i\,a^2\,\pi\,z\right)^{k+1}\right.\right.\right.$$

$$\left(\frac{i\left(\pi\,z\,a^2+(b+c)\,i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi\,z\,a^2+(b+c)\,i\right)^2}{2\,a^2\,\pi}\right)-$$

$$\left(i\,a^2\right)^{-m-1}e^{\frac{i\,(b+c)^2}{2\,a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}(-(b+c))^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(i\,\pi\,z\,a^2+(b+c)\right)^{k+1}$$

$$\left.\left.\left.\left(\frac{i\left(i\,\pi\,z\,a^2+(b+c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(i\,\pi\,z\,a^2+(b+c)\right)^2}{2\,a^2\,\pi}\right)\right)\right)-$$

$$(c-b)^{-n-1}\sum_{m=0}^{n}\frac{1}{m!}\left((-(b-c))^m\left(-\left(-i\,a^2\right)^{-m-1}e^{-\frac{i\,(b-c)^2}{2\,a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}(-(b-c))^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\right.\right.$$

$$\left((b-c)-i\,a^2\,\pi\,z\right)^{k+1}\left(\frac{i\left(\pi\,z\,a^2+(b-c)\,i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(\pi\,z\,a^2+(b-c)\,i\right)^2}{2\,a^2\,\pi}\right)-$$

$$\left(i\,a^2\right)^{-m-1}e^{\frac{i\,(b-c)^2}{2\,a^2\,\pi}}\sum_{k=0}^{m}2^{\frac{k-3}{2}}(-(b-c))^{m-k}\,\pi^{\frac{1}{2}(k-2\,m-1)}\left(i\,\pi\,z\,a^2+(b-c)\right)^{k+1}$$

$$\left.\left.\left.\left.\left.\left.\left(\frac{i\left(i\,\pi\,z\,a^2+(b-c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\,\frac{i\left(i\,\pi\,z\,a^2+(b-c)\right)^2}{2\,a^2\,\pi}\right)\right)\right)\right)\right)\right)\Big/;\,n\in\mathbb{N}$$

06.33.21.0091.01

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

06.33.21.0092.01

$$\int z^2\, e^{b z} \sinh(c z)\, C(a z)\, dz == \frac{1}{8 a^4 \pi^2}\, e^{-\frac{1}{2} i a^2 \pi z^2}\left(\frac{1}{(b+c)^3}\right.$$
$$\left(e^{-\frac{i (b+c)^2}{2 a^2 \pi}}\left(2 a (b+c)\, e^{\frac{(b+c)\left(2 \pi z a^2+b i+c i\right)}{2 a^2 \pi}}\, i\left(-(b+c) \pi z a^2+2 \pi a^2+(b+c)^2 i+e^{i a^2 \pi z^2}\left((b+c) \pi z a^2-2 \pi a^2+(b+c)^2 i\right)\right)+\right.\right.$$
$$2\, e^{\frac{1}{2} i a^2 \pi z^2}\left(2\, e^{\frac{(b+c)\left(2 \pi z a^2+b i+c i\right)}{2 a^2 \pi}} \pi^2 ((b+c) z (b z+c z-2)+2)\, C(a z)\, a^4+\right.$$
$$\left(-2 \pi^2 a^4-i (b+c)^2 \pi a^2+(b+c)^4\right)\left(C\left(\frac{\pi z a^2+b i+c i}{a \pi}\right)-i S\left(\frac{\pi z a^2+b i+c i}{a \pi}\right)\right)+$$
$$\left.\left.\left.e^{\frac{i (b+c)^2}{a^2 \pi}}\left(2 \pi^2 a^4-i (b+c)^2 \pi a^2-(b+c)^4\right)\left(i C\left(\frac{b+c}{a \pi}+a i z\right)+S\left(\frac{b+c}{a \pi}+a i z\right)\right)\right)\right)\right)-\frac{1}{(b-c)^3}$$
$$\left(e^{-\frac{i (b-c)^2}{2 a^2 \pi}}\left(2 a (b-c)\, e^{\frac{i (b-c)^2}{2 a^2 \pi}+z (b-c)}\, i\left(-(b-c) \pi z a^2+2 \pi a^2+(b-c)^2 i+e^{i a^2 \pi z^2}\left((b-c) \pi z a^2-2 \pi a^2+(b-c)^2 i\right)\right)+\right.\right.$$
$$2\, e^{\frac{1}{2} i a^2 \pi z^2}\left(2\, e^{\frac{i (b-c)^2}{2 a^2 \pi}+z (b-c)} \pi^2 ((b-c) z (b z-c z-2)+2)\, C(a z)\, a^4+\right.$$
$$\left(-2 \pi^2 a^4-i (b-c)^2 \pi a^2+(b-c)^4\right)\left(C\left(\frac{i (b-c)}{a \pi}+a z\right)-i S\left(\frac{i (b-c)}{a \pi}+a z\right)\right)+$$
$$\left.\left.\left.\left.e^{\frac{i (b-c)^2}{a^2 \pi}}\left(2 \pi^2 a^4-i (b-c)^2 \pi a^2-(b-c)^4\right)\left(i C\left(\frac{b-c}{a \pi}+a i z\right)+S\left(\frac{b-c}{a \pi}+a i z\right)\right)\right)\right)\right)\right)$$

06.33.21.0093.01

$$\int z^3\, e^{b z} \sinh(c z)\, C(a z)\, dz ==$$

$$\frac{1}{4 a^6 \pi^3} e^{-\frac{1}{2} i a^2 \pi z^2} \left(\frac{1}{(b+c)^4} \left(e^{-\frac{i (b+c)^2}{2 a^2 \pi}} \left(a (b+c)\, e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}} \left(-6 i \pi^2 a^4 - i (b+c)^2 \pi^2 z^2 a^4 + 3 (b+c) i \pi^2 z a^4 - \right.\right.\right.\right.$$
$$(b+c)^3 \pi z a^2 + (b+c)^2 \pi a^2 + (b+c)^4 i +$$
$$\left.\left.\left.\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 - 3 i (b+c) \pi^2 z a^4 - (b+c)^3 \pi z a^2 + (b+c)^2 \pi \left(a^2 i \pi z^2 + 1 \right) a^2 + (b+c)^4 (-i) \right) \right) + \right.\right.\right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}} \pi^3 ((b+c) z ((b+c) z (b z + c z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left. \left(6 \pi^3 a^6 + 3 (b+c)^2 i \pi^2 a^4 + (b+c)^6 (-i) \right) \left(C\left(\frac{\pi z a^2 + b i + c i}{a \pi} \right) - i S\left(\frac{\pi z a^2 + b i + c i}{a \pi} \right) \right) + \right.$$
$$\left. \left. e^{\frac{i (b+c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b+c)^2 \pi^2 a^4 + (b+c)^6 \right) \left(C\left(\frac{b+c}{a \pi} + a i z \right) - i S\left(\frac{b+c}{a \pi} + a i z \right) \right) \right) \right) \right) -$$
$$\frac{1}{(b-c)^4} \left(e^{-\frac{i (b-c)^2}{2 a^2 \pi}} \left(a (b-c)\, e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)} \left(-6 i \pi^2 a^4 - i (b-c)^2 \pi^2 z^2 a^4 + 3 (b-c) i \pi^2 z a^4 - \right.\right.\right.$$
$$(b-c)^3 \pi z a^2 + (b-c)^2 \pi a^2 + (b-c)^4 i +$$
$$\left.\left.\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 - 3 i (b-c) \pi^2 z a^4 - (b-c)^3 \pi z a^2 + (b-c)^2 \pi \left(a^2 i \pi z^2 + 1 \right) a^2 + (b-c)^4 (-i) \right) \right) + \right.\right.$$
$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)} \pi^3 ((b-c) z ((b-c) z (b z - c z - 3) + 6) - 6)\, C(a z)\, a^6 + \right.$$
$$\left. \left(6 \pi^3 a^6 + 3 (b-c)^2 i \pi^2 a^4 + (b-c)^6 (-i) \right) \left(C\left(\frac{i (b-c)}{a \pi} + a z \right) - i S\left(\frac{i (b-c)}{a \pi} + a z \right) \right) + \right.$$
$$\left. \left. \left. e^{\frac{i (b-c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b-c)^2 \pi^2 a^4 + (b-c)^6 \right) \left(C\left(\frac{b-c}{a \pi} + a i z \right) - i S\left(\frac{b-c}{a \pi} + a i z \right) \right) \right) \right) \right) \right)$$

06.33.21.0094.01

$$\int z^{\alpha-1}\, e^{b z^2} \sinh\left(c z^2\right) C(a z)\, dz == \frac{1}{4} \left(z^{\alpha}\, C(a z) \left(\left(-(b+c) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b+c) z^2 \right) - \left(-(b-c) z^2\right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b-c) z^2 \right) \right) + \right.$$
$$\frac{2 i}{a} \left(\sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2k+\alpha-3)}\, \pi^{\frac{1}{2}(-2k-\alpha-1)}\, z^{-2k+\alpha-1}\, a^{-4k}\, (b+c)^k}{(2k+\alpha)\, k!} \left(\left(a^4 z^4\right)^{-\frac{\alpha}{2}} \sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k+\frac{\alpha}{2}} \Gamma\left(\frac{\alpha+1}{2} + k, -\frac{1}{2} i a^2 \pi z^2 \right) - \right.\right.$$
$$\left. \left. \left(a^4 z^4\right)^{-\frac{\alpha}{2}} \left(-i a^2 z^2\right)^{k+\frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha+1}{2} + k, \frac{1}{2} i a^2 \pi z^2 \right) \right) - \right.$$
$$\sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2k+\alpha-3)}\, \pi^{\frac{1}{2}(-2k-\alpha-1)}\, z^{-2k+\alpha-1}\, a^{-4k}\, (b-c)^k}{(2k+\alpha)\, k!} \left(\left(a^4 z^4\right)^{-\frac{\alpha}{2}} \sqrt{-i a^2 z^2}\, \left(i a^2 z^2\right)^{k+\frac{\alpha}{2}} \Gamma\left(\frac{\alpha+1}{2} + k, -\frac{1}{2} i a^2 \pi z^2 \right) - \right.$$
$$\left. \left. \left. \left(a^4 z^4\right)^{-\frac{\alpha}{2}} \left(-i a^2 z^2\right)^{k+\frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha+1}{2} + k, \frac{1}{2} i a^2 \pi z^2 \right) \right) \right) \right)$$

06.33.21.0095.01

$$\int z\, e^{b z^2} \sinh\left(c z^2\right) C(a z)\, dz ==$$

$$-\frac{1}{16} i \left(a \sqrt{2\pi}\ z \left(-\frac{i}{(b-c)\sqrt{\left(-i\pi a^2-2b+2c\right)z^2}} + \frac{i}{(b+c)\sqrt{\left(i\pi a^2-2b-2c\right)z^2}} - \frac{i}{(b-c)\sqrt{\left(i\pi a^2-2b+2c\right)z^2}} + \right.\right.$$

$$\frac{i}{(b+c)\sqrt{-\left(i\pi a^2+2b+2c\right)z^2}} - \frac{(1-i)\, C\left(\frac{(1-i)\sqrt{\left(-i\pi a^2-2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b-c)\sqrt{\left(-i\pi a^2-2b+2c\right)z^2}} +$$

$$\frac{(1-i)\, C\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2+2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b+c)\sqrt{\left(i\pi a^2-2b-2c\right)z^2}} - \frac{(1-i)\, C\left(\frac{(1-i)\sqrt{\left(i\pi a^2-2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b-c)\sqrt{\left(i\pi a^2-2b+2c\right)z^2}} + \frac{(1-i)\, C\left(\frac{(1-i)\sqrt{-\left(i\pi a^2+2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b+c)\sqrt{-\left(i\pi a^2+2b+2c\right)z^2}} +$$

$$\frac{(1+i)\, S\left(\frac{(1-i)\sqrt{\left(-i\pi a^2-2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b-c)\sqrt{\left(-i\pi a^2-2b+2c\right)z^2}} - \frac{(1+i)\, S\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2+2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b+c)\sqrt{\left(i\pi a^2-2b-2c\right)z^2}} + \frac{(1+i)\, S\left(\frac{(1-i)\sqrt{\left(i\pi a^2-2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b-c)\sqrt{\left(i\pi a^2-2b+2c\right)z^2}} -$$

$$\left.\left. \frac{(1+i)\, S\left(\frac{(1-i)\sqrt{-\left(i\pi a^2+2b+2c\right)z^2}}{\sqrt{2\pi}}\right)}{(b+c)\sqrt{-\left(i\pi a^2+2b+2c\right)z^2}} + \frac{8\, e^{b z^2}\, i\, C(a z)\left(b \sinh\left(c z^2\right) - c \cosh\left(c z^2\right)\right)}{b^2-c^2} \right) \right)$$

Involving power, exp and cosh

06.33.21.0096.01

$$\int z^{\alpha-1}\, e^{b z} \cosh(c z)\, C(a z)\, dz == \frac{a z^{\alpha}}{2} \sum_{k=0}^{\infty} \frac{(-1)^k\, 2^{-2k}\, \pi^{2k}\, a^{4k}}{(4k+1)\,(2k)!}$$

$$\left((b-c)^{-4k-1}\left((c-b)z\right)^{-\alpha}\Gamma(4k+\alpha+1,\,-(b-c)z) + (b+c)^{-4k-1}\left((-b-c)z\right)^{-\alpha}\Gamma(4k+\alpha+1,\,-(b+c)z)\right)$$

06.33.21.0097.01

$$\int z^n e^{b z} \cosh(c z)\, C(a z)\, dz ==$$

$$\frac{1}{2}\left(a\, n!\left((-b-c)^{-n-1}\sum_{m=0}^{n}\frac{(-(b+c))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b+c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}} (-(b+c))^{m-k} \pi^{\frac{1}{2}(k-2m-1)} \left((b+c)-i a^2 \pi z\right)^{k+1}\right.\right.\right.$$

$$\left.\left(\frac{i\left(\pi z a^2+(b+c) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(\pi z a^2+(b+c) i\right)^2}{2 a^2 \pi}\right)-$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b+c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}} (-(b+c))^{m-k} \pi^{\frac{1}{2}(k-2m-1)} \left(i \pi z a^2+(b+c)\right)^{k+1}$$

$$\left.\left.\left(\frac{i\left(i \pi z a^2+(b+c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(i \pi z a^2+(b+c)\right)^2}{2 a^2 \pi}\right)\right)+\right.$$

$$(c-b)^{-n-1}\sum_{m=0}^{n}\frac{(-(b-c))^m}{m!}\left(-\left(-i a^2\right)^{-m-1} e^{-\frac{i (b-c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}} (-(b-c))^{m-k} \pi^{\frac{1}{2}(k-2m-1)} \left((b-c)-i a^2 \pi z\right)^{k+1}\right.$$

$$\left(\frac{i\left(\pi z a^2+(b-c) i\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(\pi z a^2+(b-c) i\right)^2}{2 a^2 \pi}\right)-$$

$$\left(i a^2\right)^{-m-1} e^{\frac{i (b-c)^2}{2 a^2 \pi}}\sum_{k=0}^{m} 2^{\frac{k-3}{2}} (-(b-c))^{m-k} \pi^{\frac{1}{2}(k-2m-1)} \left(i \pi z a^2+(b-c)\right)^{k+1}$$

$$\left.\left.\left.\left(\frac{i\left(i \pi z a^2+(b-c)\right)^2}{a^2}\right)^{-\frac{1}{2}(k+1)}\binom{m}{k}\Gamma\left(\frac{k+1}{2},\frac{i\left(i \pi z a^2+(b-c)\right)^2}{2 a^2 \pi}\right)\right)\right)-\right.$$

$$\left.C(a z)\left((-b-c)^{-n-1}\Gamma(n+1,-b z-c z)+(c-b)^{-n-1}\Gamma(n+1,-(b-c) z)\right)\right) /; n \in \mathbb{N}$$

06.33.21.0098.01

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

06.33.21.0099.01

$$\int z^2\, e^{b z} \cosh(c z)\, C(a z)\, dz == \frac{1}{8 a^4 \pi^2}\, e^{-\frac{1}{2} i a^2 \pi z^2} \left(\frac{1}{(b+c)^3}\, e^{-\frac{i (b+c)^2}{2 a^2 \pi}}\right.$$
$$\left(2 a (b+c)\, e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}}\, i \left(-(b+c) \pi z a^2 + 2 \pi a^2 + (b+c)^2 i + e^{i a^2 \pi z^2} \left((b+c) \pi z a^2 - 2 \pi a^2 + (b+c)^2 i\right)\right) + \right.$$
$$2 e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}} \pi^2 ((b+c) z (b z + c z - 2) + 2)\, C(a z)\, a^4 + \right.$$
$$\left(-2 \pi^2 a^4 - i (b+c)^2 \pi a^2 + (b+c)^4\right)\left(C\left(\frac{\pi z a^2 + b i + c i}{a \pi}\right) - i S\left(\frac{\pi z a^2 + b i + c i}{a \pi}\right)\right) +$$
$$\left.\left.\left.\left.e^{\frac{i (b+c)^2}{a^2 \pi}} \left(2 \pi^2 a^4 - i (b+c)^2 \pi a^2 - (b+c)^4\right)\left(i C\left(\frac{b+c}{a \pi} + a i z\right) + S\left(\frac{b+c}{a \pi} + a i z\right)\right)\right)\right) + \frac{1}{(b-c)^3}\, e^{-\frac{i (b-c)^2}{2 a^2 \pi}}\right.$$
$$\left(2 a (b-c)\, e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)}\, i \left(-(b-c) \pi z a^2 + 2 \pi a^2 + (b-c)^2 i + e^{i a^2 \pi z^2} \left((b-c) \pi z a^2 - 2 \pi a^2 + (b-c)^2 i\right)\right) + \right.$$
$$2 e^{\frac{1}{2} i a^2 \pi z^2} \left(2 e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)} \pi^2 ((b-c) z (b z - c z - 2) + 2)\, C(a z)\, a^4 + \right.$$
$$\left(-2 \pi^2 a^4 - i (b-c)^2 \pi a^2 + (b-c)^4\right)\left(C\left(\frac{i (b-c)}{a \pi} + a z\right) - i S\left(\frac{i (b-c)}{a \pi} + a z\right)\right) +$$
$$\left.\left.\left.\left.e^{\frac{i (b-c)^2}{a^2 \pi}} \left(2 \pi^2 a^4 - i (b-c)^2 \pi a^2 - (b-c)^4\right)\left(i C\left(\frac{b-c}{a \pi} + a i z\right) + S\left(\frac{b-c}{a \pi} + a i z\right)\right)\right)\right)\right)$$

06.33.21.0100.01

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

$$\left(a (b+c)\, e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}} \left(-6 i \pi^2 a^4 - i (b+c)^2 \pi^2 z^2 a^4 + 3 (b+c) i \pi^2 z a^4 - (b+c)^3 \pi z a^2 + (b+c)^2 \pi a^2 + (b+c)^4 i + \right. \right.$$

$$\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 - 3 i (b+c) \pi^2 z a^4 - (b+c)^3 \pi z a^2 + (b+c)^2 \pi \left(a^2 i \pi z^2 + 1 \right) a^2 + (b+c)^4 (-i) \right) \right) +$$

$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2\, e^{\frac{(b+c)\left(2 \pi z a^2 + b i + c i\right)}{2 a^2 \pi}} \pi^3 \left((b+c) z \left((b+c) z (b z + c z - 3) + 6 \right) - 6 \right) C(a z)\, a^6 + \right.$$

$$\left(6 \pi^3 a^6 + 3 (b+c)^2 i \pi^2 a^4 + (b+c)^6 (-i) \right) \left(C\left(\frac{\pi z a^2 + b i + c i}{a \pi} \right) - i S\left(\frac{\pi z a^2 + b i + c i}{a \pi} \right) \right) +$$

$$\left. \left. e^{\frac{i (b+c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b+c)^2 \pi^2 a^4 + (b+c)^6 \right) \left(C\left(\frac{b+c}{a \pi} + a i z \right) - i S\left(\frac{b+c}{a \pi} + a i z \right) \right) \right) \right) + \frac{1}{(b-c)^4}\, e^{-\frac{i (b-c)^2}{2 a^2 \pi}}$$

$$\left(a (b-c)\, e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)} \left(-6 i \pi^2 a^4 - i (b-c)^2 \pi^2 z^2 a^4 + 3 (b-c) i \pi^2 z a^4 - (b-c)^3 \pi z a^2 + (b-c)^2 \pi a^2 + (b-c)^4 i + \right. \right.$$

$$\left. e^{i a^2 \pi z^2} \left(6 i \pi^2 a^4 - 3 i (b-c) \pi^2 z a^4 - (b-c)^3 \pi z a^2 + (b-c)^2 \pi \left(a^2 i \pi z^2 + 1 \right) a^2 + (b-c)^4 (-i) \right) \right) +$$

$$e^{\frac{1}{2} i a^2 \pi z^2} \left(2\, e^{\frac{i (b-c)^2}{2 a^2 \pi} + z (b-c)} \pi^3 \left((b-c) z \left((b-c) z (b z - c z - 3) + 6 \right) - 6 \right) C(a z)\, a^6 + \right.$$

$$\left(6 \pi^3 a^6 + 3 (b-c)^2 i \pi^2 a^4 + (b-c)^6 (-i) \right) \left(C\left(\frac{i (b-c)}{a \pi} + a z \right) - i S\left(\frac{i (b-c)}{a \pi} + a z \right) \right) +$$

$$\left. \left. \left. e^{\frac{i (b-c)^2}{a^2 \pi}} \left(-6 i \pi^3 a^6 - 3 (b-c)^2 \pi^2 a^4 + (b-c)^6 \right) \left(C\left(\frac{b-c}{a \pi} + a i z \right) - i S\left(\frac{b-c}{a \pi} + a i z \right) \right) \right) \right) \right)$$

06.33.21.0101.01

$$\int z^{\alpha-1}\, e^{b z^2} \cosh\left(c z^2\right) C(a z)\, dz ==$$

$$\frac{1}{4} \left(z^{\alpha}\, C(a z) \left(\left(-(b-c) z^2 \right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b-c) z^2 \right) + \left(-(b+c) z^2 \right)^{-\frac{\alpha}{2}} \Gamma\left(\frac{\alpha}{2}, 0, -(b+c) z^2 \right) \right) + \frac{2 i \left(a^4 z^4 \right)^{-\frac{\alpha}{2}}}{a} \right.$$

$$\left(\sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2k+\alpha-3)}\, \pi^{\frac{1}{2}(-2k-\alpha-1)}\, z^{-2k+\alpha-1}\, a^{-4k}\, (b-c)^k}{(2k+\alpha)\, k!} \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2 \right)^{k+\frac{\alpha}{2}} \Gamma\left(\frac{\alpha+1}{2} + k, -\frac{1}{2} i a^2 \pi z^2 \right) - \left(-i a^2 z^2 \right)^{k+\frac{\alpha}{2}} \right. \right.$$

$$\left. \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha+1}{2} + k, \frac{1}{2} i a^2 \pi z^2 \right) \right) + \sum_{k=0}^{\infty} \frac{2^{\frac{1}{2}(2k+\alpha-3)}\, \pi^{\frac{1}{2}(-2k-\alpha-1)}\, z^{-2k+\alpha-1}\, a^{-4k}\, (b+c)^k}{(2k+\alpha)\, k!}$$

$$\left. \left. \left(\sqrt{-i a^2 z^2}\, \left(i a^2 z^2 \right)^{k+\frac{\alpha}{2}} \Gamma\left(\frac{\alpha+1}{2} + k, -\frac{1}{2} i a^2 \pi z^2 \right) - \left(-i a^2 z^2 \right)^{k+\frac{\alpha}{2}} \sqrt{i a^2 z^2}\, \Gamma\left(\frac{\alpha+1}{2} + k, \frac{1}{2} i a^2 \pi z^2 \right) \right) \right) \right)$$

06.33.21.0102.01

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

$$\frac{1}{4} a \sqrt{\frac{\pi}{2}}\, z \left(b \left(\left((1+i)\, C\left(\frac{(1-i)\sqrt{\left(i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + (1-i)\, S\left(\frac{(1-i)\sqrt{\left(i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \right.$$

$$\left(\sqrt{-\left(-i\pi a^2 + 2b - 2c\right) z^2} \right) + \left((1+i)\, C\left(\frac{(1-i)\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + \right.$$

$$\left. (1-i)\, S\left(\frac{(1-i)\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \left(\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2} \right) +$$

$$c \left(\left((1+i)\, C\left(\frac{(1-i)\sqrt{\left(i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + (1-i)\, S\left(\frac{(1-i)\sqrt{\left(i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \right.$$

$$\left(\sqrt{-\left(-i\pi a^2 + 2b - 2c\right) z^2} \right) + \left(-(1+i)\, C\left(\frac{(1-i)\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - \right.$$

$$\left. (1-i)\, S\left(\frac{(1-i)\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + 1 \right) \Big/ \left(\sqrt{-\left(i\pi a^2 + 2b + 2c\right) z^2} \right) +$$

$$b \left(\left((1+i)\, C\left(\frac{(1-i)\sqrt{\left(-i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + (1-i)\, S\left(\frac{(1-i)\sqrt{\left(-i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \right.$$

$$\left(\sqrt{-\left(i\pi a^2 + 2b - 2c\right) z^2} \right) + \left((1+i)\, C\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + \right.$$

$$\left. (1-i)\, S\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \left(\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2} \right) +$$

$$c \left(\left((1+i)\, C\left(\frac{(1-i)\sqrt{\left(-i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + (1-i)\, S\left(\frac{(1-i)\sqrt{\left(-i\pi a^2 - 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - 1 \right) \Big/ \right.$$

$$\left(\sqrt{-\left(i\pi a^2 + 2b - 2c\right) z^2} \right) + \left(-(1+i)\, C\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) - \right.$$

$$\left. \left. \left. (1-i)\, S\left(\frac{(1-i)\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2}}{\sqrt{2\pi}} \right) + 1 \right) \Big/ \left(\sqrt{-\left(-i\pi a^2 + 2b + 2c\right) z^2} \right) \right) \right) \right)$$

Involving logarithm

Involving log

06.33.21.0103.01

$$\int \log(b\,z)\,C(a\,z)\,dz == z\,C(a\,z)\,(\log(b\,z)-1)+\frac{\sin\left(\frac{1}{2}a^2\pi z^2\right)}{a\pi}+\frac{\mathrm{Si}\left(\frac{1}{2}a^2\pi z^2\right)}{2a\pi}-\frac{\log(b\,z)\sin\left(\frac{1}{2}a^2\pi z^2\right)}{a\pi}$$

Involving logarithm and a power function

Involving log and power

Linear arguments

06.33.21.0104.01

$$\int z^{\alpha-1}\log(b\,z)\,C(a\,z)\,dz == -\frac{1}{2\alpha^2}$$
$$\left(2^{\frac{\alpha-1}{2}}a\pi^{\frac{1}{2}(-\alpha-1)}z^{\alpha+1}\left(\Gamma\left(\frac{\alpha+1}{2},\frac{1}{2}i a^2\pi z^2\right)\left(-i a^2 z^2\right)^{\frac{\alpha+1}{2}}+\left(i a^2 z^2\right)^{\frac{\alpha+1}{2}}\Gamma\left(\frac{\alpha+1}{2},-\frac{1}{2}i a^2\pi z^2\right)\right)\left(a^4 z^4\right)^{\frac{1}{2}(-\alpha-1)}+2^{\frac{\alpha-1}{2}}a\pi^{\frac{1}{2}(-\alpha-1)}\right.$$
$$z^{\alpha+1}\alpha\left(\Gamma\left(\frac{\alpha+1}{2},\frac{1}{2}i a^2\pi z^2\right)\left(-i a^2 z^2\right)^{\frac{\alpha+1}{2}}+\left(i a^2 z^2\right)^{\frac{\alpha+1}{2}}\Gamma\left(\frac{\alpha+1}{2},-\frac{1}{2}i a^2\pi z^2\right)\right)(\log(z)-\log(b\,z))\left(a^4 z^4\right)^{\frac{1}{2}(-\alpha-1)}-$$
$$\frac{1}{2(\alpha+1)^2}\left(a\pi^{\frac{1}{2}(-\alpha-1)}z^{\alpha+1}\left(a^4 z^4\right)^{\frac{1}{2}(-\alpha-1)}\alpha\left(2\pi^{\frac{\alpha+1}{2}}{}_2F_2\left(\frac{\alpha}{2}+\frac{1}{2},\frac{\alpha}{2}+\frac{1}{2};\frac{\alpha}{2}+\frac{3}{2},\frac{\alpha}{2}+\frac{3}{2};\frac{1}{2}i a^2\pi z^2\right)\left(a^4 z^4\right)^{\frac{\alpha+1}{2}}+\right.\right.$$
$$2\pi^{\frac{\alpha+1}{2}}{}_2F_2\left(\frac{\alpha}{2}+\frac{1}{2},\frac{\alpha}{2}+\frac{1}{2};\frac{\alpha}{2}+\frac{3}{2},\frac{\alpha}{2}+\frac{3}{2};-\frac{1}{2}i a^2\pi z^2\right)\left(a^4 z^4\right)^{\frac{\alpha+1}{2}}+$$
$$2^{\frac{\alpha+1}{2}}(\alpha+1)\left((\alpha+1)\left(\Gamma\left(\frac{\alpha+1}{2},\frac{1}{2}i a^2\pi z^2\right)\left(-i a^2 z^2\right)^{\frac{\alpha+1}{2}}+\left(i a^2 z^2\right)^{\frac{\alpha+1}{2}}\Gamma\left(\frac{\alpha+1}{2},-\frac{1}{2}i a^2\pi z^2\right)\right)-\right.$$
$$\left.\left.\left.2\left(\left(-i a^2 z^2\right)^{\frac{\alpha+1}{2}}+\left(i a^2 z^2\right)^{\frac{\alpha+1}{2}}\right)\Gamma\left(\frac{\alpha+3}{2}\right)\right)\log(z)\right)-2z^{\alpha}\,C(a\,z)\,(\alpha\log(b\,z)-1)\right)$$

06.33.21.0105.01

$$\int z\log(b\,z)\,C(a\,z)\,dz == \frac{1}{144a^5\pi z^3}\left(4a^6\pi\,{}_2F_2\left(\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};\frac{1}{2}i a^2\pi z^2\right)z^6+4a^6\pi\,{}_2F_2\left(\frac{3}{2},\frac{3}{2};\frac{5}{2},\frac{5}{2};-\frac{1}{2}i a^2\pi z^2\right)z^6+\right.$$
$$36a^5\pi\,C(a\,z)\,(2\log(b\,z)-1)\,z^5+36a^3\,S(a\,z)\,(2\log(b\,z)-1)\,z^3+18\sqrt{2}\,i\sqrt{a^4 z^4}\left(\sqrt{-i a^2 z^2}-\sqrt{i a^2 z^2}\right)\log(z)+$$
$$9\left(4a^4\sin\left(\frac{1}{2}a^2\pi z^2\right)z^4+\sqrt{2}\,i\sqrt{a^4 z^4}\left(\sqrt{-i a^2 z^2}-\sqrt{i a^2 z^2}\right)\right)-$$
$$\left.18i\log(b\,z)\left(\sqrt{2}\sqrt{a^4 z^4}\left(\sqrt{-i a^2 z^2}-\sqrt{i a^2 z^2}\right)-4i a^4 z^4\sin\left(\frac{1}{2}a^2\pi z^2\right)\right)\right)$$

06.33.21.0106.01

$$\int z^2 \log(b\,z)\, C(a\,z)\, dz == \frac{1}{18\,a^3\,\pi^2}\left(e^{-\frac{1}{2}\,i\,a^2\,\pi\,z^2}\left(2\,a^3\,e^{\frac{1}{2}\,i\,a^2\,\pi\,z^2}\,\pi^2\,C(a\,z)\,(3\log(b\,z)-1)\,z^3 + a^2\,i\,\pi\,z^2 + e^{i\,a^2\,\pi\,z^2}\left(-i\,a^2\,\pi\,z^2-1\right)+3\,e^{\frac{1}{2}\,i\,a^2\,\pi\,z^2}\left(\mathrm{Ei}\left(\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+\mathrm{Ei}\left(-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)+3\,i\left(-a^2\,\pi\,z^2+2\,i+e^{i\,a^2\,\pi\,z^2}\left(a^2\,\pi\,z^2+2\,i\right)\right)\log(b\,z)-1\right)\right)$$

06.33.21.0107.01

$$\int z^3 \log(b\,z)\,\mathrm{erf}(a\,z)\, dz == \frac{1}{1600\,a^5\,\pi^2\,z}\,e^{-\frac{1}{2}\,i\,a^2\,\pi\,z^2}\left(8\,a^6\,e^{\frac{1}{2}\,i\,a^2\,\pi\,z^2}\,\pi^2\left({}_2F_2\left(\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+{}_2F_2\left(\frac{5}{2},\frac{5}{2};\frac{7}{2},\frac{7}{2};-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)z^6 + 25\left(2\,a^2\,i\left(-a^2\,\pi\,z^2+3\,i+e^{i\,a^2\,\pi\,z^2}\left(a^2\,\pi\,z^2+3\,i\right)\right)(4\log(b\,z)-1)\,z^2 + 4\,a\,e^{\frac{1}{2}\,i\,a^2\,\pi\,z^2}\left(a^4\,\pi^2\,z^4+3\right)C(a\,z)\,(4\log(b\,z)-1)\,z + 3\sqrt{2}\;e^{\frac{1}{2}\,i\,a^2\,\pi\,z^2}\,i\left(\sqrt{-i\,a^2\,z^2}\;-\sqrt{i\,a^2\,z^2}\;\right)(4\log(z)-4\log(b\,z)+1)\right)\right)$$

Power arguments

06.33.21.0108.01

$$\int \frac{\log(z)}{\sqrt{z}}\,C\left(a\,\sqrt{z}\right)dz == \frac{1}{a\,\pi}\left(2\left(a\,\pi\,\sqrt{z}\;C\left(a\,\sqrt{z}\right)(\log(z)-2)-\sin\left(\frac{1}{2}\,a^2\,\pi\,z\right)(\log(z)-2)+\mathrm{Si}\left(\frac{1}{2}\,a^2\,\pi\,z\right)\right)\right)$$

Involving functions of the direct function

Involving elementary functions of the direct function

Involving powers of the direct function

06.33.21.0109.01

$$\int C(a\,z)^2\, dz == \frac{2\,a\,\pi\,z\,C(a\,z)^2-4\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)C(a\,z)+\sqrt{2}\;S\left(\sqrt{2}\;a\,z\right)}{2\,a\,\pi}$$

Involving products of the direct function

06.33.21.0110.01

$$\int C(a\,z)\,C(b\,z)\, dz == \frac{1}{2\,a\,b\left(a^2-b^2\right)\pi}\left(2\,C(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)b^3+\sqrt{a^2-b^2}\;S\left(\sqrt{a^2-b^2}\;z\right)b^2-\sqrt{a^2+b^2}\;S\left(\sqrt{a^2+b^2}\;z\right)b^2-2\,a^2\,C(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)b - a^2\sqrt{b^2-a^2}\;S\left(\sqrt{b^2-a^2}\;z\right)+a^2\sqrt{a^2+b^2}\;S\left(\sqrt{a^2+b^2}\;z\right)+2\,a\left(a^2-b^2\right)C(a\,z)\left(b\,\pi\,z\,C(b\,z)-\sin\left(\frac{1}{2}\,b^2\,\pi\,z^2\right)\right)\right)$$

Involving functions of the direct function and elementary functions

Involving elementary functions of the direct function and elementary functions

Involving powers of the direct function and a power function

Linear arguments

06.33.21.0111.01

$$\int z^{\alpha-1} C(a z)^2 \, dz == \frac{z^{\alpha} C(a z)^2}{\alpha} -$$
$$\frac{1}{2\alpha}\left(a\left(\frac{\pi}{2}\right)^{-\frac{\alpha+1}{2}} z^{\alpha+1}\left(a^4 z^4\right)^{\frac{1}{2}(-\alpha-1)} C(a z)\left(\Gamma\left(\frac{\alpha+1}{2}, 0, \frac{1}{2} i a^2 \pi z^2\right)\left(-i a^2 z^2\right)^{\frac{\alpha+1}{2}} + \left(i a^2 z^2\right)^{\frac{\alpha+1}{2}} \Gamma\left(\frac{\alpha+1}{2}, 0, -\frac{1}{2} i a^2 \pi z^2\right)\right) +\right.$$
$$2 i \left(a^4 z^4\right)^{-\frac{\alpha+1}{2}} 2^{\frac{\alpha-2}{2}} \pi^{-\frac{\alpha}{2}-1}\left(\sum_{k=0}^{\infty} \frac{a^{-4k}\left(-i a^2\right)^k z^{\alpha-2k}}{(2k+\alpha+1)\,k!}\left(\sqrt{-i a^2 z^2}\,\left(i a^2 z^2\right)^{\frac{1}{2}(2k+\alpha+1)} \Gamma\left(k+\frac{\alpha}{2}+1, -\frac{1}{2} i a^2 \pi z^2\right) -\right.\right.$$
$$\left.\left(-i a^2 z^2\right)^{\frac{1}{2}(2k+\alpha+1)} \sqrt{i a^2 z^2}\;\Gamma\left(k+\frac{\alpha}{2}+1, \frac{1}{2} i a^2 \pi z^2\right)\right) + \sum_{k=0}^{\infty} \frac{a^{-4k}\left(i a^2\right)^k z^{\alpha-2k}}{(2k+\alpha+1)\,k!}\left(\sqrt{-i a^2 z^2}\right.$$
$$\left.\left.\left.\left(i a^2 z^2\right)^{\frac{1}{2}(2k+\alpha+1)} \Gamma\left(k+\frac{\alpha}{2}+1, -\frac{1}{2} i a^2 \pi z^2\right) - \left(-i a^2 z^2\right)^{\frac{1}{2}(2k+\alpha+1)} \sqrt{i a^2 z^2}\;\Gamma\left(k+\frac{\alpha}{2}+1, \frac{1}{2} i a^2 \pi z^2\right)\right)\right)\right)$$

06.33.21.0112.01

$$\int z\, C(a z)^2 \, dz ==$$
$$-\frac{1}{8 a^2 \pi^2}\left(a^4 \pi^2\, {}_2F_3\left(1, 1; \frac{3}{4}, \frac{5}{4}, 2; -\frac{1}{16} a^4 \pi^2 z^4\right) z^4 - 2 a^4 \pi^2\, {}_2F_3\left(\frac{1}{2}, 1; \frac{3}{4}, \frac{5}{4}, \frac{3}{2}; -\frac{1}{16} a^4 \pi^2 z^4\right) z^4 - 2 a^2 \pi^2 C(a z)^2 z^2 +\right.$$
$$\left. 2 a^2 \pi^2 S(a z)^2 z^2 + 4 a \pi \cos\left(\frac{1}{2} a^2 \pi z^2\right) S(a z)\, z + 2\cos\left(a^2 \pi z^2\right) - 4 \pi C(a z)\left(S(a z) - a z \sin\left(\frac{1}{2} a^2 \pi z^2\right)\right)\right)$$

06.33.21.0113.01

$$\int z^2 C(a z)^2 \, dz ==$$
$$\frac{1}{12 a^3 \pi^2}\left(2 a^3 \pi^2 C(a z)^2 z^3 + 2 a\left(a^4 \pi^2\, {}_2F_3\left(\frac{1}{2}, 1; \frac{3}{4}, \frac{5}{4}, \frac{3}{2}; -\frac{1}{16} a^4 \pi^2 z^4\right) z^4 - a^2 \pi^2 S(a z)^2 z^2 - \cos\left(a^2 \pi z^2\right) + 4\right) z +\right.$$
$$\left. 5\sqrt{2}\; C\left(\sqrt{2}\; a z\right) - 8 C(a z)\left(a^2 \pi \sin\left(\frac{1}{2} a^2 \pi z^2\right) z^2 + 2\cos\left(\frac{1}{2} a^2 \pi z^2\right)\right)\right)$$

06.33.21.0114.01

$$\int z^3 C(a z)^2 \, dz ==$$
$$-\frac{1}{24 a^4 \pi^3}\left(a^6 \pi^3\, {}_2F_3\left(1, \frac{3}{2}; \frac{3}{4}, \frac{5}{4}, \frac{5}{2}; -\frac{1}{16} a^4 \pi^2 z^4\right) z^6 - 3 a^6 \pi^3\, {}_2F_3\left(\frac{1}{2}, 1; \frac{3}{4}, \frac{5}{4}, \frac{3}{2}; -\frac{1}{16} a^4 \pi^2 z^4\right) z^6 + 3 a^2 \pi \cos\left(a^2 \pi z^2\right) z^2 +\right.$$
$$6 a \pi C(a z)\left(a^2 \pi \sin\left(\frac{1}{2} a^2 \pi z^2\right) z^2 + 3\cos\left(\frac{1}{2} a^2 \pi z^2\right)\right) z + 6 a \pi S(a z)\left(a^2 \pi z^2 \cos\left(\frac{1}{2} a^2 \pi z^2\right) - 3\sin\left(\frac{1}{2} a^2 \pi z^2\right)\right) z -$$
$$\left. 3\pi\left(a^4 \pi^2 z^4 + 3\right) C(a z)^2 + 3\pi\left(a^4 \pi^2 z^4 + 3\right) S(a z)^2 - 12 \sin\left(a^2 \pi z^2\right)\right)$$

Power arguments

06.33.21.0115.01

$$\int \frac{C\left(a\sqrt{z}\right)^2}{\sqrt{z}}\,dz == \frac{1}{a\pi}\left(2a\pi\sqrt{z}\;C\left(a\sqrt{z}\right)^2 - 4\sin\left(\frac{1}{2}a^2\pi z\right)C\left(a\sqrt{z}\right) + \sqrt{2}\;S\left(\sqrt{2}\;a\sqrt{z}\right)\right)$$

Involving products of the direct function and a power function

Linear arguments

06.33.21.0116.01

$$\int z^{\alpha-1}\,C(a\,z)\,C(b\,z)\,dz == \frac{z^{\alpha}\,C(a\,z)}{\alpha\,(\alpha+1)}\left((\alpha+1)\,C(b\,z) - b\,z\,{}_1F_2\left(\frac{\alpha}{4}+\frac{1}{4};\frac{1}{2},\frac{\alpha}{4}+\frac{5}{4};-\frac{1}{16}b^4\pi^2z^4\right)\right) + \frac{i\,2^{\frac{\alpha-2}{2}}\,\pi^{-\frac{\alpha}{2}-1}}{a}\sum_{k=0}^{\infty}\frac{(-1)^k\,b^{4k+1}\,z^{4k+\alpha}\left(a^4z^4\right)^{-2k-\frac{\alpha}{2}}}{(4k+1)\,(4k+\alpha+1)\,(2k)!}$$
$$\left(\left(i\,a^2z^2\right)^{\frac{1}{2}(4k+\alpha)}\,\Gamma\left(2k+\frac{\alpha}{2}+1,-\frac{1}{2}i\,a^2\pi z^2\right) - \left(-i\,a^2z^2\right)^{\frac{1}{2}(4k+\alpha)}\,\Gamma\left(2k+\frac{\alpha}{2}+1,\frac{1}{2}i\,a^2\pi z^2\right)\right)$$

06.33.21.0117.01

$$\int z^2\,C(a\,z)\,C(b\,z)\,dz == \frac{1}{3}C(a\,z)\,C(b\,z)\,z^3 + \frac{\sin\left(\frac{1}{2}a^2\pi z^2\right)\sin\left(\frac{1}{2}b^2\pi z^2\right)z}{3\,a\,b\,\pi^2} +$$
$$\frac{\left(2a^4-b^2a^2+2b^4\right)C\left(\sqrt{a^2-b^2}\;z\right)}{6\,a^3b^3\sqrt{a^2-b^2}\;\pi^2} + \frac{\left(2a^4+b^2a^2+2b^4\right)C\left(\sqrt{a^2+b^2}\;z\right)}{6\,a^3b^3\sqrt{a^2+b^2}\;\pi^2} -$$
$$\frac{1}{3\,a^3b^3\pi^2}\left(C(a\,z)\left(b^2\pi\sin\left(\frac{1}{2}b^2\pi z^2\right)z^2 + 2\cos\left(\frac{1}{2}b^2\pi z^2\right)\right)a^3 + b^3\,C(b\,z)\left(a^2\pi\sin\left(\frac{1}{2}a^2\pi z^2\right)z^2 + 2\cos\left(\frac{1}{2}a^2\pi z^2\right)\right)\right) -$$
$$\frac{i\left(\sqrt{i\left(a^2-b^2\right)z^2}\;a^2+b^2\sqrt{-i\left(a^2-b^2\right)z^2}\right)}{12\sqrt{2}\;a\,b\left(a^2-b^2\right)^2\pi^2z} - \frac{i\,a\left(\sqrt{-i\left(a^2+b^2\right)z^2}\;-\sqrt{i\left(a^2+b^2\right)z^2}\right)}{12\sqrt{2}\;b\left(a^2+b^2\right)^2\pi^2z}$$

Power arguments

06.33.21.0118.01

$$\int \frac{C\left(a\sqrt{z}\right)C\left(b\sqrt{z}\right)}{\sqrt{z}}\,dz == \left(\left(b^2-a^2\right)\sqrt{a^2+b^2}\;S\left(\sqrt{a^2-b^2}\;\sqrt{z}\right) + \sqrt{a^2-b^2}\left(\left(a^2+b^2\right)S\left(\sqrt{a^2+b^2}\;\sqrt{z}\right) - 2\,b\sqrt{a^2+b^2}\;C\left(b\sqrt{z}\right)\sin\left(\frac{1}{2}a^2\pi z\right)\right) + 2\,a\sqrt{a^2-b^2}\;\sqrt{a^2+b^2}\;C\left(a\sqrt{z}\right)\left(b\pi\sqrt{z}\;C\left(b\sqrt{z}\right) - \sin\left(\frac{1}{2}b^2\pi z\right)\right)\right) \Big/ \left(a\,b\sqrt{a^2-b^2}\;\sqrt{a^2+b^2}\;\pi\right)$$

Involving direct function and Gamma-, Beta-, Erf-type functions

Involving erf-type functions

Involving erf

06.33.21.0119.01

$$\int \operatorname{erf}(b\,z)\,C(a\,z)\,dz == \frac{1}{4\,a\,b\,\pi}\left(C(a\,z)\left(4\,b\,(1+i)\,\pi\,z\,C\left(\frac{(1-i)\,b\,z}{\sqrt{\pi}}\right)a + 4\,b\,(1-i)\,\pi\,z\,S\left(\frac{(1-i)\,b\,z}{\sqrt{\pi}}\right)a + 4\,e^{-b^2\,z^2}\,\sqrt{\pi}\;a\right) - 2\left(\sqrt{\pi\,a^2+2\,b^2\,i}\;C\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right) + \sqrt{a^2\,\pi-2\,i\,b^2}\;C\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right) + i\,\sqrt{\pi\,a^2+2\,b^2\,i}\;S\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right) - i\,\sqrt{a^2\,\pi-2\,i\,b^2}\;S\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right) + 2\,b\,(1+i)\,C\left(\frac{(1-i)\,b\,z}{\sqrt{\pi}}\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right) + 2\,b\,(1-i)\,S\left(\frac{(1-i)\,b\,z}{\sqrt{\pi}}\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)\right)$$

Involving erfc

06.33.21.0120.01

$$\int \operatorname{erfc}(b\,z)\,C(a\,z)\,dz == \frac{1}{4\,a\,b\,\pi}\left((1-i)\,\sqrt{a^2\,\pi-2\,i\,b^2}\;\operatorname{erf}\left(\frac{1}{2}\,(1+i)\,\sqrt{a^2\,\pi-2\,i\,b^2}\;z\right) + (1-i)\,\sqrt{\pi\,a^2+2\,b^2\,i}\;\operatorname{erfi}\left(\frac{1}{2}\,(1+i)\,\sqrt{\pi\,a^2+2\,b^2\,i}\;z\right) + 4\,a\,b\,\pi\,z\,\operatorname{erfc}(b\,z)\,C(a\,z) - 4\,a\,e^{-b^2\,z^2}\,\sqrt{\pi}\;C(a\,z) - 4\,b\,\operatorname{erfc}(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)$$

Involving erfi

06.33.21.0121.01

$$\frac{1}{4\,a\,b\,\pi}\left((1-i)\,\sqrt{\pi\,a^2+2\,b^2\,i}\;\operatorname{erf}\left(\frac{1+i}{2}\,\sqrt{\pi\,a^2+2\,b^2\,i}\;z\right) + (1-i)\,\sqrt{a^2\,\pi-2\,i\,b^2}\;\operatorname{erfi}\left(\frac{1+i}{2}\,\sqrt{a^2\,\pi-2\,i\,b^2}\;z\right) + 4\,a\,b\,\pi\,z\,\operatorname{erfi}(b\,z)\,C(a\,z) - 4\,a\,e^{b^2\,z^2}\,\sqrt{\pi}\;C(a\,z) - 4\,b\,\operatorname{erfi}(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)$$

Involving erf-type functions and a power function

Involving erf and power

06.33.21.0122.01

$$\int z^{\alpha-1}\operatorname{erf}(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{z^{\alpha}\,C(a\,z)}{\sqrt{\pi}\;\alpha}\left(\sqrt{\pi}\;\operatorname{erf}(b\,z)-b\,z\left(b^2\,z^2\right)^{\frac{1}{2}(-\alpha-1)}\Gamma\left(\frac{\alpha+1}{2},\,0,\,b^2\,z^2\right)\right)-2\,a\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{k+\frac{\alpha}{2}-1}\,b^{2\,k+1}\,\pi^{-\frac{1}{2}(\alpha+3)-k}\,z^{2\,k+\alpha+2}}{(2\,k+1)\,(2\,k+\alpha+1)\,k!}$$

$$\left(\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\Gamma\left(k+\frac{\alpha}{2}+1,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\Gamma\left(k+\frac{\alpha}{2}+1,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)$$

06.33.21.0123.01

$$\int z^2\operatorname{erf}(b\,z)\,C(a\,z)\,dz == \frac{1}{12\,\pi^2}\left(\frac{\left(4\,\pi^{3/2}\right)\left(b^3\,\sqrt{\pi}\;\operatorname{erf}(b\,z)\,z^3+e^{-b^2\,z^2}\left(b^2\,z^2+1\right)\right)C(a\,z)}{b^3}+\right.$$

$$\frac{2}{a^3\,b^3}\left(\frac{-\pi^2\,a^4-i\,b^2\,\pi\,a^2+4\,b^4}{\sqrt{\pi\,a^2+2\,b^2\,i}}\left(C\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)+i\,S\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)\right)+\right.$$

$$\left.\left.\frac{-\pi^2\,a^4+b^2\,i\,\pi\,a^2+4\,b^4}{\sqrt{a^2\,\pi-2\,i\,b^2}}\left(C\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)-i\,S\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)\right)\right)+\right.$$

$$\frac{\sqrt{\pi}\;z}{a\,b}\left(i\,\sqrt{2\,\pi}\left(\frac{1}{\sqrt{\left(2\,b^2-i\,a^2\,\pi\right)z^2}}-\frac{1}{\sqrt{\left(i\,\pi\,a^2+2\,b^2\right)z^2}}\right)+4\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sinh\left(b^2\,z^2\right)\right)-$$

$$\left.\frac{4\operatorname{erf}(b\,z)\left(a^2\,\pi\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)z^2+2\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)}{a^3}-\frac{4\,\sqrt{\pi}\;z\cosh\left(b^2\,z^2\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)}{a\,b}\right)$$

Involving erfc and power

06.33.21.0124.01

$$\int z^{\alpha-1}\operatorname{erfc}(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{2^{\frac{\alpha-3}{2}}\,\pi^{-\frac{1}{2}(\alpha+1)}\,a\,z^{\alpha+1}}{\alpha}\left(a^4\,z^4\right)^{-\frac{1}{2}(\alpha+1)}\left(\left(-i\,a^2\,z^2\right)^{\frac{\alpha+1}{2}}\Gamma\left(\frac{\alpha+1}{2},\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+\left(i\,a^2\,z^2\right)^{\frac{\alpha+1}{2}}\Gamma\left(\frac{\alpha+1}{2},\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)+$$

$$\frac{z^{\alpha}\,C(a\,z)}{\alpha}\left(\frac{b\,z\left(b^2\,z^2\right)^{-\frac{\alpha+1}{2}}}{\sqrt{\pi}}\Gamma\left(\frac{\alpha+1}{2},\,0,\,b^2\,z^2\right)+\operatorname{erfc}(b\,z)\right)+2\,a\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{k+\frac{\alpha}{2}-1}\,b^{2\,k+1}\,\pi^{-\frac{1}{2}(\alpha+3)-k}\,z^{2\,k+\alpha+2}}{(2\,k+1)\,(2\,k+\alpha+1)\,k!}$$

$$\left(\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\Gamma\left(k+\frac{\alpha}{2}+1,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\Gamma\left(k+\frac{\alpha}{2}+1,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)$$

06.33.21.0125.01

$$\int z^2 \operatorname{erfc}(b\,z)\,C(a\,z)\,dz == \frac{1}{12\,\pi^2}\left(-\frac{8\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\operatorname{erfc}(b\,z)}{a^3}+4\,\pi^{3/2}\left(\sqrt{\pi}\;z^3\operatorname{erfc}(b\,z)-\frac{e^{-b^2\,z^2}\left(b^2\,z^2+1\right)}{b^3}\right)C(a\,z)-\right.$$

$$\frac{2}{a^3\,b^3}\left(\frac{-\pi^2\,a^4-i\,b^2\,\pi\,a^2+4\,b^4}{\sqrt{\pi\,a^2+2\,b^2\,i}}\left(C\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)+i\,S\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)\right)+\frac{-\pi^2\,a^4+b^2\,i\,\pi\,a^2+4\,b^4}{\sqrt{a^2\,\pi-2\,i\,b^2}}\right.$$

$$\left.\left.\left(C\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)-i\,S\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)\right)\right)+\frac{4\sqrt{\pi}\;z\left(\cosh\left(b^2\,z^2\right)-b\sqrt{\pi}\;z\operatorname{erfc}(b\,z)\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)}{a\,b}-$$

$$\left.\frac{\sqrt{\pi}\;z}{a\,b}\left(i\sqrt{2\,\pi}\left(\frac{1}{\sqrt{\left(2\,b^2-i\,a^2\,\pi\right)z^2}}-\frac{1}{\sqrt{\left(i\,\pi\,a^2+2\,b^2\right)z^2}}\right)+4\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sinh\left(b^2\,z^2\right)\right)\right)$$

Involving erfi and power

06.33.21.0126.01

$$\int z^{\alpha-1}\operatorname{erfi}(b\,z)\,C(a\,z)\,dz ==$$

$$\frac{z^\alpha\,C(a\,z)}{\alpha}\left(\operatorname{erfi}(b\,z)-\frac{b\,z\left(-b^2\,z^2\right)^{-\frac{\alpha+1}{2}}}{\sqrt{\pi}}\,\Gamma\left(\frac{\alpha+1}{2},\,0,\,-b^2\,z^2\right)\right)+2\,a\,i\sum_{k=0}^{\infty}\frac{(-1)^k\,2^{k+\frac{\alpha}{2}-1}\,(i\,b)^{2\,k+1}\,\pi^{-\frac{1}{2}(\alpha+3)-k}\,z^{2\,k+\alpha+2}}{(2\,k+1)\,(2\,k+\alpha+1)\,k!}$$

$$\left.\left(\left(-i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\,\Gamma\left(k+\frac{\alpha}{2}+1,\,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)+\left(i\,a^2\,z^2\right)^{k+\frac{\alpha}{2}-1}\left(a^4\,z^4\right)^{-k-\frac{\alpha}{2}}\,\Gamma\left(k+\frac{\alpha}{2}+1,\,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)\right)$$

06.33.21.0127.01

$$\int z^2\operatorname{erfi}(b\,z)\,C(a\,z)\,dz == \frac{1}{12\,\pi^2}\left(\frac{\left(4\,\pi^{3/2}\right)\left(b^3\sqrt{\pi}\;\operatorname{erfi}(b\,z)\,z^3+e^{b^2\,z^2}\left(1-b^2\,z^2\right)\right)C(a\,z)}{b^3}+\right.$$

$$\frac{2}{a^3\,b^3}\left(\frac{-\pi^2\,a^4-i\,b^2\,\pi\,a^2+4\,b^4}{\sqrt{\pi\,a^2+2\,b^2\,i}}\left(C\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)-i\,S\left(\sqrt{a^2+\frac{2\,b^2\,i}{\pi}}\;z\right)\right)+\right.$$

$$\left.\left.\frac{-\pi^2\,a^4+b^2\,i\,\pi\,a^2+4\,b^4}{\sqrt{a^2\,\pi-2\,i\,b^2}}\left(C\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)+i\,S\left(\sqrt{a^2-\frac{2\,i\,b^2}{\pi}}\;z\right)\right)\right)+\frac{4\sqrt{\pi}\;z\cosh\left(b^2\,z^2\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)}{a\,b}-\right.$$

$$\frac{\sqrt{\pi}\;z}{a\,b}\left(i\sqrt{2\,\pi}\left(\frac{1}{\sqrt{-\left(i\,\pi\,a^2+2\,b^2\right)z^2}}-\frac{1}{\sqrt{\left(i\,a^2\,\pi-2\,b^2\right)z^2}}\right)-4\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\sinh\left(b^2\,z^2\right)\right)-$$

$$\left.\left.\frac{4\operatorname{erfi}(b\,z)\left(a^2\,\pi\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)z^2+2\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)}{a^3}\right)\right)$$

Involving Fresnel integrals

Involving S

06.33.21.0128.01

$$\int S(b\,z)\,C(a\,z)\,dz == \frac{1}{2\,a\,b\,\pi}\left(2\,a\cos\left(\frac{1}{2}\,b^2\,\pi\,z^2\right)C(a\,z) + 2\,a\,b\,\pi\,z\,S(b\,z)\,C(a\,z) - \sqrt{a^2-b^2}\;C\left(\sqrt{a^2-b^2}\;z\right) - \sqrt{a^2+b^2}\;C\left(\sqrt{a^2+b^2}\;z\right) - 2\,b\,S(b\,z)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right)$$

Involving Fresnel integrals and a power function

Involving S and power

Linear arguments

06.33.21.0129.01

$$\int z^{\alpha-1}\,S(b\,z)\,C(a\,z)\,dz == \frac{z^\alpha\,C(a\,z)}{2\,\alpha\,(\alpha+3)}\left(2\,(\alpha+3)\,S(b\,z) - b^3\,\pi\,z^3\,{}_1F_2\left(\frac{\alpha}{4}+\frac{3}{4};\frac{3}{2},\frac{\alpha}{4}+\frac{7}{4};-\frac{1}{16}\,b^4\,\pi^2\,z^4\right)\right) - \frac{2^{\frac{\alpha-2}{2}}\,\pi^{-\frac{\alpha}{2}-1}}{a^3}\sum_{k=0}^{\infty}\frac{(-1)^k\,b^{4\,k+3}\,z^{4\,k+\alpha}\left(a^4\,z^4\right)^{-2\,k-\frac{\alpha}{2}}}{(4\,k+3)\,(4\,k+\alpha+3)\,(2\,k+1)!}\left(\left(-i\,a^2\,z^2\right)^{\frac{1}{2}(4\,k+\alpha)}\Gamma\left(2\,k+\frac{\alpha}{2}+2,\frac{1}{2}\,i\,a^2\,\pi\,z^2\right) + \left(i\,a^2\,z^2\right)^{\frac{1}{2}(4\,k+\alpha)}\Gamma\left(2\,k+\frac{\alpha}{2}+2,-\frac{1}{2}\,i\,a^2\,\pi\,z^2\right)\right)$$

06.33.21.0130.01

$$\int z^2\,S(b\,z)\,C(a\,z)\,dz == \frac{1}{72}\left(24\,C(a\,z)\,S(b\,z)\,z^3 - \frac{24\cos\left(\frac{1}{2}\,b^2\,\pi\,z^2\right)\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)z}{a\,b\,\pi^2} + \frac{3\sqrt{2}\;a}{b\,\pi^2\,z}\left(-\frac{\sqrt{i\left(a^2-b^2\right)z^2}}{\left(a^2-b^2\right)^2} - \frac{\sqrt{i\left(b^2-a^2\right)z^2}}{\left(a^2-b^2\right)^2} - \frac{\sqrt{-i\left(a^2+b^2\right)z^2}}{\left(a^2+b^2\right)^2} - \frac{\sqrt{i\left(a^2+b^2\right)z^2}}{\left(a^2+b^2\right)^2}\right) + \frac{12\left(-2\,a^4+b^2\,a^2-2\,b^4\right)S\left(\sqrt{a^2-b^2}\;z\right)}{a^3\,b^3\,\sqrt{a^2-b^2}\;\pi^2} + \frac{12\left(2\,a^4+b^2\,a^2+2\,b^4\right)S\left(\sqrt{a^2+b^2}\;z\right)}{a^3\,b^3\,\sqrt{a^2+b^2}\;\pi^2} - \frac{24\,S(b\,z)}{a^3\,\pi^2}\left(a^2\,\pi\sin\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)z^2 + 2\cos\left(\frac{1}{2}\,a^2\,\pi\,z^2\right)\right) + \frac{24\,C(a\,z)}{b^3\,\pi^2}\left(b^2\,\pi\,z^2\cos\left(\frac{1}{2}\,b^2\,\pi\,z^2\right) - 2\sin\left(\frac{1}{2}\,b^2\,\pi\,z^2\right)\right)\right)$$

Power arguments

06.33.21.0131.01

$$\int \frac{S\left(a\sqrt{z}\right) C\left(a\sqrt{z}\right)}{\sqrt{z}}\, dz == \frac{1}{a\pi}\left(-\sqrt{2}\; C\left(\sqrt{2}\; a\sqrt{z}\right) + 2\, C\left(a\sqrt{z}\right)\left(\cos\left(\frac{1}{2}a^2\pi z\right) + a\pi\sqrt{z}\; S\left(a\sqrt{z}\right)\right) - 2\, S\left(a\sqrt{z}\right)\sin\left(\frac{1}{2}a^2\pi z\right)\right)$$

06.33.21.0132.01

$$\int \frac{S\left(b\sqrt{z}\right) C\left(a\sqrt{z}\right)}{\sqrt{z}}\, dz == \left(\left(b^2-a^2\right)\sqrt{a^2+b^2}\; C\left(\sqrt{b^2-a^2}\;\sqrt{z}\right) + 2\,a\sqrt{b^2-a^2}\;\sqrt{a^2+b^2}\; C\left(a\sqrt{z}\right)\left(\cos\left(\frac{1}{2}b^2\pi z\right) + b\pi\sqrt{z}\; S\left(b\sqrt{z}\right)\right) - \sqrt{b^2-a^2}\left(\left(a^2+b^2\right) C\left(\sqrt{a^2+b^2}\;\sqrt{z}\right) + 2\,b\sqrt{a^2+b^2}\; S\left(b\sqrt{z}\right)\sin\left(\frac{1}{2}a^2\pi z\right)\right)\right) \Big/ \left(a\,b\sqrt{b^2-a^2}\;\sqrt{a^2+b^2}\;\pi\right)$$

Definite integration

For the direct function itself

06.33.21.0133.01

$$\int_0^\infty t^{\alpha-1} C(t)\, dt == -\frac{1}{2\,\alpha}\left(\frac{\pi}{2}\right)^{-\frac{\alpha+1}{2}} \cos\left(\frac{\pi}{4}(\alpha+1)\right)\Gamma\left(\frac{\alpha+1}{2}\right) /;\; -1 < \operatorname{Re}(\alpha) < 0$$

Involving the direct function

06.33.21.0134.01

$$\int_0^\infty e^{-z\,t} C(t)\, dt == \frac{1}{2\,z}\left(\sin\left(\frac{z^2}{2\,\pi}\right)\left(2\,C\left(\frac{z}{\pi}\right) - 1\right) - \cos\left(\frac{z^2}{2\,\pi}\right)\left(2\,S\left(\frac{z}{\pi}\right) - 1\right)\right) /;\; \operatorname{Re}(z) > 0$$

06.33.21.0135.01

$$\int_0^\infty t^{\alpha-1}\, e^{-z\,t}\, C(t)\, dt == \frac{1}{6}\left(3\,z^{-\alpha}\,\Gamma(\alpha) - \frac{3\,z^2}{\alpha+2}\, 2^{\frac{\alpha+1}{2}}\,\pi^{-\frac{\alpha+3}{2}}\cos\left(\frac{\pi}{4}(\alpha+3)\right)\Gamma\left(\frac{\alpha+3}{2}\right){}_3F_4\left(\frac{\alpha+2}{4}, \frac{\alpha+3}{4}, \frac{\alpha+5}{4}; \frac{3}{4}, \frac{5}{4}, \frac{3}{2}, \frac{\alpha+6}{4}; -\frac{z^4}{16\,\pi^2}\right) - \frac{z^3}{\alpha+3}\, 2^{\frac{\alpha+2}{2}}\,\pi^{-\frac{\alpha}{2}-2}\cos\left(\frac{\pi\,\alpha}{4}\right)\Gamma\left(\frac{\alpha}{2}+2\right){}_3F_4\left(\frac{\alpha+3}{4}, \frac{\alpha}{4}+1, \frac{\alpha+6}{4}; \frac{5}{4}, \frac{3}{2}, \frac{7}{4}, \frac{\alpha+7}{4}; -\frac{z^4}{16\,\pi^2}\right) - \frac{3\,z}{\alpha+1}\left(\frac{\pi}{2}\right)^{-\frac{\alpha}{2}-1}\Gamma\left(\frac{\alpha}{2}+1\right)\sin\left(\frac{\pi\,\alpha}{4}\right){}_3F_4\left(\frac{\alpha+1}{4}, \frac{\alpha+2}{4}, \frac{\alpha}{4}+1; \frac{1}{2}, \frac{3}{4}, \frac{5}{4}, \frac{\alpha+5}{4}; -\frac{z^4}{16\,\pi^2}\right)\right) - \frac{1}{\alpha\,(\alpha+1)}\left(\frac{\pi}{2}\right)^{-\frac{\alpha+1}{2}}\cos\left(\frac{\pi}{4}(\alpha+1)\right)\Gamma\left(\frac{\alpha+3}{2}\right){}_3F_4\left(\frac{\alpha+1}{4}, \frac{\alpha+3}{4}, \frac{\alpha}{4}; \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \frac{\alpha}{4}+1; -\frac{z^4}{16\,\pi^2}\right) /;\; \operatorname{Re}(z) > 0 \wedge \operatorname{Re}(\alpha) > -1$$

Integral transforms

Laplace transforms

06.33.22.0001.01

$$\mathcal{L}_t[C(t)](z) == \frac{1}{2z}\left(\sin\left(\frac{z^2}{2\pi}\right)\left(2C\left(\frac{z}{\pi}\right)-1\right)-\cos\left(\frac{z^2}{2\pi}\right)\left(2S\left(\frac{z}{\pi}\right)-1\right)\right)\text{/; } \mathrm{Re}(z)>0$$

Mellin transforms

06.33.22.0002.01

$$\mathcal{M}_t[C(t)](z) == -\frac{1}{2z}\left(\frac{\pi}{2}\right)^{-\frac{z+1}{2}}\cos\left(\frac{\pi}{4}(z+1)\right)\Gamma\left(\frac{z+1}{2}\right)\text{/; } -1<\mathrm{Re}(z)<0$$

Representations through more general functions

Through hypergeometric functions

Involving ${}_pF_q$

06.33.26.0001.01

$$C(z) == z\,{}_1F_2\left(\frac{1}{4};\frac{1}{2},\frac{5}{4};-\frac{\pi^2 z^4}{16}\right)$$

Involving hypergeometric U

06.33.26.0002.01

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

Through Meijer G

Classical cases for the direct function itself

06.33.26.0003.01

$$C(z) == \frac{\pi z^{3/4}}{\sqrt{2}\,\sqrt[4]{z^2}\,\sqrt[4]{-z}}G^{1,0}_{1,3}\left(-\frac{\pi^2}{16}z^4\,\middle|\,\begin{matrix}1\\ \frac{1}{4},\frac{3}{4},0\end{matrix}\right)$$

06.33.26.0004.01

$$C(z) == \frac{\pi}{\sqrt{2}}e^{-\frac{i\pi}{4}}G^{1,0}_{1,3}\left(-\frac{\pi^2}{16}z^4\,\middle|\,\begin{matrix}1\\ \frac{1}{4},\frac{3}{4},0\end{matrix}\right)\text{/; } -\frac{\pi}{2}<\arg(z)\le 0$$

06.33.26.0017.01

$$C\left(\sqrt[4]{z}\right) == \frac{1}{2}G^{1,1}_{1,3}\left(\frac{\pi^2 z}{16}\,\middle|\,\begin{matrix}1\\ \frac{1}{4},0,\frac{3}{4}\end{matrix}\right)$$

06.33.26.0005.01

$$C\left(\sqrt[4]{z}\right) == \frac{\pi\sqrt[4]{z}}{\sqrt{2}\,\sqrt[4]{-z}}G^{1,0}_{1,3}\left(-\frac{\pi^2 z}{16}\,\middle|\,\begin{matrix}1\\ \frac{1}{4},\frac{3}{4},0\end{matrix}\right)$$

06.33.26.0006.01

$$C\left(\sqrt[4]{z}\right) == \frac{1}{2}-\frac{1}{2}G^{2,0}_{1,3}\left(\frac{\pi^2 z}{16}\,\middle|\,\begin{matrix}1\\ 0,\frac{1}{4},\frac{3}{4}\end{matrix}\right)$$

06.33.26.0007.01

$$C\left((1+i)\sqrt{\frac{2}{\pi}}\,\sqrt[4]{z}\right) == \frac{(1+i)\,\pi}{2}\,G^{1,0}_{1,3}\left(z \,\middle|\, \begin{matrix} 1 \\ \frac{1}{4},\, 0,\, \frac{3}{4} \end{matrix}\right)$$

Classical cases involving powers of Fresnel *C*, *S*

06.33.26.0018.01

$$C\left(\sqrt[4]{z}\right)^2 + S\left(\sqrt[4]{z}\right)^2 == \sqrt{\frac{1}{2}}\;G^{1,2}_{2,4}\left(\frac{\pi^2 z}{16} \,\middle|\, \begin{matrix} \frac{1}{2},\, 1 \\ \frac{1}{2},\, \frac{3}{4},\, \frac{1}{4},\, 0 \end{matrix}\right)$$

Generalized cases for the direct function itself

06.33.26.0019.01

$$C(z) == \frac{1}{2}\,G^{1,1}_{1,3}\left(\frac{\sqrt{\pi}\,z}{2},\, \frac{1}{4} \,\middle|\, \begin{matrix} 1 \\ \frac{1}{4},\, 0,\, \frac{3}{4} \end{matrix}\right)$$

06.33.26.0008.01

$$C(z) == \frac{\pi}{\sqrt{2}}\,e^{-\frac{i\pi}{4}}\,G^{1,0}_{1,3}\left(\frac{1}{2}\,e^{\frac{\pi i}{4}}\,\sqrt{\pi}\,z,\, \frac{1}{4} \,\middle|\, \begin{matrix} 1 \\ \frac{1}{4},\, \frac{3}{4},\, 0 \end{matrix}\right)$$

Generalized cases involving cos, sin and Fresnel *S*

06.33.26.0009.01

$$\cos\left(\frac{\pi z^2}{2}\right)C(z) + \sin\left(\frac{\pi z^2}{2}\right)S(z) == \sqrt{\frac{\pi}{2}}\;G^{1,1}_{1,3}\left(\frac{\sqrt{\pi}\,z}{2},\, \frac{1}{4} \,\middle|\, \begin{matrix} \frac{1}{4} \\ \frac{1}{4},\, 0,\, \frac{1}{2} \end{matrix}\right)$$

06.33.26.0010.01

$$\cos\left(\frac{\pi z^2}{2}\right)S(z) - \sin\left(\frac{\pi z^2}{2}\right)C(z) == -\sqrt{\frac{\pi}{2}}\;G^{1,1}_{1,3}\left(\frac{\sqrt{\pi}\,z}{2},\, \frac{1}{4} \,\middle|\, \begin{matrix} \frac{3}{4} \\ \frac{3}{4},\, 0,\, \frac{1}{2} \end{matrix}\right)$$

06.33.26.0011.01

$$\cos\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2} - C(z)\right) + \sin\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2} - S(z)\right) == (2\pi)^{-3/2}\,G^{3,1}_{1,3}\left(\frac{\sqrt{\pi}\,z}{2},\, \frac{1}{4} \,\middle|\, \begin{matrix} \frac{1}{4} \\ 0,\, \frac{1}{4},\, \frac{1}{2} \end{matrix}\right)$$

06.33.26.0012.01

$$\cos\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2} - C(z)\right) + \sin\left(\frac{\pi z^2}{2}\right)\left(\frac{1}{2} - S(z)\right) == (2\pi)^{-3/2}\,G^{3,1}_{1,3}\left(\frac{\sqrt{\pi}\,z}{2},\, \frac{1}{4} \,\middle|\, \begin{matrix} \frac{3}{4} \\ 0,\, \frac{1}{2},\, \frac{3}{4} \end{matrix}\right)$$

06.33.26.0020.01

$$\cos(z)\,C\left(\sqrt{\frac{2z}{\pi}}\right) + \sin(z)\,S\left(\sqrt{\frac{2z}{\pi}}\right) == \sqrt{\frac{\pi}{2}}\;G^{1,1}_{1,3}\left(\frac{z}{2},\, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1}{4} \\ \frac{1}{4},\, 0,\, \frac{1}{2} \end{matrix}\right)$$

06.33.26.0021.01

$$\cos(z)\,S\left(\sqrt{\frac{2z}{\pi}}\right) - \sin(z)\,C\left(\sqrt{\frac{2z}{\pi}}\right) == -\sqrt{\frac{\pi}{2}}\;G^{1,1}_{1,3}\left(\frac{z}{2},\, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{3}{4} \\ \frac{3}{4},\, 0,\, \frac{1}{2} \end{matrix}\right)$$

06.33.26.0022.01

$$\cos(z)\left(\frac{1}{2}-C\left(\sqrt{\frac{2z}{\pi}}\right)\right)+\sin(z)\left(\frac{1}{2}-S\left(\sqrt{\frac{2z}{\pi}}\right)\right)==(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{matrix}\frac{1}{4}\\0,\frac{1}{4},\frac{1}{2}\end{matrix}\right)$$

06.33.26.0023.01

$$\cos(z)\left(\frac{1}{2}-S\left(\sqrt{\frac{2z}{\pi}}\right)\right)-\sin(z)\left(\frac{1}{2}-C\left(\sqrt{\frac{2z}{\pi}}\right)\right)==(2\pi)^{-3/2}\,G_{1,3}^{3,1}\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{matrix}\frac{3}{4}\\0,\frac{1}{2},\frac{3}{4}\end{matrix}\right)$$

Generalized cases involving powers of Fresnel *C*, *S*

06.33.26.0013.01

$$C(z)^2+S(z)^2==\sqrt{\frac{1}{2}}\;G_{2,4}^{1,2}\left(\frac{\sqrt{\pi}\;z}{2},\frac{1}{4}\,\middle|\,\begin{matrix}\frac{1}{2},1\\\frac{1}{2},\frac{3}{4},\frac{1}{4},0\end{matrix}\right)$$

Through other functions

06.33.26.0014.01

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

06.33.26.0015.01

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

06.33.26.0016.01

$$C(z)==\frac{i\left(\sqrt{-i\,z^2}\;-\sqrt{i\,z^2}\;\right)}{2\sqrt{2}\;z}-\frac{z}{4}\left(E_{\frac{1}{2}}\left(\frac{i\,\pi}{2}\,z^2\right)+E_{\frac{1}{2}}\left(-\frac{i\,\pi}{2}\,z^2\right)\right)$$

Representations through equivalent functions

With related functions

06.33.27.0001.01

$$C(z)==\frac{1-i}{4}\left(\operatorname{erf}\left(\frac{1+i}{2}\,\sqrt{\pi}\;z\right)+i\,\operatorname{erf}\left(\frac{1-i}{2}\,\sqrt{\pi}\;z\right)\right)$$

Zeros

06.33.30.0001.01

$C(z)==0\;/;\;z==0$

Theorems

Light diffraction

The light intensity J behind a semi-infinite opaque wall is given by

$$J \propto \left(C\left(\frac{d\,q}{2\,\lambda\,p\,(q+p)}\right)+\frac{1}{2}\right)^2+\left(S\left(\frac{d\,q}{2\,\lambda\,p\,(q+p)}\right)+\frac{1}{2}\right)^2,$$

where p is distance from screen to wall, q is distance from light source to wall, d is lateral distance from end of wall, and λ is wave length.

History

A.J. Fresnel (1798, 1818, 1826)
– K.W. Knochenhauer (1839) found a series representaion
– N. Nielsen (1906)

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