Hypergeometric1F1

Notations

Traditional name

Kummer confluent hypergeometric function ${}_1F_1$

Traditional notation

${}_1F_1(a; b; z)$

Mathematica StandardForm notation

`Hypergeometric1F1[a, b, z]`

Primary definition

07.20.02.0001.01

$$ {}_1F_1(a; b; z) == \sum_{k=0}^{\infty} \frac{(a)_k \, z^k}{(b)_k \, k!} $$

For $a = -n$, $b == -m$ /; $m \geq n$ being nonpositive integers, the function ${}_1F_1(a; b; z)$ cannot be uniquely defined by a limiting procedure based on the above definition because the two variables a, b can approach nonpositive integers $-n$, $-m$ /; $m \geq n$ at different speeds. For nonpositive integers $a = -n$, $b == -m$ /; $m \geq n$ we define:

07.20.02.0002.01

$$ {}_1F_1(a; b; z) == \sum_{k=0}^{n} \frac{(-n)_k \, z^k}{(-m)_k \, k!} \;/;\; m \in \mathbb{N} \land n \in \mathbb{N} \land m \geq n $$

For $a == -n$, $b == -m$ /; $m < n$ being nonpositive integers, the function ${}_1F_1(a; b; z)$ is not finite:

07.20.02.0003.01

$$ {}_1F_1(-n; -m; z) = \tilde{\infty} \;/;\; m \in \mathbb{N} \land n \in \mathbb{N} \land m < n $$

Specific values

Specialized values

For fixed *a*, *b*

07.20.03.0001.01

$$ {}_1F_1(a; b; 0) == 1 $$

For fixed *a*, *z*

07.20.03.0002.01

$$ {}_1F_1(a;\, a;\, z) = e^z $$

07.20.03.0003.01

$$ {}_1F_1(a;\, a+1;\, z) = \Gamma(a+1)\,(-z)^{-a}\,(1 - Q(a,\, -z)) $$

07.20.03.0004.01

$$ {}_1F_1(a;\, a+1;\, z) = a\,(-z)^{-a}\,(\Gamma(a) - \Gamma(a,\, -z)) $$

07.20.03.0005.01

$$ {}_1F_1(a;\, a+1;\, z) = a\,((-z)^{-a}\,\Gamma(a) - E_{1-a}(-z)) $$

07.20.03.0006.01

$$ {}_1F_1(a;\, a+2;\, z) = \frac{(-z)^{-a}}{z}\left(\Gamma(a)\,a^3 + (z\,a + a + z)\,\Gamma(a+1) - (a+1)\left(e^z\,(-z)^{a+1} + (a+z)\,\Gamma(a+1,\, -z)\right)\right) $$

07.20.03.0106.01

$$ {}_1F_1(a;\, a+n;\, z) = \frac{(-z)^{-a}}{\mathrm{B}(a,\, n)} \sum_{k=0}^{n} z^{-k} \binom{n-1}{k} (\Gamma(a+k) - \Gamma(a+k,\, -z)) \;/;\; n \in \mathbb{N}^+ $$

07.20.03.0007.01

$$ {}_1F_1(a;\, a-n;\, z) = \frac{(-1)^n\, n!}{(1-a)_n}\, e^z\, L_n^{a-n-1}(-z) \;/;\; n \in \mathbb{N} $$

07.20.03.0008.01

$$ {}_1F_1(a;\, a-1;\, z) = e^z \left(1 + \frac{z}{a-1}\right) $$

07.20.03.0107.01

$$ {}_1F_1(a;\, 0;\, z) = \tilde{\infty} $$

07.20.03.0009.01

$$ {}_1F_1(a;\, 1;\, z) = L_{-a}(z) $$

07.20.03.0108.01

$$ {}_1F_1(a;\, 1;\, z) = e^z\, L_{a-1}(-z) $$

07.20.03.0010.01

$$ {}_1F_1\!\left(a;\, \frac{1}{2};\, z\right) - \frac{2\sqrt{z}}{\Gamma(a)}\, \Gamma\!\left(a + \frac{1}{2}\right) {}_1F_1\!\left(a + \frac{1}{2};\, \frac{3}{2};\, z\right) = \frac{2^{2a}}{\sqrt{\pi}}\, \Gamma\!\left(a + \frac{1}{2}\right) H_{-2a}\!\left(\sqrt{z}\right) $$

07.20.03.0109.01

$$ {}_1F_1\!\left(a;\, \frac{1}{2};\, z\right) - \frac{2\sqrt{-z}\,\Gamma(1-a)}{\Gamma\!\left(\frac{1}{2} - a\right)}\, {}_1F_1\!\left(a + \frac{1}{2};\, \frac{3}{2};\, z\right) = \frac{2^{1-2a}\, e^z\, \Gamma(1-a)}{\sqrt{\pi}}\, H_{2a-1}\!\left(\sqrt{-z}\right) $$

07.20.03.0011.01

$$ {}_1F_1(a;\, 2a-1;\, z) = 2^{2a-3}\, \Gamma\!\left(a - \frac{1}{2}\right) e^{z/2}\, z^{\frac{3}{2}-a} \left(I_{a-\frac{1}{2}}\!\left(\frac{z}{2}\right) + I_{a-\frac{3}{2}}\!\left(\frac{z}{2}\right)\right) $$

07.20.03.0110.01

$$ {}_1F_1(a;\, 2a-1;\, z) = 2^{2a-3}\, \Gamma\!\left(a - \frac{1}{2}\right) e^{z/2}\, (-z)^{\frac{3}{2}-a} \left(I_{a-\frac{3}{2}}\!\left(-\frac{z}{2}\right) - I_{a-\frac{1}{2}}\!\left(-\frac{z}{2}\right)\right) $$

07.20.03.0012.01

$$ {}_1F_1(a;\, 2a;\, z) = 2^{2a-1}\, \Gamma\!\left(a + \frac{1}{2}\right) z^{\frac{1}{2}-a}\, e^{z/2}\, I_{a-\frac{1}{2}}\!\left(\frac{z}{2}\right) $$

07.20.03.0013.01

$$ {}_1F_1(a;\,2\,a;\,z) = e^{z/2}\,{}_0F_1\!\left(;\,a+\frac{1}{2};\,\frac{z^2}{16}\right) $$

07.20.03.0111.01

$$ {}_1F_1(a;\,2\,a;\,z) = 2^{2\,a-1}\,\Gamma\!\left(a+\frac{1}{2}\right) e^{z/2}\,(-z)^{\frac{1}{2}-a}\,I_{a-\frac{1}{2}}\!\left(-\frac{z}{2}\right) $$

07.20.03.0014.01

$$ {}_1F_1(a;\,2\,a+1;\,z) = 2^{2\,a-1}\,\Gamma\!\left(a+\frac{1}{2}\right) e^{z/2}\,z^{\frac{1}{2}-a}\left(I_{a-\frac{1}{2}}\!\left(\frac{z}{2}\right)-I_{a+\frac{1}{2}}\!\left(\frac{z}{2}\right)\right) $$

07.20.03.0112.01

$$ {}_1F_1(a;\,2\,a+1;\,z) = 2^{2\,a-1}\,\Gamma\!\left(a+\frac{1}{2}\right) e^{z/2}\,(-z)^{\frac{1}{2}-a}\left(I_{a+\frac{1}{2}}\!\left(-\frac{z}{2}\right)+I_{a-\frac{1}{2}}\!\left(-\frac{z}{2}\right)\right) $$

07.20.03.0015.01

$$ {}_1F_1(a;\,2\,a-n;\,z) = \Gamma\!\left(a-n-\frac{1}{2}\right)\left(\frac{z}{4}\right)^{\frac{1}{2}+n-a} e^{z/2}\sum_{k=0}^{n}\frac{(-1)^k\,(-n)_k\,(2\,a-2\,n-1)_k\left(a+k-n-\frac{1}{2}\right)}{(2\,a-n)_k\,k!}\,I_{a+k-n-\frac{1}{2}}\!\left(\frac{z}{2}\right)\,/;\,n\in\mathbb{N} $$

07.20.03.0113.01

$$ {}_1F_1(a;\,2\,a-n;\,z) = \Gamma\!\left(a+\frac{1}{2}\right) e^{z/2}\left(\frac{z}{4}\right)^{\frac{1}{2}-a}\left(\sum_{k=0}^{n}\sum_{j=0}^{\left\lfloor\frac{k}{2}\right\rfloor}\frac{(-1)^{n-j-k}\,(k-j)!\,(-n)_{n-k}\,(2\,a-2\,n-1)_{n-k}\,2^{-4\,j+2\,k-2\,n}\,z^{2\,j-k+n}}{j!\,(k-2\,j)!\,(n-k)!\left(\frac{1}{2}-a\right)_j\left(a-k+\frac{1}{2}\right)_j(2\,a-n)_{n-k}\left(a-n-\frac{1}{2}\right)_{n-k}}\right) I_{a-\frac{1}{2}}\!\left(\frac{z}{2}\right)+ $$
$$ \Gamma\!\left(a-\frac{1}{2}\right) e^{z/2}\left(\frac{z}{4}\right)^{\frac{3}{2}-a}\left(\sum_{k=0}^{n}\sum_{j=0}^{\left\lfloor\frac{k-1}{2}\right\rfloor}\frac{(-1)^{n-j-k}\,(k-j-1)!\,(-n)_{n-k}\,(2\,a-2\,n-1)_{n-k}\,2^{-4\,j+2\,k-2\,n}\,z^{2\,j-k+n}}{j!\,(k-2\,j-1)!\,(n-k)!\left(\frac{3}{2}-a\right)_j\left(a-k+\frac{1}{2}\right)_j(2\,a-n)_{n-k}\left(a-n-\frac{1}{2}\right)_{n-k}}\right) I_{a+\frac{1}{2}}\!\left(\frac{z}{2}\right)\,/;\,n\in\mathbb{N} $$

07.20.03.0016.01

$$ {}_1F_1(a;\,2\,a+n;\,z) = \Gamma\!\left(a-\frac{1}{2}\right)\left(\frac{z}{4}\right)^{\frac{1}{2}-a} e^{z/2}\sum_{k=0}^{n}\frac{(-n)_k\,(2\,a-1)_k\left(a+k-\frac{1}{2}\right)}{(2\,a+n)_k\,k!}\,I_{a+k-\frac{1}{2}}\!\left(\frac{z}{2}\right)\,/;\,n\in\mathbb{N} $$

07.20.03.0114.01

$$ {}_1F_1(a;\,2\,a+n;\,z) = \Gamma\!\left(a+\frac{1}{2}\right)\left(\frac{z}{4}\right)^{\frac{1}{2}-a} e^{z/2}\left(\sum_{k=0}^{n}\sum_{j=0}^{\left\lfloor\frac{k}{2}\right\rfloor}\frac{(-1)^{k-j}\,2^{2\,k-4\,j}\,z^{2\,j-k}\,(k-j)!\left(a+\frac{1}{2}\right)_k(2\,a-1)_k\,(-n)_k}{j!\,k!\,(k-2\,j)!\,(2\,a+n)_k\left(\frac{3}{2}-a-k\right)_j\left(a-\frac{1}{2}\right)_j}\right) I_{a-\frac{1}{2}}\!\left(\frac{z}{2}\right)- $$
$$ \Gamma\!\left(a-\frac{1}{2}\right) e^{z/2}\left(\frac{z}{4}\right)^{\frac{3}{2}-a}\left(\sum_{k=0}^{n}\sum_{j=0}^{\left\lfloor\frac{k-1}{2}\right\rfloor}\frac{(-1)^{k-j}\,2^{2\,k-4\,j}\,z^{2\,j-k}\,(k-j-1)!\left(a+\frac{1}{2}\right)_k(2\,a-1)_k\,(-n)_k}{j!\,k!\,(k-2\,j-1)!\,(2\,a+n)_k\left(\frac{3}{2}-a-k\right)_j\left(a+\frac{1}{2}\right)_j}\right) I_{a-\frac{3}{2}}\!\left(\frac{z}{2}\right)\,/;\,n\in\mathbb{N} $$

For fixed b, z

07.20.03.0017.01

$$ {}_1F_1(-2;\,b;\,z) = 1-\frac{2\,z}{b}+\frac{z^2}{b\,(1+b)} $$

07.20.03.0018.01

$$ {}_1F_1(-1;\,b;\,z) = 1-\frac{z}{b} $$

07.20.03.0019.01

$${}_1F_1(0; b; z) = 1$$

07.20.03.0020.01

$${}_1F_1(1; b; z) = (b-1)\, z^{1-b}\, e^z\, (\Gamma(b-1) - \Gamma(b-1, z))$$

07.20.03.0021.01

$${}_1F_1(2; b; z) = (b-1)\left(1 + e^z\, z^{1-b}\, (2-b+z)\, \Gamma(b-1, 0, z)\right)$$

07.20.03.0022.01

$${}_1F_1(-n; b; z) = \frac{n!}{(b)_n}\, L_n^{b-1}(z)$$

07.20.03.0023.01

$${}_1F_1(n; b; z) = \frac{b-1}{(n-1)!}\, \frac{\partial^{n-1}\left(z^{n-b}\, e^z\, (\Gamma(b-1) - \Gamma(b-1, z))\right)}{\partial z^{n-1}} \;/;\; n \in \mathbb{N}^+$$

07.20.03.0115.01

$${}_1F_1(n; b; z) = \frac{e^z\, z^{n-b}}{\mathrm{B}(b-n, n)} \sum_{k=0}^{n} (-z)^{-k} \binom{n-1}{k} (\Gamma(b+k-n) - \Gamma(b+k-n, z)) \;/;\; n \in \mathbb{N}^+$$

For fixed z and with symbolical integers in parameters

For fixed z and $a = n$, $b = m$

07.20.03.0027.01

$${}_1F_1(1; m; z) = (m-1)!\, z^{1-m} \left(e^z - \sum_{k=0}^{m-2} \frac{z^k}{k!}\right) /;\; m \in \mathbb{N}^+$$

07.20.03.0028.01

$${}_1F_1(2; m; z) = (z+2-m)\,(m-1)!\, z^{1-m} \left(e^z - \sum_{k=0}^{m-3} \frac{z^k}{k!}\right) + \frac{(m-2)\,(m-1)}{z} \;/;\; m \in \mathbb{N}^+$$

07.20.03.0024.01

$${}_1F_1(n; m; z) = \frac{(m-2)!\, (1-m)_n\, z^{1-m}}{(n-1)!} \left(\sum_{k=0}^{m-n-1} \frac{(n-m+1)_k\, z^k}{k!\, (2-m)_k} - e^z \sum_{k=0}^{n-1} \frac{(1-n)_k\, (-z)^k}{k!\, (2-m)_k}\right) /;\; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{N}^+ \bigwedge m > n$$

07.20.03.0025.01

$${}_1F_1(n; m; z) = e^z \sum_{k=0}^{n-m} \frac{(m-n)_k\, (-z)^k}{k!\, (m)_k} \;/;\; m \in \mathbb{N}^+ \bigwedge n \in \mathbb{N}^+ \bigwedge m \le n$$

07.20.03.0026.01

$${}_1F_1(n; n+1; z) = \frac{(-1)^n\, n!}{z^n} \left(1 - e^z \sum_{k=0}^{n-1} \frac{(-z)^k}{k!}\right) /;\; n \in \mathbb{N}$$

For fixed z and $a = -n$, $b = \pm m$

07.20.03.0116.01

$${}_1F_1(-n; m; z) = \sum_{k=0}^{n} \frac{(-n)_k\, z^k}{(m)_k\, k!} \;/;\; n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

07.20.03.0117.01

$${}_1F_1(-n; -n; z) = e^z\, Q(n+1, z) /; n \in \mathbb{N}$$

07.20.03.0118.01

$${}_1F_1(-n; -n; z) = \sum_{k=0}^{n} \frac{z^k}{k!} /; n \in \mathbb{N}$$

07.20.03.0029.01

$${}_1F_1(-n; -2n; z) = \frac{n!}{(2n)!\sqrt{\pi}} z^{n+\frac{1}{2}} e^{z/2} K_{n+\frac{1}{2}}\left(\frac{z}{2}\right) /; n \in \mathbb{N}^+$$

07.20.03.0119.01

$${}_1F_1(-n; -m; z) = \sum_{k=0}^{m} \frac{(-n)_k\, z^k}{k!\,(-m)_k} /; n \in \mathbb{N} \land m \in \mathbb{Z} \land m \geq n$$

For fixed z and $a = \frac{1}{2} \pm n$, $b = m$

07.20.03.0120.01

$${}_1F_1\left(n + \frac{1}{2}; m; z\right) = \frac{2^{1-m} e^{z/2} (m-1)!\, n!}{\left(\frac{1}{2}\right)_{m-1} \left(\frac{1}{2}\right)_n} \sum_{k=0}^{n} \frac{2^{-k} (-z)^k}{k!} L_{n-k}^{k-\frac{1}{2}}(-z) \sum_{p=0}^{k+m-1} (-1)^p\, 2^{-p} \binom{k+m-1}{p} \sum_{j=0}^{p} \binom{p}{j} I_{p-2j}\left(\frac{z}{2}\right) /;$$

$$n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Brychkov Yu.A. (2006)

07.20.03.0121.01

$${}_1F_1\left(\frac{1}{2} - n; m; z\right) = \frac{(-1)^n\, 2^{1-m} e^{z/2} (m-1)!}{\left(\frac{1}{2}\right)_{m-1} \left(m - \frac{1}{2}\right)_n} \sum_{k=0}^{n} 2^{-k} z^k \binom{n}{k} \left(\frac{3}{2} - m - n\right)_{n-k} \sum_{p=0}^{k+m-1} \left(-\frac{1}{2}\right)^p \binom{k+m-1}{p} \sum_{j=0}^{p} I_{p-2j}\left(\frac{z}{2}\right) \binom{p}{j} /;$$

$$n \in \mathbb{N} \bigwedge m \in \mathbb{N}^+$$

Brychkov Yu.A. (2006)

For fixed z and $a = -n$, $b = \frac{1}{2} \pm m$

07.20.03.0030.01

$${}_1F_1\left(-n; \frac{1}{2}; z\right) = \frac{(-1)^n\, n!}{(2n)!} H_{2n}\left(\sqrt{z}\right) /; n \in \mathbb{N}$$

07.20.03.0031.01

$${}_1F_1\left(-n; \frac{3}{2}; z\right) = \frac{(-1)^n\, n!}{2\,(2n+1)!\sqrt{z}} H_{2n+1}\left(\sqrt{z}\right) /; n \in \mathbb{N}$$

07.20.03.0122.01

$${}_1F_1\left(-n; m + \frac{1}{2}; z\right) = \frac{(-1)^n\, n!}{\left(-m - n + \frac{1}{2}\right)_n} L_n^{m-\frac{1}{2}}(z) /; n \in \mathbb{N} \land m \in \mathbb{Z} \land m \geq -n$$

For fixed z and $a = n$, $b = \frac{1}{2} \pm m$

07.20.03.0123.01

$$ {}_1F_1\left(n; \frac{1}{2}; z\right) = \frac{\sqrt{\pi}}{2\sqrt{z}} e^z \left(L_{n-1}^{-\frac{1}{2}}(-z) + 2\, n\, L_n^{-\frac{3}{2}}(-z)\right) \operatorname{erf}\left(\sqrt{z}\right) + n \sum_{p=0}^{n-1} \frac{1}{p+1} L_{n-p-1}^{p-\frac{1}{2}}(-z)\, L_p^{-p-\frac{1}{2}}(z) + \frac{1}{2} \sum_{p=0}^{n-2} \frac{1}{p+1} L_{n-p-2}^{p+\frac{1}{2}}(-z)\, L_p^{-p-\frac{1}{2}}(z) /; n \in \mathbb{N}^+ $$

Brychkov Yu.A. (2006)

07.20.03.0124.01

$$ {}_1F_1\left(n; \frac{3}{2}; z\right) = \frac{\sqrt{\pi}}{2\sqrt{z}} e^z \sum_{k=0}^{n-1} \frac{(-1)^k \left(\frac{1}{2}\right)_k}{k!} L_{-k+n-1}^k(-z) \left(1 - Q\left(k + \frac{1}{2}, z\right)\right) /; n \in \mathbb{N}^+ $$

Brychkov Yu.A. (2006)

07.20.03.0125.01

$$ {}_1F_1\left(n; \frac{1}{2} - m; z\right) = -\left(m + \frac{1}{2}\right) z^{m+\frac{1}{2}} e^z \sum_{k=0}^{n-1} \frac{(-1)^k}{k!} \left(\Gamma\left(k - m - \frac{1}{2}\right) - \Gamma\left(k - m - \frac{1}{2}, z\right)\right) L_{-k+n-1}^k(-z) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{Z} $$

Brychkov Yu.A. (2006)

07.20.03.0126.01

$$ {}_1F_1\left(n; \frac{1}{2} - m; z\right) = -e^z \left(m + \frac{1}{2}\right) z^{m+\frac{1}{2}} \sum_{k=0}^{n-1} \frac{(-1)^k}{k!} L_{-k+n-1}^k(-z) \left(\operatorname{erf}\left(\sqrt{z}\right) \Gamma\left(k - m - \frac{1}{2}\right) - e^{-z} \sum_{j=0}^{k-m-2} \frac{z^{j+\frac{1}{2}}}{\left(k - m - \frac{1}{2}\right)_{j-k+m+2}} + e^{-z} \sum_{j=k-m-1}^{-1} \frac{z^{j+\frac{1}{2}}}{\left(k - m - \frac{1}{2}\right)_{j-k+m+2}}\right) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{Z} $$

Brychkov Yu.A. (2006)

07.20.03.0127.01

$$ {}_1F_1\left(n; \frac{1}{2} - m; z\right) = \frac{\left((-1)^{m+1} (m+1)!\right)}{2\,(m+n)! \left(-\frac{1}{2}\right)_{m+1}} \left(\frac{\sqrt{\pi}\; e^z \operatorname{erf}\left(\sqrt{z}\right)}{\sqrt{z}} \sum_{k=0}^{m+1} \frac{(k+m+n)!}{k!} L_{-k+m+1}^{k-m-\frac{1}{2}}(z)\, L_{k+m+n}^{-k-\frac{1}{2}}(-z) + \sum_{k=0}^{m+1} \frac{(k+m+n)!}{k!} L_{-k+m+1}^{k-m-\frac{1}{2}}(z) \sum_{p=1}^{k+m+n} \frac{1}{p} L_{k+m+n-p}^{-k+p-\frac{1}{2}}(-z)\, L_{p-1}^{\frac{1}{2}-p}(z)\right) /; n \in \mathbb{Z} \land n \geq -m \land m \in \mathbb{Z} $$

07.20.03.0128.01

$$ {}_1F_1\left(n; m + \frac{1}{2}; z\right) = \left(m - \frac{1}{2}\right) z^{\frac{1}{2}-m} e^z \sum_{k=0}^{n-1} \frac{(-1)^k}{k!} \left(\Gamma\left(k + m - \frac{1}{2}\right) - \Gamma\left(k + m - \frac{1}{2}, z\right)\right) L_{-k+n-1}^k(-z) /; n \in \mathbb{N}^+ \bigwedge m \in \mathbb{Z} $$

Brychkov Yu.A. (2006)

07.20.03.0129.01

$$ {}_1F_1\left(n;\, \frac{1}{2}+m;\, z\right) = \left(m-\frac{1}{2}\right) z^{\frac{1}{2}-m}\, e^z \sum_{k=0}^{n-1} \frac{(-1)^k}{k!} L_{-k+n-1}^{k}(-z) \left(\operatorname{erf}\left(\sqrt{z}\right) \Gamma\left(k+m-\frac{1}{2}\right) - e^{-z} \sum_{j=0}^{k+m-2} \frac{z^{j+\frac{1}{2}}}{\left(k+m-\frac{1}{2}\right)_{j-k-m+2}} + e^{-z} \sum_{j=k+m-1}^{-1} \frac{z^{j+\frac{1}{2}}}{\left(k+m-\frac{1}{2}\right)_{j-k-m+2}}\right) /;\, n \in \mathbb{N}^+ \bigwedge m \in \mathbb{Z} $$

Brychkov Yu.A. (2006)

07.20.03.0130.01

$$ {}_1F_1\left(n;\, m+\frac{1}{2};\, z\right) = \frac{2m-2n+1}{2(n-1)!} \left(m-n+\frac{3}{2}\right)_{n-1} \left(e^z \sqrt{\pi}\, z^{-m+n-\frac{1}{2}} \operatorname{erf}\left(\sqrt{z}\right) \sum_{p=0}^{n-1} (-z)^{-p} \binom{n-1}{p} \left(\frac{1}{2}\right)_{m-n+p} - 2 \sum_{p=0}^{n-1} \frac{(-1)^p \binom{n-1}{p}}{2m-2n+2p+1} \sum_{k=1}^{m-n+p} (-z)^{-k} \left(-m+n-p-\frac{1}{2}\right)_k\right) /;\, n \in \mathbb{N}^+ \bigwedge m \in \mathbb{Z} \bigwedge m \geq n $$

07.20.03.0131.01

$$ {}_1F_1\left(n;\, m+\frac{1}{2};\, z\right) = \frac{1}{2} \left(\frac{3}{2}\right)_{m-1} z^{1-m} \sum_{k=0}^{n-m} \binom{n-m}{k} \sum_{p=1}^{k+m-1} \frac{1}{p} L_{k+m-p-1}^{-k-m+p+\frac{1}{2}}(-z)\, L_{p-1}^{\frac{1}{2}-p}(z) + \frac{\sqrt{\pi}}{2} \left(\frac{3}{2}\right)_{m-1} z^{\frac{1}{2}-m} e^z \operatorname{erf}\left(\sqrt{z}\right) \sum_{k=0}^{n-m} \binom{n-m}{k} L_{k+m-1}^{-k-m+\frac{1}{2}}(-z) /;\, n \in \mathbb{N}^+ \bigwedge m \in \mathbb{N}^+ \bigwedge m \leq n $$

For fixed z and $a = \frac{1}{2} \pm n$, $b = \frac{1}{2} \pm m$

07.20.03.0132.01

$$ {}_1F_1\left(\frac{1}{2}-n;\, \frac{1}{2};\, z\right) = \frac{\sqrt{\pi}}{2\sqrt{z}} \operatorname{erfi}\left(\sqrt{z}\right) \left(L_{n-1}^{-\frac{1}{2}}(z) + 2n\, L_n^{-\frac{3}{2}}(z)\right) + e^z\, n \sum_{p=0}^{n-1} \frac{1}{p+1} L_{n-p-1}^{p-\frac{1}{2}}(z)\, L_p^{-p-\frac{1}{2}}(-z) + \frac{1}{2} e^z \sum_{p=0}^{n-2} \frac{1}{p+1} L_{n-p-2}^{p+\frac{1}{2}}(z)\, L_p^{-p-\frac{1}{2}}(-z) /;\, n \in \mathbb{N}^+ $$

07.20.03.0133.01

$$ {}_1F_1\left(\frac{1}{2}-n;\, \frac{3}{2};\, z\right) = \frac{\sqrt{\pi}}{2\sqrt{-z}} \sum_{k=0}^{n} \frac{(-1)^k \left(\frac{1}{2}\right)_k}{k!} L_{n-k}^{k}(z) \left(1 - Q\left(k+\frac{1}{2},\, -z\right)\right) /;\, n \in \mathbb{N} $$

07.20.03.0134.01

$$ {}_1F_1\left(\frac{1}{2}-n;\, \frac{1}{2}-m;\, z\right) = \left(-m-\frac{1}{2}\right) (-z)^{m+\frac{1}{2}} \sum_{k=0}^{-m+n-1} \frac{(-1)^k}{k!} \left(\Gamma\left(k-m-\frac{1}{2}\right) - \Gamma\left(k-m-\frac{1}{2},\, -z\right)\right) L_{-k-m+n-1}^{k}(z) /;\, n \in \mathbb{Z} \land n > m \land m \in \mathbb{Z} $$

07.20.03.0135.01

$$ {}_1F_1\left(\frac{1}{2}-n;\frac{1}{2}-m;z\right)=(-1)^m\left(m+\frac{1}{2}\right)z^{m+1}\sum_{k=0}^{-m+n-1}\frac{(-1)^k}{k!}L_{-k-m+n-1}^{k}(z)\left(\frac{\Gamma\left(k-m-\frac{1}{2}\right)}{\sqrt{z}}\operatorname{erfi}\left(\sqrt{z}\right)-e^z\sum_{j=0}^{k-m-2}\frac{(-z)^j}{\left(k-m-\frac{1}{2}\right)_{j-k+m+2}}+e^z\sum_{j=k-m-1}^{-1}\frac{(-z)^j}{\left(k-m-\frac{1}{2}\right)_{j-k+m+2}}\right)/;n\in\mathbb{Z}\land n>m\land m\in\mathbb{Z} $$

07.20.03.0136.01

$$ {}_1F_1\left(\frac{1}{2}-n;\frac{1}{2}-m;z\right)=\frac{(-1)^{m+1}(m+1)!}{2\,n!\left(-\frac{1}{2}\right)_{m+1}}\left(\frac{\sqrt{\pi}\operatorname{erfi}\left(\sqrt{z}\right)}{\sqrt{z}}\sum_{k=0}^{m+1}\frac{(k+n)!}{k!}L_{-k+m+1}^{k-m-\frac{1}{2}}(-z)\,L_{k+n}^{-k-\frac{1}{2}}(z)+e^z\sum_{k=0}^{m+1}\frac{(k+n)!}{k!}L_{-k+m+1}^{k-m-\frac{1}{2}}(-z)\sum_{p=1}^{k+n}\frac{1}{p}L_{k+n-p}^{-k+p-\frac{1}{2}}(z)\,L_{p-1}^{\frac{1}{2}-p}(-z)\right)/;n\in\mathbb{N}\land m\in\mathbb{N} $$

Brychkov Yu.A. (2006)

07.20.03.0137.01

$$ {}_1F_1\left(\frac{1}{2}-n;m+\frac{1}{2};z\right)=\left(m-\frac{1}{2}\right)(-z)^{\frac{1}{2}-m}\sum_{k=0}^{m+n-1}\frac{(-1)^k}{k!}\left(\Gamma\left(k+m-\frac{1}{2}\right)-\Gamma\left(k+m-\frac{1}{2},-z\right)\right)L_{-k+m+n-1}^{k}(z)\,/;n\in\mathbb{Z}\land n>-m\land m\in\mathbb{Z} $$

07.20.03.0138.01

$$ {}_1F_1\left(\frac{1}{2}-n;m+\frac{1}{2};z\right)=(-1)^m\left(\frac{1}{2}-m\right)z^{1-m}\sum_{k=0}^{m+n-1}\frac{(-1)^k}{k!}L_{-k+m+n-1}^{k}(z)\left(\frac{\Gamma\left(k+m-\frac{1}{2}\right)}{\sqrt{z}}\operatorname{erfi}\left(\sqrt{z}\right)-e^z\sum_{j=0}^{k+m-2}\frac{(-z)^j}{\left(k+m-\frac{1}{2}\right)_{j-k-m+2}}+e^z\sum_{j=k+m-1}^{-1}\frac{(-z)^j}{\left(k+m-\frac{1}{2}\right)_{j-k-m+2}}\right)/;n\in\mathbb{Z}\land n>-m\land m\in\mathbb{Z} $$

07.20.03.0139.01

$$ {}_1F_1\left(\frac{1}{2}-n;m+\frac{1}{2};z\right)=\frac{(-1)^{m-1}}{2}\left(\frac{3}{2}\right)_{m-1}e^z\,z^{1-m}\sum_{k=0}^{n}\binom{n}{k}\sum_{p=1}^{k+m-1}\frac{1}{p}L_{k+m-p-1}^{-k-m+p+\frac{1}{2}}(z)\,L_{p-1}^{\frac{1}{2}-p}(-z)+\frac{(-1)^{m-1}\sqrt{\pi}}{2}\left(\frac{3}{2}\right)_{m-1}z^{\frac{1}{2}-m}\operatorname{erfi}\left(\sqrt{z}\right)\sum_{k=0}^{n}\binom{n}{k}L_{k+m-1}^{-k-m+\frac{1}{2}}(z)\,/;n\in\mathbb{N}\land m\in\mathbb{N}^+ $$

Brychkov Yu.A. (2006)

07.20.03.0140.01

$$ {}_1F_1\left(n+\frac{1}{2};\frac{1}{2};z\right)=\frac{(-1)^n\,n!}{(2\,n)!}e^z\,H_{2n}\left(\sqrt{-z}\right)/;n\in\mathbb{N} $$

07.20.03.0141.01

$$ {}_1F_1\left(n+\frac{1}{2};\frac{3}{2};z\right)=\frac{(-1)^{n-1}(n-1)!}{2\,(2\,n-1)!\sqrt{-z}}e^z\,H_{2n-1}\left(\sqrt{-z}\right)/;n\in\mathbb{N}^+ $$

07.20.03.0142.01

$$ {}_1F_1\left(n+\frac{1}{2};\, m+\frac{1}{2};\, z\right) = \frac{(2n+1)\left(n+\frac{3}{2}\right)_{m-n-1}}{2\,(m-n-1)!} \left((-1)^n \sqrt{\pi}\, z^{-n-\frac{1}{2}} \operatorname{erfi}\left(\sqrt{z}\right) \sum_{p=0}^{m-n-1} z^{-p} \binom{m-n-1}{p} \left(\frac{1}{2}\right)_{n+p} - 2\, e^z \sum_{p=0}^{m-n-1} \frac{(-1)^p \binom{m-n-1}{p}}{2n+2p+1} \sum_{k=1}^{n+p} z^{-k} \left(-n-p-\frac{1}{2}\right)_k \right) /;\, n \in \mathbb{N} \land m \in \mathbb{Z} \land m > n $$

Brychkov Yu.A. (2006)

07.20.03.0143.01

$$ {}_1F_1\left(n+\frac{1}{2};\, m+\frac{1}{2};\, z\right) = \frac{(-1)^{n-m}\,(n-m)!}{\left(\frac{1}{2}-n\right)_{n-m}}\, e^z\, L_{n-m}^{m-\frac{1}{2}}(-z) /;\, n \in \mathbb{N} \land m \in \mathbb{Z} \land m \le n $$

Brychkov Yu.A. (2006)

07.20.03.0144.01

$$ {}_1F_1\left(\frac{1}{2}-n;\, \frac{1}{2};\, z\right) = \frac{\sqrt{\pi}}{2\sqrt{z}} \operatorname{erfi}\left(\sqrt{z}\right) \left(L_{n-1}^{-\frac{1}{2}}(z) + 2\, n\, L_n^{-\frac{3}{2}}(z)\right) + e^z\, n \sum_{p=0}^{n-1} \frac{1}{p+1} L_{n-p-1}^{p-\frac{1}{2}}(z)\, L_p^{-p-\frac{1}{2}}(-z) + \frac{1}{2}\, e^z \sum_{p=0}^{n-2} \frac{1}{p+1} L_{n-p-2}^{p+\frac{1}{2}}(z)\, L_p^{-p-\frac{1}{2}}(-z) /;\, n \in \mathbb{N}^+ $$

For fixed *z*

For fixed *z* and $a = -\frac{11}{2}$

07.20.03.0145.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{11}{2};\, z\right) = e^z $$

07.20.03.0146.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{9}{2};\, z\right) = \frac{1}{945}\left(e^z\left(2z\left(2z\left(8z^3+4z^2+6z+15\right)+105\right)+945\right) - 32\sqrt{\pi}\, z^{11/2} \operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0147.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{9}{2};\, -z\right) = \frac{1}{945}\, e^{-z}\left(-32\, e^z \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right) z^{11/2} - 2\left(2z\left(8z^3-4z^2+6z-15\right)+105\right)z + 945\right) $$

07.20.03.0148.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{7}{2};\, z\right) = \frac{1}{105}\left(8\sqrt{\pi}\,(2z-11) \operatorname{erfi}\left(\sqrt{z}\right) z^{9/2} + e^z\,(4z(z(9-4z((z-5)z-2))+15)+105)\right) $$

07.20.03.0149.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{7}{2};\, -z\right) = \frac{1}{105}\, e^{-z}\left(8\, e^z \sqrt{\pi}\,(2z+11) \operatorname{erf}\left(\sqrt{z}\right) z^{9/2} + 4(z(4z(z(z+5)-2)+9)-15)z + 105\right) $$

07.20.03.0150.01

$$ {}_1F_1\left(-\frac{11}{2};\, -\frac{5}{2};\, z\right) = \frac{1}{15}\left(\sqrt{\pi}\,(-4(z-11)z-99) \operatorname{erfi}\left(\sqrt{z}\right) z^{7/2} + e^z\,(2z(z((z-8)z(2z-5)+12)+9)+15)\right) $$

07.20.03.0151.01

$${}_1F_1\left(-\frac{11}{2}; -\frac{5}{2}; -z\right) = \frac{1}{15} e^{-z} \left(-e^z \sqrt{\pi}\ (4\,z\,(z+11)+99)\,\mathrm{erf}\left(\sqrt{z}\right) z^{7/2} - 2\,(z+3)\,(z\,(z\,(2\,z+15)-5)+3)\,z+15\right)$$

07.20.03.0152.01

$${}_1F_1\left(-\frac{11}{2}; -\frac{3}{2}; z\right) = \frac{1}{36} \left(\sqrt{\pi}\ z^{5/2} \left(2\,z\left(4\,z^2-66\,z+297\right)-693\right) \mathrm{erfi}\left(\sqrt{z}\right) - 2\,e^z\,(z\,(z\,(z\,(4\,(z-16)\,z+267)-240)-48)-18)\right)$$

07.20.03.0153.01

$${}_1F_1\left(-\frac{11}{2}; -\frac{3}{2}; -z\right) = \frac{1}{36} e^{-z} \left(e^z \sqrt{\pi}\ \left(2\,z\left(4\,z^2+66\,z+297\right)+693\right) \mathrm{erf}\left(\sqrt{z}\right) z^{5/2} + 2\,(z\,(z\,(4\,z\,(z+16)+267)+240)-48)\,z+36\right)$$

07.20.03.0154.01

$${}_1F_1\left(-\frac{11}{2}; -\frac{1}{2}; z\right) =$$
$$\frac{1}{192} \left(\sqrt{\pi}\ (-8\,z\,(z\,(2\,(z-22)\,z+297)-693)-3465)\,\mathrm{erfi}\left(\sqrt{z}\right) z^{3/2} + 2\,e^z \left(z\left(z\left(2\,z\left(4\,z^2-86\,z+553\right)-2295\right)+960\right)+96\right)\right)$$

07.20.03.0155.01

$${}_1F_1\left(-\frac{11}{2}; -\frac{1}{2}; -z\right) =$$
$$\frac{1}{192} e^{-z} \left(-e^z \sqrt{\pi}\ (8\,z\,(z\,(2\,z\,(z+22)+297)+693)+3465)\,\mathrm{erf}\left(\sqrt{z}\right) z^{3/2} - 2\left(z\left(z\left(2\,z\left(4\,z^2+86\,z+553\right)+2295\right)+960\right)-96\right)\right)$$

07.20.03.0156.01

$${}_1F_1\left(-\frac{11}{2}; \frac{1}{2}; z\right) = \frac{1}{3840} \left(\sqrt{\pi}\ \sqrt{z}\ (2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-55)+495)-3465)+17\,325)-10\,395)\,\mathrm{erfi}\left(\sqrt{z}\right) -\right.$$
$$\left. 2\,e^z\,(z\,(4\,z\,(2\,z\,(2\,(z-27)\,z+469)-3045)+12\,645)-1920)\right)$$

07.20.03.0157.01

$${}_1F_1\left(-\frac{11}{2}; \frac{1}{2}; -z\right) = \frac{1}{3840} \left(e^{-z} \left(2\,z\,(4\,z\,(2\,z\,(2\,z\,(z+27)+469)+3045)+12\,645) + \right.\right.$$
$$\left.\left. e^z \sqrt{\pi}\ \sqrt{z}\ (2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+55)+495)+3465)+17\,325)+10\,395)\,\mathrm{erf}\left(\sqrt{z}\right)+3840\right)\right)$$

07.20.03.0158.01

$${}_1F_1\left(-\frac{11}{2}; 1; z\right) = \frac{1}{10\,395} \left(e^{z/2} \left((2\,z\,(z\,(8\,z\,(z\,(2\,(z-31)\,z+657)-2934)+44\,337)-31\,185)+10\,395)\,I_0\left(\frac{z}{2}\right) + \right.\right.$$
$$\left.\left. 2\,z\,(z\,(-16\,z\,(z\,((z-30)\,z+299)-1182)-27\,387)+9762)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0159.01

$${}_1F_1\left(-\frac{11}{2}; \frac{3}{2}; z\right) = \frac{1}{92\,160\,\sqrt{z}} \left(\sqrt{\pi}\ (4\,z\,(z\,(4\,z\,(z\,(4\,(z-33)\,z+1485)-6930)+51\,975)-31\,185)+10\,395)\,\mathrm{erfi}\left(\sqrt{z}\right) -\right.$$
$$\left. 2\,e^z \sqrt{z}\ (2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-65)+711)-6279)+41\,685)-35\,685)\right)$$

07.20.03.0160.01

$${}_1F_1\left(-\frac{11}{2}; \frac{3}{2}; -z\right) = \frac{1}{92\,160\,\sqrt{z}} \left(e^{-z} \left(2\sqrt{z}\ (2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+65)+711)+6279)+41\,685)+35\,685) + \right.\right.$$
$$\left.\left. e^z \sqrt{\pi}\ (4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+33)+1485)+6930)+51\,975)+31\,185)+10\,395)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0161.01

$${}_1F_1\left(-\frac{11}{2}; 2; z\right) = \frac{1}{135\,135}\left(e^{z/2}\left((2 z (4 z (2 z (z (2 z (2 z - 73) + 1875) - 10\,554) + 53\,139) - 218\,295) + 135\,135) I_0\left(\frac{z}{2}\right) + (2 z (95\,721 - 4 z (2 z (z (2 z (2 z - 71) + 1735) - 8886) + 36\,843)) - 10\,395) I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0162.01

$${}_1F_1\left(-\frac{11}{2}; \frac{5}{2}; z\right) = \frac{1}{860\,160\, z^{3/2}}\left(\sqrt{\pi}\, (2 z (2 z (2 z (2 z (2 z (2 z - 77) + 2079) - 24\,255) + 121\,275) - 218\,295) + 72\,765) + 10\,395)\, \mathrm{erfi}\left(\sqrt{z}\right) - 2 e^z \sqrt{z}\, (4 z (z (4 z (z (4 (z - 38) z + 2005) - 11\,196) + 102\,207) - 72\,870) + 10\,395)\right)$$

07.20.03.0163.01

$${}_1F_1\left(-\frac{11}{2}; \frac{5}{2}; -z\right) = \frac{1}{860\,160\, z^{3/2}}\left(e^{-z}\left(2 \sqrt{z}\, (4 z (z (4 z (z (4 z (z + 38) + 2005) + 11\,196) + 102\,207) + 72\,870) + 10\,395) + e^z \sqrt{\pi}\, (2 z (2 z (2 z (2 z (2 z (2 z (2 z + 77) + 2079) + 24\,255) + 121\,275) + 218\,295) + 72\,765) - 10\,395)\, \mathrm{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0164.01

$${}_1F_1\left(-\frac{11}{2}; 3; z\right) = \frac{1}{2\,027\,025\, z}\left(4 e^{z/2}\left(z (8 z (z (2 z (z (4 (z - 42) z + 2535) - 17\,220) + 108\,315) - 145\,530) + 509\,355) I_0\left(\frac{z}{2}\right) - (z (8 z (z (2 z (z (4 (z - 41) z + 2373) - 14\,925) + 80\,535) - 76\,095) + 72\,765) + 10\,395) I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0165.01

$${}_1F_1\left(-\frac{11}{2}; \frac{7}{2}; z\right) = \frac{1}{5\,505\,024\, z^{5/2}}\left(\sqrt{\pi}\, (16 z (z (2 z (z (8 z (z ((z - 44) z + 693) - 4851) + 121\,275) - 145\,530) + 72\,765) + 10\,395) + 31\,185)\, \mathrm{erfi}\left(\sqrt{z}\right) - 2 e^z \sqrt{z}\, (2 z (2 z (2 z (2 z (2 z (2 z (2 z - 87) + 2687) - 36\,285) + 210\,843) - 422\,709) + 72\,765) + 31\,185)\right)$$

07.20.03.0166.01

$${}_1F_1\left(-\frac{11}{2}; \frac{7}{2}; -z\right) = \frac{1}{5\,505\,024\, z^{5/2}}\left(e^{-z}\left(2 \sqrt{z}\, (2 z (2 z (2 z (2 z (2 z (2 z (2 z + 87) + 2687) + 36\,285) + 210\,843) + 422\,709) + 72\,765) - 31\,185) + e^z \sqrt{\pi}\, (16 z (z (2 z (z (8 z (z (z (z + 44) + 693) + 4851) + 121\,275) + 145\,530) + 72\,765) - 10\,395) + 31\,185)\, \mathrm{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0167.01

$${}_1F_1\left(-\frac{11}{2}; 4; z\right) = \frac{1}{11\,486\,475\, z^2}\left(4 e^{z/2}\left(z (8 z (z (2 z (z (4 z (z (2 z - 95) + 1647) - 52\,425) + 197\,745) - 654\,885) + 363\,825) + 10\,395) I_0\left(\frac{z}{2}\right) - (z (8 z (z (2 z (z (4 z (z (2 z - 93) + 1555) - 46\,383) + 154\,125) - 382\,695) + 72\,765) + 155\,925) + 41\,580) I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0168.01

$$ {}_1F_1\left(-\frac{11}{2};\frac{9}{2};z\right)=\frac{1}{28\,311\,552\,z^{7/2}} \left(\sqrt{\pi}\,(2\,z\,(8\,z\,(2\,z\,(z\,(2\,z\,(4\,z\,(z\,(z\,(2\,z-99)+1782)-14\,553)+218\,295)-654\,885)+218\,295)+93\,555)+280\,665)+155\,925)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^z\,\sqrt{z}\,(4\,z\,(4\,z\,(z\,(2\,z\,(2\,z\,(4\,z\,((z-49)\,z+867)-27\,465)+193\,845)-501\,903)+72\,765)+114\,345)+155\,925)\right) $$

07.20.03.0169.01

$$ {}_1F_1\left(-\frac{11}{2};\frac{9}{2};-z\right)=\frac{1}{28\,311\,552\,z^{7/2}} \left(e^{-z}\left(2\,\sqrt{z}\,(4\,z\,(4\,z\,(z\,(2\,z\,(2\,z\,(4\,z\,(z\,(z+49)+867)+27\,465)+193\,845)+501\,903)+72\,765)-114\,345)+155\,925)+e^z\,\sqrt{\pi}\,(2\,z\,(8\,z\,(2\,z\,(z\,(2\,z\,(4\,z\,(z\,(z\,(2\,z+99)+1782)+14\,553)+218\,295)+654\,885)+218\,295)-93\,555)+280\,665)-155\,925)\operatorname{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0170.01

$$ {}_1F_1\left(-\frac{11}{2};5;z\right)=\frac{1}{218\,243\,025\,z^3} \left(32\,e^{z/2}\left(z\,(8\,z\,(2\,z\,(z\,(2\,z\,(2\,z\,(2\,z\,((z-53)\,z+1038)-18\,939)+166\,605)-654\,885)+436\,590)+10\,395)+31\,185)\,I_0\left(\frac{z}{2}\right)-4\,(2\,z\,(z\,(z\,(2\,z\,(z\,(4\,z\,(z\,(2\,(z-52)\,z+1973)-17\,016)+268\,701)-413\,520)+218\,295)+83\,160)+41\,580)+31\,185)\,I_1\left(\frac{z}{2}\right)\right)\right) $$

07.20.03.0171.01

$$ {}_1F_1\left(-\frac{11}{2};\frac{11}{2};z\right)=\frac{1}{125\,829\,120\,z^{9/2}} \left(\sqrt{\pi}\,(4\,z\,(z\,(8\,z\,(z\,(4\,z\,(z\,(2\,z\,(z\,(4\,(z-55)\,z+4455)-41\,580)+363\,825)-654\,885)+1\,091\,475)+311\,850)+1\,403\,325)+779\,625)+1\,091\,475)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^z\,\sqrt{z}\,(2\,z\,(8\,z\,(2\,z\,(z\,(2\,z\,(4\,z\,(z\,(z\,(2\,z-109)+2174)-19\,755)+328\,155)-1\,042\,575)+218\,295)+239\,085)+1\,195\,425)+1\,091\,475)\right) $$

07.20.03.0172.01

$$ {}_1F_1\left(-\frac{11}{2};\frac{11}{2};-z\right)=\frac{1}{125\,829\,120\,z^{9/2}} \left(e^{-z}\left(2\,\sqrt{z}\,(2\,z\,(8\,z\,(2\,z\,(z\,(2\,z\,(4\,z\,(z\,(z\,(2\,z+109)+2174)+19\,755)+328\,155)+1\,042\,575)+218\,295)-239\,085)+1\,195\,425)-1\,091\,475)+e^z\,\sqrt{\pi}\,(4\,z\,(z\,(8\,z\,(z\,(4\,z\,(z\,(2\,z\,(z\,(4\,z\,(z+55)+4455)+41\,580)+363\,825)+654\,885)+1\,091\,475)-311\,850)+1\,403\,325)-779\,625)+1\,091\,475)\operatorname{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0173.01

$$ {}_1F_1\left(-\frac{11}{2};6;z\right)=\frac{1}{916\,620\,705\,z^4}\left(32\,e^{z/2}\left(z\left(z\left(8\,z\left(z\left(2\,z\left(z\left(4\,z\left(z\left(4\,z^2-234\,z+5109\right)-52\,563\right)+1\,056\,447\right)-2\,401\,245\right)+3\,711\,015\right)+93\,555\right)+530\,145\right)+249\,480\right)I_0\left(\frac{z}{2}\right)-\left(z\left(z\left(8\,z\left(z\left(2\,z\left(z\left(4\,z\left(z\left(4\,z^2-230\,z+4881\right)-47\,793\right)+874\,167\right)-1\,605\,807\right)+1\,091\,475\right)+530\,145\right)+3\,024\,945\right)+2\,120\,580\right)+997\,920\right)I_1\left(\frac{z}{2}\right)\right)\right) $$

For fixed z and $a=-\frac{9}{2}$

07.20.03.0174.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{11}{2};z\right)=e^z\left(1-\frac{2\,z}{11}\right) $$

07.20.03.0175.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{9}{2};z\right)=e^z $$

07.20.03.0176.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{7}{2};z\right)=\frac{1}{105}\left(e^z\left(2\,z\left(8\,z^3+4\,z^2+6\,z+15\right)+105\right)-16\sqrt{\pi}\,z^{9/2}\operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0177.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{7}{2};-z\right)=\frac{1}{105}\,e^{-z}\left(16\,e^z\sqrt{\pi}\operatorname{erf}\left(\sqrt{z}\right)z^{9/2}+2\left(8\,z^3-4\,z^2+6\,z-15\right)z+105\right) $$

07.20.03.0178.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{5}{2};z\right)=\frac{1}{15}\left(4\sqrt{\pi}\,(2\,z-9)\operatorname{erfi}\left(\sqrt{z}\right)z^{7/2}+e^z\,(4\,z\,(z\,(3-2\,(z-4)\,z)+3)+15)\right) $$

07.20.03.0179.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{5}{2};-z\right)=\frac{1}{15}\,e^{-z}\left(-4\,e^z\sqrt{\pi}\,(2\,z+9)\operatorname{erf}\left(\sqrt{z}\right)z^{7/2}-4\,(z\,(2\,z\,(z+4)-3)+3)\,z+15\right) $$

07.20.03.0180.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{3}{2};z\right)=\frac{1}{3}\,e^z\,(z\,(z\,(z\,(2\,z-17)+24)+6)+3)-\frac{1}{6}\sqrt{\pi}\,z^{5/2}\,(4\,(z-9)\,z+63)\operatorname{erfi}\left(\sqrt{z}\right) $$

07.20.03.0181.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{3}{2};-z\right)=\frac{1}{6}\,e^{-z}\left(e^z\sqrt{\pi}\,(4\,z\,(z+9)+63)\operatorname{erf}\left(\sqrt{z}\right)z^{5/2}+2\,(z\,(z\,(2\,z+17)+24)-6)\,z+6\right) $$

07.20.03.0182.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{1}{2};z\right)=\frac{1}{24}\left(\sqrt{\pi}\,z^{3/2}\left(2\,z\left(4\,z^2-54\,z+189\right)-315\right)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^z\,(z\,(z\,(4\,(z-13)\,z+165)-96)-12)\right) $$

07.20.03.0183.01

$$ {}_1F_1\left(-\frac{9}{2};-\frac{1}{2};-z\right)=\frac{1}{24}\,e^{-z}\left(-e^z\sqrt{\pi}\left(2\,z\left(4\,z^2+54\,z+189\right)+315\right)\operatorname{erf}\left(\sqrt{z}\right)z^{3/2}-2\,(z\,(z\,(4\,z\,(z+13)+165)+96)-12)\right) $$

07.20.03.0184.01

$$ {}_1F_1\left(-\frac{9}{2};\frac{1}{2};z\right)=\frac{1}{384}\left(2\,e^z\,(z\,(2\,z-5)\,(4\,(z-15)\,z+195)+192)+\sqrt{\pi}\sqrt{z}\,(-8\,z\,(z\,(2\,(z-18)\,z+189)-315)-945)\operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0185.01

$${}_1F_1\left(-\frac{9}{2};\frac{1}{2};-z\right)=\frac{1}{384}\,e^{-z}\left(2\,(z\,(2\,z+5)\,(4\,z\,(z+15)+195)+192)+e^z\,\sqrt{\pi}\,\sqrt{z}\,(8\,z\,(z\,(2\,z\,(z+18)+189)+315)+945)\,\text{erf}\left(\sqrt{z}\right)\right)$$

07.20.03.0186.01

$${}_1F_1\left(-\frac{9}{2};1;z\right)=\frac{1}{945}\,e^{z/2}\left((z\,(4\,z\,(z\,(-4\,(z-21)\,z-555)+1371)-4725)+945)\,I_0\left(\frac{z}{2}\right)+z\,(4\,z\,(z\,(4\,(z-20)\,z+477)-930)+1689)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0187.01

$${}_1F_1\left(-\frac{9}{2};\frac{3}{2};z\right)=\frac{1}{7680\,\sqrt{z}}\left(2\,e^z\,\sqrt{z}\,(16\,z\,(z\,((z-22)\,z+147)-330)+2895)+\sqrt{\pi}\,(945-2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-45)+315)-1575)+4725))\,\text{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0188.01

$${}_1F_1\left(-\frac{9}{2};\frac{3}{2};-z\right)=\frac{1}{7680\,\sqrt{z}}\left(e^{-z}\left(2\,\sqrt{z}\,(16\,z\,(z\,(z\,(z+22)+147)+330)+2895)+e^z\,\sqrt{\pi}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+45)+315)+1575)+4725)+945)\,\text{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0189.01

$${}_1F_1\left(-\frac{9}{2};2;z\right)=-\frac{1}{10\,395}\left(e^{z/2}\left((2\,z\,(2\,z\,(4\,z\,(z\,(2\,z-51)+426)-5631)+14\,175)-10\,395)\,I_0\left(\frac{z}{2}\right)+(945-2\,z\,(2\,z\,(4\,z\,(z\,(2\,z-49)+378)-4209)+6927))\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0190.01

$${}_1F_1\left(-\frac{9}{2};\frac{5}{2};z\right)=\frac{1}{61\,440\,z^{3/2}}\left(2\,e^z\,\sqrt{z}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-53)+447)-2751)+10\,005)-945)+\sqrt{\pi}\,(4\,z\,(z\,(4\,z\,(z\,(-4\,(z-27)\,z-945)+3150)-14\,175)+2835)+945)\,\text{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0191.01

$${}_1F_1\left(-\frac{9}{2};\frac{5}{2};-z\right)=\frac{1}{61\,440\,z^{3/2}}\left(e^{-z}\left(2\,\sqrt{z}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+53)+447)+2751)+10\,005)+945)+e^z\,\sqrt{\pi}\,(4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+27)+945)+3150)+14\,175)+2835)-945)\,\text{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0192.01

$${}_1F_1\left(-\frac{9}{2};3;z\right)=-\frac{1}{135\,135\,z}\left(4\,e^{z/2}\left(2\,z\,(2\,z-9)\,(z\,(2\,z\,(2\,z\,(2\,z-51)+753)-3255)+1890)\,I_0\left(\frac{z}{2}\right)+(2\,z\,(z\,(-8\,z\,(z\,(2\,(z-29)\,z+549)-1986)-18\,969)+2835)+945)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0193.01

$${}_1F_1\left(-\frac{9}{2};\frac{7}{2};z\right)=\frac{1}{344\,064\,z^{5/2}}\left(2\,e^z\,\sqrt{z}\,(4\,z\,(z\,(4\,z\,(z\,(4\,(z-31)\,z+1263)-4938)+25\,179)-2835)-2835)+\sqrt{\pi}\,(2\,z\,(2\,z\,(19\,845-2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z-63)+1323)-11\,025)+33\,075))+6615)+2835)\,\text{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0194.01

$${}_1F_1\left(-\frac{9}{2};\frac{7}{2};-z\right)=\frac{1}{344064\,z^{5/2}}\left(e^{-z}\left(2\sqrt{z}\,(4z(z(4z(z(4z(z+31)+1263)+4938)+25179)+2835)-2835)+e^{z}\sqrt{\pi}\,(2z(2z(2z(2z(2z(2z(2z+63)+1323)+11025)+33075)+19845)-6615)+2835)\operatorname{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0195.01

$${}_1F_1\left(-\frac{9}{2};4;z\right)=-\frac{1}{675675\,z^2}\left(4e^{z/2}\left(z(2z(4z(2z(z(2z(2z-69)+1635)-8130)+33075)-85995)-945)\,I_0\left(\frac{z}{2}\right)+(z(2z(19845-4z(2z(z(2z(2z-67)+1503)-6690)+20955))+12285)+3780)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0196.01

$${}_1F_1\left(-\frac{9}{2};\frac{9}{2};z\right)=\frac{1}{1572864\,z^{7/2}}\left(2e^{z}\sqrt{z}\,(2z(2z(2z(2z(2z(2z(2z-71)+1695)-16077)+52827)-19845)-17955)-14175)+\sqrt{\pi}\,(14175-16z(z(2z(z(8z(z((z-36)z+441)-2205)+33075)-13230)-6615)-2835))\operatorname{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0197.01

$${}_1F_1\left(-\frac{9}{2};\frac{9}{2};-z\right)=\frac{1}{1572864\,z^{7/2}}\left(e^{-z}\left(2\sqrt{z}\,(2z(2z(2z(2z(2z(2z(2z+71)+1695)+16077)+52827)+19845)-17955)+14175)+e^{z}\sqrt{\pi}\,(16z(z(2z(z(8z(z(z(z+36)+441)+2205)+33075)+13230)-6615)+2835)-14175)\operatorname{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0198.01

$${}_1F_1\left(-\frac{9}{2};5;z\right)=-\frac{1}{11486475\,z^3}\left(32e^{z/2}\left(z(z(8z(z(2z(z(4(z-39)z+2121)-12315)+59535)-46305)-6615)-2835)\,I_0\left(\frac{z}{2}\right)+(z(z(46305-8z(z(2z(z(4(z-38)z+1971)-10416)+40395)-13230))+26460)+11340)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0199.01

$${}_1F_1\left(-\frac{9}{2};\frac{11}{2};z\right)=\frac{1}{6291456\,z^{9/2}}\left(2e^{z}\sqrt{z}\,(8z(z(8z(2z(z(z(2(z-40)z+1095)-6105)+12288)-6615)-33075)-23625)-99225)+\sqrt{\pi}\,(2z(127575-8z(2z(z(2z(4(z-21)z(z(2z-39)+315)+59535)-59535)-19845)-25515))+99225)\operatorname{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0200.01

$${}_1F_1\left(-\frac{9}{2};\frac{11}{2};-z\right)=\frac{1}{6291456\,z^{9/2}}\left(e^{-z}\left(2\sqrt{z}\,(8z(z(8z(2z(z(z(2z(z+40)+1095)+6105)+12288)+6615)-33075)+23625)-99225)+e^{z}\sqrt{\pi}\,(2z(8z(2z(z(2z(4z(z+21)(z(2z+39)+315)+59535)+59535)-19845)+25515)-127575)+99225)\operatorname{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0201.01

$$ {}_1F_1\left(-\frac{9}{2};6;z\right)=-\frac{1}{43\,648\,605\,z^4}\left(32\,e^{z/2}\left(z\,(z\,(8\,z\,(z\,(2\,z\,(z\,(4\,z\,(z\,(2\,z-87)+1335)-35\,457)+99\,225)-178\,605)-6615)-42\,525)-22\,680)\,I_0\left(\frac{z}{2}\right)+(z\,(z\,(214\,515-8\,z\,(z\,(2\,z\,(z\,(4\,z\,(z\,(2\,z-85)+1251)-30\,615)+70\,797)-59\,535)-33\,075))+170\,100)+90\,720)\,I_1\left(\frac{z}{2}\right)\right)\right) $$

For fixed z and $a=-\frac{7}{2}$

07.20.03.0202.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{11}{2};z\right)=\frac{1}{99}\,e^z\,(4\,(z-9)\,z+99) $$

07.20.03.0203.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{9}{2};z\right)=e^z\left(1-\frac{2\,z}{9}\right) $$

07.20.03.0204.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{7}{2};z\right)=e^z $$

07.20.03.0205.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{5}{2};z\right)=\frac{1}{15}\left(e^z\left(8\,z^3+4\,z^2+6\,z+15\right)-8\sqrt{\pi}\,z^{7/2}\operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0206.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{5}{2};-z\right)=-\frac{1}{15}\,e^{-z}\left(8\,e^z\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{z}\right)z^{7/2}+8\,z^3-4\,z^2+6\,z-15\right) $$

07.20.03.0207.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{3}{2};z\right)=\frac{1}{3}\left(2\sqrt{\pi}\,(2\,z-7)\operatorname{erfi}\left(\sqrt{z}\right)z^{5/2}+e^z\,(3-4\,z\,((z-3)\,z-1))\right) $$

07.20.03.0208.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{3}{2};-z\right)=\frac{1}{3}\,e^{-z}\left(2\,e^z\sqrt{\pi}\,(2\,z+7)\operatorname{erf}\left(\sqrt{z}\right)z^{5/2}+4\,(z\,(z+3)-1)\,z+3\right) $$

07.20.03.0209.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{1}{2};z\right)=\frac{1}{2}\,e^z\,(z\,(z\,(2\,z-13)+12)+2)-\frac{1}{4}\sqrt{\pi}\,z^{3/2}\,(4\,(z-7)\,z+35)\operatorname{erfi}\left(\sqrt{z}\right) $$

07.20.03.0210.01

$$ {}_1F_1\left(-\frac{7}{2};-\frac{1}{2};-z\right)=\frac{1}{4}\,e^{-z}\left(-e^z\sqrt{\pi}\,(4\,z\,(z+7)+35)\operatorname{erf}\left(\sqrt{z}\right)z^{3/2}-2\,(z\,(2\,z+13)+12)\,z+4\right) $$

07.20.03.0211.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{1}{2};z\right)=\frac{1}{48}\left(\sqrt{\pi}\sqrt{z}\left(8\,z^3-84\,z^2+210\,z-105\right)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^z\,(z\,(4\,(z-10)\,z+87)-24)\right) $$

07.20.03.0212.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{1}{2};-z\right)=\frac{1}{48}\,e^{-z}\left(2\,z\,(4\,z\,(z+10)+87)+e^z\sqrt{\pi}\sqrt{z}\left(8\,z^3+84\,z^2+210\,z+105\right)\operatorname{erf}\left(\sqrt{z}\right)+48\right) $$

07.20.03.0213.01

$$ {}_1F_1\left(-\frac{7}{2};1;z\right)=\frac{1}{105}\,e^{z/2}\left((4z(2z((z-13)z+47)-105)+105)\,I_0\left(\frac{z}{2}\right)+4z(z(-2(z-12)z-71)+44)\,I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0214.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{3}{2};z\right)=\frac{\sqrt{\pi}\,(8z(z(2(z-14)z+105)-105)+105)\,\mathrm{erfi}\left(\sqrt{z}\right)-2e^z\sqrt{z}\left(2z\left(4z^2-54z+185\right)-279\right)}{768\sqrt{z}} $$

07.20.03.0215.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{3}{2};-z\right)= \frac{1}{768\sqrt{z}}\left(e^{-z}\left(2\sqrt{z}\left(2z\left(4z^2+54z+185\right)+279\right)+e^z\sqrt{\pi}\,(8z(z(2z(z+14)+105)+105)+105)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0216.01

$$ {}_1F_1\left(-\frac{7}{2};2;z\right)=\frac{1}{945}\,e^{z/2}\left((2z-9)(2z(4(z-12)z+105)-105)\,I_0\left(\frac{z}{2}\right)+\left(-4z\left(z\left(4z^2-62z+261\right)-291\right)-105\right)I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0217.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{5}{2};z\right)=\frac{1}{5120\,z^{3/2}} \left(\sqrt{\pi}\,(2z(4z(2z(z(2z-35)+175)-525)+525)+105)\,\mathrm{erfi}\left(\sqrt{z}\right)-2e^z\sqrt{z}\,(4z(2z(2(z-17)z+159)-395)+105)\right) $$

07.20.03.0218.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{5}{2};-z\right)=\frac{1}{5120\,z^{3/2}}\left(e^{-z} \left(2\sqrt{z}\,(4z(2z(2z(z+17)+159)+395)+105)+e^z\sqrt{\pi}\,(2z(4z(2z(z(2z+35)+175)+525)+525)-105)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0219.01

$$ {}_1F_1\left(-\frac{7}{2};3;z\right)= \frac{1}{10\,395\,z}\left(4e^{z/2}\left(z(4z(z(4(z-20)z+489)-1050)+2625)\,I_0\left(\frac{z}{2}\right)-(z(4(z-3)z(4(z-16)z+223)+525)+105)\,I_1\left(\frac{z}{2}\right)\right)\right) $$

07.20.03.0220.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{7}{2};z\right)=\frac{1}{24\,576\,z^{5/2}}\left(\sqrt{\pi}\,(4z(z(4z(z(4(z-21)z+525)-1050)+1575)+315)+315)\,\mathrm{erfi}\left(\sqrt{z}\right)- 2e^z\sqrt{z}\,(2z(4z(2z(z(2z-41)+243)-843)+525)+315)\right) $$

07.20.03.0221.01

$$ {}_1F_1\left(-\frac{7}{2};\frac{7}{2};-z\right)=\frac{1}{24\,576\,z^{5/2}}\left(e^{-z}\left(2\sqrt{z}\,(2z(4z(2z(z(2z+41)+243)+843)+525)-315)+ e^z\sqrt{\pi}\,(4z(z(4z(z(4z(z+21)+525)+1050)+1575)-315)+315)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0222.01

$$ {}_1F_1\left(-\frac{7}{2};4;z\right)=\frac{1}{45\,045\,z^2}\left(4e^{z/2}\left(z(2z(2z(4z(z(2z-47)+346)-3675)+5775)+105)\,I_0\left(\frac{z}{2}\right)- (z(2z(2z(4z(z(2z-45)+302)-2549)+1575)+1155)+420)\,I_1\left(\frac{z}{2}\right)\right)\right) $$

07.20.03.0223.01

$${}_1F_1\left(-\frac{7}{2};\frac{9}{2};z\right)=\frac{1}{98\,304\,z^{7/2}}\left(\sqrt{\pi}\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(4\,z^2-98\,z+735\right)-3675\right)+3675\right)+2205\right)+2205\right)+1575\right)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^z\sqrt{z}\,(4\,z\,(z\,(4\,z\,(z\,(4\,(z-24)\,z+689)-1536)+1575)+840)+1575)\right)$$

07.20.03.0224.01

$${}_1F_1\left(-\frac{7}{2};\frac{9}{2};-z\right)=\frac{1}{98\,304\,z^{7/2}}\left(e^{-z}\left(2\sqrt{z}\,(4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+24)+689)+1536)+1575)-840)+1575)+e^z\sqrt{\pi}\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(4\,z^2+98\,z+735\right)+3675\right)+3675\right)-2205\right)+2205\right)-1575\right)\operatorname{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0225.01

$${}_1F_1\left(-\frac{7}{2};5;z\right)=\frac{1}{675\,675\,z^3}\left(32\,e^{z/2}\left(z\,(2\,z\,(z\,(8\,z\,(z\,(2\,(z-27)\,z+465)-1470)+11\,025)+315)+315)\,I_0\left(\frac{z}{2}\right)-2\,(z\,(z\,(z\,(16\,z\,(z\,((z-26)\,z+207)-540)+3675)+1890)+1260)+630)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

07.20.03.0226.01

$${}_1F_1\left(-\frac{7}{2};\frac{11}{2};z\right)=\frac{1}{1\,048\,576\,z^{9/2}}\left(3\sqrt{\pi}\,(16\,z\,(z\,(2\,z\,(z\,(8\,z\,(z\,((z-28)\,z+245)-735)+3675)+1470)+2205)+1575)+11\,025)\operatorname{erfi}\left(\sqrt{z}\right)-6\,e^z\sqrt{z}\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z-55)+927)-5053)+3675)+5355)+8925)+11\,025)\right)$$

07.20.03.0227.01

$${}_1F_1\left(-\frac{7}{2};\frac{11}{2};-z\right)=\frac{1}{1\,048\,576\,z^{9/2}}\left(e^{-z}\left(6\sqrt{z}\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z+55)+927)+5053)+3675)-5355)+8925)-11\,025)+3\,e^z\sqrt{\pi}\,(16\,z\,(z\,(2\,z\,(z\,(8\,z\,(z\,(z\,(z+28)+245)+735)+3675)-1470)+2205)-1575)+11\,025)\operatorname{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0228.01

$${}_1F_1\left(-\frac{7}{2};6;z\right)=\frac{1}{2\,297\,295\,z^4}\left(32\,e^{z/2}\left(z\,(z\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z\,(2\,z-61)+1203)-4410)+9555)+2205)+4095)+2520)\,I_0\left(\frac{z}{2}\right)-(z\,(z\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z\,(2\,z-59)+1087)-3378)+3675)+9555)+17\,955)+16\,380)+10\,080)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

For fixed z and $a=-\frac{5}{2}$

07.20.03.0229.01

$${}_1F_1\left(-\frac{5}{2};-\frac{11}{2};z\right)=\frac{1}{693}\,e^z\left(-8\,z^3+84\,z^2-378\,z+693\right)$$

07.20.03.0230.01

$${}_1F_1\left(-\frac{5}{2};-\frac{9}{2};z\right)=\frac{1}{63}\,e^z\,(4\,(z-7)\,z+63)$$

07.20.03.0231.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{7}{2}; z\right) = e^z \left(1 - \frac{2z}{7}\right) $$

07.20.03.0232.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{5}{2}; z\right) = e^z $$

07.20.03.0233.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{3}{2}; z\right) = \frac{1}{3}\left(e^z (4z^2 + 2z + 3) - 4\sqrt{\pi}\, z^{5/2} \operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0234.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{3}{2}; -z\right) = \frac{1}{3} e^{-z}\left(4 e^z \sqrt{\pi} \operatorname{erf}\left(\sqrt{z}\right) z^{5/2} + 4z^2 - 2z + 3\right) $$

07.20.03.0235.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{1}{2}; z\right) = \sqrt{\pi}\,(2z - 5) \operatorname{erfi}\left(\sqrt{z}\right) z^{3/2} + e^z (1 - 2(z - 2) z) $$

07.20.03.0236.01

$$ {}_1F_1\left(-\frac{5}{2}; -\frac{1}{2}; -z\right) = e^{-z}\left(-e^z \sqrt{\pi}\,(2z + 5) \operatorname{erf}\left(\sqrt{z}\right) z^{3/2} - 2(z + 2) z + 1\right) $$

07.20.03.0237.01

$$ {}_1F_1\left(-\frac{5}{2}; \frac{1}{2}; z\right) = \frac{1}{8}\left(2 e^z (z(2z - 9) + 4) + \sqrt{\pi}\sqrt{z}\,(-4(z - 5) z - 15) \operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0238.01

$$ {}_1F_1\left(-\frac{5}{2}; \frac{1}{2}; -z\right) = \frac{1}{8} e^{-z}\left(2(z + 4)(2z + 1) + e^z \sqrt{\pi}\sqrt{z}\,(4z(z + 5) + 15) \operatorname{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0239.01

$$ {}_1F_1\left(-\frac{5}{2}; 1; z\right) = \frac{1}{15} e^{z/2}\left((z(-4(z - 7) z - 45) + 15) I_0\left(\frac{z}{2}\right) + z(4(z - 6) z + 23) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0240.01

$$ {}_1F_1\left(-\frac{5}{2}; \frac{3}{2}; z\right) = \frac{2 e^z \sqrt{z}\,(4(z - 7) z + 33) + \sqrt{\pi}\left(-8z^3 + 60z^2 - 90z + 15\right) \operatorname{erfi}\left(\sqrt{z}\right)}{96\sqrt{z}} $$

07.20.03.0241.01

$$ {}_1F_1\left(-\frac{5}{2}; \frac{3}{2}; -z\right) = \frac{1}{96}\left(e^{-z}(8z(z + 7) + 66) + \frac{\sqrt{\pi}\left(8z^3 + 60z^2 + 90z + 15\right) \operatorname{erf}\left(\sqrt{z}\right)}{\sqrt{z}}\right) $$

07.20.03.0242.01

$$ {}_1F_1\left(-\frac{5}{2}; 2; z\right) = -\frac{1}{105} e^{z/2}\left((4(z - 5) z(2z - 9) - 105) I_0\left(\frac{z}{2}\right) + (15 - 4z(z(2z - 17) + 29)) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0243.01

$$ {}_1F_1\left(-\frac{5}{2}; \frac{5}{2}; z\right) = \frac{2 e^z \sqrt{z}\,(2z - 5)(4(z - 7) z + 3) + \sqrt{\pi}\,(15 - 8z(z(2(z - 10) z + 45) - 15)) \operatorname{erfi}\left(\sqrt{z}\right)}{512 z^{3/2}} $$

07.20.03.0244.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{5}{2};-z\right)=\frac{e^{-z}\left(2\sqrt{z}\,(2z+5)(4z(z+7)+3)+e^{z}\sqrt{\pi}\,(8z(z(2z(z+10)+45)+15)-15)\operatorname{erf}\left(\sqrt{z}\right)\right)}{512z^{3/2}} $$

07.20.03.0245.01

$$ {}_1F_1\left(-\frac{5}{2};3;z\right)=-\frac{4e^{z/2}\left(4z(z(2(z-12)z+75)-60)I_0\left(\frac{z}{2}\right)+(4z(15-2z((z-11)z+27))+15)I_1\left(\frac{z}{2}\right)\right)}{945z} $$

07.20.03.0246.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{7}{2};z\right)= \frac{1}{2048z^{5/2}}\left(2e^{z}\sqrt{z}\,(2z-1)\left(8z^3-92z^2+210z+45\right)+\sqrt{\pi}\,(2z(4z(75-2(z-5)z(2z-15))+75)+45)\operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0247.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{7}{2};-z\right)= \frac{1}{2048z^{5/2}}\left(e^{-z}\left(2\sqrt{z}\,(2z+1)\left(8z^3+92z^2+210z-45\right)+e^{z}\sqrt{\pi}\,(2z(4z(2z(z+5)(2z+15)+75)-75)+45)\operatorname{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0248.01

$$ {}_1F_1\left(-\frac{5}{2};4;z\right)= -\frac{1}{3465z^2}\left(4e^{z/2}\left(z\left(4z\left(z\left(4z^2-58z+225\right)-225\right)-15\right)I_0\left(\frac{z}{2}\right)+\left(z\left(4z\left(z\left(-4z^2+54z-173\right)+75\right)+135\right)+60\right)I_1\left(\frac{z}{2}\right)\right)\right) $$

07.20.03.0249.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{9}{2};z\right)=\frac{1}{49152z^{7/2}}\left(7\left(2e^{z}\sqrt{z}\,(2z(4z(2(z-9)z(2z-11)-75)-195)-225)+\sqrt{\pi}\,\left(4z\left(z\left(4z\left(150-(15-2z)^2z\right)+225\right)+135\right)+225\right)\operatorname{erfi}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0250.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{9}{2};-z\right)=\frac{1}{49152z^{7/2}}\left(7e^{-z}\left(2\sqrt{z}\,(2z(4z(2z(z+9)(2z+11)+75)-195)+225)+e^{z}\sqrt{\pi}\,\left(4z\left(z\left(4z\left(z(2z+15)^2+150\right)-225\right)+135\right)-225\right)\operatorname{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0251.01

$$ {}_1F_1\left(-\frac{5}{2};5;z\right)=-\frac{1}{45045z^3}\left(32e^{z/2}\left(z(z(4(z-5)z(4(z-12)z+75)-75)-45)I_0\left(\frac{z}{2}\right)+(z(z(4z(z(-4(z-16)z-253)+150)+375)+300)+180)I_1\left(\frac{z}{2}\right)\right)\right) $$

07.20.03.0252.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{11}{2};z\right)=\frac{1}{65536z^{9/2}}\left(3\left(2e^{z}\sqrt{z}\,(4z(z(4z(z(4(z-17)z+283)-150)-525)-525)-1575)+\sqrt{\pi}\,\left(2z\left(2z\left(2z\left(2z\left(525-2z\left(4z^2-70z+315\right)\right)+525\right)+945\right)+1575\right)+1575\right)\operatorname{erfi}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0253.01

$$ {}_1F_1\left(-\frac{5}{2};\frac{11}{2};-z\right)=\frac{1}{65\,536\,z^{9/2}}\left(e^{-z}\left(6\sqrt{z}\,(4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+17)+283)+150)-525)+525)-1575)+3\,e^{z}\sqrt{\pi}\,\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(4\,z^2+70\,z+315\right)+525\right)-525\right)+945\right)-1575\right)+1575\right)\operatorname{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0254.01

$$ {}_1F_1\left(-\frac{5}{2};6;z\right)=-\frac{1}{135\,135\,z^4}\left(32\,e^{z/2}\left(z\,(z\,(2\,z\,(2\,z\,(4\,z\,(z\,(2\,z-39)+210)-1155)-225)-495)-360)\,I_0\left(\frac{z}{2}\right)+(z\,(z\,(2\,z\,(2\,z\,(525-4\,z\,(z\,(2\,z-37)+174))+825)+1845)+1980)+1440)\,I_1\left(\frac{z}{2}\right)\right)\right) $$

For fixed z and $a=-\frac{3}{2}$

07.20.03.0255.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{11}{2};z\right)=\frac{e^{z}\,(8\,z\,(z\,(2\,(z-10)\,z+105)-315)+3465)}{3465} $$

07.20.03.0256.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{9}{2};z\right)=e^{z}\left(1-\frac{2}{315}\,z\left(4\,z^2-30\,z+105\right)\right) $$

07.20.03.0257.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{7}{2};z\right)=\frac{1}{35}\,e^{z}\,(4\,(z-5)\,z+35) $$

07.20.03.0258.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{5}{2};z\right)=e^{z}\left(1-\frac{2\,z}{5}\right) $$

07.20.03.0259.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{3}{2};z\right)=e^{z} $$

07.20.03.0260.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{1}{2};z\right)=e^{z}\,(2\,z+1)-2\sqrt{\pi}\,z^{3/2}\operatorname{erfi}\left(\sqrt{z}\right) $$

07.20.03.0261.01

$$ {}_1F_1\left(-\frac{3}{2};-\frac{1}{2};-z\right)=e^{-z}\left(-2\,e^{z}\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{z}\right)z^{3/2}-2\,z+1\right) $$

07.20.03.0262.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{1}{2};z\right)=\frac{1}{2}\sqrt{\pi}\,\sqrt{z}\,(2\,z-3)\operatorname{erfi}\left(\sqrt{z}\right)-e^{z}\,(z-1) $$

07.20.03.0263.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{1}{2};-z\right)=e^{-z}\,(z+1)+\frac{1}{2}\sqrt{\pi}\,\sqrt{z}\,(2\,z+3)\operatorname{erf}\left(\sqrt{z}\right) $$

07.20.03.0264.01

$$ {}_1F_1\left(-\frac{3}{2};1;z\right)=\frac{1}{3}\,e^{z/2}\left((2\,(z-3)\,z+3)\,I_0\left(\frac{z}{2}\right)-2\,(z-2)\,z\,I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0265.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{3}{2};z\right)=\frac{1}{16}\left(\frac{\sqrt{\pi}\,(4\,(z-3)\,z+3)\,\mathrm{erfi}\left(\sqrt{z}\right)}{\sqrt{z}}-2\,e^{z}\,(2\,z-5)\right) $$

07.20.03.0266.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{3}{2};-z\right)=\frac{1}{16}\left(2\,e^{-z}\,(2\,z+5)+\frac{\sqrt{\pi}\,(4\,z\,(z+3)+3)\,\mathrm{erf}\left(\sqrt{z}\right)}{\sqrt{z}}\right) $$

07.20.03.0267.01

$$ {}_1F_1\left(-\frac{3}{2};2;z\right)=\frac{1}{15}\,e^{z/2}\left((2\,z\,(2\,z-9)+15)\,I_0\left(\frac{z}{2}\right)+(2\,(7-2\,z)\,z-3)\,I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0268.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{5}{2};z\right)=\frac{\sqrt{\pi}\,(2\,z\,(2\,z\,(2\,z-9)+9)+3)\,\mathrm{erfi}\left(\sqrt{z}\right)-2\,e^{z}\,\sqrt{z}\,(4\,(z-4)\,z+3)}{64\,z^{3/2}} $$

07.20.03.0269.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{5}{2};-z\right)=\frac{e^{-z}\left(2\,\sqrt{z}\,(4\,z\,(z+4)+3)+e^{z}\,\sqrt{\pi}\,(2\,z\,(2\,z\,(2\,z+9)+9)-3)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{64\,z^{3/2}} $$

07.20.03.0270.01

$$ {}_1F_1\left(-\frac{3}{2};3;z\right)=\frac{4\,e^{z/2}\left(z\,(4\,(z-6)\,z+27)\,I_0\left(\frac{z}{2}\right)-(z\,(4\,(z-5)\,z+9)+3)\,I_1\left(\frac{z}{2}\right)\right)}{105\,z} $$

07.20.03.0271.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{7}{2};z\right)=\frac{5\,\sqrt{\pi}\,(8\,z\,(z\,(2\,(z-6)\,z+9)+3)+9)\,\mathrm{erfi}\left(\sqrt{z}\right)-10\,e^{z}\,\sqrt{z}\,\left(2\,z\left(4\,z^2-22\,z+9\right)+9\right)}{1024\,z^{5/2}} $$

07.20.03.0272.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{7}{2};-z\right)=\frac{5\,e^{-z}\left(2\,\sqrt{z}\,\left(2\,z\left(4\,z^2+22\,z+9\right)-9\right)+e^{z}\,\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+6)+9)-3)+9)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{1024\,z^{5/2}} $$

07.20.03.0273.01

$$ {}_1F_1\left(-\frac{3}{2};4;z\right)=\frac{4\,e^{z/2}\left(z\,(4\,z\,(z\,(2\,z-15)+21)+3)\,I_0\left(\frac{z}{2}\right)-(z\,(4\,z\,(z\,(2\,z-13)+9)+21)+12)\,I_1\left(\frac{z}{2}\right)\right)}{315\,z^2} $$

07.20.03.0274.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{9}{2};z\right)= \frac{1}{4096\,z^{7/2}}\left(7\,\sqrt{\pi}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-15)+15)+15)+45)+45)\,\mathrm{erfi}\left(\sqrt{z}\right)-14\,e^{z}\,\sqrt{z}\,(4\,z\,(2\,z\,(2\,(z-7)\,z+9)+15)+45)\right) $$

07.20.03.0275.01

$$ {}_1F_1\left(-\frac{3}{2};\frac{9}{2};-z\right)= \frac{1}{4096\,z^{7/2}}\left(7\,e^{-z}\left(2\,\sqrt{z}\,(2\,z+3)\left(8\,z^3+44\,z^2-30\,z+15\right)+e^{z}\,\sqrt{\pi}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+15)+15)-15)+45)-45)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0276.01

$${}_1F_1\left(-\frac{3}{2}; 5; z\right) = \frac{32\, e^{z/2} \left(z\,(4\,z\,(2\,z\,((z-9)\,z+15)+3)+9)\,I_0\left(\frac{z}{2}\right) - 4\,((z-2)\,z\,(z\,(2\,(z-6)\,z-9)-6)+9)\,I_1\left(\frac{z}{2}\right)\right)}{3465\,z^3}$$

07.20.03.0277.01

$${}_1F_1\left(-\frac{3}{2}; \frac{11}{2}; z\right) = \frac{1}{32\,768\,z^{9/2}} \left(21\sqrt{\pi}\,(4\,z\,(z\,(4\,z\,(z\,(4\,(z-9)\,z+45)+30)+135)+135)+315)\,\mathrm{erfi}\left(\sqrt{z}\right) - 42\,e^z\sqrt{z}\,(2\,z\,(4\,z\,(2\,(z-1)\,z\,(2\,z-15)+33)+165)+315)\right)$$

07.20.03.0278.01

$${}_1F_1\left(-\frac{3}{2}; \frac{11}{2}; -z\right) = \frac{1}{32\,768\,z^{9/2}} \left(21\,e^{-z}\left(2\sqrt{z}\,(2\,z\,(4\,z\,(2\,z\,(z+1)\,(2\,z+15)-33)+165)-315) + e^z\sqrt{\pi}\,(4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+9)+45)-30)+135)-135)+315)\,\mathrm{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0279.01

$${}_1F_1\left(-\frac{3}{2}; 6; z\right) = \frac{1}{9009\,z^4} \left(32\,e^{z/2}\left(z\left(z\left(4\,z\left(z\left(4\,z^2-42\,z+81\right)+15\right)+81\right)+72\right)I_0\left(\frac{z}{2}\right) - \left(z\left(z\left(4\,z\left(z\left(4\,z^2-38\,z+45\right)+45\right)+249\right)+324\right)+288\right)I_1\left(\frac{z}{2}\right)\right)\right)$$

For fixed z and $a = -\frac{1}{2}$

07.20.03.0280.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{11}{2}; z\right) = \frac{e^z\,(10\,395 - 2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-15)+75)-525)+4725))}{10\,395}$$

07.20.03.0281.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{9}{2}; z\right) = \frac{1}{945}\,e^z\,(8\,z\,(z\,(2\,(z-6)\,z+45)-105)+945)$$

07.20.03.0282.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{7}{2}; z\right) = \frac{1}{105}\,e^z\,(105 - 2\,z\,(2\,z\,(2\,z-9)+45))$$

07.20.03.0283.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{5}{2}; z\right) = \frac{1}{15}\,e^z\,(4\,(z-3)\,z+15)$$

07.20.03.0284.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{3}{2}; z\right) = e^z\left(1 - \frac{2\,z}{3}\right)$$

07.20.03.0285.01

$${}_1F_1\left(-\frac{1}{2}; -\frac{1}{2}; z\right) = e^z$$

07.20.03.0032.01

$${}_1F_1\left(-\frac{1}{2}; \frac{1}{2}; z\right) = e^z - \sqrt{\pi}\,\sqrt{z}\,\mathrm{erfi}\left(\sqrt{z}\right)$$

07.20.03.0286.01

$${}_1F_1\left(-\frac{1}{2}; \frac{1}{2}; -z\right) = \sqrt{\pi}\,\sqrt{z}\,\mathrm{erf}\left(\sqrt{z}\right) + e^{-z}$$

07.20.03.0033.01

$${}_1F_1\left(-\frac{1}{2};1;z\right) = e^{z/2}\left(z\,I_1\left(\frac{z}{2}\right)-(z-1)\,I_0\left(\frac{z}{2}\right)\right)$$

07.20.03.0034.01

$${}_1F_1\left(-\frac{1}{2};\frac{3}{2};z\right) = \frac{1}{4\sqrt{z}}\left(\sqrt{\pi}\,(1-2z)\,\mathrm{erfi}\left(\sqrt{z}\right)+2\,e^z\sqrt{z}\right)$$

07.20.03.0287.01

$${}_1F_1\left(-\frac{1}{2};\frac{3}{2};-z\right) = \frac{1}{4}\left(\frac{\sqrt{\pi}\,(2z+1)\,\mathrm{erf}\left(\sqrt{z}\right)}{\sqrt{z}}+2\,e^{-z}\right)$$

07.20.03.0035.01

$${}_1F_1\left(-\frac{1}{2};2;z\right) = -\frac{1}{3}\,e^{z/2}\left((2z-3)\,I_0\left(\frac{z}{2}\right)+(1-2z)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0036.01

$${}_1F_1\left(-\frac{1}{2};\frac{5}{2};z\right) = \frac{3}{32\,z^{3/2}}\left(2\,e^z\sqrt{z}\,(2z-1)+\sqrt{\pi}\left(-4z^2+4z+1\right)\mathrm{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0288.01

$${}_1F_1\left(-\frac{1}{2};\frac{5}{2};-z\right) = \frac{3\left(2\,e^{-z}\sqrt{z}\,(2z+1)+\sqrt{\pi}\,(4z(z+1)-1)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{32\,z^{3/2}}$$

07.20.03.0037.01

$${}_1F_1\left(-\frac{1}{2};3;z\right) = -\frac{4}{15\,z}\,e^{z/2}\left(2\,(z-2)\,z\,I_0\left(\frac{z}{2}\right)+\left(-2z^2+2z+1\right)I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0038.01

$${}_1F_1\left(-\frac{1}{2};\frac{7}{2};z\right) = \frac{5}{128\,z^{5/2}}\left(2\,e^z\sqrt{z}\left(4z^2-4z-3\right)+\sqrt{\pi}\left(-8z^3+12z^2+6z+3\right)\mathrm{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0289.01

$${}_1F_1\left(-\frac{1}{2};\frac{7}{2};-z\right) = \frac{5\,e^{-z}\left(2\sqrt{z}\,(4z(z+1)-3)+e^z\sqrt{\pi}\left(2z\left(4z^2+6z-3\right)+3\right)\mathrm{erf}\left(\sqrt{z}\right)\right)}{128\,z^{5/2}}$$

07.20.03.0039.01

$${}_1F_1\left(-\frac{1}{2};4;z\right) = -\frac{4}{35\,z^2}\,e^{z/2}\left(z\left(4z^2-10z-1\right)I_0\left(\frac{z}{2}\right)+\left(-4z^3+6z^2+5z+4\right)I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0290.01

$${}_1F_1\left(-\frac{1}{2};\frac{9}{2};z\right) = \frac{35\left(2\,e^z\sqrt{z}\,(2z-5)\,(4z(z+1)+3)+\sqrt{\pi}\,(8z(z(3-2(z-2)z)+3)+15)\,\mathrm{erfi}\left(\sqrt{z}\right)\right)}{2048\,z^{7/2}}$$

07.20.03.0291.01

$${}_1F_1\left(-\frac{1}{2};\frac{9}{2};-z\right) = \frac{35\,e^{-z}\left(2\sqrt{z}\,(2z+5)\,(4(z-1)z+3)+e^z\sqrt{\pi}\,(8z(z(2z(z+2)-3)+3)-15)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{2048\,z^{7/2}}$$

07.20.03.0292.01

$${}_1F_1\left(-\frac{1}{2};5;z\right) = -\frac{32\,e^{z/2}\left(z\,(z\,(4\,(z-3)\,z-3)-3)\,I_0\left(\frac{z}{2}\right)+(z\,(z\,(9-4\,(z-2)\,z)+12)+12)\,I_1\left(\frac{z}{2}\right)\right)}{315\,z^3}$$

07.20.03.0293.01

$${}_1F_1\left(-\frac{1}{2};\frac{11}{2};z\right)=\frac{1}{8192\,z^{9/2}}\left(63\left(2\,e^z\sqrt{z}\,(16\,z\,((z-3)\,z\,(z+1)-5)-105)+\sqrt{\pi}\,(2\,z\,(4\,z\,(2\,z\,((5-2\,z)\,z+5)+15)+75)+105)\,\text{erfi}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0294.01

$${}_1F_1\left(-\frac{1}{2};\frac{11}{2};-z\right)=\frac{1}{8192\,z^{9/2}}\left(63\,e^{-z}\left(2\sqrt{z}\,(16\,z\,((z-1)\,z\,(z+3)+5)-105)+e^z\sqrt{\pi}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+5)-5)+15)-75)+105)\,\text{erf}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0295.01

$${}_1F_1\left(-\frac{1}{2};6;z\right)=-\frac{1}{693\,z^4}\left(32\,e^{z/2}\left(z\,(z\,(4\,z\,(z\,(2\,z-7)-3)-21)-24)\,I_0\left(\frac{z}{2}\right)+(z\,(z\,(4\,z\,((5-2\,z)\,z+7)+51)+84)+96)\,I_1\left(\frac{z}{2}\right)\right)\right)$$

For fixed z and $a=\frac{1}{2}$

07.20.03.0296.01

$${}_1F_1\left(\frac{1}{2};-\frac{11}{2};z\right)=\frac{e^z\,(4\,z\,(z\,(4\,z\,(z\,(4\,(z-3)\,z+45)-150)+1575)-2835)+10\,395)}{10\,395}$$

07.20.03.0297.01

$${}_1F_1\left(\frac{1}{2};-\frac{9}{2};z\right)=\frac{1}{945}\,e^z\left(945-2\,z\left(4\,z\,(2\,z-5)\left(2\,z^2+15\right)+525\right)\right)$$

07.20.03.0298.01

$${}_1F_1\left(\frac{1}{2};-\frac{7}{2};z\right)=\frac{1}{105}\,e^z\,(8\,z\,(z\,(2\,(z-2)\,z+9)-15)+105)$$

07.20.03.0299.01

$${}_1F_1\left(\frac{1}{2};-\frac{5}{2};z\right)=\frac{1}{15}\,e^z\left(15-2\,z\left(4\,z^2-6\,z+9\right)\right)$$

07.20.03.0300.01

$${}_1F_1\left(\frac{1}{2};-\frac{3}{2};z\right)=\frac{1}{3}\,e^z\,(4\,(z-1)\,z+3)$$

07.20.03.0040.01

$${}_1F_1\left(\frac{1}{2};-\frac{1}{2};z\right)=e^z\,(1-2\,z)$$

07.20.03.0301.01

$${}_1F_1\left(\frac{1}{2};\frac{1}{2};z\right)=e^z$$

07.20.03.0041.01

$${}_1F_1\left(\frac{1}{2};1;z\right)=e^{z/2}\,I_0\left(\frac{z}{2}\right)$$

07.20.03.0042.01

$${}_1F_1\left(\frac{1}{2};\frac{3}{2};z\right)=\frac{\sqrt{\pi}}{2\sqrt{z}}\,\text{erfi}\left(\sqrt{z}\right)$$

07.20.03.0043.01

$${}_1F_1\left(\frac{1}{2};\frac{3}{2};z\right) = -\frac{i\sqrt{\pi}}{2\sqrt{z}}\operatorname{erf}\left(i\sqrt{z}\right)$$

07.20.03.0302.01

$${}_1F_1\left(\frac{1}{2};\frac{3}{2};-z\right) = \frac{\sqrt{\pi}\operatorname{erf}\left(\sqrt{z}\right)}{2\sqrt{z}}$$

07.20.03.0044.01

$${}_1F_1\left(\frac{1}{2};2;z\right) = e^{z/2}\left(I_0\left(\frac{z}{2}\right) - I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0045.01

$${}_1F_1\left(\frac{1}{2};\frac{5}{2};z\right) = \frac{1}{8z^{3/2}}\left(3\sqrt{\pi}\,(2z+1)\operatorname{erfi}\left(\sqrt{z}\right) - 6e^z\sqrt{z}\right)$$

07.20.03.0303.01

$${}_1F_1\left(\frac{1}{2};\frac{5}{2};-z\right) = \frac{3\sqrt{\pi}\,(2z-1)\operatorname{erf}\left(\sqrt{z}\right)}{8z^{3/2}} + \frac{3e^{-z}}{4z}$$

07.20.03.0046.01

$${}_1F_1\left(\frac{1}{2};3;z\right) = \frac{4}{3z}e^{z/2}\left(z\,I_0\left(\frac{z}{2}\right) - (z+1)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0047.01

$${}_1F_1\left(\frac{1}{2};\frac{7}{2};z\right) = \frac{15}{64z^{5/2}}\left(\sqrt{\pi}\left(4z^2+4z+3\right)\operatorname{erfi}\left(\sqrt{z}\right) - 2e^z\sqrt{z}\,(2z+3)\right)$$

07.20.03.0304.01

$${}_1F_1\left(\frac{1}{2};\frac{7}{2};-z\right) = \frac{15e^{-z}\left(2\sqrt{z}\,(2z-3) + e^z\sqrt{\pi}\,(4(z-1)z+3)\operatorname{erf}\left(\sqrt{z}\right)\right)}{64z^{5/2}}$$

07.20.03.0048.01

$${}_1F_1\left(\frac{1}{2};4;z\right) = \frac{4}{5z^2}e^{z/2}\left(z(2z+1)\,I_0\left(\frac{z}{2}\right) - \left(2z^2+3z+4\right)I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0305.01

$${}_1F_1\left(\frac{1}{2};\frac{9}{2};z\right) = \frac{35\sqrt{\pi}\left(2z\left(4z^2+6z+9\right)+15\right)\operatorname{erfi}\left(\sqrt{z}\right) - 70e^z\sqrt{z}\,(4z(z+2)+15)}{256z^{7/2}}$$

07.20.03.0306.01

$${}_1F_1\left(\frac{1}{2};\frac{9}{2};-z\right) = \frac{35e^{-z}\left(2\sqrt{z}\,(4(z-2)z+15) + e^z\sqrt{\pi}\left(2z\left(4z^2-6z+9\right)-15\right)\operatorname{erf}\left(\sqrt{z}\right)\right)}{256z^{7/2}}$$

07.20.03.0307.01

$${}_1F_1\left(\frac{1}{2};5;z\right) = \frac{32e^{z/2}\left(z(2z(z+1)+3)\,I_0\left(\frac{z}{2}\right) - 2(z(z(z+2)+4)+6)\,I_1\left(\frac{z}{2}\right)\right)}{35z^3}$$

07.20.03.0308.01

$${}_1F_1\left(\frac{1}{2};\frac{11}{2};z\right) = \frac{315\left(\sqrt{\pi}\,(8z(z(2z(z+2)+9)+15)+105)\operatorname{erfi}\left(\sqrt{z}\right) - 2e^z\sqrt{z}\,(2z(2z(2z+5)+25)+105)\right)}{4096z^{9/2}}$$

07.20.03.0309.01

$$ {}_1F_1\left(\frac{1}{2}; \frac{11}{2}; -z\right) = \frac{1}{4096\, z^{9/2}} \left(315\, e^{-z} \left(2 \sqrt{z}\, (2\, z\, (2\, z\, (2\, z - 5) + 25) - 105) + e^z \sqrt{\pi}\, (8\, z\, (z\, (2\, (z - 2)\, z + 9) - 15) + 105)\, \mathrm{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0310.01

$$ {}_1F_1\left(\frac{1}{2}; 6; z\right) = \frac{32\, e^{z/2} \left(z \left(z \left(4\, z^2 + 6\, z + 15\right) + 24\right) I_0\left(\frac{z}{2}\right) - (z\, (z\, (2\, z\, (2\, z + 5) + 27) + 60) + 96)\, I_1\left(\frac{z}{2}\right)\right)}{63\, z^4} $$

For fixed z and $a = 1$

07.20.03.0311.01

$$ {}_1F_1\left(1; -\frac{11}{2}; z\right) = \frac{64\, e^z \sqrt{\pi}\, \mathrm{erf}\left(\sqrt{z}\right) z^{13/2} + 2 \left(2\, z \left(2\, z \left(8\, z^3 - 4\, z^2 + 6\, z - 15\right) + 105\right) - 945\right) z + 10\,395}{10\,395} $$

07.20.03.0312.01

$$ {}_1F_1\left(1; -\frac{11}{2}; -z\right) = \frac{e^{-z} \left(e^z \left(2\, z \left(2\, z \left(2\, z \left(8\, z^3 + 4\, z^2 + 6\, z + 15\right) + 105\right) + 945\right) + 10\,395\right) - 64 \sqrt{\pi}\, z^{13/2}\, \mathrm{erfi}\left(\sqrt{z}\right)\right)}{10\,395} $$

07.20.03.0313.01

$$ {}_1F_1\left(1; -\frac{9}{2}; z\right) = \frac{1}{945} \left(-32\, e^z \sqrt{\pi}\, \mathrm{erf}\left(\sqrt{z}\right) z^{11/2} - 2 \left(2\, z \left(8\, z^3 - 4\, z^2 + 6\, z - 15\right) + 105\right) z + 945\right) $$

07.20.03.0314.01

$$ {}_1F_1\left(1; -\frac{9}{2}; -z\right) = \frac{1}{945} \left(-32\, e^{-z} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{z}\right) z^{11/2} + 2 \left(2\, z \left(8\, z^3 + 4\, z^2 + 6\, z + 15\right) + 105\right) z + 945\right) $$

07.20.03.0315.01

$$ {}_1F_1\left(1; -\frac{7}{2}; z\right) = \frac{1}{105} \left(16\, e^z \sqrt{\pi}\, \mathrm{erf}\left(\sqrt{z}\right) z^{9/2} + 2 \left(8\, z^3 - 4\, z^2 + 6\, z - 15\right) z + 105\right) $$

07.20.03.0316.01

$$ {}_1F_1\left(1; -\frac{7}{2}; -z\right) = \frac{1}{105} \left(-16\, e^{-z} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{z}\right) z^{9/2} + 2 \left(8\, z^3 + 4\, z^2 + 6\, z + 15\right) z + 105\right) $$

07.20.03.0317.01

$$ {}_1F_1\left(1; -\frac{5}{2}; z\right) = \frac{1}{15} \left(-8\, e^z \sqrt{\pi}\, \mathrm{erf}\left(\sqrt{z}\right) z^{7/2} - 8\, z^3 + 4\, z^2 - 6\, z + 15\right) $$

07.20.03.0318.01

$$ {}_1F_1\left(1; -\frac{5}{2}; -z\right) = \frac{1}{15} \left(-8\, e^{-z} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{z}\right) z^{7/2} + 8\, z^3 + 4\, z^2 + 6\, z + 15\right) $$

07.20.03.0319.01

$$ {}_1F_1\left(1; -\frac{3}{2}; z\right) = \frac{1}{3} \left(4\, e^z \sqrt{\pi}\, \mathrm{erf}\left(\sqrt{z}\right) z^{5/2} + 4\, z^2 - 2\, z + 3\right) $$

07.20.03.0320.01

$$ {}_1F_1\left(1; -\frac{3}{2}; -z\right) = \frac{1}{3} \left(-4\, e^{-z} \sqrt{\pi}\, \mathrm{erfi}\left(\sqrt{z}\right) z^{5/2} + 4\, z^2 + 2\, z + 3\right) $$

07.20.03.0049.01

$$ {}_1F_1\left(1; -\frac{1}{2}; z\right) = -2 \sqrt{\pi}\, z^{3/2}\, e^z\, \mathrm{erf}\left(\sqrt{z}\right) - 2\, z + 1 $$

07.20.03.0321.01

$${}_1F_1\left(1; -\frac{1}{2}; -z\right) = -2\, e^{-z} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right) z^{3/2} + 2\, z + 1$$

07.20.03.0050.01

$${}_1F_1\left(1; \frac{1}{2}; z\right) = \sqrt{\pi}\, \sqrt{z}\, e^z \operatorname{erf}\left(\sqrt{z}\right) + 1$$

07.20.03.0322.01

$${}_1F_1\left(1; \frac{1}{2}; -z\right) = 1 - e^{-z} \sqrt{\pi}\, \sqrt{z}\, \operatorname{erfi}\left(\sqrt{z}\right)$$

07.20.03.0323.01

$${}_1F_1(1; 1; z) = e^z$$

07.20.03.0051.01

$${}_1F_1\left(1; \frac{3}{2}; z\right) = \frac{e^z \sqrt{\pi}}{2\sqrt{z}} \operatorname{erf}\left(\sqrt{z}\right)$$

07.20.03.0324.01

$${}_1F_1\left(1; \frac{3}{2}; -z\right) = \frac{e^{-z} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)}{2\sqrt{z}}$$

07.20.03.0052.01

$${}_1F_1(1; 2; z) = \frac{e^z - 1}{z}$$

07.20.03.0053.01

$${}_1F_1\left(1; \frac{5}{2}; z\right) = \frac{3\, e^z \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right)}{4\, z^{3/2}} - \frac{3}{2\, z}$$

07.20.03.0325.01

$${}_1F_1\left(1; \frac{5}{2}; -z\right) = \frac{3}{2\, z} - \frac{3\, e^{-z} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)}{4\, z^{3/2}}$$

07.20.03.0054.01

$${}_1F_1(1; 3; z) = \frac{2\,(e^z - 1 - z)}{z^2}$$

07.20.03.0055.01

$${}_1F_1\left(1; \frac{7}{2}; z\right) = -\frac{5}{8\, z^{5/2}} \left(2\sqrt{z}\, (2\, z + 3) - 3\, e^z \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right)\right)$$

07.20.03.0326.01

$${}_1F_1\left(1; \frac{7}{2}; -z\right) = \frac{5\,(2\, z - 3)}{4\, z^2} + \frac{15\, e^{-z} \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)}{8\, z^{5/2}}$$

07.20.03.0056.01

$${}_1F_1(1; 4; z) = \frac{3\left(2\, e^z - 2 - 2\, z - z^2\right)}{z^3}$$

07.20.03.0327.01

$${}_1F_1\left(1;\,\frac{9}{2};\,z\right)=\frac{105\,e^z\,\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{z}\right)}{16\,z^{7/2}}-\frac{7\,(2\,z\,(2\,z+5)+15)}{8\,z^3}$$

07.20.03.0328.01

$${}_1F_1\left(1;\,\frac{9}{2};\,-z\right)=\frac{7\,(2\,z\,(2\,z-5)+15)}{8\,z^3}-\frac{105\,e^{-z}\,\sqrt{\pi}\,\operatorname{erfi}\left(\sqrt{z}\right)}{16\,z^{7/2}}$$

07.20.03.0329.01

$${}_1F_1(1;\,5;\,z)=-\frac{4\,(z\,(z\,(z+3)+6)-6\,e^z+6)}{z^4}$$

07.20.03.0330.01

$${}_1F_1\left(1;\,\frac{11}{2};\,z\right)=\frac{945\,e^z\,\sqrt{\pi}\,\operatorname{erf}\left(\sqrt{z}\right)-18\,\sqrt{z}\,(2\,z\,(2\,z\,(2\,z+7)+35)+105)}{32\,z^{9/2}}$$

07.20.03.0331.01

$${}_1F_1\left(1;\,\frac{11}{2};\,-z\right)=\frac{9\,(2\,z\,(2\,z\,(2\,z-7)+35)-105)}{16\,z^4}+\frac{945\,e^{-z}\,\sqrt{\pi}\,\operatorname{erfi}\left(\sqrt{z}\right)}{32\,z^{9/2}}$$

07.20.03.0332.01

$${}_1F_1(1;\,6;\,z)=-\frac{5\,(z\,(z\,(z\,(z+4)+12)+24)-24\,e^z+24)}{z^5}$$

For fixed z and $a=\frac{3}{2}$

07.20.03.0333.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{11}{2};\,z\right)=\frac{e^z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z+7)-21)+105)-525)+2205)-6615)+10\,395)}{10\,395}$$

07.20.03.0334.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{9}{2};\,z\right)=\frac{1}{945}\,e^z\,(945-4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+3)-15)+30)-225)+315))$$

07.20.03.0335.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{7}{2};\,z\right)=\frac{1}{105}\,e^z\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+5)-5)+15)-75)+105)$$

07.20.03.0336.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{5}{2};\,z\right)=\frac{1}{15}\,e^z\,(15-8\,z\,(z\,(2\,z\,(z+2)-3)+3))$$

07.20.03.0337.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{3}{2};\,z\right)=e^z\left(\frac{8\,z^3}{3}+4\,z^2-2\,z+1\right)$$

07.20.03.0058.01

$${}_1F_1\left(\frac{3}{2};\,-\frac{1}{2};\,z\right)=e^z\,\left(1-4\,z-4\,z^2\right)$$

07.20.03.0059.01

$${}_1F_1\left(\frac{3}{2};\,\frac{1}{2};\,z\right)=e^z\,(1+2\,z)$$

07.20.03.0060.01

$${}_1F_1\left(\frac{3}{2}; 1; z\right) = e^{z/2}\left((z+1)\, I_0\left(\frac{z}{2}\right) + z\, I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0338.01

$${}_1F_1\left(\frac{3}{2}; \frac{3}{2}; z\right) = e^z$$

07.20.03.0061.01

$${}_1F_1\left(\frac{3}{2}; 2; z\right) = e^{z/2}\left(I_0\left(\frac{z}{2}\right) + I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0062.01

$${}_1F_1\left(\frac{3}{2}; \frac{5}{2}; z\right) = \frac{3\, e^z}{2\, z} - \frac{3\sqrt{\pi}}{4\, z^{3/2}} \operatorname{erfi}\left(\sqrt{z}\right)$$

07.20.03.0339.01

$${}_1F_1\left(\frac{3}{2}; \frac{5}{2}; -z\right) = \frac{3\sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right)}{4\, z^{3/2}} - \frac{3\, e^{-z}}{2\, z}$$

07.20.03.0063.01

$${}_1F_1\left(\frac{3}{2}; 3; z\right) = \frac{4}{z}\, e^{z/2}\, I_1\left(\frac{z}{2}\right)$$

07.20.03.0064.01

$${}_1F_1\left(\frac{3}{2}; \frac{7}{2}; z\right) = \frac{15}{16\, z^{5/2}}\left(6\, e^z \sqrt{z} - \sqrt{\pi}\, (2\, z+3) \operatorname{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0340.01

$${}_1F_1\left(\frac{3}{2}; \frac{7}{2}; -z\right) = \frac{15\left(\sqrt{\pi}\, (2\, z-3) \operatorname{erf}\left(\sqrt{z}\right) + 6\, e^{-z} \sqrt{z}\right)}{16\, z^{5/2}}$$

07.20.03.0065.01

$${}_1F_1\left(\frac{3}{2}; 4; z\right) = \frac{4}{z^2}\, e^{z/2}\left((z+4)\, I_1\left(\frac{z}{2}\right) - z\, I_0\left(\frac{z}{2}\right)\right)$$

07.20.03.0341.01

$${}_1F_1\left(\frac{3}{2}; \frac{9}{2}; z\right) = \frac{105\left(2\, e^z \sqrt{z}\, (2\, z+15) - \sqrt{\pi}\, (4\, z\, (z+3)+15) \operatorname{erfi}\left(\sqrt{z}\right)\right)}{128\, z^{7/2}}$$

07.20.03.0342.01

$${}_1F_1\left(\frac{3}{2}; \frac{9}{2}; -z\right) = \frac{105\, e^{-z}\left(2\sqrt{z}\, (2\, z-15) + e^z \sqrt{\pi}\, (4\, (z-3)\, z+15) \operatorname{erf}\left(\sqrt{z}\right)\right)}{128\, z^{7/2}}$$

07.20.03.0343.01

$${}_1F_1\left(\frac{3}{2}; 5; z\right) = \frac{32\, e^{z/2}\left((z\, (z+4)+12)\, I_1\left(\frac{z}{2}\right) - z\, (z+3)\, I_0\left(\frac{z}{2}\right)\right)}{5\, z^3}$$

07.20.03.0344.01

$${}_1F_1\left(\frac{3}{2}; \frac{11}{2}; z\right) = \frac{315\left(2\, e^z \sqrt{z}\, (4\, z\, (z+5)+105) - \sqrt{\pi}\, (2\, z\, (2\, z\, (2\, z+9)+45)+105) \operatorname{erfi}\left(\sqrt{z}\right)\right)}{512\, z^{9/2}}$$

07.20.03.0345.01

$${}_1F_1\left(\frac{3}{2};\frac{11}{2};-z\right)=\frac{315\,e^{-z}\left(2\sqrt{z}\,(4\,(z-5)\,z+105)+e^z\sqrt{\pi}\,(2\,z\,(2\,z\,(2\,z-9)+45)-105)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{512\,z^{9/2}}$$

07.20.03.0346.01

$${}_1F_1\left(\frac{3}{2};6;z\right)=\frac{32\,e^{z/2}\left((z+4)\,(z\,(2\,z+3)+24)\,I_1\left(\frac{z}{2}\right)-z\,(z\,(2\,z+9)+24)\,I_0\left(\frac{z}{2}\right)\right)}{7\,z^4}$$

For fixed z and $a=2$

07.20.03.0347.01

$${}_1F_1\left(2;-\frac{11}{2};z\right)=\frac{1}{10\,395}\left(32\,e^z\sqrt{\pi}\,(2\,z+15)\,\mathrm{erf}\left(\sqrt{z}\right)z^{13/2}+4\,(z\,(4\,z\,(z\,(4\,z\,(z\,(z+7)-3)+15)-30)+315)-945)\,z+10\,395\right)$$

07.20.03.0348.01

$${}_1F_1\left(2;-\frac{11}{2};-z\right)=$$
$$\frac{1}{10\,395}\left(e^{-z}\left(32\sqrt{\pi}\,(2\,z-15)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{13/2}+e^z\,(4\,z\,(z\,(4\,z\,(z\,(15-4\,z\,((z-7)\,z-3))+30)+315)+945)+10\,395)\right)\right)$$

07.20.03.0349.01

$${}_1F_1\left(2;-\frac{9}{2};z\right)=\frac{1}{945}\left(-16\,e^z\sqrt{\pi}\,(2\,z+13)\,\mathrm{erf}\left(\sqrt{z}\right)z^{11/2}-4\,(z\,(4\,z\,(z\,(2\,z\,(z+6)-5)+6)-45)+105)\,z+945\right)$$

07.20.03.0350.01

$${}_1F_1\left(2;-\frac{9}{2};-z\right)=\frac{1}{945}\,e^{-z}\left(16\sqrt{\pi}\,(2\,z-13)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{11/2}+e^z\,(4\,z\,(z\,(4\,z\,(z\,(5-2\,(z-6)\,z)+6)+45)+105)+945)\right)$$

07.20.03.0351.01

$${}_1F_1\left(2;-\frac{7}{2};z\right)=\frac{1}{105}\left(8\,e^z\sqrt{\pi}\,(2\,z+11)\,\mathrm{erf}\left(\sqrt{z}\right)z^{9/2}+4\,(z\,(4\,z\,(z\,(z+5)-2)+9)-15)\,z+105\right)$$

07.20.03.0352.01

$${}_1F_1\left(2;-\frac{7}{2};-z\right)=\frac{1}{105}\,e^{-z}\left(8\sqrt{\pi}\,(2\,z-11)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{9/2}+e^z\,(4\,z\,(z\,(9-4\,z\,((z-5)\,z-2))+15)+105)\right)$$

07.20.03.0353.01

$${}_1F_1\left(2;-\frac{5}{2};z\right)=\frac{1}{15}\left(-4\,e^z\sqrt{\pi}\,(2\,z+9)\,\mathrm{erf}\left(\sqrt{z}\right)z^{7/2}-4\,(z\,(2\,z\,(z+4)-3)+3)\,z+15\right)$$

07.20.03.0354.01

$${}_1F_1\left(2;-\frac{5}{2};-z\right)=\frac{1}{15}\,e^{-z}\left(4\sqrt{\pi}\,(2\,z-9)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{7/2}+e^z\,(4\,z\,(z\,(3-2\,(z-4)\,z)+3)+15)\right)$$

07.20.03.0355.01

$${}_1F_1\left(2;-\frac{3}{2};z\right)=\frac{1}{3}\left(2\,e^z\sqrt{\pi}\,(2\,z+7)\,\mathrm{erf}\left(\sqrt{z}\right)z^{5/2}+4\,(z\,(z+3)-1)\,z+3\right)$$

07.20.03.0356.01

$${}_1F_1\left(2;-\frac{3}{2};-z\right)=\frac{1}{3}\,e^{-z}\left(2\sqrt{\pi}\,(2\,z-7)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{5/2}+e^z\,(3-4\,z\,((z-3)\,z-1))\right)$$

07.20.03.0066.01

$${}_1F_1\left(2;-\frac{1}{2};z\right)=1-4\,z-2\,z^2-e^z\sqrt{\pi}\,(2\,z+5)\,\mathrm{erf}\left(\sqrt{z}\right)z^{3/2}$$

07.20.03.0357.01

$${}_1F_1\left(2; -\frac{1}{2}; -z\right) = e^{-z} \sqrt{\pi} \, (2z-5) \operatorname{erfi}\left(\sqrt{z}\right) z^{3/2} - 2(z-2)z + 1$$

07.20.03.0067.01

$${}_1F_1\left(2; \frac{1}{2}; z\right) = 1 + z + \frac{1}{2} e^z \sqrt{\pi} \, (2z+3) \sqrt{z} \, \operatorname{erf}\left(\sqrt{z}\right)$$

07.20.03.0358.01

$${}_1F_1\left(2; \frac{1}{2}; -z\right) = -z + \frac{1}{2} e^{-z} \sqrt{\pi} \, (2z-3) \operatorname{erfi}\left(\sqrt{z}\right) \sqrt{z} + 1$$

07.20.03.0068.01

$${}_1F_1(2; 1; z) = e^z (1+z)$$

07.20.03.0069.01

$${}_1F_1\left(2; \frac{3}{2}; z\right) = \frac{e^z \sqrt{\pi} \, (2z+1) \operatorname{erf}\left(\sqrt{z}\right) + 2\sqrt{z}}{4\sqrt{z}}$$

07.20.03.0359.01

$${}_1F_1\left(2; \frac{3}{2}; -z\right) = \frac{1}{4}\left(\frac{e^{-z} \sqrt{\pi} \, (1-2z) \operatorname{erfi}\left(\sqrt{z}\right)}{\sqrt{z}} + 2\right)$$

07.20.03.0360.01

$${}_1F_1(2; 2; z) = e^z$$

07.20.03.0070.01

$${}_1F_1\left(2; \frac{5}{2}; z\right) = \frac{3 e^z \sqrt{\pi} \, (2z-1) \operatorname{erf}\left(\sqrt{z}\right) + 6\sqrt{z}}{8 z^{3/2}}$$

07.20.03.0361.01

$${}_1F_1\left(2; \frac{5}{2}; -z\right) = \frac{3 e^{-z} \sqrt{\pi} \, (2z+1) \operatorname{erfi}\left(\sqrt{z}\right)}{8 z^{3/2}} - \frac{3}{4z}$$

07.20.03.0071.01

$${}_1F_1(2; 3; z) = \frac{2 + 2 e^z (-1+z)}{z^2}$$

07.20.03.0072.01

$${}_1F_1\left(2; \frac{7}{2}; z\right) = \frac{15\left(e^z \sqrt{\pi} \, (2z-3) \operatorname{erf}\left(\sqrt{z}\right) + 6\sqrt{z}\right)}{16 z^{5/2}}$$

07.20.03.0362.01

$${}_1F_1\left(2; \frac{7}{2}; -z\right) = \frac{45}{8z^2} - \frac{15 e^{-z} \sqrt{\pi} \, (2z+3) \operatorname{erfi}\left(\sqrt{z}\right)}{16 z^{5/2}}$$

07.20.03.0073.01

$${}_1F_1(2; 4; z) = \frac{6\left(e^z (z-2) + z + 2\right)}{z^3}$$

07.20.03.0363.01

$$ {}_1F_1\left(2;\frac{9}{2};z\right)=\frac{35\left(2\sqrt{z}\,(4z+15)+3e^z\sqrt{\pi}\,(2z-5)\,\text{erf}\left(\sqrt{z}\right)\right)}{32z^{7/2}} $$

07.20.03.0364.01

$$ {}_1F_1\left(2;\frac{9}{2};-z\right)=\frac{35\left(2\sqrt{z}\,(4z-15)+3e^{-z}\sqrt{\pi}\,(2z+5)\,\text{erfi}\left(\sqrt{z}\right)\right)}{32z^{7/2}} $$

07.20.03.0365.01

$$ {}_1F_1(2;5;z)=\frac{12\,(2e^z(z-3)+z(z+4)+6)}{z^4} $$

07.20.03.0366.01

$$ {}_1F_1\left(2;\frac{11}{2};z\right)=\frac{63\left(2\sqrt{z}\,(8z(z+5)+105)+15e^z\sqrt{\pi}\,(2z-7)\,\text{erf}\left(\sqrt{z}\right)\right)}{64z^{9/2}} $$

07.20.03.0367.01

$$ {}_1F_1\left(2;\frac{11}{2};-z\right)=\frac{63e^{-z}\left(2e^z\sqrt{z}\,(8(z-5)z+105)-15\sqrt{\pi}\,(2z+7)\,\text{erfi}\left(\sqrt{z}\right)\right)}{64z^{9/2}} $$

07.20.03.0368.01

$$ {}_1F_1(2;6;z)=\frac{20\,(6e^z(z-4)+z(z(z+6)+18)+24)}{z^5} $$

For fixed z and $a=\frac{5}{2}$

07.20.03.0369.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{11}{2};z\right)=\frac{e^z\,(16z(z(2z(z(8z(z(z(z+12)+21)-21)+315)-630)+2205)-2835)+31185)}{31185} $$

07.20.03.0370.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{9}{2};z\right)=\frac{e^z\left(2835-2z\left(2z\left(2z\left(2z\left(2z\left(4z^2+42z+63\right)-105\right)+315\right)-945\right)+2205\right)\right)}{2835} $$

07.20.03.0371.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{7}{2};z\right)=\frac{1}{315}e^z\,(4z(z(4z(z(4z(z+9)+45)-30)+135)-135)+315) $$

07.20.03.0372.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{5}{2};z\right)=\frac{1}{45}e^z\,(45-2z(4z(2z(z(2z+15)+15)-15)+45)) $$

07.20.03.0373.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{3}{2};z\right)=\frac{1}{9}e^z\,(8z(z(2z(z+6)+9)-3)+9) $$

07.20.03.0074.01

$$ {}_1F_1\left(\frac{5}{2};-\frac{1}{2};z\right)=e^z\left(1-6z-12z^2-\frac{8z^3}{3}\right) $$

07.20.03.0075.01

$${}_1F_1\left(\frac{5}{2}; \frac{1}{2}; z\right) = e^z\, e^z \left(1 + 4z + \frac{4z^2}{3}\right)$$

07.20.03.0076.01

$${}_1F_1\left(\frac{5}{2}; 1; z\right) = \frac{1}{3} e^{z/2} \left(\left(2z^2 + 6z + 3\right) I_0\left(\frac{z}{2}\right) + 2z(z+2) I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0077.01

$${}_1F_1\left(\frac{5}{2}; \frac{3}{2}; z\right) = e^z \left(1 + \frac{2z}{3}\right)$$

07.20.03.0078.01

$${}_1F_1\left(\frac{5}{2}; 2; z\right) = \frac{1}{3} e^{z/2} \left((2z+3) I_0\left(\frac{z}{2}\right) + (2z+1) I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0374.01

$${}_1F_1\left(\frac{5}{2}; \frac{5}{2}; z\right) = e^z$$

07.20.03.0079.01

$${}_1F_1\left(\frac{5}{2}; 3; z\right) = \frac{4}{3z} e^{z/2} \left(z I_0\left(\frac{z}{2}\right) + (z-1) I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0080.01

$${}_1F_1\left(\frac{5}{2}; \frac{7}{2}; z\right) = \frac{5\left(2 e^z \sqrt{z}\, (2z-3) + 3\sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)\right)}{8 z^{5/2}}$$

07.20.03.0375.01

$${}_1F_1\left(\frac{5}{2}; \frac{7}{2}; -z\right) = \frac{15\sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right)}{8 z^{5/2}} - \frac{5 e^{-z} (2z+3)}{4z^2}$$

07.20.03.0081.01

$${}_1F_1\left(\frac{5}{2}; \frac{7}{2}; z\right) = \frac{5\left(2 e^z \sqrt{z}\, (2z-3) + 3\sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)\right)}{8 z^{5/2}}$$

07.20.03.0376.01

$${}_1F_1\left(\frac{5}{2}; \frac{9}{2}; z\right) = \frac{35\left(2 e^z \sqrt{z}\, (4z-15) + 3\sqrt{\pi}\, (2z+5) \operatorname{erfi}\left(\sqrt{z}\right)\right)}{32 z^{7/2}}$$

07.20.03.0377.01

$${}_1F_1\left(\frac{5}{2}; \frac{9}{2}; -z\right) = \frac{35\left(2 e^{-z} \sqrt{z}\, (4z+15) + 3\sqrt{\pi}\, (2z-5) \operatorname{erf}\left(\sqrt{z}\right)\right)}{32 z^{7/2}}$$

07.20.03.0378.01

$${}_1F_1\left(\frac{5}{2}; 5; z\right) = e^{z/2}\, {}_0F_1\left(; 3; \frac{z^2}{16}\right)$$

07.20.03.0379.01

$${}_1F_1\left(\frac{5}{2}; \frac{11}{2}; z\right) = \frac{315\left(10 e^z \sqrt{z}\, (2z-21) + 3\sqrt{\pi}\, (4z(z+5)+35) \operatorname{erfi}\left(\sqrt{z}\right)\right)}{256 z^{9/2}}$$

07.20.03.0380.01

$${}_1F_1\left(\frac{5}{2};\, \frac{11}{2};\, -z\right) = \frac{315\, e^{-z} \left(3\, e^z \sqrt{\pi}\, (4\, (z-5)\, z+35)\, \operatorname{erf}\left(\sqrt{z}\right) - 10\sqrt{z}\, (2\, z+21)\right)}{256\, z^{9/2}}$$

07.20.03.0381.01

$${}_1F_1\left(\frac{5}{2};\, 6;\, z\right) = \frac{32\, e^{z/2} \left(z\, (z+8)\, I_0\left(\frac{z}{2}\right) - (z\, (z+4)+32)\, I_1\left(\frac{z}{2}\right)\right)}{z^4}$$

For fixed *z* and *a* = 3

07.20.03.0382.01

$${}_1F_1\left(3;\, -\frac{11}{2};\, z\right) = \frac{1}{10\,395} \left(8\, e^z \sqrt{\pi}\, (4\, z\, (z+17)+255)\, \operatorname{erf}\left(\sqrt{z}\right) z^{13/2} + 2\, (4\, z\, (2\, z\, (z\, (z\, (z\, (2\, z+33)+112)-42)+45)-75)+315)-2835)\, z+10\,395\right)$$

07.20.03.0383.01

$${}_1F_1\left(3;\, -\frac{11}{2};\, -z\right) = \frac{1}{10\,395} \left(e^{-z} \left(e^z\, (2\, z\, (4\, z\, (2\, z\, (z\, (z\, (z\, (2\, z-33)+112)+42)+45)+75)+315)+2835)+10\,395) - 8\sqrt{\pi}\, z^{13/2}\, (4\, (z-17)\, z+255)\, \operatorname{erfi}\left(\sqrt{z}\right)\right)\right)$$

07.20.03.0384.01

$${}_1F_1\left(3;\, -\frac{9}{2};\, z\right) = \frac{1}{945} \left(-4\, e^z \sqrt{\pi}\, (4\, z\, (z+15)+195)\, \operatorname{erf}\left(\sqrt{z}\right) z^{11/2} - 2\, (4\, z\, (z\, (z\, (z\, (z+4)\, (2\, z+21)-30)+30)-45)+315)\, z+945\right)$$

07.20.03.0385.01

$${}_1F_1\left(3;\, -\frac{9}{2};\, -z\right) = \frac{1}{945}\, e^{-z} \left(e^z\, (2\, z\, (4\, z\, (z\, (z\, ((z-4)\, z\, (2\, z-21)+30)+30)+45)+315)+945) - 4\sqrt{\pi}\, z^{11/2}\, (4\, (z-15)\, z+195)\, \operatorname{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0386.01

$${}_1F_1\left(3;\, -\frac{7}{2};\, z\right) = \frac{1}{105} \left(2\, e^z \sqrt{\pi}\, (4\, z\, (z+13)+143)\, \operatorname{erf}\left(\sqrt{z}\right) z^{9/2} + 2\, (2\, z\, (z\, (z\, (z\, (2\, z+25)+60)-20)+18)-45)\, z+105\right)$$

07.20.03.0387.01

$${}_1F_1\left(3;\, -\frac{7}{2};\, -z\right) = \frac{1}{105}\, e^{-z} \left(e^z\, (2\, z\, (2\, z\, (z\, (z\, (z\, (2\, z-25)+60)+20)+18)+45)+105) - 2\sqrt{\pi}\, z^{9/2}\, (4\, (z-13)\, z+143)\, \operatorname{erfi}\left(\sqrt{z}\right)\right)$$

07.20.03.0388.01

$${}_1F_1\left(3;\, -\frac{5}{2};\, z\right) = \frac{1}{15} \left(-e^z \sqrt{\pi}\, (4\, z\, (z+11)+99)\, \operatorname{erf}\left(\sqrt{z}\right) z^{7/2} - 2\, (z+3)\, (z\, (z\, (2\, z+15)-5)+3)\, z+15\right)$$

07.20.03.0389.01

$${}_1F_1\left(3;\, -\frac{5}{2};\, -z\right) = \frac{1}{15}\, e^{-z} \left(\sqrt{\pi}\, (-4\, (z-11)\, z-99)\, \operatorname{erfi}\left(\sqrt{z}\right) z^{7/2} + e^z\, (2\, z\, (z\, ((z-8)\, z\, (2\, z-5)+12)+9)+15)\right)$$

07.20.03.0390.01

$$ {}_1F_1\left(3; -\frac{3}{2}; z\right) = \frac{1}{6}\left(e^z \sqrt{\pi}\,(4\,z\,(z+9)+63)\,\text{erf}\left(\sqrt{z}\right) z^{5/2} + 2\,(z\,(z\,(2\,z+17)+24)-6)\,z+6\right) $$

07.20.03.0391.01

$$ {}_1F_1\left(3; -\frac{3}{2}; -z\right) = \frac{1}{6}\,e^{-z}\left(\sqrt{\pi}\,(-4\,(z-9)\,z-63)\,\text{erfi}\left(\sqrt{z}\right) z^{5/2} + 2\,e^z\,(z\,(z\,(z\,(2\,z-17)+24)+6)+3)\right) $$

07.20.03.0082.01

$$ {}_1F_1\left(3; -\frac{1}{2}; z\right) = 1-6\,z-\frac{13\,z^2}{2}-z^3-\frac{1}{4}\,e^z\sqrt{\pi}\left(4\,z^2+28\,z+35\right) z^{3/2}\,\text{erf}\left(\sqrt{z}\right) $$

07.20.03.0392.01

$$ {}_1F_1\left(3; -\frac{1}{2}; -z\right) = \frac{1}{4}\,e^{-z}\left(\sqrt{\pi}\,(-4\,(z-7)\,z-35)\,\text{erfi}\left(\sqrt{z}\right) z^{3/2} + 2\,e^z\,(z\,(z\,(2\,z-13)+12)+2)\right) $$

07.20.03.0083.01

$$ {}_1F_1\left(3; \frac{1}{2}; z\right) = \frac{1}{8}\left(4\,z^2+18\,z+e^z\sqrt{\pi}\left(4\,z^2+20\,z+15\right)\text{erf}\left(\sqrt{z}\right)\sqrt{z}+8\right) $$

07.20.03.0393.01

$$ {}_1F_1\left(3; \frac{1}{2}; -z\right) = \frac{1}{8}\,e^{-z}\left(2\,e^z\,(z\,(2\,z-9)+4)+\sqrt{\pi}\,\sqrt{z}\,(-4\,(z-5)\,z-15)\,\text{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0084.01

$$ {}_1F_1(3; 1; z) = \frac{1}{2}\,e^z\left(z^2+4\,z+2\right) $$

07.20.03.0085.01

$$ {}_1F_1\left(3; \frac{3}{2}; z\right) = \frac{2\sqrt{z}\,(2\,z+5)+e^z\sqrt{\pi}\left(4\,z^2+12\,z+3\right)\text{erf}\left(\sqrt{z}\right)}{16\sqrt{z}} $$

07.20.03.0394.01

$$ {}_1F_1\left(3; \frac{3}{2}; -z\right) = \frac{1}{16}\left(-4\,z+10+\frac{e^{-z}\sqrt{\pi}\,(4\,(z-3)\,z+3)\,\text{erfi}\left(\sqrt{z}\right)}{\sqrt{z}}\right) $$

07.20.03.0086.01

$$ {}_1F_1(3; 2; z) = \frac{1}{2}\,e^z\,(2+z) $$

07.20.03.0087.01

$$ {}_1F_1\left(3; \frac{5}{2}; z\right) = \frac{3}{32\,z^{3/2}}\left(2\sqrt{z}\,(2\,z+1)+e^z\sqrt{\pi}\left(4\,z^2+4\,z-1\right)\text{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0395.01

$$ {}_1F_1\left(3; \frac{5}{2}; -z\right) = \frac{3\,e^{-z}\left(2\,e^z\sqrt{z}\,(2\,z-1)+\sqrt{\pi}\,(1-4\,(z-1)\,z)\,\text{erfi}\left(\sqrt{z}\right)\right)}{32\,z^{3/2}} $$

07.20.03.0396.01

$$ {}_1F_1(3; 3; z) = e^z $$

07.20.03.0088.01

$$ {}_1F_1\left(3; \frac{7}{2}; z\right) = \frac{15}{64\,z^{5/2}}\left(2\sqrt{z}\,(2\,z-3)+e^z\sqrt{\pi}\left(4\,z^2-4\,z+3\right)\text{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0397.01

$${}_1F_1\left(3; \frac{7}{2}; -z\right) = \frac{15\, e^{-z} \left(\sqrt{\pi}\, (4\, z\, (z+1)+3)\, \text{erfi}\left(\sqrt{z}\right) - 2\, e^z \sqrt{z}\, (2\, z+3)\right)}{64\, z^{5/2}}$$

07.20.03.0089.01

$${}_1F_1(3; 4; z) = \frac{-6 + 3\, e^z \left(2 - 2\, z + z^2\right)}{z^3}$$

07.20.03.0398.01

$${}_1F_1\left(3; \frac{9}{2}; z\right) = \frac{105 \left(2 \sqrt{z}\, (2\, z - 15) + e^z \sqrt{\pi}\, (4\, (z-3)\, z + 15)\, \text{erf}\left(\sqrt{z}\right)\right)}{128\, z^{7/2}}$$

07.20.03.0399.01

$${}_1F_1\left(3; \frac{9}{2}; -z\right) = \frac{105\, e^{-z} \left(2\, e^z \sqrt{z}\, (2\, z + 15) - \sqrt{\pi}\, (4\, z\, (z+3) + 15)\, \text{erfi}\left(\sqrt{z}\right)\right)}{128\, z^{7/2}}$$

07.20.03.0400.01

$${}_1F_1(3; 5; z) = \frac{12\, (e^z\, ((z-4)\, z + 6) - 2\, (z+3))}{z^4}$$

07.20.03.0401.01

$${}_1F_1\left(3; \frac{11}{2}; z\right) = \frac{315 \left(3\, e^z \sqrt{\pi}\, (4\, (z-5)\, z + 35)\, \text{erf}\left(\sqrt{z}\right) - 10 \sqrt{z}\, (2\, z + 21)\right)}{256\, z^{9/2}}$$

07.20.03.0402.01

$${}_1F_1\left(3; \frac{11}{2}; -z\right) = \frac{315\, e^{-z} \left(10\, e^z \sqrt{z}\, (2\, z - 21) + 3 \sqrt{\pi}\, (4\, z\, (z+5) + 35)\, \text{erfi}\left(\sqrt{z}\right)\right)}{256\, z^{9/2}}$$

07.20.03.0403.01

$${}_1F_1(3; 6; z) = \frac{60\, (-z\, (z+6) + e^z\, ((z-6)\, z + 12) - 12)}{z^5}$$

For fixed z and $a = \frac{7}{2}$

07.20.03.0404.01

$${}_1F_1\left(\frac{7}{2}; -\frac{11}{2}; z\right) = \frac{1}{155\,925} (e^z\, (2\, z\, (8\, z\, (2\, z\, (z\, (2\, z\, (4\, z\, (z\, (z\, (2\, z + 45) + 270) + 315) - 945) + 2835) - 4725) + 14\,175) - 127\,575) + 155\,925))$$

07.20.03.0405.01

$${}_1F_1\left(\frac{7}{2}; -\frac{9}{2}; z\right) = \frac{e^z\, (14\,175 - 16\, z\, (z\, (2\, z\, (z\, (8\, z\, (z\, (z\, (z + 20) + 105) + 105) - 525) + 630) - 1575) + 1575))}{14\,175}$$

07.20.03.0406.01

$${}_1F_1\left(\frac{7}{2}; -\frac{7}{2}; z\right) = \frac{e^z \left(2\, z \left(2\, z \left(2\, z \left(2\, z \left(2\, z \left(4\, z^2 + 70\, z + 315\right) + 525\right) - 525\right) + 945\right) - 1575\right) + 1575\right)}{1575}$$

07.20.03.0407.01

$${}_1F_1\left(\frac{7}{2}; -\frac{5}{2}; z\right) = \frac{1}{225}\, e^z \left(225 - 4\, z \left(z \left(4\, z \left(z\, (2\, z + 15)^2 + 150\right) - 225\right) + 135\right)\right)$$

07.20.03.0408.01

$$ {}_1F_1\left(\frac{7}{2}; -\frac{3}{2}; z\right) = \frac{1}{45} e^z (2 z (4 z (2 z (z+5) (2 z+15)+75)-75)+45) $$

07.20.03.0090.01

$$ {}_1F_1\left(\frac{7}{2}; -\frac{1}{2}; z\right) = e^z \left(1-8 z-24 z^2-\frac{32 z^3}{3}-\frac{16 z^4}{15}\right) $$

07.20.03.0091.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{1}{2}; z\right) = e^z \left(1+6 z+4 z^2+\frac{8 z^3}{15}\right) $$

07.20.03.0092.01

$$ {}_1F_1\left(\frac{7}{2}; 1; z\right) = \frac{1}{15} e^{z/2} \left(\left(4 z^3+28 z^2+45 z+15\right) I_0\left(\frac{z}{2}\right)+z \left(4 z^2+24 z+23\right) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0093.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{3}{2}; z\right) = e^z \left(1+\frac{4 z}{3}+\frac{4 z^2}{15}\right) $$

07.20.03.0094.01

$$ {}_1F_1\left(\frac{7}{2}; 2; z\right) = \frac{1}{15} e^{z/2} \left(\left(4 z^2+18 z+15\right) I_0\left(\frac{z}{2}\right)+\left(4 z^2+14 z+3\right) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0095.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{5}{2}; z\right) = e^z \left(1+\frac{2 z}{5}\right) $$

07.20.03.0096.01

$$ {}_1F_1\left(\frac{7}{2}; 3; z\right) = \frac{4}{15 z} e^{z/2} \left(2 z (z+2) I_0\left(\frac{z}{2}\right)+\left(2 z^2+2 z-1\right) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0409.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{7}{2}; z\right) = e^z $$

07.20.03.0097.01

$$ {}_1F_1\left(\frac{7}{2}; 4; z\right) = \frac{4}{5 z^2} e^{z/2} \left(z (2 z-1) I_0\left(\frac{z}{2}\right)+\left(2 z^2-3 z+4\right) I_1\left(\frac{z}{2}\right)\right) $$

07.20.03.0410.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{9}{2}; z\right) = \frac{7\left(2 e^z \sqrt{z}\, (2 z (2 z-5)+15)-15 \sqrt{\pi}\, \operatorname{erfi}\left(\sqrt{z}\right)\right)}{16 z^{7/2}} $$

07.20.03.0411.01

$$ {}_1F_1\left(\frac{7}{2}; \frac{9}{2}; -z\right) = \frac{105 \sqrt{\pi}\, \operatorname{erf}\left(\sqrt{z}\right)}{16 z^{7/2}}-\frac{7 e^{-z} (2 z (2 z+5)+15)}{8 z^3} $$

07.20.03.0412.01

$$ {}_1F_1\left(\frac{7}{2}; 5; z\right) = \frac{32 e^{z/2} \left((z-3) z I_0\left(\frac{z}{2}\right)+((z-4) z+12) I_1\left(\frac{z}{2}\right)\right)}{5 z^3} $$

07.20.03.0413.01

$${}_1F_1\left(\frac{7}{2};\ \frac{11}{2};\ z\right) = \frac{63\left(2\, e^z \sqrt{z}\ (8\,(z-5)\,z+105) - 15\sqrt{\pi}\ (2\,z+7)\operatorname{erfi}\left(\sqrt{z}\right)\right)}{64\, z^{9/2}}$$

07.20.03.0414.01

$${}_1F_1\left(\frac{7}{2};\ \frac{11}{2};\ -z\right) = \frac{63\, e^{-z}\left(2\sqrt{z}\ (8\,z\,(z+5)+105) + 15\, e^z \sqrt{\pi}\ (2\,z-7)\operatorname{erf}\left(\sqrt{z}\right)\right)}{64\, z^{9/2}}$$

07.20.03.0415.01

$${}_1F_1\left(\frac{7}{2};\ 6;\ z\right) = \frac{32\, e^{z/2}\left((z-8)\,z\, I_0\left(\frac{z}{2}\right) + ((z-4)\,z+32)\, I_1\left(\frac{z}{2}\right)\right)}{z^4}$$

For fixed z and $a = 4$

07.20.03.0416.01

$${}_1F_1\left(4;\ -\frac{11}{2};\ z\right) = \frac{1}{31\,185}\left(4\, e^z \sqrt{\pi}\ (2\,z\,(2\,z\,(2\,z+57)+969)+4845)\operatorname{erf}\left(\sqrt{z}\right) z^{13/2} + 8\,(z\,(z\,(z\,(z\,(z\,(4\,z\,(z+28)+915)+2016)-672)+630)-900)+1575)-2835)\,z+31\,185\right)$$

07.20.03.0417.01

$${}_1F_1\left(4;\ -\frac{11}{2};\ -z\right) = \frac{1}{31\,185}\left(e^{-z}\left(4\sqrt{\pi}\ (2\,z\,(2\,z\,(2\,z-57)+969)-4845)\operatorname{erfi}\left(\sqrt{z}\right) z^{13/2} + e^z\,(8\,z\,(z\,(z\,(z\,(z\,(z\,(-4\,(z-28)\,z-915)+2016)+672)+630)+900)+1575)+2835)+31\,185)\right)\right)$$

07.20.03.0418.01

$${}_1F_1\left(4;\ -\frac{9}{2};\ z\right) = \frac{1}{2835}\left(-2\, e^z \sqrt{\pi}\ (2\,z\,(2\,z\,(2\,z+51)+765)+3315)\operatorname{erf}\left(\sqrt{z}\right) z^{11/2} - 4\,(z\,(z\,(z\,(z\,(4\,z\,(z+25)+717)+1344)-420)+360)-450)+630)\,z+2835\right)$$

07.20.03.0419.01

$${}_1F_1\left(4;\ -\frac{9}{2};\ -z\right) = \frac{1}{2835}\left(e^{-z}\left(2\sqrt{\pi}\ (2\,z\,(2\,z\,(2\,z-51)+765)-3315)\operatorname{erfi}\left(\sqrt{z}\right) z^{11/2} + e^z\,(4\,z\,(z\,(z\,(z\,(z\,(-4\,(z-25)\,z-717)+1344)+420)+360)+450)+630)+2835)\right)\right)$$

07.20.03.0420.01

$${}_1F_1\left(4;\ -\frac{7}{2};\ z\right) = \frac{1}{315}\left(e^z \sqrt{\pi}\ \left(2\,z\left(4\,z^2+90\,z+585\right)+2145\right)\operatorname{erf}\left(\sqrt{z}\right) z^{9/2} + 2\,(z\,(z\,(z\,(z\,(4\,z\,(z+22)+543)+840)-240)+180)-180)\,z+315\right)$$

07.20.03.0421.01

$${}_1F_1\left(4;\ -\frac{7}{2};\ -z\right) = \frac{1}{315}\, e^{-z}\left(\sqrt{\pi}\ \left(2\,z\left(4\,z^2-90\,z+585\right)-2145\right)\operatorname{erfi}\left(\sqrt{z}\right) z^{9/2} + e^z\,(2\,z\,(z\,(z\,(z\,(z\,(-4\,(z-22)\,z-543)+840)+240)+180)+180)+315)\right)$$

07.20.03.0422.01

$${}_1F_1\left(4;\ -\frac{5}{2};\ z\right) = \frac{1}{90}\left(-e^z \sqrt{\pi}\ \left(2\,z\left(4\,z^2+78\,z+429\right)+1287\right)\operatorname{erf}\left(\sqrt{z}\right) z^{7/2} - 2\,(z\,(z\,(z\,(z\,(4\,z\,(z+19)+393)+480)-120)+72)-45)\right)$$

07.20.03.0423.01

$$ {}_1F_1\left(4; -\frac{5}{2}; -z\right) = \frac{1}{90} e^{-z} \left(\sqrt{\pi}\, z^{7/2} \left(2 z \left(4 z^2 - 78 z + 429\right) - 1287\right) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z (z (z (z (z (4 (z - 19) z + 393) - 480) - 120) - 72) - 45)\right) $$

07.20.03.0424.01

$$ {}_1F_1\left(4; -\frac{3}{2}; z\right) = \frac{1}{36} \left(e^z \sqrt{\pi} \left(2 z \left(4 z^2 + 66 z + 297\right) + 693\right) \operatorname{erf}\left(\sqrt{z}\right) z^{5/2} + 2 (z (z (4 z (z + 16) + 267) + 240) - 48) z + 36\right) $$

07.20.03.0425.01

$$ {}_1F_1\left(4; -\frac{3}{2}; -z\right) = \frac{1}{36} e^{-z} \left(\sqrt{\pi}\, z^{5/2} \left(2 z \left(4 z^2 - 66 z + 297\right) - 693\right) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z (z (z (z (4 (z - 16) z + 267) - 240) - 48) - 18)\right) $$

07.20.03.0098.01

$$ {}_1F_1\left(4; -\frac{1}{2}; z\right) = \frac{1}{24} \left(-e^z \sqrt{\pi} \left(8 z^3 + 108 z^2 + 378 z + 315\right) z^{3/2} \operatorname{erf}\left(\sqrt{z}\right) - 2 \left(4 z^4 + 52 z^3 + 165 z^2 + 96 z - 12\right)\right) $$

07.20.03.0426.01

$$ {}_1F_1\left(4; -\frac{1}{2}; -z\right) = \frac{1}{24} e^{-z} \left(\sqrt{\pi}\, z^{3/2} \left(2 z \left(4 z^2 - 54 z + 189\right) - 315\right) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z (z (z (4 (z - 13) z + 165) - 96) - 12)\right) $$

07.20.03.0099.01

$$ {}_1F_1\left(4; \frac{1}{2}; z\right) = \frac{1}{48} \left(8 z^3 + 80 z^2 + 174 z + e^z \sqrt{\pi} \left(8 z^3 + 84 z^2 + 210 z + 105\right) \operatorname{erf}\left(\sqrt{z}\right) \sqrt{z} + 48\right) $$

07.20.03.0427.01

$$ {}_1F_1\left(4; \frac{1}{2}; -z\right) = \frac{1}{48} e^{-z} \left(\sqrt{\pi} \sqrt{z} \left(8 z^3 - 84 z^2 + 210 z - 105\right) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z (z (4 (z - 10) z + 87) - 24)\right) $$

07.20.03.0100.01

$$ {}_1F_1(4; 1; z) = \frac{1}{6} e^z \left(6 + 18 z + 9 z^2 + z^3\right) $$

07.20.03.0101.01

$$ {}_1F_1\left(4; \frac{3}{2}; z\right) = \frac{2 \sqrt{z} \left(4 z^2 + 28 z + 33\right) + e^z \sqrt{\pi} \left(8 z^3 + 60 z^2 + 90 z + 15\right) \operatorname{erf}\left(\sqrt{z}\right)}{96 \sqrt{z}} $$

07.20.03.0428.01

$$ {}_1F_1\left(4; \frac{3}{2}; -z\right) = \frac{1}{96} \left(8 (z - 7) z + 66 + \frac{e^{-z} \sqrt{\pi} \left(-8 z^3 + 60 z^2 - 90 z + 15\right) \operatorname{erfi}\left(\sqrt{z}\right)}{\sqrt{z}}\right) $$

07.20.03.0102.01

$$ {}_1F_1(4; 2; z) = e^z \left(1 + z + \frac{z^2}{6}\right) $$

07.20.03.0103.01

$$ {}_1F_1\left(4; \frac{5}{2}; z\right) = \frac{2 \sqrt{z} \left(4 z^2 + 16 z + 3\right) + e^z \sqrt{\pi} \left(8 z^3 + 36 z^2 + 18 z - 3\right) \operatorname{erf}\left(\sqrt{z}\right)}{64 z^{3/2}} $$

07.20.03.0429.01

$$ {}_1F_1\left(4; \frac{5}{2}; -z\right) = \frac{e^{-z} \left(\sqrt{\pi} (2 z (2 z (2 z - 9) + 9) + 3) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z \sqrt{z} (4 (z - 4) z + 3)\right)}{64 z^{3/2}} $$

07.20.03.0104.01

$${}_1F_1(4;3;z) = \frac{1}{3} e^z (3+z)$$

07.20.03.0105.01

$${}_1F_1\left(4;\frac{7}{2};z\right) = \frac{5}{128 z^{5/2}} \left(2\sqrt{z}\left(4z^2+4z-3\right) + e^z \sqrt{\pi}\left(8z^3+12z^2-6z+3\right) \operatorname{erf}\left(\sqrt{z}\right)\right)$$

07.20.03.0430.01

$${}_1F_1\left(4;\frac{7}{2};-z\right) = \frac{5 e^{-z}\left(2 e^z \sqrt{z}\,(4(z-1)z-3) + \sqrt{\pi}\left(2z\left(-4z^2+6z+3\right)+3\right)\operatorname{erfi}\left(\sqrt{z}\right)\right)}{128 z^{5/2}}$$

07.20.03.0431.01

$${}_1F_1(4;4;z) = e^z$$

07.20.03.0432.01

$${}_1F_1\left(4;\frac{9}{2};z\right) = \frac{35\left(2\sqrt{z}\,(4(z-2)z+15) + e^z\sqrt{\pi}\left(2z\left(4z^2-6z+9\right)-15\right)\operatorname{erf}\left(\sqrt{z}\right)\right)}{256 z^{7/2}}$$

07.20.03.0433.01

$${}_1F_1\left(4;\frac{9}{2};-z\right) = \frac{e^{-z}\left(35\sqrt{\pi}\left(2z\left(4z^2+6z+9\right)+15\right)\operatorname{erfi}\left(\sqrt{z}\right) - 70 e^z\sqrt{z}\,(4z(z+2)+15)\right)}{256 z^{7/2}}$$

07.20.03.0434.01

$${}_1F_1(4;5;z) = \frac{4\left(e^z(z((z-3)z+6)-6)+6\right)}{z^4}$$

07.20.03.0435.01

$${}_1F_1\left(4;\frac{11}{2};z\right) = \frac{315\left(2\sqrt{z}\,(4(z-5)z+105) + e^z\sqrt{\pi}\,(2z(2z(2z-9)+45)-105)\operatorname{erf}\left(\sqrt{z}\right)\right)}{512 z^{9/2}}$$

07.20.03.0436.01

$${}_1F_1\left(4;\frac{11}{2};-z\right) = \frac{315 e^{-z}\left(2 e^z\sqrt{z}\,(4z(z+5)+105) - \sqrt{\pi}\,(2z(2z(2z+9)+45)+105)\operatorname{erfi}\left(\sqrt{z}\right)\right)}{512 z^{9/2}}$$

07.20.03.0437.01

$${}_1F_1(4;6;z) = \frac{20\left(6(z+4) + e^z(z((z-6)z+18)-24)\right)}{z^5}$$

For fixed z and $a = \frac{9}{2}$

07.20.03.0438.01

$${}_1F_1\left(\frac{9}{2};-\frac{11}{2};z\right) = \frac{1}{1\,091\,475} \left(e^z(4z(z(8z(z(4z(z(2z(z(4z(z+35)+1575)+6300)+11\,025)-6615)+33\,075)-47\,250)+496\,125)-496\,125)+1\,091\,475)\right)$$

07.20.03.0439.01

$${}_1F_1\left(\frac{9}{2};-\frac{9}{2};z\right) = \frac{1}{99\,225}\left(e^z(99\,225-2z(8z(2z(z(2z(4z(z(z(2z+63)+630)+2205)+6615)-6615)+6615)-14\,175)+99\,225))\right)$$

07.20.03.0440.01

$${}_1F_1\left(\frac{9}{2}; -\frac{7}{2}; z\right) = \frac{e^z\,(16\,z\,(z\,(2\,z\,(z\,(8\,z\,(z\,(z\,(z+28)+245)+735)+3675)-1470)+2205)-1575)+11\,025)}{11\,025}$$

07.20.03.0441.01

$${}_1F_1\left(\frac{9}{2}; -\frac{5}{2}; z\right) = \frac{e^z\left(1575-2\,z\left(2\,z\left(2\,z\left(2\,z\left(2\,z\left(4\,z^2+98\,z+735\right)+3675\right)+3675\right)-2205\right)+2205\right)\right)}{1575}$$

07.20.03.0442.01

$${}_1F_1\left(\frac{9}{2}; -\frac{3}{2}; z\right) = \frac{1}{315}\,e^z\,(4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+21)+525)+1050)+1575)-315)+315)$$

07.20.03.0443.01

$${}_1F_1\left(\frac{9}{2}; -\frac{1}{2}; z\right) = \frac{1}{105}\,e^z\,(105-2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+35)+175)+525)+525))$$

07.20.03.0444.01

$${}_1F_1\left(\frac{9}{2}; \frac{1}{2}; z\right) = e^z\left(\frac{8}{105}\,z\,(z\,(2\,z\,(z+14)+105)+105)+1\right)$$

07.20.03.0445.01

$${}_1F_1\left(\frac{9}{2}; 1; z\right) = \frac{1}{105}\,e^{z/2}\left((4\,z\,(2\,z\,(z\,(z+13)+47)+105)+105)\,I_0\left(\frac{z}{2}\right)+4\,z\,(z\,(2\,z\,(z+12)+71)+44)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0446.01

$${}_1F_1\left(\frac{9}{2}; \frac{3}{2}; z\right) = e^z\left(\frac{8\,z^3}{105}+\frac{4\,z^2}{5}+2\,z+1\right)$$

07.20.03.0447.01

$${}_1F_1\left(\frac{9}{2}; 2; z\right) = \frac{1}{105}\,e^{z/2}\left((4\,z\,(z+5)\,(2\,z+9)+105)\,I_0\left(\frac{z}{2}\right)+(4\,z\,(z\,(2\,z+17)+29)+15)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0448.01

$${}_1F_1\left(\frac{9}{2}; \frac{5}{2}; z\right) = \frac{1}{35}\,e^z\,(4\,z\,(z+7)+35)$$

07.20.03.0449.01

$${}_1F_1\left(\frac{9}{2}; 3; z\right) = \frac{4\,e^{z/2}\left(z\,(2\,z+3)\,(2\,z+9)\,I_0\left(\frac{z}{2}\right)+(z\,(4\,z\,(z+5)+9)-3)\,I_1\left(\frac{z}{2}\right)\right)}{105\,z}$$

07.20.03.0450.01

$${}_1F_1\left(\frac{9}{2}; \frac{7}{2}; z\right) = e^z\left(\frac{2\,z}{7}+1\right)$$

07.20.03.0451.01

$${}_1F_1\left(\frac{9}{2}; 4; z\right) = \frac{4\,e^{z/2}\left(z\,(2\,z\,(2\,z+5)-1)\,I_0\left(\frac{z}{2}\right)+\left(z\left(4\,z^2+6\,z-5\right)+4\right)I_1\left(\frac{z}{2}\right)\right)}{35\,z^2}$$

07.20.03.0452.01

$${}_1F_1\left(\frac{9}{2}; \frac{9}{2}; z\right) = e^z$$

07.20.03.0453.01

$${}_1F_1\left(\frac{9}{2}; 5; z\right) = \frac{32\,e^{z/2}\left(z\,(2\,(z-1)\,z+3)\,I_0\left(\frac{z}{2}\right)+2\,(z\,((z-2)\,z+4)-6)\,I_1\left(\frac{z}{2}\right)\right)}{35\,z^3}$$

07.20.03.0454.01

$$ {}_1F_1\left(\frac{9}{2};\frac{11}{2};z\right) = \frac{9\left(2\,e^z\sqrt{z}\,(2\,z\,(2\,z\,(2\,z-7)+35)-105)+105\sqrt{\pi}\,\mathrm{erfi}\left(\sqrt{z}\right)\right)}{32\,z^{9/2}} $$

07.20.03.0455.01

$$ {}_1F_1\left(\frac{9}{2};\frac{11}{2};-z\right) = \frac{945\sqrt{\pi}\,\mathrm{erf}\left(\sqrt{z}\right)}{32\,z^{9/2}} - \frac{9\,e^{-z}\,(2\,z\,(2\,z\,(2\,z+7)+35)+105)}{16\,z^4} $$

07.20.03.0456.01

$$ {}_1F_1\left(\frac{9}{2};6;z\right) = \frac{32\,e^{z/2}\left(z\,(z\,(2\,z-9)+24)\,I_0\left(\frac{z}{2}\right)+(z-4)\,(z\,(2\,z-3)+24)\,I_1\left(\frac{z}{2}\right)\right)}{7\,z^4} $$

For fixed z and $a = 5$

07.20.03.0457.01

$$ {}_1F_1\left(5;-\frac{11}{2};z\right) = \frac{1}{62\,370}\left(e^z\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+42)+1197)+6783)+101\,745)\,\mathrm{erf}\left(\sqrt{z}\right)z^{13/2} + 2\,(z\,(z\,(z\,(z\,(z\,(2\,z\,(2\,z\,(2\,z+83)+2313)+24\,975)+40\,320)-12\,096)+10\,080)-12\,600)+18\,900)-28\,350)\,z + 62\,370\right) $$

07.20.03.0458.01

$$ {}_1F_1\left(5;-\frac{11}{2};-z\right) = \frac{1}{62\,370}\left(e^{-z}\left(\sqrt{\pi}\,(8\,z\,(z\,(-2\,(z-42)\,z-1197)+6783)-101\,745)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{13/2} + 2\,e^z\,(z\,(z\,(z\,(z\,(z\,(z\,(2\,z\,(2\,z\,(2\,z-83)+2313)-24\,975)+40\,320)+12\,096)+10\,080)+12\,600)+18\,900)+28\,350)+31\,185)\right)\right) $$

07.20.03.0459.01

$$ {}_1F_1\left(5;-\frac{9}{2};z\right) = \frac{1}{11\,340}\left(-e^z\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+38)+969)+4845)+62\,985)\,\mathrm{erf}\left(\sqrt{z}\right)z^{11/2} - 2\,(z\,(z\,(z\,(z\,(2\,z+21)\,(z\,(4\,z\,(z+27)+731)+1152)-6720)+5040)-5400)+6300)-5670)\right) $$

07.20.03.0460.01

$$ {}_1F_1\left(5;-\frac{9}{2};-z\right) = \frac{1}{11\,340}\left(e^{-z}\left(\sqrt{\pi}\,(-8\,z\,(z\,(2\,(z-38)\,z+969)-4845)-62\,985)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{11/2} + 2\,e^z\,(z\,(z\,(z\,(z\,(2\,z-21)\,(z\,(4\,(z-27)\,z+731)-1152)+6720)+5040)+5400)+6300)+5670)\right)\right) $$

07.20.03.0461.01

$$ {}_1F_1\left(5;-\frac{7}{2};z\right) = \frac{1}{2520}\left(e^z\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+34)+765)+3315)+36\,465)\,\mathrm{erf}\left(\sqrt{z}\right)z^{9/2} + 2\,(z\,(z\,(z\,(2\,z\,(2\,z\,(2\,z+67)+1465)+11\,919)+13\,440)-3360)+2160)-1800)\,z+2520\right) $$

07.20.03.0462.01

$$ {}_1F_1\left(5;-\frac{7}{2};-z\right) = \frac{1}{2520}\left(e^{-z}\left(\sqrt{\pi}\,(-8\,z\,(z\,(2\,(z-34)\,z+765)-3315)-36\,465)\,\mathrm{erfi}\left(\sqrt{z}\right)z^{9/2} + 2\,e^z\,(z\,(z\,(z\,(z\,(2\,z\,(2\,z\,(2\,z-67)+1465)-11\,919)+13\,440)+3360)+2160)+1800)+1260)\right)\right) $$

07.20.03.0463.01

$$ {}_1F_1\left(5; -\frac{5}{2}; z\right) = -\frac{1}{720} e^z \sqrt{\pi} \, (8 z (z (2 z (z + 30) + 585) + 2145) + 19\,305) \operatorname{erf}\left(\sqrt{z}\right) z^{7/2} - \frac{1}{360} (z (z (z (2 z (2 z (2 z + 59) + 1113) + 7575) + 6720) - 1440) + 720) z + 1 $$

07.20.03.0464.01

$$ {}_1F_1\left(5; -\frac{5}{2}; -z\right) = \frac{1}{720} e^{-z} \left(\sqrt{\pi} \, (-8 z (z (2 (z - 30) z + 585) - 2145) - 19\,305) \operatorname{erfi}\left(\sqrt{z}\right) z^{7/2} + 2 e^z (z (z (z (z (2 z (2 z (2 z - 59) + 1113) - 7575) + 6720) + 1440) + 720) + 360)\right) $$

07.20.03.0465.01

$$ {}_1F_1\left(5; -\frac{3}{2}; z\right) = \frac{1}{288} \left(e^z \sqrt{\pi} \, (8 z (z (2 z (z + 26) + 429) + 1287) + 9009) \operatorname{erf}\left(\sqrt{z}\right) z^{5/2} + 2 (z (z (2 z (2 z (2 z + 51) + 809) + 4431) + 2880) - 480) z + 288\right) $$

07.20.03.0466.01

$$ {}_1F_1\left(5; -\frac{3}{2}; -z\right) = \frac{1}{288} e^{-z} \left(\sqrt{\pi} \, (-8 z (z (2 (z - 26) z + 429) - 1287) - 9009) \operatorname{erfi}\left(\sqrt{z}\right) z^{5/2} + 2 e^z (z (z (z (2 z (2 z (2 z - 51) + 809) - 4431) + 2880) + 480) + 144)\right) $$

07.20.03.0467.01

$$ {}_1F_1\left(5; -\frac{1}{2}; z\right) = \frac{1}{192} \left(-e^z \sqrt{\pi} \, (8 z (z (2 z (z + 22) + 297) + 693) + 3465) \operatorname{erf}\left(\sqrt{z}\right) z^{3/2} - 2 \left(z \left(z \left(2 z \left(4 z^2 + 86 z + 553\right) + 2295\right) + 960\right) - 96\right)\right) $$

07.20.03.0468.01

$$ {}_1F_1\left(5; -\frac{1}{2}; -z\right) = \frac{1}{192} e^{-z} \left(\sqrt{\pi} \, (-8 z (z (2 (z - 22) z + 297) - 693) - 3465) \operatorname{erfi}\left(\sqrt{z}\right) z^{3/2} + 2 e^z \left(z \left(z \left(2 z \left(4 z^2 - 86 z + 553\right) - 2295\right) + 960\right) + 96\right)\right) $$

07.20.03.0469.01

$$ {}_1F_1\left(5; \frac{1}{2}; z\right) = \frac{1}{384} \left(2 (z (2 z + 5) (4 z (z + 15) + 195) + 192) + e^z \sqrt{\pi} \sqrt{z} \, (8 z (z (2 z (z + 18) + 189) + 315) + 945) \operatorname{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0470.01

$$ {}_1F_1\left(5; \frac{1}{2}; -z\right) = \frac{1}{384} e^{-z} \left(2 e^z (z (2 z - 5) (4 (z - 15) z + 195) + 192) + \sqrt{\pi} \sqrt{z} \, (-8 z (z (2 (z - 18) z + 189) - 315) - 945) \operatorname{erfi}\left(\sqrt{z}\right)\right) $$

07.20.03.0471.01

$$ {}_1F_1(5; 1; z) = \frac{1}{24} e^z (z (z + 4) (z (z + 12) + 24) + 24) $$

07.20.03.0472.01

$$ {}_1F_1\left(5; \frac{3}{2}; z\right) = \frac{2 \sqrt{z} \left(2 z \left(4 z^2 + 54 z + 185\right) + 279\right) + e^z \sqrt{\pi} \, (8 z (z (2 z (z + 14) + 105) + 105) + 105) \operatorname{erf}\left(\sqrt{z}\right)}{768 \sqrt{z}} $$

07.20.03.0473.01

$${}_1F_1\left(5; \frac{3}{2}; -z\right) = \frac{1}{768\sqrt{z}} \left(e^{-z} \left(\sqrt{\pi}\, (8\,z\,(z\,(2\,(z-14)\,z+105)-105)+105)\,\mathrm{erfi}\left(\sqrt{z}\right) - 2\,e^{z}\,\sqrt{z}\,\left(2\,z\left(4\,z^2-54\,z+185\right)-279\right)\right)\right)$$

07.20.03.0474.01

$${}_1F_1(5; 2; z) = \frac{1}{24}\,e^{z}\left(z\,(z+6)^2+24\right)$$

07.20.03.0475.01

$${}_1F_1\left(5; \frac{5}{2}; z\right) = \frac{2\sqrt{z}\,(2\,z+5)\,(4\,z\,(z+7)+3) + e^{z}\,\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+10)+45)+15)-15)\,\mathrm{erf}\left(\sqrt{z}\right)}{512\,z^{3/2}}$$

07.20.03.0476.01

$${}_1F_1\left(5; \frac{5}{2}; -z\right) = \frac{e^{-z}\left(2\,e^{z}\,\sqrt{z}\,(2\,z-5)\,(4\,(z-7)\,z+3) + \sqrt{\pi}\,(15-8\,z\,(z\,(2\,(z-10)\,z+45)-15))\,\mathrm{erfi}\left(\sqrt{z}\right)\right)}{512\,z^{3/2}}$$

07.20.03.0477.01

$${}_1F_1(5; 3; z) = \frac{1}{12}\,e^{z}\,(z+2)\,(z+6)$$

07.20.03.0478.01

$${}_1F_1\left(5; \frac{7}{2}; z\right) = \frac{5\left(2\sqrt{z}\,\left(2\,z\left(4\,z^2+22\,z+9\right)-9\right) + e^{z}\,\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+6)+9)-3)+9)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{1024\,z^{5/2}}$$

07.20.03.0479.01

$${}_1F_1\left(5; \frac{7}{2}; -z\right) = \frac{e^{-z}\left(5\sqrt{\pi}\,(8\,z\,(z\,(2\,(z-6)\,z+9)+3)+9)\,\mathrm{erfi}\left(\sqrt{z}\right) - 10\,e^{z}\,\sqrt{z}\,\left(2\,z\left(4\,z^2-22\,z+9\right)+9\right)\right)}{1024\,z^{5/2}}$$

07.20.03.0480.01

$${}_1F_1(5; 4; z) = \frac{1}{4}\,e^{z}\,(z+4)$$

07.20.03.0481.01

$${}_1F_1\left(5; \frac{9}{2}; z\right) = \frac{35\left(2\sqrt{z}\,(2\,z+5)\,(4\,(z-1)\,z+3) + e^{z}\,\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+2)-3)+3)-15)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{2048\,z^{7/2}}$$

07.20.03.0482.01

$${}_1F_1\left(5; \frac{9}{2}; -z\right) = \frac{35\,e^{-z}\left(2\,e^{z}\,\sqrt{z}\,(2\,z-5)\,(4\,z\,(z+1)+3) + \sqrt{\pi}\,(8\,z\,(z\,(3-2\,(z-2)\,z)+3)+15)\,\mathrm{erfi}\left(\sqrt{z}\right)\right)}{2048\,z^{7/2}}$$

07.20.03.0483.01

$${}_1F_1(5; 5; z) = e^{z}$$

07.20.03.0484.01

$${}_1F_1\left(5; \frac{11}{2}; z\right) = \frac{315\left(2\sqrt{z}\,(2\,z\,(2\,z\,(2\,z-5)+25)-105) + e^{z}\,\sqrt{\pi}\,(8\,z\,(z\,(2\,(z-2)\,z+9)-15)+105)\,\mathrm{erf}\left(\sqrt{z}\right)\right)}{4096\,z^{9/2}}$$

07.20.03.0485.01

$${}_1F_1\left(5; \frac{11}{2}; -z\right) = \frac{1}{4096\,z^{9/2}}\left(315\,e^{-z}\left(\sqrt{\pi}\,(8\,z\,(z\,(2\,z\,(z+2)+9)+15)+105)\,\mathrm{erfi}\left(\sqrt{z}\right) - 2\,e^{z}\,\sqrt{z}\,(2\,z\,(2\,z\,(2\,z+5)+25)+105)\right)\right)$$

07.20.03.0486.01

$$_1F_1(5;6;z)=\frac{5\,(e^z\,(z\,(z\,((z-4)\,z+12)-24)+24)-24)}{z^5}$$

For fixed z and $a=\frac{11}{2}$

07.20.03.0487.01

$$_1F_1\left(\frac{11}{2};-\frac{11}{2};z\right)=e^z\left(\frac{2048\,z^{11}}{9\,823\,275}+\frac{1024\,z^{10}}{99\,225}+\frac{512\,z^9}{2835}+\frac{256\,z^8}{189}+\frac{256\,z^7}{63}+\frac{128\,z^6}{45}-\frac{64\,z^5}{45}+\frac{32\,z^4}{21}-\frac{40\,z^3}{21}+\frac{20\,z^2}{9}-2\,z+1\right)$$

07.20.03.0488.01

$$_1F_1\left(\frac{11}{2};-\frac{9}{2};z\right)=\frac{1}{893\,025}\,(e^z\,(893\,025-4\,z\,(z\,(8\,z\,(z\,(4\,z\,(z\,(2\,z\,(z\,(4\,z\,(z+45)+2835)+18\,900)+99\,225)+59\,535)-99\,225)+85\,050)-637\,875)+496\,125)))$$

07.20.03.0489.01

$$_1F_1\left(\frac{11}{2};-\frac{7}{2};z\right)=\frac{1}{99\,225}\,(e^z\,(2\,z\,(8\,z\,(2\,z\,(z\,(2\,z\,(4\,z\,(z+21)\,(z\,(2\,z+39)+315)+59\,535)+59\,535)-19\,845)+25\,515)-127\,575)+99\,225))$$

07.20.03.0490.01

$$_1F_1\left(\frac{11}{2};-\frac{5}{2};z\right)=\frac{e^z\,(14\,175-16\,z\,(z\,(2\,z\,(z\,(8\,z\,(z\,(z\,(z+36)+441)+2205)+33\,075)+13\,230)-6615)+2835))}{14\,175}$$

07.20.03.0491.01

$$_1F_1\left(\frac{11}{2};-\frac{3}{2};z\right)=e^z\left(\frac{2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z\,(2\,z+63)+1323)+11\,025)+33\,075)+19\,845)-6615)}{2835}+1\right)$$

07.20.03.0492.01

$$_1F_1\left(\frac{11}{2};-\frac{1}{2};z\right)=\frac{1}{945}\,e^z\,(945-4\,z\,(z\,(4\,z\,(z\,(4\,z\,(z+27)+945)+3150)+14\,175)+2835))$$

07.20.03.0493.01

$$_1F_1\left(\frac{11}{2};\frac{1}{2};z\right)=\frac{1}{945}\,e^z\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+45)+315)+1575)+4725)+945)$$

07.20.03.0494.01

$$_1F_1\left(\frac{11}{2};1;z\right)=\frac{1}{945}\,e^{z/2}\left((z\,(4\,z\,(z\,(4\,z\,(z+21)+555)+1371)+4725)+945)\,I_0\left(\frac{z}{2}\right)+z\,(4\,z\,(z\,(4\,z\,(z+20)+477)+930)+1689)\,I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0495.01

$$_1F_1\left(\frac{11}{2};\frac{3}{2};z\right)=\frac{1}{945}\,e^z\,(8\,z\,(z\,(2\,z\,(z+18)+189)+315)+945)$$

07.20.03.0496.01

$$_1F_1\left(\frac{11}{2};2;z\right)=\frac{1}{945}\,e^{z/2}\left((2\,z+9)\,(2\,z\,(4\,z\,(z+12)+105)+105)\,I_0\left(\frac{z}{2}\right)+\left(4\,z\left(z\left(4\,z^2+62\,z+261\right)+291\right)+105\right)I_1\left(\frac{z}{2}\right)\right)$$

07.20.03.0497.01

$$_1F_1\left(\frac{11}{2};\frac{5}{2};z\right)=e^z\left(\frac{2}{315}\,z\left(4\,z^2+54\,z+189\right)+1\right)$$

07.20.03.0498.01

$$ {}_1F_1\left(\frac{11}{2}; 3; z\right) = \frac{4\, e^{z/2} \left(4\, z\, (z\, (2\, z\, (z+12)+75)+60)\, I_0\left(\frac{z}{2}\right) + (4\, z\, (2\, z\, (z\, (z+11)+27)+15)-15)\, I_1\left(\frac{z}{2}\right)\right)}{945\, z} $$

07.20.03.0499.01

$$ {}_1F_1\left(\frac{11}{2}; \frac{7}{2}; z\right) = \frac{1}{63}\, e^z\, (4\, z\, (z+9)+63) $$

07.20.03.0500.01

$$ {}_1F_1\left(\frac{11}{2}; 4; z\right) = \frac{4\, e^{z/2} \left(z\, (4\, z\, (z\, (2\, z+15)+21)-3)\, I_0\left(\frac{z}{2}\right) + (z\, (4\, z\, (z\, (2\, z+13)+9)-21)+12)\, I_1\left(\frac{z}{2}\right)\right)}{315\, z^2} $$

07.20.03.0501.01

$$ {}_1F_1\left(\frac{11}{2}; \frac{9}{2}; z\right) = e^z \left(\frac{2\, z}{9}+1\right) $$

07.20.03.0502.01

$$ {}_1F_1\left(\frac{11}{2}; 5; z\right) = \frac{32\, e^{z/2} \left(z\, (z\, (4\, z\, (z+3)-3)+3)\, I_0\left(\frac{z}{2}\right) + (z\, (z\, (4\, z\, (z+2)-9)+12)-12)\, I_1\left(\frac{z}{2}\right)\right)}{315\, z^3} $$

07.20.03.0503.01

$$ {}_1F_1\left(\frac{11}{2}; \frac{11}{2}; z\right) = e^z $$

07.20.03.0504.01

$$ {}_1F_1\left(\frac{11}{2}; 6; z\right) = \frac{32\, e^{z/2} \left(z\left(z\left(4\, z^2-6\, z+15\right)-24\right) I_0\left(\frac{z}{2}\right) + (z\, (z\, (2\, z\, (2\, z-5)+27)-60)+96)\, I_1\left(\frac{z}{2}\right)\right)}{63\, z^4} $$

For fixed z and $a = 6$

07.20.03.0505.01

$$ {}_1F_1\left(6; -\frac{11}{2}; z\right) = \frac{1}{623\,700} \Big(e^z \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z+115)+2415)+45\,885)+780\,045)+2\,340\,135)\, \mathrm{erf}\left(\sqrt{z}\right) z^{13/2} + 2\, (z\, (z\, (z\, (z\, (z\, (z\, (4\, z\, (2\, z\, (2\, z\, (z+57)+2359)+43\,635)+701\,145)+887\,040)-241\,920)+181\,440)-201\,600)+264\,600)-340\,200)+311\,850)\Big) $$

07.20.03.0506.01

$$ {}_1F_1\left(6; -\frac{11}{2}; -z\right) = \frac{1}{623\,700} \Big(e^{-z} \Big(\sqrt{\pi}\, z^{13/2}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z-115)+2415)-45\,885)+780\,045)-2\,340\,135)\, \mathrm{erfi}\left(\sqrt{z}\right) - 2\, e^z\, (z\, (z\, (z\, (z\, (z\, (z\, (4\, z\, (2\, z\, (2\, (z-57)\, z+2359)-43\,635)+701\,145)-887\,040)-241\,920)-181\,440)-201\,600)-264\,600)-340\,200)-311\,850)\Big)\Big) $$

07.20.03.0507.01

$$ {}_1F_1\left(6; -\frac{9}{2}; z\right) = \frac{1}{113\,400} \Big(-e^z \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z+105)+1995)+33\,915)+508\,725)+1\,322\,685)\, \mathrm{erf}\left(\sqrt{z}\right) z^{11/2} - 2\, (z\, (z\, (z\, (z\, (z\, (8\, z\, (2\, z\, (z\, (z+52)+972)+16\,035)+451\,395)+483\,840)-120\,960)+80\,640)-75\,600)+75\,600)-56\,700)\Big) $$

07.20.03.0508.01

$${}_1F_1\left(6;-\frac{9}{2};-z\right)=\frac{1}{113\,400}\left(e^{-z}\left(\sqrt{\pi}\;z^{11/2}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-105)+1995)-33\,915)+508\,725)-1\,322\,685)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^{z}\right.\right.$$
$$\left.\left.(z\,(z\,(z\,(z\,(z\,(z\,(8\,z\,(2\,z\,((z-52)\,z+972)-16\,035)+451\,395)-483\,840)-120\,960)-80\,640)-75\,600)-75\,600)-56\,700)\right)\right)$$

07.20.03.0509.01

$${}_1F_1\left(6;-\frac{7}{2};z\right)=\frac{1}{25\,200}\left(e^{z}\,\sqrt{\pi}\,\left(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+95)+1615)+24\,225)+314\,925)+692\,835\right)\operatorname{erf}\left(\sqrt{z}\right)z^{9/2}+\right.$$
$$\left.2\,(z\,(z\,(z\,(z\,(z\,(4\,z\,(2\,z\,(2\,z\,(z+47)+1569)+22\,745)+274\,845)+241\,920)-53\,760)+30\,240)-21\,600)+12\,600)\right)$$

07.20.03.0510.01

$${}_1F_1\left(6;-\frac{7}{2};-z\right)=\frac{1}{25\,200}\left(e^{-z}\left(\sqrt{\pi}\;z^{9/2}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-95)+1615)-24\,225)+314\,925)-692\,835)\operatorname{erfi}\left(\sqrt{z}\right)-2\,e^{z}\right.\right.$$
$$\left.\left.(z\,(z\,(z\,(z\,(z\,(4\,z\,(2\,z\,(2\,(z-47)\,z+1569)-22\,745)+274\,845)-241\,920)-53\,760)-30\,240)-21\,600)-12\,600)\right)\right)$$

07.20.03.0511.01

$${}_1F_1\left(6;-\frac{5}{2};z\right)=\frac{1}{7200}\left(-e^{z}\,\sqrt{\pi}\,\left(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+85)+1275)+16\,575)+182\,325)+328\,185\right)\operatorname{erf}\left(\sqrt{z}\right)z^{7/2}-\right.$$
$$\left.2\,(z\,(z\,(z\,(z\,(16\,z\,(z\,(z\,(z+42)+617)+3855)+155\,655)+107\,520)-20\,160)+8640)-3600)\right)$$

07.20.03.0512.01

$${}_1F_1\left(6;-\frac{5}{2};-z\right)=\frac{1}{7200}\left(e^{-z}\left(\sqrt{\pi}\;z^{7/2}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-85)+1275)-16\,575)+182\,325)-328\,185)\operatorname{erfi}\left(\sqrt{z}\right)-\right.\right.$$
$$\left.\left.2\,e^{z}\,(z\,(z\,(z\,(z\,(16\,z\,(z\,((z-42)\,z+617)-3855)+155\,655)-107\,520)-20\,160)-8640)-3600)\right)\right)$$

07.20.03.0513.01

$${}_1F_1\left(6;-\frac{3}{2};z\right)=\frac{z^7}{90}+\frac{37\,z^6}{90}+\frac{313\,z^5}{60}+\frac{219\,z^4}{8}+\frac{5327\,z^3}{96}+$$
$$\frac{e^{z}\,\sqrt{\pi}\,\left(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+75)+975)+10\,725)+96\,525)+135\,135\right)\operatorname{erf}\left(\sqrt{z}\right)z^{5/2}}{2880}+28\,z^2-4\,z+1$$

07.20.03.0514.01

$${}_1F_1\left(6;-\frac{3}{2};-z\right)=\frac{1}{2880}\left(e^{-z}\left(\sqrt{\pi}\;z^{5/2}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-75)+975)-10\,725)+96\,525)-135\,135)\operatorname{erfi}\left(\sqrt{z}\right)-\right.\right.$$
$$\left.\left.2\,e^{z}\,(z\,(z\,(z\,(4\,z\,(2\,z\,(2\,(z-37)\,z+939)-9855)+79\,905)-40\,320)-5760)-1440)\right)\right)$$

07.20.03.0515.01

$${}_1F_1\left(6;-\frac{1}{2};z\right)=\frac{1}{1920}\left(-e^{z}\,\sqrt{\pi}\,\left(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z+65)+715)+6435)+45\,045)+45\,045\right)\operatorname{erf}\left(\sqrt{z}\right)z^{3/2}-\right.$$
$$\left.2\,(z\,(z\,(8\,z\,(2\,z\,(z\,(z+32)+342)+2905)+35\,595)+11\,520)-960)\right)$$

07.20.03.0516.01

$${}_1F_1\left(6;-\frac{1}{2};-z\right)=\frac{1}{1920}\left(e^{-z}\left(\sqrt{\pi}\;z^{3/2}\,(2\,z\,(4\,z\,(2\,z\,(z\,(2\,z-65)+715)-6435)+45\,045)-45\,045)\operatorname{erfi}\left(\sqrt{z}\right)-\right.\right.$$
$$\left.\left.2\,e^{z}\,(z\,(z\,(8\,z\,(2\,z\,((z-32)\,z+342)-2905)+35\,595)-11\,520)-960)\right)\right)$$

07.20.03.0517.01

$$ {}_1F_1\left(6; \frac{1}{2}; z\right) = \frac{1}{3840} \left(2 z (4 z (2 z (2 z (z+27)+469)+3045)+12645)+ e^z \sqrt{\pi} \sqrt{z} (2 z (4 z (2 z (z (2 z+55)+495)+3465)+17325)+10395) \operatorname{erf}\left(\sqrt{z}\right)+3840\right) $$

07.20.03.0518.01

$$ {}_1F_1\left(6; \frac{1}{2}; -z\right) = \frac{1}{3840} \left(e^{-z} \left(\sqrt{\pi} \sqrt{z} (2 z (4 z (2 z (z (2 z-55)+495)-3465)+17325)-10395) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z (z (4 z (2 z (2 (z-27) z+469)-3045)+12645)-1920)\right)\right) $$

07.20.03.0519.01

$$ {}_1F_1(6; 1; z) = \frac{1}{120} e^z (z (z (z+10)+20) (z (z+15)+30)+120) $$

07.20.03.0520.01

$$ {}_1F_1\left(6; \frac{3}{2}; z\right) = \frac{1}{7680 \sqrt{z}} \left(2 \sqrt{z} (16 z (z (z (z+22)+147)+330)+2895)+e^z \sqrt{\pi} (2 z (4 z (2 z (z (2 z+45)+315)+1575)+4725)+945) \operatorname{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0521.01

$$ {}_1F_1\left(6; \frac{3}{2}; -z\right) = \frac{1}{7680 \sqrt{z}} \left(e^{-z} \left(2 e^z \sqrt{z} (16 z (z ((z-22) z+147)-330)+2895)+ \sqrt{\pi} (945-2 z (4 z (2 z (z (2 z-45)+315)-1575)+4725)) \operatorname{erfi}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0522.01

$$ {}_1F_1(6; 2; z) = e^z \left(\frac{z^4}{120}+\frac{z^3}{6}+z^2+2 z+1\right) $$

07.20.03.0523.01

$$ {}_1F_1\left(6; \frac{5}{2}; z\right) = \frac{1}{5120 z^{3/2}} \left(2 \sqrt{z} (4 z (2 z (2 z (z+17)+159)+395)+105)+e^z \sqrt{\pi} (2 z (4 z (2 z (z (2 z+35)+175)+525)+525)-105) \operatorname{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0524.01

$$ {}_1F_1\left(6; \frac{5}{2}; -z\right) = \frac{1}{5120 z^{3/2}} \left(e^{-z} \left(\sqrt{\pi} (2 z (4 z (2 z (z (2 z-35)+175)-525)+525)+105) \operatorname{erfi}\left(\sqrt{z}\right) - 2 e^z \sqrt{z} (4 z (2 z (2 (z-17) z+159)-395)+105)\right)\right) $$

07.20.03.0525.01

$$ {}_1F_1(6; 3; z) = e^z \left(\frac{1}{60} z (z (z+15)+60)+1\right) $$

07.20.03.0526.01

$$ {}_1F_1\left(6; \frac{7}{2}; z\right) = \frac{1}{2048 z^{5/2}} \left(2 \sqrt{z} (2 z+1) \left(8 z^3+92 z^2+210 z-45\right)+e^z \sqrt{\pi} (2 z (4 z (2 z (z+5) (2 z+15)+75)-75)+45) \operatorname{erf}\left(\sqrt{z}\right)\right) $$

07.20.03.0527.01

$$ {}_1F_1\left(6;\, \frac{7}{2};\, -z\right) = \frac{1}{2048\, z^{5/2}} \left(e^{-z} \left(2\, e^z \sqrt{z}\, (2\, z-1) \left(8\, z^3 - 92\, z^2 + 210\, z + 45\right) + \sqrt{\pi}\, (2\, z\, (4\, z\, (75 - 2\, (z-5)\, z\, (2\, z - 15)) + 75) + 45)\, \text{erfi}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0528.01

$$ {}_1F_1(6;\, 4;\, z) = \frac{1}{20}\, e^z\, (z\, (z+10) + 20) $$

07.20.03.0529.01

$$ {}_1F_1\left(6;\, \frac{9}{2};\, z\right) = \frac{1}{4096\, z^{7/2}} \left(7 \left(2 \sqrt{z}\, (2\, z+3) \left(8\, z^3 + 44\, z^2 - 30\, z + 15\right) + e^z \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z+15) + 15) - 15) + 45) - 45)\, \text{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0530.01

$$ {}_1F_1\left(6;\, \frac{9}{2};\, -z\right) = \frac{1}{4096\, z^{7/2}} \left(e^{-z} \left(7 \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z - 15) + 15) + 15) + 45) + 45)\, \text{erfi}\left(\sqrt{z}\right) - 14\, e^z \sqrt{z}\, (4\, z\, (2\, z\, (2\, (z-7)\, z + 9) + 15) + 45)\right)\right) $$

07.20.03.0531.01

$$ {}_1F_1(6;\, 5;\, z) = \frac{1}{5}\, e^z\, (z+5) $$

07.20.03.0532.01

$$ {}_1F_1\left(6;\, \frac{11}{2};\, z\right) = \frac{1}{8192\, z^{9/2}} \left(63 \left(2 \sqrt{z}\, (16\, z\, ((z-1)\, z\, (z+3) + 5) - 105) + e^z \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, (z\, (2\, z+5) - 5) + 15) - 75) + 105)\, \text{erf}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0533.01

$$ {}_1F_1\left(6;\, \frac{11}{2};\, -z\right) = \frac{1}{8192\, z^{9/2}} \left(63\, e^{-z} \left(2\, e^z \sqrt{z}\, (16\, z\, ((z-3)\, z\, (z+1) - 5) - 105) + \sqrt{\pi}\, (2\, z\, (4\, z\, (2\, z\, ((5 - 2\, z)\, z + 5) + 15) + 75) + 105)\, \text{erfi}\left(\sqrt{z}\right)\right)\right) $$

07.20.03.0534.01

$$ {}_1F_1(6;\, 6;\, z) = e^z $$

General characteristics

Domain and analyticity

${}_1F_1(a; b; z)$ is an analytical function of a, b and z which is defined in $\mathbb{C}^3$. For fixed a, b, it is an entire function of z. For fixed b, z, it is an entire function of a. For negative integer a, ${}_1F_1(a; b; z)$ degenerates to a polynomial in z of order $-a$.

07.20.04.0001.01

$$ (a * b * z) \longrightarrow {}_1F_1(a;\, b;\, z) :: (\mathbb{C} \otimes \mathbb{C} \otimes \mathbb{C}) \longrightarrow \mathbb{C} $$

Symmetries and periodicities

Mirror symmetry

07.20.04.0002.01

$${}_1F_1(\overline{a}; \overline{b}; \overline{z}) = \overline{{}_1F_1(a; b; z)}$$

Periodicity

No periodicity

Poles and essential singularities

With respect to *z*

For fixed a /; $-a \notin \mathbb{N}$, b, the function ${}_1F_1(a; b; z)$ has only one singular point at $z = \tilde{\infty}$. It is an essential singular point.

07.20.04.0003.01

$$\mathcal{S}ing_z({}_1F_1(a; b; z)) = \{\{\tilde{\infty}, \infty\}\} /; -a \notin \mathbb{N}$$

For negative integer a and fixed b, the function ${}_1F_1(a; b; z)$ is a polynomial and has pole of order $-a$ at $z = \tilde{\infty}$.

07.20.04.0004.01

$$\mathcal{S}ing_z({}_1F_1(a; b; z)) = \{\{\tilde{\infty}, -a\}\} /; -a \in \mathbb{N}^+$$

With respect to *b*

For fixed a, z, the function ${}_1F_1(a; b; z)$ has an infinite set of singular points:

a) $b = -k$ /; $k \in \mathbb{N}$, are the simple poles with residues $\frac{(-1)^k}{k!}\, {}_1\tilde{F}_1(a; -k; z)$;

b) $b = \tilde{\infty}$ is the point of convergence of poles, which is an essential singular point.

07.20.04.0005.01

$$\mathcal{S}ing_b({}_1F_1(a; b; z)) = \{\{\{-k, 1\} /; k \in \mathbb{N}\}, \{\tilde{\infty}, \infty\}\}$$

07.20.04.0006.01

$$\text{res}_b({}_1F_1(a; b; z))(-k) = \frac{(-1)^k}{k!}\, {}_1\tilde{F}_1(a; -k; z) /; k \in \mathbb{N}$$

With respect to *a*

For fixed b, z, the function ${}_1F_1(a; b; z)$ has only one singular point at $a = \tilde{\infty}$. It is an essential singular point.

07.20.04.0007.01

$$\mathcal{S}ing_a({}_1F_1(a; b; z)) = \{\{\tilde{\infty}, \infty\}\}$$

Branch points

With respect to *z*

The function ${}_1F_1(a; b; z)$ does not have branch points with respect to z.

07.20.04.0008.01

$$\mathcal{BP}_z({}_1F_1(a; b; z)) = \{\}$$

With respect to b

The function ${}_1F_1(a; b; z)$ does not have branch points with respect to b.

07.20.04.0009.01

$$\mathcal{BP}_b({}_1F_1(a; b; z)) == \{\}$$

With respect to a

The function ${}_1F_1(a; b; z)$ does not have branch points with respect to a.

07.20.04.0010.01

$$\mathcal{BP}_a({}_1F_1(a; b; z)) == \{\}$$

Branch cuts

With respect to z

The function ${}_1F_1(a; b; z)$ does not have branch cuts with respect to z.

07.20.04.0011.01

$$\mathcal{BC}_z({}_1F_1(a; b; z)) == \{\}$$

With respect to b

The function ${}_1F_1(a; b; z)$ does not have branch cuts with respect to b.

07.20.04.0012.01

$$\mathcal{BC}_b({}_1F_1(a; b; z)) == \{\}$$

With respect to a

The function ${}_1F_1(a; b; z)$ does not have branch cuts with respect to a.

07.20.04.0013.01

$$\mathcal{BC}_a({}_1F_1(a; b; z)) == \{\}$$

Series representations

Generalized power series

Expansions at generic point $z == z_0$

For the function itself

07.20.06.0011.01

$${}_1F_1(a; b; z) \propto {}_1F_1(a; b; z_0) + \frac{a}{b}\, {}_1F_1(a+1; b+1; z_0)\,(z-z_0) + \frac{a\,(a+1)}{2\,b\,(b+1)}\, {}_1F_1(a+2; b+2; z_0)\,(z-z_0)^2 + \ldots \,/;\, (z \to z_0)$$

07.20.06.0012.01

$${}_1F_1(a; b; z) \propto {}_1F_1(a; b; z_0) + \frac{a}{b}\, {}_1F_1(a+1; b+1; z_0)\,(z-z_0) + \frac{a\,(a+1)}{2\,b\,(b+1)}\, {}_1F_1(a+2; b+2; z_0)\,(z-z_0)^2 + O\big((z-z_0)^3\big)$$

07.20.06.0013.01

$$ {}_1F_1(a;\,b;\,z) = \sum_{k=0}^{\infty} \frac{(a)_k}{k!\,(b)_k}\, {}_1F_1(a+k;\,b+k;\,z_0)\,(z-z_0)^k $$

07.20.06.0014.01

$$ {}_1F_1(a;\,b;\,z) = F_{1\times 0\times 0}^{1\times 0\times 0}\left(\begin{matrix} a;;; \\ b;;; \end{matrix} \, z_0,\, z-z_0 \right) $$

07.20.06.0015.01

$$ {}_1F_1(a;\,b;\,z) \propto {}_1F_1(a;\,b;\,z_0)\,(1+O(z-z_0)) $$

Expansions at $z == 0$

For the function itself

General case

07.20.06.0001.02

$$ {}_1F_1(a;\,b;\,z) \propto 1 + \frac{a\,z}{b} + \frac{a\,(1+a)\,z^2}{2\,b\,(1+b)} + \ldots \,/;\, (z \to 0) $$

07.20.06.0016.01

$$ {}_1F_1(a;\,b;\,z) \propto 1 + \frac{a\,z}{b} + \frac{a\,(1+a)\,z^2}{2\,b\,(1+b)} + O\!\left(z^3\right) $$

07.20.06.0002.01

$$ {}_1F_1(a;\,b;\,z) == \sum_{k=0}^{\infty} \frac{(a)_k\, z^k}{(b)_k\, k!} $$

07.20.06.0003.02

$$ {}_1F_1(a;\,b;\,z) \propto 1 + O(z) $$

07.20.06.0017.01

$$ {}_1F_1(a;\,b;\,z) == F_\infty(z,\,a,\,b) \,/; $$
$$ \left(\left(F_n(z,\,a,\,b) == \sum_{k=0}^{n} \frac{(a)_k\, z^k}{(b)_k\, k!} == {}_1F_1(a;\,b;\,z) - \frac{z^{n+1}\,(a)_{n+1}}{(b)_{n+1}\,(n+1)!}\, {}_2F_2(1,\,a+n+1;\,n+2,\,b+n+1;\,z) \right) \bigwedge n \in \mathbb{N} \right) $$

Summed form of the truncated series expansion.

Generic formulas for main term

07.20.06.0018.01

$$ {}_1F_1(a;\,b;\,z) \propto \begin{cases} \tilde{\infty} & -b \in \mathbb{N} \bigwedge -a \in \mathbb{N} \bigwedge b-a > 0 \\ 1 & \text{True} \end{cases} \,/;\, (z \to 0) $$

Expansions at $z == \infty$ for polynomial cases

07.20.06.0004.01

$$ {}_1F_1(-n;\,b;\,z) == \frac{(-z)^n}{(b)_n}\, {}_2F_0\!\left(-n,\,-b-n+1;\,;\,-\frac{1}{z}\right) /;\, n \in \mathbb{N} \bigwedge \neg\,(-b \in \mathbb{N} \bigwedge b+n > 0) $$

Asymptotic series expansions

07.20.06.0005.01

$$ {}_1F_1(a;b;z)\propto\Gamma(b)\,\mathcal{A}_{\tilde{F}}\!\left(\begin{matrix}a;\\ b;\end{matrix}\ \{z,\tilde{\infty},\infty\}\right)/;\ (|z|\to\infty) $$

07.20.06.0006.01

$$ {}_1F_1(a;b;z)\propto\Gamma(b)\left(\mathcal{A}_{\tilde{F}}^{(\text{power})}\!\left(\begin{matrix}a;\\ b;\end{matrix}\ \{z,\tilde{\infty},\infty\}\right)+\mathcal{A}_{\tilde{F}}^{(\text{exp})}\!\left(\begin{matrix}a;\\ b;\end{matrix}\ \{z,\tilde{\infty},\infty\}\right)\right)/;\ (|z|\to\infty) $$

07.20.06.0007.01

$$ {}_1F_1(a;b;z)\propto\Gamma(b)\left(\frac{e^z z^{a-b}}{\Gamma(a)}\left(1+\frac{(a-1)(a-b)}{z}+\frac{(a-2)(a-1)(a-b-1)(a-b)}{2z^2}+\ldots\right)+\frac{(-z)^{-a}}{\Gamma(b-a)}\left(1-\frac{a(a-b+1)}{z}+\frac{a(a+1)(a-b+1)(a-b+2)}{2z^2}+\ldots\right)\right)/;\ (|z|\to\infty) $$

07.20.06.0019.01

$$ {}_1F_1(a;b;z)\propto\frac{\Gamma(b)(-z)^{-a}}{\Gamma(b-a)}\left(\sum_{k=0}^{n}\frac{(-1)^k (a)_k (a-b+1)_k\ z^{-k}}{k!}+O\!\left(z^{-n-1}\right)\right)+\frac{e^z z^{a-b}\,\Gamma(b)}{\Gamma(a)}\left(\sum_{k=0}^{n}\frac{(b-a)_k (1-a)_k\, z^{-k}}{k!}+O\!\left(z^{-n-1}\right)\right)/;\ (|z|\to\infty) $$

07.20.06.0008.01

$$ {}_1F_1(a;b;z)\propto\frac{\Gamma(b)}{\Gamma(b-a)}(-z)^{-a}\,{}_2F_0\!\left(a,a-b+1;;-\frac{1}{z}\right)+\frac{\Gamma(b)}{\Gamma(a)}e^z z^{a-b}\,{}_2F_0\!\left(b-a,1-a;;\frac{1}{z}\right)/;\ (|z|\to\infty) $$

07.20.06.0009.01

$$ {}_1F_1(a;b;z)\propto\frac{\Gamma(b)}{\Gamma(b-a)}(-z)^{-a}\left(1+O\!\left(\frac{1}{z}\right)\right)+\frac{\Gamma(b)}{\Gamma(a)}e^z z^{a-b}\left(1+O\!\left(\frac{1}{z}\right)\right)/;\ (|z|\to\infty) $$

Residue representations

07.20.06.0010.01

$$ {}_1F_1(a;b;z)=\frac{\Gamma(b)}{\Gamma(a)}\sum_{j=0}^{\infty}\operatorname{res}_s\!\left(\frac{\Gamma(a-s)(-z)^{-s}}{\Gamma(b-s)}\,\Gamma(s)\right)(-j) $$

Limit representations

07.20.09.0001.01

$$ {}_1F_1(a;b;z)=\lim_{p\to\infty}{}_2F_1\!\left(a,p;b;\frac{z}{p}\right) $$

Continued fraction representations

07.20.10.0001.01

$$ {}_1F_1(a;b;z) \equiv 1 + (a\,z/b) \Big/ \left(1 + -\frac{(1+a)\,z}{2\,(1+b)} \Big/ \left(1 + \frac{(1+a)\,z}{2\,(1+b)} + -\frac{(2+a)\,z}{3\,(2+b)} \Big/ \left(1 + \frac{(2+a)\,z}{3\,(2+b)} + \frac{-\frac{(3+a)\,z}{4\,(3+b)}}{1 + \frac{(3+a)\,z}{4\,(3+b)} + \frac{-\frac{(4+a)\,z}{5\,(4+b)}}{1 + \frac{(4+a)\,z}{5\,(4+b)} + \ldots}}\right)\right)\right) $$

07.20.10.0002.01

$$ {}_1F_1(a;b;z) \equiv 1 + \frac{a\,z}{b\left(1 + \mathrm{K}_k\left(-\frac{(a+k)\,z}{(k+1)\,(b+k)}, \frac{(a+k)\,z}{(k+1)\,(b+k)} + 1\right)_1^{\infty}\right)} $$

Differential equations

Ordinary linear differential equations and wronskians

For the direct function itself

07.20.13.0003.01

$$ z\,w''(z) + (b-z)\,w'(z) - a\,w(z) \equiv 0 \,/;\, w(z) \equiv c_1\,{}_1\tilde{F}_1(a;b;z) + c_2\,(U(a,b,z) + e^z\,U(b-a,b,-z)) $$

07.20.13.0004.01

$$ W_z\left({}_1\tilde{F}_1(a;b;z),\, U(a,b,z) + e^z\,U(b-a,b,-z)\right) \equiv \frac{e^z\,(-z)^{-b}}{\Gamma(b-a)} - \frac{e^z\,z^{-b}}{\Gamma(a)} $$

07.20.13.0001.02

$$ z\,w''(z) + (b-z)\,w'(z) - a\,w(z) \equiv 0 \,/;\, w(z) \equiv c_1\,{}_1\tilde{F}_1(a;b;z) + c_2\,U(a,b,z) \,/;\, -a \notin \mathbb{N} $$

07.20.13.0002.02

$$ W_z\left({}_1\tilde{F}_1(a;b;z),\, U(a,b,z)\right) \equiv -\frac{e^z\,z^{-b}}{\Gamma(a)} $$

07.20.13.0005.01

$$ z\,w''(z) + (b-z)\,w'(z) - a\,w(z) \equiv 0 \,/;\, w(z) \equiv c_1\,{}_1\tilde{F}_1(a;b;z) + c_2\,z^{1-b}\,{}_1\tilde{F}_1(a-b+1;2-b;z) \,/;\, b \notin \mathbb{Z} $$

07.20.13.0006.01

$$ W_z\left({}_1\tilde{F}_1(a;b;z),\, z^{1-b}\,{}_1\tilde{F}_1(a-b+1;2-b;z)\right) \equiv \frac{\sin(b\,\pi)}{\pi}\,e^z\,z^{-b} $$

07.20.13.0007.01

$$ z\,w''(z) + (b-z)\,w'(z) - a\,w(z) \equiv 0 \,/;\, w(z) \equiv c_1\,{}_1F_1(a;b;z) + c_2\,z^{1-b}\,{}_1F_1(a-b+1;2-b;z) \,/;\, b \notin \mathbb{Z} $$

07.20.13.0008.01

$$ W_z\left({}_1F_1(a;b;z),\, z^{1-b}\,{}_1F_1(a-b+1;2-b;z)\right) \equiv (1-b)\,e^z\,z^{-b} $$

07.20.13.0009.01

$$ w''(z) + \left(\frac{b\,g'(z)}{g(z)} - g'(z) - \frac{g''(z)}{g'(z)}\right) w'(z) - \frac{a\,g'(z)^2}{g(z)}\,w(z) = 0 \,/;\, w(z) = c_1\,{}_1\tilde{F}_1(a;b;g(z)) + c_2\,U(a,b,g(z)) $$

07.20.13.0010.01

$$W_z\left({}_1\tilde{F}_1(a;b;g(z)),\,U(a,b,g(z))\right)=-\frac{g'(z)\,e^{g(z)}\,g(z)^{-b}}{\Gamma(a)}$$

07.20.13.0011.01

$$h(z)^2\,w''(z)+h(z)^2\left(\frac{b\,g'(z)}{g(z)}-g'(z)-\frac{2\,h'(z)}{h(z)}-\frac{g''(z)}{g'(z)}\right)w'(z)+\left(2\,h'(z)^2+h(z)\left(g'(z)\,h'(z)+\frac{g''(z)\,h'(z)}{g'(z)}-h''(z)\right)-\frac{h(z)\,g'(z)\,(a\,h(z)\,g'(z)+b\,h'(z))}{g(z)}\right)w(z)=0\,/;\,w(z)=c_1\,h(z)\,{}_1\tilde{F}_1(a;b;g(z))+c_2\,h(z)\,U(a,b,g(z))$$

07.20.13.0012.01

$$W_z\left(h(z)\,{}_1\tilde{F}_1(a;b;g(z)),\,h(z)\,U(a,b,g(z))\right)=-\frac{h(z)^2\,g'(z)\,e^{g(z)}\,g(z)^{-b}}{\Gamma(a)}$$

07.20.13.0013.01

$$w''(z)\,z^2+(-2\,s+r\,(-d\,z^r+b-1)+1)\,z\,w'(z)+(d\,r\,(s-a\,r)\,z^r+s\,(-b\,r+r+s))\,w(z)=0\,/;\,w(z)=c_1\,z^s\,{}_1\tilde{F}_1(a;b;d\,z^r)+c_2\,z^s\,U(a,b,d\,z^r)$$

07.20.13.0014.01

$$W_z\left(z^s\,{}_1\tilde{F}_1(a;b;d\,z^r),\,z^s\,U(a,b,d\,z^r)\right)=-\frac{d\,e^{d\,z^r}\,r\,z^{r+2\,s-1}\,(d\,z^r)^{-b}}{\Gamma(a)}$$

07.20.13.0015.01

$$w''(z)-((d\,r^z-b+1)\log(r)+2\log(s))\,w'(z)+\left(-a\,d\log^2(r)\,r^z+\log^2(s)+(d\,r^z-b+1)\log(r)\log(s)\right)w(z)=0\,/;\,w(z)=c_1\,s^z\,{}_1\tilde{F}_1(a;b;d\,r^z)+c_2\,s^z\,U(a,b,d\,r^z)$$

07.20.13.0016.01

$$W_z\left(s^z\,{}_1\tilde{F}_1(a;b;d\,r^z),\,s^z\,U(a,b,d\,r^z)\right)=-\frac{d\,e^{d\,r^z}\,r^z\,(d\,r^z)^{-b}\,s^{2\,z}\log(r)}{\Gamma(a)}$$

Transformations

Transformations and argument simplifications

Argument involving basic arithmetic operations

07.20.16.0001.01

$${}_1F_1(b-a;b;z)=e^z\,{}_1F_1(a;b;-z)$$

Products, sums, and powers of the direct function

Products of the direct function

07.20.16.0002.01

$${}_1F_1(a;b;z)\,{}_1F_1(a;b;-z)={}_2F_3\left(a,b-a;\frac{b+1}{2},\frac{b}{2},b;\frac{z^2}{4}\right)$$

07.20.16.0003.01

$${}_1F_1(a;\, b;\, c\, z)\, {}_1F_1(\alpha;\, \beta;\, d\, z) = \sum_{k=0}^{\infty} c_k\, z^k \;/;$$

$$c_k = \frac{d^k\, (\alpha)_k}{k!\, (\beta)_k}\, {}_3F_2\!\left(-k,\, 1-k-\beta,\, a;\, 1-k-\alpha,\, b;\, -\frac{c}{d}\right) \bigvee c_k = \frac{c^k\, (a)_k}{k!\, (b)_k}\, {}_3F_2\!\left(-k,\, 1-b-k,\, \alpha;\, 1-a-k,\, \beta;\, -\frac{d}{c}\right)$$

07.20.16.0004.01

$${}_1F_1(a;\, b;\, c\, z)\, {}_1F_1(\alpha;\, \beta;\, d\, z) = \sum_{k=0}^{\infty} \sum_{m=0}^{k} \frac{(a)_m\, (\alpha)_{k-m}\, c^m\, d^{k-m}\, z^k}{(b)_m\, m!\, (\beta)_{k-m}\, (k-m)!}$$

07.20.16.0005.01

$${}_1F_1(a;\, b;\, c\, z)\, {}_1F_1(\alpha;\, \beta;\, d\, z) = F_{0:1;1}^{0:1;1}\!\left(\begin{matrix} :a;\, \alpha; \\ :b;\, \beta; \end{matrix}\; c\, z,\, d\, z\right)$$

Sums of the direct function

07.20.16.0006.01

$${}_1F_1(a;\, b;\, z) + \frac{\Gamma(a-b+1)\, \Gamma(b-1)}{\Gamma(a)\, \Gamma(1-b)}\, z^{1-b}\, {}_1F_1(a-b+1;\, 2-b;\, z) = \frac{\Gamma(a-b+1)}{\Gamma(1-b)}\, U(a,\, b,\, z) \;/;\; b \notin \mathbb{Z}$$

Identities

Recurrence identities

Consecutive neighbors

07.20.17.0001.01

$${}_1F_1(a;\, b;\, z) = \frac{2\, a - b + z + 2}{a - b + 1}\, {}_1F_1(a+1;\, b;\, z) - \frac{a+1}{a-b+1}\, {}_1F_1(a+2;\, b;\, z)$$

07.20.17.0002.01

$${}_1F_1(a;\, b;\, z) = \frac{2\, a - b + z - 2}{a - 1}\, {}_1F_1(a-1;\, b;\, z) + \frac{1-a+b}{a-1}\, {}_1F_1(a-2;\, b;\, z)$$

07.20.17.0003.01

$${}_1F_1(a;\, b;\, z) = \frac{b+z}{b}\, {}_1F_1(a;\, b+1;\, z) + \frac{(a-b-1)\, z}{b\, (b+1)}\, {}_1F_1(a;\, b+2;\, z)$$

07.20.17.0004.01

$${}_1F_1(a;\, b;\, z) = \frac{(1-b)\, (b+z-2)}{(a-b+1)\, z}\, {}_1F_1(a;\, b-1;\, z) + \frac{(1-b)\, (2-b)}{(a-b+1)\, z}\, {}_1F_1(a;\, b-2;\, z)$$

Distant neighbors

07.20.17.0018.01

$${}_1F_1(a;\, b;\, z) = C_n(a,\, b,\, z)\, {}_1F_1(a+n;\, b;\, z) - \frac{a+n}{a-b+n}\, C_{n-1}(a,\, b,\, z)\, {}_1F_1(a+n+1;\, b;\, z) \;/;\; C_0(a,\, b,\, z) = 1 \bigwedge$$

$$C_1(a,\, b,\, z) = \frac{2\, a - b + z + 2}{a - b + 1} \bigwedge C_n(a,\, b,\, z) = \frac{2\, a - b + 2\, n + z}{a - b + n}\, C_{n-1}(a,\, b,\, z) - \frac{a+n-1}{a-b+n-1}\, C_{n-2}(a,\, b,\, z) \bigwedge n \in \mathbb{N}^+$$

07.20.17.0019.01

$${}_1F_1(a;b;z) == \frac{n-a+b}{a-n} C_{n-1}(a,b,z)\,{}_1F_1(a-n-1;b;z) + C_n(a,b,z)\,{}_1F_1(a-n;b;z) \,/;\, C_0(a,b,z) == 1 \bigwedge$$
$$C_1(a,b,z) == \frac{2a-b+z-2}{a-1} \bigwedge C_n(a,b,z) == \frac{2n-2a+b-z}{n-a} C_{n-1}(a,b,z) - \frac{n-a+b-1}{n-a-1} C_{n-2}(a,b,z) \bigwedge n \in \mathbb{N}^+$$

07.20.17.0020.01

$${}_1F_1(a;b;z) == C_n(a,b,z)\,{}_1F_1(a;b+n;z) + \frac{(a-b-n)\,z}{(b+n-1)\,(b+n)} C_{n-1}(a,b,z)\,{}_1F_1(a;b+n+1;z) \,/;\, C_0(a,b,z) == 1 \bigwedge$$
$$C_1(a,b,z) == \frac{b+z}{b} \bigwedge C_n(a,b,z) == \frac{b+n+z-1}{b+n-1} C_{n-1}(a,b,z) - \frac{(b-a+n-1)\,z}{(b+n-1)\,(b+n-2)} C_{n-2}(a,b,z) \bigwedge n \in \mathbb{N}^+$$

07.20.17.0021.01

$${}_1F_1(a;b;z) == \frac{(n-b)\,(n-b+1)}{(a-b+n)\,z} C_{n-1}(a,b,z)\,{}_1F_1(a;b-n-1;z) + C_n(a,b,z)\,{}_1F_1(a;b-n;z) \,/;$$
$$C_0(a,b,z) == 1 \bigwedge C_1(a,b,z) == \frac{(1-b)\,(b+z-2)}{(a-b+1)\,z} \bigwedge$$
$$C_n(a,b,z) == \frac{(n-b-1)\,(n-b)}{(a-b+n-1)\,z} C_{n-2}(a,b,z) - \frac{(n-b)\,(n-b-z+1)}{(a-b+n)\,z} C_{n-1}(a,b,z) \bigwedge n \in \mathbb{N}^+$$

Functional identities

Relations between contiguous functions

07.20.17.0005.01

$$(a-b)\,{}_1F_1(a-1;b;z) + a\,{}_1F_1(a+1;b;z) + (b-2a-z)\,{}_1F_1(a;b;z) == 0$$

07.20.17.0006.01

$$(1-b)\,b\,{}_1F_1(a;b-1;z) + (a-b)\,z\,{}_1F_1(a;b+1;z) + b\,(b+z-1)\,{}_1F_1(a;b;z) == 0$$

07.20.17.0007.01

$$(a+z-1)\,{}_1F_1(a;b;z) + (b-a)\,{}_1F_1(a-1;b;z) + (1-b)\,{}_1F_1(a;b-1;z) == 0$$

07.20.17.0008.01

$$b\,{}_1F_1(a;b;z) - b\,{}_1F_1(a-1;b;z) - z\,{}_1F_1(a;b+1;z) == 0$$

07.20.17.0009.01

$$(a-b+1)\,{}_1F_1(a;b;z) - a\,{}_1F_1(a+1;b;z) - (1-b)\,{}_1F_1(a;b-1;z) == 0$$

07.20.17.0010.01

$$b\,(a+z)\,{}_1F_1(a;b;z) - a\,b\,{}_1F_1(a+1;b;z) - (b-a)\,z\,{}_1F_1(a;b+1;z) == 0$$

07.20.17.0011.01

$$(a-b+1)\,(b-a)\,{}_1F_1(a-1;b;z) + a\,(a+z-1)\,{}_1F_1(a+1;b;z) + (b-1)\,(b-2a-z)\,{}_1F_1(a;b-1;z) == 0$$

07.20.17.0012.01

$$a\,b\,(b+z-1)\,{}_1F_1(a+1;b;z) + (1-b)\,b\,(a+z)\,{}_1F_1(a;b-1;z) + (a-b)\,(a-b+1)\,z\,{}_1F_1(a;b+1;z) == 0$$

Relations of special kind

07.20.17.0013.01

$${}_1F_1(a;b;z) == e^z\,{}_1F_1(b-a;b;-z)$$

07.20.17.0014.01

$${}_1F_1(-a;1-a;z) + {}_1F_1(a;a+1;z) == 2\,{}_2F_2(a,-a;a+1,1-a;z)$$

Division on even and odd parts and generalization

07.20.17.0015.01

$$ {}_1F_1(a;b;z)=A^+(z)+A^-(z)\;/;\;A^+(z)=\frac{1}{2}\left({}_1F_1(a;b;z)+{}_1F_1(a;b;-z)\right)\bigwedge A^-(z)=\frac{1}{2}\left({}_1F_1(a;b;z)-{}_1F_1(a;b;-z)\right) $$

07.20.17.0016.01

$$ {}_1F_1(a;b;z)=A^+(z)+A^-(z)\;/;\;A^+(z)={}_2F_3\left(\frac{a}{2},\frac{a+1}{2};\frac{1}{2},\frac{b}{2},\frac{b+1}{2};\frac{z^2}{4}\right)\bigwedge A^-(z)=\frac{a\,z}{b}\,{}_2F_3\left(\frac{a+1}{2},\frac{a+2}{2};\frac{3}{2},\frac{b+1}{2},\frac{b+2}{2};\frac{z^2}{4}\right) $$

07.20.17.0017.01

$$ {}_1F_1(a;b;z)=\sum_{k=0}^{n-1}\frac{(a)_k\,z^k}{k!\,(b)_k}\,{}_{n+1}F_{2n}\left(1,\frac{a+k}{n},\ldots,\frac{a+k+n-1}{n};\frac{k+1}{n},\ldots,\frac{k+n}{n},\frac{b+k}{n},\ldots,\frac{b+k+n-1}{n};n^{-n}z^n\right) $$

Differentiation

Low-order differentiation

With respect to *a*

07.20.20.0001.01

$$ {}_1F_1^{(1,0,0)}(a;b;z)=\sum_{k=0}^{\infty}\frac{(a)_k\,\psi(a+k)\,z^k}{k!\,(b)_k}-\psi(a)\,{}_1F_1(a;b;z) $$

07.20.20.0002.01

$$ {}_1F_1^{(1,0,0)}(a;b;z)=\frac{z}{b}\,F_{2\times0\times1}^{1\times1\times2}\left(\begin{matrix}a+1;1;1,a;\\2,b+1;;a+1;\end{matrix}\,z,z\right) $$

With respect to *b*

07.20.20.0003.01

$$ {}_1F_1^{(0,1,0)}(a;b;z)=\psi(b)\,{}_1F_1(a;b;z)-\sum_{k=0}^{\infty}\frac{(a)_k\,\psi(b+k)\,z^k}{k!\,(b)_k} $$

07.20.20.0004.01

$$ {}_1F_1^{(0,1,0)}(a;b;z)=-\frac{a\,z}{b^2}\,F_{2\times0\times1}^{1\times1\times2}\left(\begin{matrix}a+1;1;1,b;\\2,b+1;;b+1;\end{matrix}\,z,z\right) $$

07.20.20.0005.01

$$ {}_1F_1^{(0,1,0)}(1;b;z)=-\frac{z\,e^z}{b^2}\,{}_2F_2(b,b;b+1,b+1;-z) $$

With respect to element of parameters ||| With respect to element of parameters

07.20.20.0006.01

$$ \frac{\partial\,{}_1F_1(a;a+1;z)}{\partial a}=\frac{z}{(a+1)^2}\,{}_2F_2(a+1,a+1;a+2,a+2;z) $$

07.20.20.0007.01

$$ \frac{\partial\,{}_1F_1(a+1;a;z)}{\partial a}=-\frac{z\,e^z}{a^2} $$

With respect to *z*

07.20.20.0008.01

$$\frac{\partial\, {}_1F_1(a; b; z)}{\partial z} = \frac{a}{b}\, {}_1F_1(a+1; b+1; z)$$

07.20.20.0009.01

$$\frac{\partial^2\, {}_1F_1(a; b; z)}{\partial z^2} = \frac{a\,(a+1)}{b\,(b+1)}\, {}_1F_1(a+2; b+2; z)$$

Symbolic differentiation

With respect to *a*

07.20.20.0010.02

$${}_1F_1^{(n,0,0)}(a; b; z) = \sum_{k=0}^{\infty} \frac{1}{k!\,(b)_k} \frac{\partial^n (a)_k}{\partial a^n} z^k \;/;\; n \in \mathbb{N}$$

With respect to *b*

07.20.20.0011.02

$${}_1F_1^{(0,n,0)}(a; b; z) = \sum_{k=0}^{\infty} \frac{(a)_k}{k!} \frac{\partial^n \frac{1}{(b)_k}}{\partial b^n} z^k \;/;\; n \in \mathbb{N}$$

With respect to *z*

07.20.20.0012.02

$$\frac{\partial^n\, {}_1F_1(a; b; z)}{\partial z^n} = \frac{(a)_n}{(b)_n}\, {}_1F_1(a+n; b+n; z) \;/;\; n \in \mathbb{N}$$

07.20.20.0013.02

$$\frac{\partial^n\, {}_1F_1(a; b; z)}{\partial z^n} = z^{-n}\, \Gamma(b)\, {}_2\tilde{F}_2(1, a; 1-n, b; z) \;/;\; n \in \mathbb{N}$$

07.20.20.0040.01

$$\frac{\partial^n\, {}_1F_1(a; b; z)}{\partial z^n} = z^{-n}\, (-1)^{n-1}\, (b-1)_n \left(\sum_{k=0}^{n-1} \frac{(-k+n-1)!\,(-z)^k\,(a)_k}{k!\,(-2\,k+n-1)!\,(-b-n+2)_k\,(b)_k}\, {}_1F_1(a+k; b-1; z) - \sum_{k=0}^{n} \frac{(n-k)!\,(-z)^k\,(a)_k}{k!\,(n-2\,k)!\,(-b-n+2)_k\,(b-1)_k}\, {}_1F_1(a+k; b; z) \right) /;\; n \in \mathbb{N}$$

07.20.20.0014.02

$$\frac{\partial^n \left(z^\alpha\, {}_1F_1(a; b; z)\right)}{\partial z^n} = (-1)^n\, (-\alpha)_n\, z^{\alpha-n}\, {}_2F_2(\alpha+1, a; 1-n+\alpha, b; z) \;/;\; n \in \mathbb{N}$$

07.20.20.0015.02

$$\frac{\partial^n \left(z^{a+n-1}\, {}_1F_1(a; b; z)\right)}{\partial z^n} = (a)_n\, z^{a-1}\, {}_1F_1(a+n; b; z) \;/;\; n \in \mathbb{N}$$

07.20.20.0016.02

$$\frac{\partial^n \left(z^{b-1}\, {}_1F_1(a; b; z)\right)}{\partial z^n} = (-1)^n\, (1-b)_n\, z^{b-n-1}\, {}_1F_1(a; b-n; z) \;/;\; n \in \mathbb{N}$$

07.20.20.0017.02

$$\frac{\partial^n\left(z^n\,{}_1F_1\left(-n;\,\frac{1}{2};\,z\right)\right)}{\partial z^n} = n!\,{}_2F_2\left(-n,\,n+1;\,\frac{1}{2},\,1;\,z\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0018.02

$$\frac{\partial^n\left(z^\alpha\,{}_1F_1(-n;\,b;\,z)\right)}{\partial z^n} = (-1)^n\,(-\alpha)_n\,z^{\alpha-n}\,{}_2F_2(-n,\,\alpha+1;\,1-n+\alpha,\,b;\,z)\,/;\,n\in\mathbb{N}$$

07.20.20.0019.02

$$\frac{\partial^n\left(z^\alpha\,{}_1F_1(-n;\,b;\,z^m)\right)}{\partial z^n} = (-1)^n\,(-\alpha)_n\,z^{\alpha-n}\,{}_{p+m}F_{q+m}\left(-n,\,\frac{\alpha+1}{m},\,\frac{\alpha+2}{m},\,\ldots,\,\frac{\alpha+m}{m};\,\frac{\alpha-n+1}{m},\,\frac{\alpha-n+2}{m},\,\ldots,\,\frac{\alpha-n+m}{m},\,b;\,z^m\right)\,/;\,m\in\mathbb{N}^+\bigwedge n\in\mathbb{N}$$

07.20.20.0020.02

$$\frac{\partial^n\left(e^{-z}\,{}_1F_1(-n;\,b;\,z)\right)}{\partial z^n} = (-1)^n\,e^{-z}\sum_{k=0}^{n}\frac{(-n)_k\,z^k}{k!\,(b)_k}\,{}_2F_1(-n,\,k-n;\,b+k;\,z)\,/;\,n\in\mathbb{N}$$

07.20.20.0021.02

$$\frac{\partial^n\left(e^{-z}\,{}_1F_1(a;\,b;\,z)\right)}{\partial z^n} = \frac{(-1)^n\,(b-a)_n}{(b)_n}\,e^{-z}\,{}_1F_1(a;\,b+n;\,z)\,/;\,n\in\mathbb{N}$$

07.20.20.0022.02

$$\frac{\partial^n\left(z^{b-1}\,e^{-z}\,{}_1F_1(a;\,b;\,z)\right)}{\partial z^n} = (-1)^n\,(1-b)_n\,e^{-z}\,z^{b-n-1}\,{}_1F_1(a-n;\,b-n;\,z)\,/;\,n\in\mathbb{N}$$

07.20.20.0023.02

$$\frac{\partial^n\left(z^{b-a+n-1}\,e^{-z}\,{}_1F_1(a;\,b;\,z)\right)}{\partial z^n} = (b-a)_n\,e^{-z}\,z^{b-a-1}\,{}_1F_1(a-n;\,b;\,z)\,/;\,n\in\mathbb{N}$$

07.20.20.0024.02

$$\frac{\partial^n\left(z^{-a}\,{}_1F_1\left(a;\,b;\,\frac{1}{z}\right)\right)}{\partial z^n} = (-1)^n\,(a)_n\,z^{-a-n}\,{}_1F_1\left(a+n;\,b;\,\frac{1}{z}\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0025.02

$$\frac{\partial^n\left(z^{a-b}\,e^{-\frac{1}{z}}\,{}_1F_1\left(a;\,b;\,\frac{1}{z}\right)\right)}{\partial z^n} = (-1)^n\,(b-a)_n\,z^{a-b-n}\,e^{-\frac{1}{z}}\,{}_1F_1\left(a-n;\,b;\,\frac{1}{z}\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0026.02

$$\frac{\partial^n\,{}_1F_1\left(\frac{1}{2}-\left\lfloor\frac{n}{2}\right\rfloor;\,b;\,z^2\right)}{\partial z^n} = \frac{(-1)^{\left\lfloor\frac{n}{2}\right\rfloor}\,2^{2\left\lfloor\frac{n}{2}\right\rfloor}}{(b)_{n-\left\lfloor\frac{n}{2}\right\rfloor}}\left(\frac{1}{2}\right)_{\left\lfloor\frac{n}{2}\right\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor+\frac{1}{2}\right)_{\left\lfloor\frac{n}{2}\right\rfloor}z^{n-2\left\lfloor\frac{n}{2}\right\rfloor}\,{}_1F_1\left(n-\left\lfloor\frac{n}{2}\right\rfloor+\frac{1}{2};\,b+n-\left\lfloor\frac{n}{2}\right\rfloor;\,z^2\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0027.02

$$\frac{\partial^n\left(z\,{}_1F_1\left(-n+\left\lfloor\frac{n}{2}\right\rfloor+\frac{3}{2};\,b;\,z^2\right)\right)}{\partial z^n} = \frac{(-1)^{\left\lfloor\frac{n}{2}\right\rfloor}\,2^{2\left\lfloor\frac{n}{2}\right\rfloor}}{(b)_{\left\lfloor\frac{n}{2}\right\rfloor}}\left(\frac{3}{2}\right)_{\left\lfloor\frac{n}{2}\right\rfloor}\left(n-2\left\lfloor\frac{n}{2}\right\rfloor-\frac{1}{2}\right)_{\left\lfloor\frac{n}{2}\right\rfloor}z^{1-n+2\left\lfloor\frac{n}{2}\right\rfloor}\,{}_1F_1\left(\left\lfloor\frac{n}{2}\right\rfloor+\frac{3}{2};\,b+\left\lfloor\frac{n}{2}\right\rfloor;\,z^2\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0028.02

$$\frac{\partial^n\left(z^{2b-1}\,{}_1F_1\left(b-n+\left\lfloor\frac{n}{2}\right\rfloor+\frac{1}{2};\,b;\,z^2\right)\right)}{\partial z^n} = (-1)^{n-2\left\lfloor\frac{n}{2}\right\rfloor}\,(1-2b)_n\,z^{2b-n-1}\,{}_1F_1\left(b+\frac{1}{2};\,b-\left\lfloor\frac{n}{2}\right\rfloor;\,z^2\right)\,/;\,n\in\mathbb{N}$$

07.20.20.0029.02

$$\frac{\partial^n \left(z^{2b-2}\, {}_1F_1\left(b - \left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}; b; z^2\right)\right)}{\partial z^n} = (-1)^{n-2\left\lfloor \frac{n}{2} \right\rfloor} (2-2b)_n\, z^{2b-n-2}\, {}_1F_1\left(b - \frac{1}{2}; b - n + \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0030.02

$$\frac{\partial^n \left(z^{2b-2}\, {}_1F_1\left(b - \left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}; b; z^2\right)\right)}{\partial z^n} = (-1)^{n-2\left\lfloor \frac{n}{2} \right\rfloor} (2-2b)_n\, z^{2b-n-2}\, {}_1F_1\left(b - \frac{1}{2}; b - n + \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0031.02

$$\frac{\partial^n\, {}_1F_1\left(a; \frac{1}{2}; z^2\right)}{\partial z^n} = 2^{2n-2\left\lfloor \frac{n}{2} \right\rfloor} (a)_{n-\left\lfloor \frac{n}{2} \right\rfloor}\, z^{n-2\left\lfloor \frac{n}{2} \right\rfloor}\, {}_1F_1\left(a + n - \left\lfloor \frac{n}{2} \right\rfloor; n - 2\left\lfloor \frac{n}{2} \right\rfloor + \frac{1}{2}; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0032.02

$$\frac{\partial^n \left(z\, {}_1F_1\left(a; \frac{3}{2}; z^2\right)\right)}{\partial z^n} = 2^{2\left\lfloor \frac{n}{2} \right\rfloor} (a)_{\left\lfloor \frac{n}{2} \right\rfloor}\, z^{2\left\lfloor \frac{n}{2} \right\rfloor - n + 1}\, {}_1F_1\left(a + \left\lfloor \frac{n}{2} \right\rfloor; 2\left\lfloor \frac{n}{2} \right\rfloor - n + \frac{3}{2}; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0033.02

$$\frac{\partial^n \left(e^{-z^2}\, {}_1F_1\left(b + \left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}; b; z^2\right)\right)}{\partial z^n} = \frac{(-1)^{n-2\left\lfloor \frac{n}{2} \right\rfloor}\, 2^{2\left\lfloor \frac{n}{2} \right\rfloor}}{(b)_{n-\left\lfloor \frac{n}{2} \right\rfloor}} \left(\frac{1}{2}\right)_{\left\lfloor \frac{n}{2} \right\rfloor} \left(n - 2\left\lfloor \frac{n}{2} \right\rfloor + \frac{1}{2}\right)_{\left\lfloor \frac{n}{2} \right\rfloor} z^{n-2\left\lfloor \frac{n}{2} \right\rfloor}\, e^{-z^2}\, {}_1F_1\left(b - \frac{1}{2}; b + n - \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0034.02

$$\frac{\partial^n \left(z\, e^{-z^2}\, {}_1F_1\left(b + n - \left\lfloor \frac{n}{2} \right\rfloor - \frac{3}{2}; b; z^2\right)\right)}{\partial z^n} = \frac{2^{2\left\lfloor \frac{n}{2} \right\rfloor}}{(b)_{\left\lfloor \frac{n}{2} \right\rfloor}} \left(\frac{3}{2}\right)_{\left\lfloor \frac{n}{2} \right\rfloor} \left(n - 2\left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}\right)_{\left\lfloor \frac{n}{2} \right\rfloor} z^{1-n+2\left\lfloor \frac{n}{2} \right\rfloor}\, e^{-z^2}\, {}_1F_1\left(b - \frac{3}{2}; b + \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0035.02

$$\frac{\partial^n \left(z^{2b-1}\, e^{-z^2}\, {}_1F_1\left(n - \left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}; b; z^2\right)\right)}{\partial z^n} = (-1)^{n-2\left\lfloor \frac{n}{2} \right\rfloor} (1-2b)_n\, z^{2b-n-1}\, e^{-z^2}\, {}_1F_1\left(-\left\lfloor \frac{n}{2} \right\rfloor - \frac{1}{2}; b - \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0036.02

$$\frac{\partial^n \left(z^{2b-2}\, e^{-z^2}\, {}_1F_1\left(\left\lfloor \frac{n}{2} \right\rfloor + \frac{1}{2}; b; z^2\right)\right)}{\partial z^n} = (-1)^{n-2\left\lfloor \frac{n}{2} \right\rfloor} (2-2b)_n\, z^{2b-n-2}\, e^{-z^2}\, {}_1F_1\left(\left\lfloor \frac{n}{2} \right\rfloor - n + \frac{1}{2}; b - n + \left\lfloor \frac{n}{2} \right\rfloor; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0037.02

$$\frac{\partial^n \left(e^{-z^2}\, {}_1F_1\left(a; \frac{1}{2}; z^2\right)\right)}{\partial z^n} = (-4)^{n-\left\lfloor \frac{n}{2} \right\rfloor} \left(\frac{1}{2} - a\right)_{n-\left\lfloor \frac{n}{2} \right\rfloor} z^{n-2\left\lfloor \frac{n}{2} \right\rfloor}\, e^{-z^2}\, {}_1F_1\left(a - \left\lfloor \frac{n}{2} \right\rfloor; n - 2\left\lfloor \frac{n}{2} \right\rfloor + \frac{1}{2}; z^2\right) /; n \in \mathbb{N}$$

07.20.20.0038.02

$$\frac{\partial^n \left(z\, e^{-z^2}\, {}_1F_1\left(a; \frac{3}{2}; z^2\right)\right)}{\partial z^n} = (-4)^{\left\lfloor \frac{n}{2} \right\rfloor} \left(\frac{3}{2} - a\right)_{\left\lfloor \frac{n}{2} \right\rfloor} z^{1-n+2\left\lfloor \frac{n}{2} \right\rfloor}\, e^{-z^2}\, {}_1F_1\left(a - n + \left\lfloor \frac{n}{2} \right\rfloor; 2\left\lfloor \frac{n}{2} \right\rfloor - n + \frac{3}{2}; z^2\right) /; n \in \mathbb{N}$$

Fractional integro-differentiation

With respect to *z*

07.20.20.0039.01

$$\frac{\partial^\alpha\, {}_1F_1(a; b; z)}{\partial z^\alpha} = z^{-\alpha}\, \Gamma(b)\, {}_2\tilde{F}_2(1, a; 1-\alpha, b; z)$$

Integration

Indefinite integration

Involving only one direct function

07.20.21.0001.01

$$\int {}_1F_1(a; b; z)\, dz = \frac{b-1}{a-1}\, {}_1F_1(a-1; b-1; z)$$

Involving one direct function and elementary functions

Involving power function

07.20.21.0002.01

$$\int z^{\alpha-1}\, {}_1F_1(a; b; c\, z)\, dz = \frac{z^{\alpha}\, {}_2F_2(a, \alpha; b, \alpha+1; c\, z)}{\alpha}$$

07.20.21.0003.01

$$\int z^{\alpha-1}\, {}_1F_1(a; b; z)\, dz = \frac{z^{\alpha}}{\alpha}\, {}_2F_2(a, \alpha; b, \alpha+1; z)$$

07.20.21.0004.01

$$\int z^{a-2}\, {}_1F_1(a; b; z)\, dz = \frac{z^{a-1}\, {}_1F_1(a-1; b; z)}{a-1}$$

07.20.21.0005.01

$$\int z^{b-1}\, {}_1F_1(a; b; z)\, dz = z^b\, \Gamma(b)\, {}_1\tilde{F}_1(a; b+1; z)$$

Involving exponential function

07.20.21.0006.01

$$\int e^{-z}\, {}_1F_1(a; b; z)\, dz = \frac{\Gamma(b)\left(\Gamma(b-1)\, {}_1\tilde{F}_1(-a+b-1; b-1; -z)-1\right)}{(a-b+1)\, \Gamma(b-1)}$$

Involving exponential function and a power function

07.20.21.0007.01

$$\int z^{\alpha-1}\, e^{-c\, z}\, {}_1F_1(a; b; c\, z)\, dz = \frac{z^{\alpha}\, {}_2F_2(b-a, \alpha; b, \alpha+1; -c\, z)}{\alpha}$$

07.20.21.0008.01

$$\int z^{\alpha-1}\, e^{-z}\, {}_1F_1(a; b; z)\, dz = \frac{z^{\alpha}\, {}_2F_2(b-a, \alpha; b, \alpha+1; -z)}{\alpha}$$

07.20.21.0009.01

$$\int z^{b-1}\, e^{-z}\, {}_1F_1(a; b; z)\, dz = z^b\, \Gamma(b)\, {}_1\tilde{F}_1(b-a; b+1; -z)$$

07.20.21.0010.01

$$\int z^{b-a-2}\, e^{-z}\, {}_1F_1(a; b; z)\, dz = \frac{z^{-a+b-1}\,\Gamma(b)\,\Gamma(-a+b-1)\, {}_1\tilde{F}_1(-a+b-1; b; -z)}{\Gamma(b-a)}$$

Definite integration

For the direct function itself

07.20.21.0011.01

$$\int_0^\infty t^{\alpha-1}\, {}_1F_1(a; b; -t)\, dt = \frac{\Gamma(b)\,\Gamma(a-\alpha)\,\Gamma(\alpha)}{\Gamma(a)\,\Gamma(b-\alpha)} \;/;\; 0 < \operatorname{Re}(\alpha) < \operatorname{Re}(a)$$

Involving the direct function

07.20.21.0012.01

$$\int_0^\infty t^{\alpha-1}\, e^{-c\,t}\, {}_1F_1(a; b; -t)\, dt = c^{-\alpha}\,\Gamma(\alpha)\, {}_2F_1\left(a, \alpha; b; -\frac{1}{c}\right) \;/;\; \operatorname{Re}(\alpha) > 0 \land \operatorname{Re}(c) > 0$$

Integral transforms

Laplace transforms

07.20.22.0001.01

$$\mathcal{L}_t[{}_1F_1(a; b; -t)](z) = \frac{1}{z}\, {}_2F_1\left(1, a; b; -\frac{1}{z}\right) \;/;\; \operatorname{Re}(z) > 0$$

Operations

Limit operation

07.20.25.0001.01

$$\lim_{b\to -n} \frac{{}_1F_1(a; b; z)}{\Gamma(b)} = \frac{(a)_{n+1}}{(n+1)!}\, z^{n+1}\, {}_1F_1(a+n+1; n+2; z) \;/;\; n \in \mathbb{N}$$

07.20.25.0002.01

$$\lim_{z\to\infty} z^a\, {}_1F_1(a; a+1; -z) = \Gamma(a+1)$$

07.20.25.0003.01

$$\lim_{a\to\infty} {}_1F_1\left(a; b; \frac{z}{a}\right) = z^{\frac{1-b}{2}}\,\Gamma(b)\, I_{b-1}\left(2\sqrt{z}\right)$$

Representations through more general functions

Through hypergeometric functions

Involving ${}_pF_q$

07.20.26.0001.01

$${}_1F_1(a; b; z) = {}_pF_q(a_1, \ldots, a_p; b_1, \ldots, b_q; z) \;/;\; p = 1 \bigwedge q = 1 \bigwedge a_1 = a \bigwedge b_1 = b$$

07.20.26.0002.01

$${}_1F_1(a; b; z) = {}_2F_2(a, a_2; b, a_2; z)$$

07.20.26.0003.01

$${}_1F_1(a;\, b;\, z)\, {}_1F_1(a;\, b;\, -z) = {}_2F_3\!\left(a,\, b-a;\, \frac{b+1}{2},\, \frac{b}{2},\, b;\, \frac{z^2}{4}\right)$$

Involving ${}_1\tilde{F}_1$

07.20.26.0004.01

$${}_1F_1(a;\, b;\, z) = \Gamma(b)\, {}_1\tilde{F}_1(a;\, b;\, z)$$

Through Meijer *G*

Classical cases for the direct function itself

07.20.26.0005.01

$${}_1F_1(a;\, b;\, z) = \frac{\pi\, \Gamma(b)}{\Gamma(a)}\, G_{2,3}^{1,1}\!\left(z \,\middle|\, \begin{matrix} 1-a,\, \frac{1}{2} \\ 0,\, 1-b,\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0006.01

$${}_1F_1(a;\, b;\, z) = \frac{\Gamma(b)}{\Gamma(a)}\, G_{1,2}^{1,1}\!\left(-z \,\middle|\, \begin{matrix} 1-a \\ 0,\, 1-b \end{matrix}\right)$$

07.20.26.0007.01

$${}_1F_1(a;\, b;\, z) = 1 - \frac{\pi\, \Gamma(b)}{\Gamma(a)}\, G_{3,4}^{1,2}\!\left(z \,\middle|\, \begin{matrix} 1,\, 1-a,\, \frac{1}{2} \\ 1,\, 0,\, 1-b,\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0008.01

$${}_1F_1(a;\, b;\, z) = 1 - \frac{\Gamma(b)}{\Gamma(a)}\, G_{2,3}^{1,2}\!\left(-z \,\middle|\, \begin{matrix} 1,\, 1-a \\ 1,\, 0,\, 1-b \end{matrix}\right)$$

07.20.26.0009.01

$$b\, {}_1F_1(a;\, a+1;\, z) - a\, {}_1F_1(b;\, b+1;\, z) = a\, b\, (b-a)\, G_{2,3}^{1,2}\!\left(-z \,\middle|\, \begin{matrix} 1-a,\, 1-b \\ 0,\, -a,\, -b \end{matrix}\right)$$

07.20.26.0010.01

$$b\, {}_1F_1(a;\, a+1;\, z) - a\, {}_1F_1(b;\, b+1;\, z) = \pi\, a\, b\, (b-a)\, G_{3,4}^{1,2}\!\left(z \,\middle|\, \begin{matrix} 1-a,\, 1-b,\, \frac{1}{2} \\ 0,\, -a,\, -b,\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0011.01

$${}_1F_1(a;\, b;\, z) + {}_1F_1(a;\, b;\, -z) = \frac{2^{a-b+1}\sqrt{\pi}\, \Gamma(b)}{\Gamma(a)}\, G_{2,4}^{1,2}\!\left(-\frac{z^2}{4} \,\middle|\, \begin{matrix} \frac{1-a}{2},\, 1-\frac{a}{2} \\ 0,\, \frac{1}{2},\, \frac{1-b}{2},\, 1-\frac{b}{2} \end{matrix}\right)$$

07.20.26.0012.01

$${}_1F_1(a;\, b;\, -z) + {}_1F_1(a;\, b;\, z) = \frac{2^{a-b+1}\pi^{3/2}\, \Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z^2}{4} \,\middle|\, \begin{matrix} \frac{1-a}{2},\, 1-\frac{a}{2},\, \frac{1}{2} \\ 0,\, \frac{1}{2},\, \frac{1-b}{2},\, 1-\frac{b}{2},\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0013.01

$${}_1F_1(a;\, b;\, z) - {}_1F_1(a;\, b;\, -z) = \frac{2^{a-b}\sqrt{\pi}\, z\, \Gamma(b)}{\Gamma(a)}\, G_{2,4}^{1,2}\!\left(-\frac{z^2}{4} \,\middle|\, \begin{matrix} -\frac{a}{2},\, \frac{1-a}{2} \\ 0,\, -\frac{1}{2},\, -\frac{b}{2},\, \frac{1-b}{2} \end{matrix}\right)$$

07.20.26.0014.01

$$ {}_1F_1(a;b;z) - {}_1F_1(a;b;-z) = \frac{2^{a-b}\pi^{3/2}\,z\,\Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\, \begin{matrix} -\frac{a}{2}, \frac{1-a}{2}, \frac{1}{2} \\ 0, -\frac{1}{2}, \frac{1}{2}, -\frac{b}{2}, \frac{1-b}{2} \end{matrix}\right) $$

07.20.26.0035.01

$$ {}_1F_1\left(a;b;-\sqrt{z}\right) + {}_1F_1\left(a;b;\sqrt{z}\right) = \frac{2^{a-b+1}\pi^{3/2}\,\Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{4}\,\middle|\, \begin{matrix} \frac{1-a}{2}, 1-\frac{a}{2}, \frac{1}{2} \\ 0, \frac{1}{2}, \frac{1-b}{2}, 1-\frac{b}{2}, \frac{1}{2} \end{matrix}\right) $$

07.20.26.0036.01

$$ {}_1F_1\left(a;b;\sqrt{z}\right) - {}_1F_1\left(a;b;-\sqrt{z}\right) = \frac{2^{a-b+1}\pi^{3/2}\,\Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{4}\,\middle|\, \begin{matrix} \frac{1-a}{2}, \frac{2-a}{2}, 1 \\ \frac{1}{2}, 0, 1, \frac{1-b}{2}, \frac{2-b}{2} \end{matrix}\right) $$

Classical cases involving exp

07.20.26.0015.01

$$ e^{-z}\,{}_1F_1(a;b;z) = \frac{\Gamma(b)}{\Gamma(b-a)}\, G_{1,2}^{1,1}\!\left(z\,\middle|\, \begin{matrix} a-b+1 \\ 0, 1-b \end{matrix}\right) $$

Classical cases involving exp and cosh

07.20.26.0040.01

$$ e^{-\frac{z}{2}}\cosh\left(\frac{z}{2}\right){}_1F_1(a;b;z) = \frac{\pi\,\Gamma(b)}{2\,\Gamma(a)}\, G_{2,3}^{1,1}\!\left(z\,\middle|\, \begin{matrix} 1-a, \frac{1}{2} \\ 0, 1-b, \frac{1}{2} \end{matrix}\right) + \frac{\Gamma(b)}{2\,\Gamma(b-a)}\, G_{1,2}^{1,1}\!\left(z\,\middle|\, \begin{matrix} a-b+1 \\ 0, 1-b \end{matrix}\right) $$

Classical cases involving exp and sinh

07.20.26.0041.01

$$ e^{-\frac{z}{2}}\sinh\left(\frac{z}{2}\right){}_1F_1(a;b;z) = \frac{\pi\,\Gamma(b)}{2\,\Gamma(a)}\, G_{2,3}^{1,1}\!\left(z\,\middle|\, \begin{matrix} 1-a, \frac{1}{2} \\ 0, 1-b, \frac{1}{2} \end{matrix}\right) - \frac{\Gamma(b)}{2\,\Gamma(b-a)}\, G_{1,2}^{1,1}\!\left(z\,\middle|\, \begin{matrix} a-b+1 \\ 0, 1-b \end{matrix}\right) $$

Classical cases for products of ${}_1F_1$

07.20.26.0016.01

$$ {}_1F_1(a;b;z)\,{}_1F_1(a;b;-z) = \frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\, \begin{matrix} 1-a, a-b+1 \\ 0, \frac{1-b}{2}, 1-\frac{b}{2}, 1-b \end{matrix}\right) $$

07.20.26.0017.01

$$ {}_1F_1(a;b;z)\,{}_1F_1(a;b;-z) = \frac{2^{1-b}\pi^{3/2}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\, \begin{matrix} 1-a, a-b+1, \frac{1}{2} \\ 0, \frac{1-b}{2}, 1-\frac{b}{2}, 1-b, \frac{1}{2} \end{matrix}\right) $$

07.20.26.0018.01

$$ {}_1F_1(a;2a;z)\,{}_1F_1(c;2c;-z) = \frac{2^{a+c-1}}{\sqrt{\pi}}\,\Gamma\left(a+\frac{1}{2}\right)\Gamma\left(c+\frac{1}{2}\right) G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\, \begin{matrix} 1-\frac{a+c}{2}, \frac{1-a-c}{2} \\ 0, -a-c+1, \frac{1}{2}-c, \frac{1}{2}-a \end{matrix}\right) $$

07.20.26.0019.01

$$ {}_1F_1(a;2a;z)\,{}_1F_1(c;2c;-z) = 2^{a+c-1}\sqrt{\pi}\,\Gamma\left(a+\frac{1}{2}\right)\Gamma\left(c+\frac{1}{2}\right) G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\, \begin{matrix} 1-\frac{a+c}{2}, \frac{1-a-c}{2}, \frac{1}{2} \\ 0, 1-a-c, \frac{1}{2}-c, \frac{1}{2}-a, \frac{1}{2} \end{matrix}\right) $$

Classical cases involving exp and products of ${}_1F_1$

07.20.26.0020.01

$$e^{-z}\,{}_1F_1(a;b;z)\,{}_1F_1(b-a;b;z)=\frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\,G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

07.20.26.0021.01

$$e^{-z}\,{}_1F_1(a;b;z)\,{}_1F_1(b-a;b;z)=\frac{2^{1-b}\pi^{3/2}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\,G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1,\,\frac{1}{2}\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b,\,\frac{1}{2}\end{matrix}\right)$$

07.20.26.0022.01

$$e^{-z}\,{}_1F_1(a;2a;z)\,{}_1F_1(c;2c;z)=\frac{2^{a+c-1}}{\sqrt{\pi}}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right)G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1-a-c}{2}\\0,\,1-a-c,\,\frac{1}{2}-c,\,\frac{1}{2}-a\end{matrix}\right)$$

07.20.26.0023.01

$$e^{-z}\,{}_1F_1(a;2a;z)\,{}_1F_1(c;2c;z)=2^{a+c-1}\sqrt{\pi}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right)G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1-a-c}{2},\,\frac{1}{2}\\0,\,1-a-c,\,\frac{1}{2}-c,\,\frac{1}{2}-a,\,\frac{1}{2}\end{matrix}\right)$$

Classical cases involving ${}_1\tilde{F}_1$

07.20.26.0024.01

$${}_1F_1(a;b;z)\,{}_1\tilde{F}_1(a;b;-z)=\frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

07.20.26.0025.01

$${}_1F_1(a;b;z)\,{}_1\tilde{F}_1(a;b;-z)=\frac{2^{1-b}\pi^{3/2}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1,\,\frac{1}{2}\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b,\,\frac{1}{2}\end{matrix}\right)$$

07.20.26.0026.01

$${}_1F_1(a;2a;z)\,{}_1\tilde{F}_1(c;2c;-z)=\frac{2^{a-c}\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1-a-c}{2}\\0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a\end{matrix}\right)$$

07.20.26.0027.01

$${}_1F_1(a;2a;z)\,{}_1\tilde{F}_1(c;2c;-z)=\frac{2^{a-c}\pi\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1-a-c}{2},\,\frac{1}{2}\\0,\,1-a-c,\,\frac{1}{2}-c,\,\frac{1}{2}-a,\,\frac{1}{2}\end{matrix}\right)$$

Classical cases involving exp and ${}_1\tilde{F}_1$

07.20.26.0028.01

$$e^{-z}\,{}_1F_1(a;b;z)\,{}_1\tilde{F}_1(b-a;b;z)=\frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

07.20.26.0029.01

$$e^{-z}\,{}_1F_1(a;b;z)\,{}_1\tilde{F}_1(b-a;b;z)=\frac{2^{1-b}\pi^{3/2}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{3,5}^{1,2}\!\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\,a-b+1,\,\frac{1}{2}\\0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b,\,\frac{1}{2}\end{matrix}\right)$$

07.20.26.0030.01

$$e^{-z}\,{}_1F_1(a;2a;z)\,{}_1\tilde{F}_1(c;2c;z)=\frac{2^{a-c}\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{2,4}^{1,2}\!\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1-a-c}{2}\\0,\,1-a-c,\,\frac{1}{2}-c,\,\frac{1}{2}-a\end{matrix}\right)$$

07.20.26.0031.01

$$e^{-z}\,{}_1F_1(a;2a;z)\,{}_1\tilde{F}_1(c;2c;z) = \frac{2^{a-c}\,\pi\,\Gamma\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{3,5}^{1,2}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\ \frac{1-a-c}{2},\ \frac{1}{2}\\ 0,\ 1-a-c,\ \frac{1}{2}-c,\ \frac{1}{2}-a,\ \frac{1}{2}\end{matrix}\right)$$

Classical cases involving hypergeometric U

07.20.26.0037.01

$${}_1F_1\left(a;b;-\sqrt{z}\right)U\left(a,b,\sqrt{z}\right) = \frac{2^{-b}\,\Gamma(b)}{\sqrt{\pi}\,\Gamma(a)}\,G_{2,4}^{3,1}\left(\frac{z}{4}\,\middle|\,\begin{matrix}1-a,\ a-b+1\\ 0,\ \frac{1-b}{2},\ 1-\frac{b}{2},\ 1-b\end{matrix}\right)$$

07.20.26.0032.01

$${}_1F_1(a;b;z)\,U(a,b,-z) = \frac{2^{-b}\,\Gamma(b)}{\sqrt{\pi}\,\Gamma(a)}\,G_{2,4}^{3,1}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\ a-b+1\\ 0,\ \frac{1-b}{2},\ 1-\frac{b}{2},\ 1-b\end{matrix}\right)\;/;\;\frac{\pi}{2}<\arg(z)\le\pi\bigwedge-\pi<\arg(z)\le-\frac{\pi}{2}$$

Classical cases involving exp and hypergeometric U

07.20.26.0038.01

$$e^{-\sqrt{z}}\,{}_1F_1\left(a;b;\sqrt{z}\right)U\left(b-a,b,\sqrt{z}\right) = \frac{2^{-b}\,\Gamma(b}{\sqrt{\pi}\,\Gamma(b-a)}\,G_{2,4}^{3,1}\left(\frac{z}{4}\,\middle|\,\begin{matrix}a-b+1,\ 1-a\\ \frac{1-b}{2},\ 1-\frac{b}{2},\ 0,\ 1-b\end{matrix}\right)$$

07.20.26.0033.01

$$e^{-z}\,{}_1F_1(a;b;z)\,U(b-a,b,z) = \frac{2^{-b}\,\Gamma(b)}{\sqrt{\pi}\,\Gamma(b-a)}\,G_{2,4}^{3,1}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}a-b+1,\ 1-a\\ \frac{1-b}{2},\ 1-\frac{b}{2},\ 0,\ 1-b\end{matrix}\right)\;/;\;-\frac{\pi}{2}<\arg(z)\le\frac{\pi}{2}$$

Classical cases involving Laguerre L

07.20.26.0042.01

$${}_1F_1(a;1;z)\,L_{-a}(-z) = \frac{\sin(a\,\pi)}{\sqrt{\pi}}\,G_{2,4}^{1,2}\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\ a\\ 0,\ 0,\ 0,\ \frac{1}{2}\end{matrix}\right)$$

07.20.26.0043.01

$${}_1F_1(a;1;z)\,L_{-a}(-z) = \sqrt{\pi}\,\sin(a\,\pi)\,G_{3,5}^{1,2}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\ a,\ \frac{1}{2}\\ 0,\ 0,\ 0,\ \frac{1}{2},\ \frac{1}{2}\end{matrix}\right)$$

07.20.26.0044.01

$${}_1F_1(a;b;z)\,L_{-a}^{b-1}(-z) = \frac{2^{1-b}\,\Gamma(b)\sin(a\,\pi)}{\sqrt{\pi}}\,G_{2,4}^{1,2}\left(-\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\ a-b+1\\ 0,\ \frac{1-b}{2},\ \frac{2-b}{2},\ 1-b\end{matrix}\right)$$

07.20.26.0045.01

$${}_1F_1(a;b;z)\,L_{-a}^{b-1}(-z) = 2^{1-b}\,\sqrt{\pi}\,\Gamma(b)\sin(a\,\pi)\,G_{3,5}^{1,2}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}1-a,\ a-b+1,\ \frac{1}{2}\\ 0,\ \frac{1-b}{2},\ \frac{2-b}{2},\ 1-b,\ \frac{1}{2}\end{matrix}\right)$$

Classical cases involving exp and Laguerre L

07.20.26.0046.01

$$e^{-z}\,{}_1F_1(a;1;z)\,L_{a-1}(z) = \sqrt{\pi}\,\Gamma(b)\sin(a\,\pi)\,G_{3,5}^{1,2}\left(\frac{z^2}{4}\,\middle|\,\begin{matrix}a,\ 1-a,\ \frac{1}{2}\\ 0,\ 0,\ 0,\ \frac{1}{2},\ \frac{1}{2}\end{matrix}\right)$$

07.20.26.0047.01

$$e^{-z}\, {}_1F_1(a;b;z)\, L_{a-b}^{b-1}(z) = -2^{1-b}\sqrt{\pi}\,\Gamma(b)\sin((a-b)\pi)\, G_{3,5}^{1,2}\!\left(\frac{z^2}{4} \,\middle|\, \begin{matrix} a-b+1,\, 1-a,\, \frac{1}{2} \\ 0,\, \frac{1-b}{2},\, 1-\frac{b}{2},\, 1-b,\, \frac{1}{2} \end{matrix}\right)$$

Generalized cases for the direct function itself

07.20.26.0039.01

$${}_1F_1(a;b;-z) + {}_1F_1(a;b;z) = \frac{2^{a-b+1}\pi^{3/2}\Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1-a}{2},\, 1-\frac{a}{2},\, \frac{1}{2} \\ 0,\, \frac{1}{2},\, \frac{1}{2},\, \frac{1-b}{2},\, 1-\frac{b}{2} \end{matrix}\right)$$

07.20.26.0034.01

$${}_1F_1(a;b;z) - {}_1F_1(a;b;-z) = \frac{2^{a-b+1}\pi^{3/2}\,\Gamma(b)}{\Gamma(a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} \frac{1-a}{2},\, 1-\frac{a}{2},\, 1 \\ \frac{1}{2},\, 0,\, 1,\, \frac{1-b}{2},\, 1-\frac{b}{2} \end{matrix}\right)$$

Generalized cases for products of ${}_1F_1$

07.20.26.0048.01

$${}_1F_1(a;b;z)\, {}_1F_1(a;b;-z) = \frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{2,4}^{1,2}\!\left(\frac{i z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-a,\, a-b+1 \\ 0,\, \frac{1-b}{2},\, 1-\frac{b}{2},\, 1-b \end{matrix}\right)$$

07.20.26.0049.01

$${}_1F_1(a;b;z)\, {}_1F_1(a;b;-z) = \frac{2^{1-b}\pi^{3/2}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-a,\, a-b+1,\, \frac{1}{2} \\ 0,\, \frac{1-b}{2},\, 1-\frac{b}{2},\, 1-b,\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0050.01

$${}_1F_1(a;2a;z)\, {}_1F_1(c;2c;-z) = \frac{2^{a+c-1}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right)}{\sqrt{\pi}}\, G_{2,4}^{1,2}\!\left(\frac{i z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-\frac{a+c}{2},\, \frac{1}{2}(-a-c+1) \\ 0,\, -a-c+1,\, \frac{1}{2}-c,\, \frac{1}{2}-a \end{matrix}\right)$$

07.20.26.0051.01

$${}_1F_1(a;2a;z)\, {}_1F_1(c;2c;-z) = 2^{a+c-1}\sqrt{\pi}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right) G_{3,5}^{1,2}\!\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-\frac{a+c}{2},\, \frac{1}{2}(-a-c+1),\, \frac{1}{2} \\ 0,\, -a-c+1,\, \frac{1}{2}-c,\, \frac{1}{2}-a,\, \frac{1}{2} \end{matrix}\right)$$

Generalized cases involving exp and products of ${}_1F_1$

07.20.26.0052.01

$$e^{-z}\, {}_1F_1(a;b;z)\, {}_1F_1(b-a;b;z) = \frac{2^{1-b}\sqrt{\pi}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{2,4}^{1,2}\!\left(\frac{i z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-a,\, a-b+1 \\ 0,\, \frac{1-b}{2},\, 1-\frac{b}{2},\, 1-b \end{matrix}\right)$$

07.20.26.0053.01

$$e^{-z}\, {}_1F_1(a;b;z)\, {}_1F_1(b-a;b;z) = \frac{2^{1-b}\pi^{3/2}\,\Gamma(b)^2}{\Gamma(a)\,\Gamma(b-a)}\, G_{3,5}^{1,2}\!\left(\frac{z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-a,\, a-b+1,\, \frac{1}{2} \\ 0,\, \frac{1-b}{2},\, 1-\frac{b}{2},\, 1-b,\, \frac{1}{2} \end{matrix}\right)$$

07.20.26.0054.01

$$e^{-z}\, {}_1F_1(a;2a;z)\, {}_1F_1(c;2c;z) = \frac{2^{a+c-1}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right)}{\sqrt{\pi}}\, G_{2,4}^{1,2}\!\left(\frac{i z}{2}, \frac{1}{2} \,\middle|\, \begin{matrix} 1-\frac{a+c}{2},\, \frac{1}{2}(-a-c+1) \\ 0,\, -a-c+1,\, \frac{1}{2}-c,\, \frac{1}{2}-a \end{matrix}\right)$$

07.20.26.0055.01

$$e^{-z}\,{}_1F_1(a;\,2\,a;\,z)\,{}_1F_1(c;\,2\,c;\,z) = 2^{a+c-1}\,\sqrt{\pi}\,\Gamma\!\left(a+\frac{1}{2}\right)\Gamma\!\left(c+\frac{1}{2}\right)G_{3,5}^{1,2}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1}{2}(-a-c+1),\,\frac{1}{2}\\ 0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a,\,\frac{1}{2}\end{matrix}\right)$$

Generalized cases involving ${}_1\tilde{F}_1$

07.20.26.0056.01

$${}_1F_1(a;\,b;\,z)\,{}_1\tilde{F}_1(a;\,b;\,-z) = \frac{2^{1-b}\,\sqrt{\pi}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{2,4}^{1,2}\!\left(\frac{i\,z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\ 0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

07.20.26.0057.01

$${}_1F_1(a;\,b;\,z)\,{}_1\tilde{F}_1(a;\,b;\,-z) = \frac{2^{1-b}\,\pi^{3/2}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-a,\,a-b+1,\,\frac{1}{2}\\ 0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b,\,\frac{1}{2}\end{matrix}\right)$$

07.20.26.0058.01

$${}_1F_1(a;\,2\,a;\,z)\,{}_1\tilde{F}_1(c;\,2\,c;\,-z) = \frac{2^{a-c}\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{2,4}^{1,2}\!\left(\frac{i\,z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1}{2}(-a-c+1)\\ 0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a\end{matrix}\right)$$

07.20.26.0059.01

$${}_1F_1(a;\,2\,a;\,z)\,{}_1\tilde{F}_1(c;\,2\,c;\,-z) = \frac{2^{a-c}\,\pi\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1}{2}(-a-c+1),\,\frac{1}{2}\\ 0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a,\,\frac{1}{2}\end{matrix}\right)$$

Generalized cases involving exp and ${}_1\tilde{F}_1$

07.20.26.0060.01

$$e^{-z}\,{}_1F_1(a;\,b;\,z)\,{}_1\tilde{F}_1(b-a;\,b;\,z) = \frac{2^{1-b}\,\sqrt{\pi}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{2,4}^{1,2}\!\left(\frac{i\,z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\ 0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

07.20.26.0061.01

$$e^{-z}\,{}_1F_1(a;\,b;\,z)\,{}_1\tilde{F}_1(b-a;\,b;\,z) = \frac{2^{1-b}\,\pi^{3/2}\,\Gamma(b)}{\Gamma(a)\,\Gamma(b-a)}\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-a,\,a-b+1,\,\frac{1}{2}\\ 0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b,\,\frac{1}{2}\end{matrix}\right)$$

07.20.26.0062.01

$$e^{-z}\,{}_1F_1(a;\,2\,a;\,z)\,{}_1\tilde{F}_1(c;\,2\,c;\,z) = \frac{2^{a-c}\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{2,4}^{1,2}\!\left(\frac{i\,z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1}{2}(-a-c+1)\\ 0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a\end{matrix}\right)$$

07.20.26.0063.01

$$e^{-z}\,{}_1F_1(a;\,2\,a;\,z)\,{}_1\tilde{F}_1(c;\,2\,c;\,z) = \frac{2^{a-c}\,\pi\,\Gamma\!\left(a+\frac{1}{2}\right)}{\Gamma(c)}\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-\frac{a+c}{2},\,\frac{1}{2}(-a-c+1),\,\frac{1}{2}\\ 0,\,-a-c+1,\,\frac{1}{2}-c,\,\frac{1}{2}-a,\,\frac{1}{2}\end{matrix}\right)$$

Generalized cases involving hypergeometric U

07.20.26.0064.01

$${}_1F_1(a;\,b;\,-z)\,U(a,\,b,\,z) = \frac{2^{-b}\,\Gamma(b)}{\sqrt{\pi}\,\Gamma(a)}\,G_{2,4}^{3,1}\!\left(\frac{z}{2},\,\frac{1}{2}\,\middle|\,\begin{matrix}1-a,\,a-b+1\\ 0,\,\frac{1-b}{2},\,1-\frac{b}{2},\,1-b\end{matrix}\right)$$

Generalized cases involving exp and hypergeometric U

07.20.26.0065.01

$$e^{-z}\,{}_1F_1(a;b;z)\,U(b-a,b,z)=\frac{2^{-b}\,\Gamma(b)}{\sqrt{\pi}\,\Gamma(b-a)}\,G_{2,4}^{3,1}\!\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}a-b+1,1-a\\0,\frac{1-b}{2},1-\frac{b}{2},1-b\end{array}\right)$$

Generalized cases involving Laguerre *L*

07.20.26.0066.01

$${}_1F_1(a;1;z)\,L_{-a}(-z)=\frac{\sin(a\pi)}{\sqrt{\pi}}\,G_{2,4}^{1,2}\!\left(-\frac{1}{2}(i\,z),\frac{1}{2}\,\middle|\,\begin{array}{c}1-a,a\\0,0,0,\frac{1}{2}\end{array}\right)$$

07.20.26.0067.01

$${}_1F_1(a;1;z)\,L_{-a}(-z)=\sqrt{\pi}\,\sin(a\pi)\,G_{3,5}^{1,2}\!\left(-\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}1-a,a,\frac{1}{2}\\0,0,0,\frac{1}{2},\frac{1}{2}\end{array}\right)$$

07.20.26.0068.01

$${}_1F_1(a;b;z)\,L_{-a}^{b-1}(-z)=\frac{2^{1-b}\,\Gamma(b)\sin(a\pi)}{\sqrt{\pi}}\,G_{2,4}^{1,2}\!\left(-\frac{1}{2}(i\,z),\frac{1}{2}\,\middle|\,\begin{array}{c}1-a,a-b+1\\0,\frac{1-b}{2},\frac{2-b}{2},1-b\end{array}\right)$$

07.20.26.0069.01

$${}_1F_1(a;b;z)\,L_{-a}^{b-1}(-z)=2^{1-b}\sqrt{\pi}\,\Gamma(b)\sin(a\pi)\,G_{3,5}^{1,2}\!\left(-\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}1-a,a-b+1,\frac{1}{2}\\0,\frac{1-b}{2},\frac{2-b}{2},1-b,\frac{1}{2}\end{array}\right)$$

Generalized cases involving exp and Laguerre *L*

07.20.26.0070.01

$$e^{-z}\,{}_1F_1(a;1;z)\,L_{a-1}(z)=\sqrt{\pi}\,\sin(a\pi)\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}a,1-a,\frac{1}{2}\\0,0,0,\frac{1}{2},\frac{1}{2}\end{array}\right)$$

07.20.26.0071.01

$$e^{-z}\,{}_1F_1(a;b;z)\,L_{a-b}^{b-1}(z)=-2^{1-b}\sqrt{\pi}\,\Gamma(b)\sin((a-b)\pi)\,G_{3,5}^{1,2}\!\left(\frac{z}{2},\frac{1}{2}\,\middle|\,\begin{array}{c}a-b+1,1-a,\frac{1}{2}\\0,\frac{1-b}{2},1-\frac{b}{2},1-b,\frac{1}{2}\end{array}\right)$$

Representations through equivalent functions

With related functions

07.20.27.0001.01

$${}_1F_1(a;b;z)=\frac{\Gamma(1-a)\,\Gamma(b)}{\Gamma(b-a)}\,L_{-a}^{b-1}(z)$$

07.20.27.0002.01

$${}_1F_1(a;b;z)=\frac{\Gamma(a-b+1)}{\Gamma(1-b)}\,U(a,b,z)-\frac{\Gamma(a-b+1)\,\Gamma(b-1)}{\Gamma(a)\,\Gamma(1-b)}\,z^{1-b}\,{}_1F_1(a-b+1;2-b;z)\;/;\;b\notin\mathbb{Z}$$

07.20.27.0003.01

$${}_1F_1(a;b;z)=\frac{\pi}{\Gamma(1-b)\left(\sin(a\pi)(-z)^{b-1}+z^{b-1}\sin((a-b)\pi)\right)}\left(\frac{e^z}{\Gamma(a)}\,U(1-a,2-b,-z)-\frac{1}{\Gamma(b-a)}\,U(a-b+1,2-b,z)\right)/;\;b\notin\mathbb{Z}$$

07.20.27.0004.01

$$ {}_1F_1(a;b;z) = e^{z/2} z^{-\frac{b}{2}} M_{\frac{1}{2}(b-2a),\frac{b-1}{2}}(z) $$

07.20.27.0005.01

$$ {}_1F_1(a;b;z) = \frac{e^{z/2}\pi}{\Gamma(a)\Gamma(1-b)\Gamma(b-a)\left((-z)^b\sin(a\pi) - z^b\sin((a-b)\pi)\right)} \left(\Gamma(b-a) W_{a-\frac{b}{2},\frac{1-b}{2}}(-z)(-z)^{b/2} + z^{b/2}\Gamma(a) W_{\frac{b}{2}-a,\frac{1-b}{2}}(z)\right) /; b \notin \mathbb{Z} $$

Theorems

The solution to the two dimensional time-independent Schrödinger equation

The solution to the two dimensional time–independent Schrödinger equation with the harmonic oscillator potential

$$ -\frac{\partial^2 \psi_{n,m}(x,y)}{\partial x^2} - \frac{\partial^2 \psi_{n,m}(x,y)}{\partial y^2} + \frac{\omega^2}{4}\left(x^2+y^2\right)\psi_{n,m}(x,y) == \varepsilon_{n,m}\,\psi_{n,m}(x,y) $$

in polar coordinates is given by

$$ \varepsilon_{n,m} == \omega(\,|m|+2n+1) /; m \in \mathbb{Z}, n \in \mathbb{N}, $$

$$ \psi_{n,m}(r,\phi) == e^{i m \phi}\, r^{|m|}\, e^{-\frac{\omega}{4}r^2}\, {}_1F_1\left(-n; |m|+1; \frac{\omega}{2}r^2\right) /; m \in \mathbb{Z}, n \in \mathbb{N}. $$

One-parameter family of solutions of Burgers' equation

The function

$$ w_\alpha(x,y) == \left(\Gamma(\alpha+1)\left(\Gamma\left(\frac{\alpha+1}{2}\right)x\ {}_1F_1\left(\frac{\alpha+1}{2};\frac{3}{2};\frac{x^2}{4y}\right) - \Gamma\left(\frac{\alpha}{2}\right)\sqrt{y}\ {}_1F_1\left(\frac{\alpha}{2};\frac{1}{2};\frac{x^2}{4y}\right)\right)\right) \Big/ \left(\Gamma\left(\frac{\alpha}{2}+1\right)\Gamma(\alpha)\,x\sqrt{y}\ {}_1F_1\left(\frac{\alpha}{2}+1;\frac{3}{2};\frac{x^2}{4y}\right) - \Gamma(\alpha)\Gamma\left(\frac{\alpha+1}{2}\right)y\ {}_1F_1\left(\frac{\alpha+1}{2};\frac{1}{2};\frac{x^2}{4y}\right)\right) $$

is a one-parameter family of solutions of Burgers' equation

$$ \frac{\partial w(x,y)}{\partial y} + \frac{\partial w(x,y)}{\partial x}\,w(x,y) == \frac{\partial^2 w(x,y)}{\partial x^2}. $$

Padé approximation to the exponential function

The function ${}_1F_1(-p;-p-q;z)/{}_1F_1(-q;-p-q;-z)$ is the $[p,q]$ –Padé approximation to $\exp(z)$.

Effective potential of the hydrogen atom in a strong magnetic field

The function

$$ V_m(x) == \int_0^\infty \frac{r^{2m} e^{-r^2}}{\sqrt{r^2+x^2}}\,dr == \frac{1}{2}\left(\frac{\Gamma(-m)\Gamma(m+1/2)}{\sqrt{\pi}}\ {}_1F_1\left(m+\frac{1}{2};m+1;x^2\right)x^{2m} + \Gamma(m)\,{}_1F_1\left(\frac{1}{2};1-m;x^2\right)\right) $$

is the effective potential of the hydrogen atom in a strong magnetic field where m is the angular momentum and x is the distance from the nucleus.

Dirac equation with d-dimensional Coulomb potential

The d-dimensional Dirac equation $i \sum_{\mu=0}^{d} \gamma^{\mu}\left(\partial_{\mu} + i\, e\, A_{\mu}\right) \psi(\mathbf{x}, t) = m\, \psi(\mathbf{x}, t)$ where the $d+1$ matrices γ^{μ} obey the commutation relations $\gamma^{\mu}.\gamma^{\nu} + \gamma^{\nu}.\gamma^{\mu} = 2\, \eta^{\mu\nu}\, \mathbf{1}$ and $\eta^{\mu\nu} = \delta_{\mu 0}\, \delta_{\mu\nu} - \left(1 - \delta_{\mu 0}\right) \delta_{\mu\nu}$ and $e\, A_0 = V(r) = -Z\, \alpha\, r^{-1}$, $Z\, \alpha > 0$, $A_1 = A_2 = \ldots = A_d = 0$ yields after separting the angular part for the radial part the coupled equations

$$+\frac{\partial G(r)}{\partial r} + \frac{k}{r} G(r) = (\varepsilon - V(r) - m)\, F(r)$$
$$-\frac{\partial F(r)}{\partial r} + \frac{k}{r} F(r) = (\varepsilon - V(r) + m)\, G(r)$$

where $k = \pm\left(l + \tilde{d}\right)$ ($\tilde{d} = d/2$ for even d and $\tilde{d} = (d-1)/2$ for odd d and l is the highest weight angular momentum) and ε is the energy of the stationary states. The bound state solutions of these two coupled differential equations are

$$\left.\begin{matrix} F_{\varepsilon}(r) \\ G_{\varepsilon}(r) \end{matrix}\right\} =$$
$$\frac{\sqrt[4]{m^2 - \varepsilon^2}}{\Gamma(2\,\lambda + 1)} \sqrt{\frac{(m \pm \varepsilon)\, \varepsilon\, \Gamma(\nu + 2\,\lambda + 1)}{2\, m^2\, \tau\, (k + \tau\, m/\varepsilon)\, \nu!}}\; \rho^{\lambda}\, e^{-\rho/2} ((k + \tau\, m/\varepsilon)\; {}_1F_1(-\nu; 2\,\lambda + 1; \rho) \mp \nu\; {}_1F_1(1 - \nu; 2\,\lambda + 1; \rho))$$

where $\rho = 2\, r \left(m^2 - \varepsilon^2\right)^{1/2}$, $\kappa = \left(k^2 - \xi^2\right)^{1/2}$, $\tau = \varepsilon\, \xi \left(m^2 - \varepsilon^2\right)^{-1/2}$, $\nu = \tau - \lambda \in \mathbb{N}$, and $0 < \varepsilon < m$.

This yields the energy eigenvalues $\varepsilon = m \left(1 + \xi^2 \left(\left(k^2 - \xi^2\right)^{1/2} + \nu\right)^{-2}\right)^{-1/2}$.

History

– E. E. Kummer (1836)

Copyright