Mathematica 11.3 Integration Test Results

on the problems in the test-suite directory "6 Hyperbolic functions\6.6 Hyperbolic cosecant"

Test results for the 29 problems in "6.6.1 (c+d x)^m (a+b csch)^n.m"

Problem 3: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (c+d x) \operatorname{Csch}[a+b x] \, dx$$

Optimal (type 4, 50 leaves, 5 steps):

$$-\frac{2 (c+d x) \operatorname{ArcTanh}\left[e^{a+b x}\right]}{b}-\frac{d \operatorname{PolyLog}\left[2,-e^{a+b x}\right]}{b^2}+\frac{d \operatorname{PolyLog}\left[2, e^{a+b x}\right]}{b^2}$$

Result (type 4, 174 leaves):

$$-\frac{c \operatorname{Log}\left[\operatorname{Cosh}\left[\frac{a}{2}+\frac{b x}{2}\right]\right]}{b}+\frac{c \operatorname{Log}\left[\operatorname{Sinh}\left[\frac{a}{2}+\frac{b x}{2}\right]\right]}{b}+\frac{1}{b^2} d \left(-a \operatorname{Log}\left[\operatorname{Tanh}\left[\frac{1}{2} (a+b x)\right]\right]-\right.$$
$$\left. i \left((i a+i b x) \left(\operatorname{Log}\left[1-e^{i (i a+i b x)}\right]-\operatorname{Log}\left[1+e^{i (i a+i b x)}\right]\right)+i \left(\operatorname{PolyLog}\left[2,-e^{i (i a+i b x)}\right]-\operatorname{PolyLog}\left[2, e^{i (i a+i b x)}\right]\right)\right)\right)$$

Problem 6: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (c+d x)^2 \operatorname{Csch}[a+b x]^2 \, dx$$

Optimal (type 4, 74 leaves, 5 steps):

$$-\frac{(c+d x)^2}{b}-\frac{(c+d x)^2 \operatorname{Coth}[a+b x]}{b}+\frac{2 d (c+d x) \operatorname{Log}\left[1-e^{2 (a+b x)}\right]}{b^2}+\frac{d^2 \operatorname{PolyLog}\left[2, e^{2 (a+b x)}\right]}{b^3}$$

Result (type 4, 277 leaves):

$$-\frac{2\,c\,d\,\text{Csch}[a]\,\left(-b\,x\,\text{Cosh}[a]+\text{Log}[\text{Cosh}[b\,x]\,\text{Sinh}[a]+\text{Cosh}[a]\,\text{Sinh}[b\,x]]\,\text{Sinh}[a]\right)}{b^2\,\left(-\text{Cosh}[a]^2+\text{Sinh}[a]^2\right)}+$$
$$\frac{\text{Csch}[a]\,\text{Csch}[a+b\,x]\,\left(c^2\,\text{Sinh}[b\,x]+2\,c\,d\,x\,\text{Sinh}[b\,x]+d^2\,x^2\,\text{Sinh}[b\,x]\right)}{b}+$$
$$\left(d^2\,\text{Csch}[a]\,\text{Sech}[a]\,\left(-b^2\,e^{-\text{ArcTanh}[\text{Tanh}[a]]}\,x^2+\frac{1}{\sqrt{1-\text{Tanh}[a]^2}}\,i\,\left(-b\,x\,\left(-\pi+2\,i\,\text{ArcTanh}[\text{Tanh}[a]]\right)-\pi\,\text{Log}\left[1+e^{2\,b\,x}\right]-\right.\right.\right.$$
$$2\,\left(i\,b\,x+i\,\text{ArcTanh}[\text{Tanh}[a]]\right)\,\text{Log}\left[1-e^{2\,i\,(i\,b\,x+i\,\text{ArcTanh}[\text{Tanh}[a]])}\right]+\pi\,\text{Log}[\text{Cosh}[b\,x]]+2\,i\,\text{ArcTanh}[\text{Tanh}[a]]$$
$$\left.\left.\left.\text{Log}[i\,\text{Sinh}[b\,x+\text{ArcTanh}[\text{Tanh}[a]]]]+i\,\text{PolyLog}\left[2,\,e^{2\,i\,(i\,b\,x+i\,\text{ArcTanh}[\text{Tanh}[a]])}\right]\right)\,\text{Tanh}[a]\right)\right)\Big/\left(b^3\,\sqrt{\text{Sech}[a]^2\,\left(\text{Cosh}[a]^2-\text{Sinh}[a]^2\right)}\right)$$

Problem 10: Result more than twice size of optimal antiderivative.

$$\int (c+d\,x)^2\,\text{Csch}[a+b\,x]^3\,dx$$

Optimal (type 4, 154 leaves, 9 steps):

$$\frac{(c+d\,x)^2\,\text{ArcTanh}\left[e^{a+b\,x}\right]}{b}-\frac{d^2\,\text{ArcTanh}[\text{Cosh}[a+b\,x]]}{b^3}-\frac{d\,(c+d\,x)\,\text{Csch}[a+b\,x]}{b^2}-\frac{(c+d\,x)^2\,\text{Coth}[a+b\,x]\,\text{Csch}[a+b\,x]}{2\,b}+$$
$$\frac{d\,(c+d\,x)\,\text{PolyLog}\left[2,\,-e^{a+b\,x}\right]}{b^2}-\frac{d\,(c+d\,x)\,\text{PolyLog}\left[2,\,e^{a+b\,x}\right]}{b^2}-\frac{d^2\,\text{PolyLog}\left[3,\,-e^{a+b\,x}\right]}{b^3}+\frac{d^2\,\text{PolyLog}\left[3,\,e^{a+b\,x}\right]}{b^3}$$

Result (type 4, 420 leaves):

$$-\frac{d\,(c+d\,x)\,\text{Csch}[a]}{b^2}+\frac{\left(-c^2-2\,c\,d\,x-d^2\,x^2\right)\,\text{Csch}\left[\frac{a}{2}+\frac{b\,x}{2}\right]^2}{8\,b}+$$
$$\frac{1}{2\,b^3}\left(-b^2\,c^2\,\text{Log}\left[1-e^{a+b\,x}\right]+2\,d^2\,\text{Log}\left[1-e^{a+b\,x}\right]-2\,b^2\,c\,d\,x\,\text{Log}\left[1-e^{a+b\,x}\right]-b^2\,d^2\,x^2\,\text{Log}\left[1-e^{a+b\,x}\right]+\right.$$
$$b^2\,c^2\,\text{Log}\left[1+e^{a+b\,x}\right]-2\,d^2\,\text{Log}\left[1+e^{a+b\,x}\right]+2\,b^2\,c\,d\,x\,\text{Log}\left[1+e^{a+b\,x}\right]+b^2\,d^2\,x^2\,\text{Log}\left[1+e^{a+b\,x}\right]+$$
$$\left.2\,b\,d\,(c+d\,x)\,\text{PolyLog}\left[2,\,-e^{a+b\,x}\right]-2\,b\,d\,(c+d\,x)\,\text{PolyLog}\left[2,\,e^{a+b\,x}\right]-2\,d^2\,\text{PolyLog}\left[3,\,-e^{a+b\,x}\right]+2\,d^2\,\text{PolyLog}\left[3,\,e^{a+b\,x}\right]\right)+$$
$$\frac{\left(-c^2-2\,c\,d\,x-d^2\,x^2\right)\,\text{Sech}\left[\frac{a}{2}+\frac{b\,x}{2}\right]^2}{8\,b}+\frac{\text{Csch}\left[\frac{a}{2}\right]\,\text{Csch}\left[\frac{a}{2}+\frac{b\,x}{2}\right]\,\left(c\,d\,\text{Sinh}\left[\frac{b\,x}{2}\right]+d^2\,x\,\text{Sinh}\left[\frac{b\,x}{2}\right]\right)}{2\,b^2}+$$
$$\frac{\text{Sech}\left[\frac{a}{2}\right]\,\text{Sech}\left[\frac{a}{2}+\frac{b\,x}{2}\right]\,\left(c\,d\,\text{Sinh}\left[\frac{b\,x}{2}\right]+d^2\,x\,\text{Sinh}\left[\frac{b\,x}{2}\right]\right)}{2\,b^2}$$

Problem 11: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (c+d x)\,\mathrm{Csch}[a+b x]^3\,dx$$

Optimal (type 4, 92 leaves, 6 steps):

$$\frac{(c+d x)\,\mathrm{ArcTanh}\left[e^{a+b x}\right]}{b}-\frac{d\,\mathrm{Csch}[a+b x]}{2 b^2}-\frac{(c+d x)\,\mathrm{Coth}[a+b x]\,\mathrm{Csch}[a+b x]}{2 b}+\frac{d\,\mathrm{PolyLog}\left[2,-e^{a+b x}\right]}{2 b^2}-\frac{d\,\mathrm{PolyLog}\left[2,e^{a+b x}\right]}{2 b^2}$$

Result (type 4, 332 leaves):

$$-\frac{d\,x\,\mathrm{Csch}\left[\frac{a}{2}+\frac{b x}{2}\right]^2}{8 b}-\frac{c\,\mathrm{Csch}\left[\frac{1}{2}(a+b x)\right]^2}{8 b}+\frac{c\,\mathrm{Log}\left[\mathrm{Cosh}\left[\frac{1}{2}(a+b x)\right]\right]}{2 b}-\frac{c\,\mathrm{Log}\left[\mathrm{Sinh}\left[\frac{1}{2}(a+b x)\right]\right]}{2 b}-\frac{1}{2 b^2}d\left(-a\,\mathrm{Log}\left[\mathrm{Tanh}\left[\frac{1}{2}(a+b x)\right]\right]-\right.$$

$$\left.i\left((i a+i b x)\left(\mathrm{Log}\left[1-e^{i(i a+i b x)}\right]-\mathrm{Log}\left[1+e^{i(i a+i b x)}\right]\right)+i\left(\mathrm{PolyLog}\left[2,-e^{i(i a+i b x)}\right]-\mathrm{PolyLog}\left[2,e^{i(i a+i b x)}\right]\right)\right)\right)-$$

$$\frac{d\,x\,\mathrm{Sech}\left[\frac{a}{2}+\frac{b x}{2}\right]^2}{8 b}-\frac{c\,\mathrm{Sech}\left[\frac{1}{2}(a+b x)\right]^2}{8 b}+\frac{d\,\mathrm{Csch}\left[\frac{a}{2}\right]\mathrm{Csch}\left[\frac{a}{2}+\frac{b x}{2}\right]\mathrm{Sinh}\left[\frac{b x}{2}\right]}{4 b^2}+\frac{d\,\mathrm{Sech}\left[\frac{a}{2}\right]\mathrm{Sech}\left[\frac{a}{2}+\frac{b x}{2}\right]\mathrm{Sinh}\left[\frac{b x}{2}\right]}{4 b^2}$$

Problem 17: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x)^3\,\mathrm{Cosh}[c+d x]}{a+b\,\mathrm{Csch}[c+d x]}\,dx$$

Optimal (type 4, 448 leaves, 17 steps):

$$\frac{b\,(e+f x)^4}{4 a^2 f}-\frac{6 f^3\,\mathrm{Cosh}[c+d x]}{a d^4}-\frac{3 f\,(e+f x)^2\,\mathrm{Cosh}[c+d x]}{a d^2}-\frac{b\,(e+f x)^3\,\mathrm{Log}\left[1+\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^2 d}-$$

$$\frac{b\,(e+f x)^3\,\mathrm{Log}\left[1+\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^2 d}-\frac{3 b f\,(e+f x)^2\,\mathrm{PolyLog}\left[2,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^2 d^2}-\frac{3 b f\,(e+f x)^2\,\mathrm{PolyLog}\left[2,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^2 d^2}+$$

$$\frac{6 b f^2\,(e+f x)\,\mathrm{PolyLog}\left[3,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^2 d^3}+\frac{6 b f^2\,(e+f x)\,\mathrm{PolyLog}\left[3,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^2 d^3}-\frac{6 b f^3\,\mathrm{PolyLog}\left[4,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^2 d^4}-$$

$$\frac{6 b f^3\,\mathrm{PolyLog}\left[4,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^2 d^4}+\frac{6 f^2\,(e+f x)\,\mathrm{Sinh}[c+d x]}{a d^3}+\frac{(e+f x)^3\,\mathrm{Sinh}[c+d x]}{a d}$$

Result (type 4, 1635 leaves):

$$\frac{1}{2 a^2 d^3 \left(a + b\,\text{Csch}[c + d x]\right)} e f^2\,\text{Csch}[c + d x] \Bigg(-12 b d x\,\text{PolyLog}\left[2, -\frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] - 12 b d x\,\text{PolyLog}\left[2, -\frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] +$$

$$e^{-c} \Bigg(2 b d^3 e^c x^3 - 6 a\,\text{Cosh}[d x] + 6 a\,e^{2 c}\,\text{Cosh}[d x] - 6 a d x\,\text{Cosh}[d x] - 6 a d\,e^{2 c} x\,\text{Cosh}[d x] - 3 a d^2 x^2\,\text{Cosh}[d x] +$$

$$3 a d^2 e^{2 c} x^2\,\text{Cosh}[d x] - 6 b d^2 e^c x^2\,\text{Log}\left[1 + \frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] - 6 b d^2 e^c x^2\,\text{Log}\left[1 + \frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] +$$

$$12 b\,e^c\,\text{PolyLog}\left[3, -\frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] + 12 b\,e^c\,\text{PolyLog}\left[3, -\frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] + 6 a\,\text{Sinh}[d x] + 6 a\,e^{2 c}\,\text{Sinh}[d x] +$$

$$6 a d x\,\text{Sinh}[d x] - 6 a d\,e^{2 c} x\,\text{Sinh}[d x] + 3 a d^2 x^2\,\text{Sinh}[d x] + 3 a d^2 e^{2 c} x^2\,\text{Sinh}[d x]\Bigg)\Bigg) \left(b + a\,\text{Sinh}[c + d x]\right) +$$

$$\frac{1}{4 a^2 d^4 \left(a + b\,\text{Csch}[c + d x]\right)} f^3\,\text{Csch}[c + d x] \Bigg(-12 b d^2 x^2\,\text{PolyLog}\left[2, -\frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] +$$

$$e^{-c} \Bigg(b d^4 e^c x^4 - 12 a\,\text{Cosh}[d x] - 12 a\,e^{2 c}\,\text{Cosh}[d x] - 12 a d x\,\text{Cosh}[d x] + 12 a d\,e^{2 c} x\,\text{Cosh}[d x] - 6 a d^2 x^2\,\text{Cosh}[d x] - 6 a d^2 e^{2 c} x^2\,\text{Cosh}[d x] -$$

$$2 a d^3 x^3\,\text{Cosh}[d x] + 2 a d^3 e^{2 c} x^3\,\text{Cosh}[d x] - 4 b d^3 e^c x^3\,\text{Log}\left[1 + \frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] - 4 b d^3 e^c x^3\,\text{Log}\left[1 + \frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] -$$

$$12 b d^2 e^c x^2\,\text{PolyLog}\left[2, -\frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] + 24 b d\,e^c x\,\text{PolyLog}\left[3, -\frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] +$$

$$24 b d\,e^c x\,\text{PolyLog}\left[3, -\frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] - 24 b\,e^c\,\text{PolyLog}\left[4, -\frac{a\,e^{2 c+d x}}{b\,e^c - \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] -$$

$$24 b\,e^c\,\text{PolyLog}\left[4, -\frac{a\,e^{2 c+d x}}{b\,e^c + \sqrt{\left(a^2 + b^2\right) e^{2 c}}}\right] + 12 a\,\text{Sinh}[d x] - 12 a\,e^{2 c}\,\text{Sinh}[d x] + 12 a d x\,\text{Sinh}[d x] + 12 a d\,e^{2 c} x\,\text{Sinh}[d x] +$$

$$6 a d^2 x^2\,\text{Sinh}[d x] - 6 a d^2 e^{2 c} x^2\,\text{Sinh}[d x] + 2 a d^3 x^3\,\text{Sinh}[d x] + 2 a d^3 e^{2 c} x^3\,\text{Sinh}[d x]\Bigg)\Bigg) \left(b + a\,\text{Sinh}[c + d x]\right) +$$

$$\frac{e^3\,\text{Csch}[c + d x] \left(b + a\,\text{Sinh}[c + d x]\right) \left(-\frac{2 b\,\text{Log}[b+a\,\text{Sinh}[c+d x]]}{a^2 d} + \frac{2\,\text{Sinh}[c+d x]}{a d}\right)}{2 \left(a + b\,\text{Csch}[c + d x]\right)} + \frac{1}{a^2 d^2 \left(a + b\,\text{Csch}[c + d x]\right)}$$

3

$$e^2 \; f \; \text{Csch}[c+d x] \left(b+a \text{Sinh}[c+d x]\right) \left(-a \text{Cosh}[c+d x]-b (c+d x) \text{Log}[b+a \text{Sinh}[c+d x]]+b c \text{Log}\left[1+\frac{a \text{Sinh}[c+d x]}{b}\right]+\right.$$

$$i b \left(-\frac{1}{8} i (2 c+i \pi+2 d x)^2-4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \text{ArcTan}\left[\frac{(i a+b) \text{Cot}\left[\frac{1}{4} (2 i c+\pi+2 i d x)\right]}{\sqrt{a^2+b^2}}\right]-\right.$$

$$\frac{1}{2} \left(-2 i c+\pi-2 i d x+4 \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right) \text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$\frac{1}{2} \left(-2 i c+\pi-2 i d x-4 \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right) \text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\left(\frac{\pi}{2}-i (c+d x)\right) \text{Log}[b+a \text{Sinh}[c+d x]]+$$

$$\left.\left. i \left(\text{PolyLog}\left[2, \frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\text{PolyLog}\left[2, \frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]\right)\right)+a d x \text{Sinh}[c+d x]\right)$$

Problem 18: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x)^2 \text{Cosh}[c+d x]}{a+b \text{Csch}[c+d x]} \, dx$$

Optimal (type 4, 330 leaves, 14 steps) :

$$\frac{b\,(e+f\,x)^3}{3\,a^2\,f}-\frac{2\,f\,(e+f\,x)\,\text{Cosh}[c+d\,x]}{a\,d^2}-\frac{b\,(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,d}-\frac{b\,(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,d}-\frac{2\,b\,f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,d^2}-$$

$$\frac{2\,b\,f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,d^2}+\frac{2\,b\,f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,d^3}+\frac{2\,b\,f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,d^3}+\frac{2\,f^2\,\text{Sinh}[c+d\,x]}{a\,d^3}+\frac{(e+f\,x)^2\,\text{Sinh}[c+d\,x]}{a\,d}$$

Result (type 4, 971 leaves):

$$\frac{1}{6\,a^2\,d^3\,(a+b\,\text{Csch}[c+d\,x])}\,f^2\,\text{Csch}[c+d\,x]\left(-12\,b\,d\,x\,\text{PolyLog}\left[2,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]-12\,b\,d\,x\,\text{PolyLog}\left[2,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]+\right.$$

$$e^{-c}\left(2\,b\,d^3\,e^c\,x^3-6\,a\,\text{Cosh}[d\,x]+6\,a\,e^{2\,c}\,\text{Cosh}[d\,x]-6\,a\,d\,x\,\text{Cosh}[d\,x]-6\,a\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x]-3\,a\,d^2\,x^2\,\text{Cosh}[d\,x]+\right.$$

$$3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x]-6\,b\,d^2\,e^c\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]-6\,b\,d^2\,e^c\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]+$$

$$12\,b\,e^c\,\text{PolyLog}\left[3,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]+12\,b\,e^c\,\text{PolyLog}\left[3,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{(a^2+b^2)\,e^{2\,c}}}\right]+6\,a\,\text{Sinh}[d\,x]+6\,a\,e^{2\,c}\,\text{Sinh}[d\,x]+$$

$$\left.\left.6\,a\,d\,x\,\text{Sinh}[d\,x]-6\,a\,d\,e^{2\,c}\,x\,\text{Sinh}[d\,x]+3\,a\,d^2\,x^2\,\text{Sinh}[d\,x]+3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Sinh}[d\,x]\right)\right)(b+a\,\text{Sinh}[c+d\,x])+$$

$$\frac{e^2\,\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])\left(-\frac{2\,b\,\text{Log}[b+a\,\text{Sinh}[c+d\,x]]}{a^2\,d}+\frac{2\,\text{Sinh}[c+d\,x]}{a\,d}\right)}{2\,(a+b\,\text{Csch}[c+d\,x])}+\frac{1}{a^2\,d^2\,(a+b\,\text{Csch}[c+d\,x])}$$

$$2\,e\,f\,\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])$$

$$\left(-a\,\text{Cosh}[c+d\,x]-b\,(c+d\,x)\,\text{Log}[b+a\,\text{Sinh}[c+d\,x]]+b\,c\,\text{Log}\left[1+\frac{a\,\text{Sinh}[c+d\,x]}{b}\right]+\right.$$

$$i\,b\left(-\frac{1}{8}\,i\,(2\,c+i\,\pi+2\,d\,x)^2-4\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{(i\,a+b)\,\text{Cot}\left[\frac{1}{4}\,(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{a^2+b^2}}\right]-\right.$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x+4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]-$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x-4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\left(\frac{\pi}{2}-i\,(c+d\,x)\right)\text{Log}[b+a\,\text{Sinh}[c+d\,x]]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]\right)\Bigg)+a\,d\,x\,\text{Sinh}[c+d\,x]\Bigg)$$

Problem 19: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{(e+f\,x)\,\text{Cosh}[c+d\,x]}{a+b\,\text{Csch}[c+d\,x]}\,dx$$

Optimal (type 4, 212 leaves, 11 steps):

$$\frac{b\,(e+f\,x)^2}{2\,a^2\,f}-\frac{f\,\text{Cosh}[c+d\,x]}{a\,d^2}-\frac{b\,(e+f\,x)\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,d}-\frac{b\,(e+f\,x)\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,d}-$$

$$\frac{b\,f\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,d^2}-\frac{b\,f\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,d^2}+\frac{(e+f\,x)\,\text{Sinh}[c+d\,x]}{a\,d}$$

Result (type 4, 401 leaves):

$$-\frac{1}{a^2\, d^2\, \left(a+b\,\mathrm{Csch}[c+d\,x]\right)}$$

$$\mathrm{Csch}[c+d\,x]\,\left(b+a\,\mathrm{Sinh}[c+d\,x]\right)\left(d\,e\,\left(b\,\mathrm{Log}[b+a\,\mathrm{Sinh}[c+d\,x]]-a\,\mathrm{Sinh}[c+d\,x]\right)+\frac{1}{8}\,f\left(-b\,\left(2\,c+i\,\pi+2\,d\,x\right)^2-32\,b\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\,\mathrm{ArcTan}\left[\right.\right.\right.$$

$$\left.\frac{\left(i\,a+b\right)\,\mathrm{Cot}\left[\frac{1}{4}\left(2\,i\,c+\pi+2\,i\,d\,x\right)\right]}{\sqrt{a^2+b^2}}\right]+8\,a\,\mathrm{Cosh}[c+d\,x]+4\,b\left(2\,c+i\,\pi+2\,d\,x+4\,i\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\mathrm{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)\,e^{c+d\,x}}{a}\right]+$$

$$4\,b\left(2\,c+i\,\pi+2\,d\,x-4\,i\,\mathrm{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\mathrm{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right)\,e^{c+d\,x}}{a}\right]-4\,i\,b\,\pi\,\mathrm{Log}[b+a\,\mathrm{Sinh}[c+d\,x]]-$$

$$\left.\left.8\,b\,c\,\mathrm{Log}\left[1+\frac{a\,\mathrm{Sinh}[c+d\,x]}{b}\right]+8\,b\left(\mathrm{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right)\,e^{c+d\,x}}{a}\right]+\mathrm{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right)\,e^{c+d\,x}}{a}\right]\right)-8\,a\,d\,x\,\mathrm{Sinh}[c+d\,x]\right)\right)$$

Problem 21: Attempted integration timed out after 120 seconds.

$$\int \frac{\mathrm{Cosh}[c+d\,x]}{\left(e+f\,x\right)\,\left(a+b\,\mathrm{Csch}[c+d\,x]\right)}\,dx$$

Optimal (type 9, 34 leaves, 1 step):

$$\mathrm{Unintegrable}\left[\frac{\mathrm{Cosh}[c+d\,x]\,\mathrm{Sinh}[c+d\,x]}{\left(e+f\,x\right)\,\left(b+a\,\mathrm{Sinh}[c+d\,x]\right)},\,x\right]$$

Result (type 1, 1 leaves):

???

Problem 22: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x)^3 \operatorname{Cosh}[c+d x]^2}{a+b \operatorname{Csch}[c+d x]} \, dx$$

Optimal (type 4, 696 leaves, 24 steps):

$$\frac{3 e f^2 x}{4 a d^2}+\frac{3 f^3 x^2}{8 a d^2}+\frac{(e+f x)^4}{8 a f}+\frac{b^2 (e+f x)^4}{4 a^3 f}-\frac{6 b f^2 (e+f x) \operatorname{Cosh}[c+d x]}{a^2 d^3}-\frac{b (e+f x)^3 \operatorname{Cosh}[c+d x]}{a^2 d}-\frac{3 f^3 \operatorname{Cosh}[c+d x]^2}{8 a d^4}-\frac{3 f (e+f x)^2 \operatorname{Cosh}[c+d x]^2}{4 a d^2}-\frac{b \sqrt{a^2+b^2} (e+f x)^3 \operatorname{Log}\left[1+\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^3 d}+\frac{b \sqrt{a^2+b^2} (e+f x)^3 \operatorname{Log}\left[1+\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^3 d}-\frac{3 b \sqrt{a^2+b^2} f (e+f x)^2 \operatorname{PolyLog}\left[2,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^3 d^2}+\frac{3 b \sqrt{a^2+b^2} f (e+f x)^2 \operatorname{PolyLog}\left[2,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^3 d^2}+\frac{6 b \sqrt{a^2+b^2} f^2 (e+f x) \operatorname{PolyLog}\left[3,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^3 d^3}-\frac{6 b \sqrt{a^2+b^2} f^2 (e+f x) \operatorname{PolyLog}\left[3,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^3 d^3}-\frac{6 b \sqrt{a^2+b^2} f^3 \operatorname{PolyLog}\left[4,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^3 d^4}+\frac{6 b \sqrt{a^2+b^2} f^3 \operatorname{PolyLog}\left[4,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^3 d^4}+\frac{6 b f^3 \operatorname{Sinh}[c+d x]}{a^2 d^4}+\frac{3 b f (e+f x)^2 \operatorname{Sinh}[c+d x]}{a^2 d^2}+\frac{3 f^2 (e+f x) \operatorname{Cosh}[c+d x] \operatorname{Sinh}[c+d x]}{4 a d^3}+\frac{(e+f x)^3 \operatorname{Cosh}[c+d x] \operatorname{Sinh}[c+d x]}{2 a d}$$

Result (type 4, 3560 leaves):

$$\frac{e^3 \left(\frac{c}{d}+x-\frac{2 b \operatorname{ArcTan}\left[\frac{a-b \operatorname{Tanh}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}\, d}\right) \operatorname{Csch}[c+d x]\, (b+a \operatorname{Sinh}[c+d x])}{4 a\, (a+b \operatorname{Csch}[c+d x])}+\frac{1}{8 a\, (a+b \operatorname{Csch}[c+d x])} 3 e^2 f \operatorname{Csch}[c+d x]$$

$$\left(x^2+\frac{1}{d^2} 2 b \left(\frac{i \pi \operatorname{ArcTanh}\left[\frac{-a+b \operatorname{Tanh}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}}+\frac{1}{\sqrt{-a^2-b^2}} \left(2 \left(c+i \operatorname{ArcCos}\left[-\frac{i b}{a}\right]\right) \operatorname{ArcTan}\left[\frac{(a-i b) \operatorname{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]}{\sqrt{-a^2-b^2}}\right]+(-2 i c+\pi-2\right.\right.\right.$$

$$i d x) \operatorname{ArcTanh}\left[\frac{(-i a+b) \operatorname{Tan}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]}{\sqrt{-a^2-b^2}}\right]-\left(\operatorname{ArcCos}\left[-\frac{i b}{a}\right]-2 \operatorname{ArcTan}\left[\frac{(a-i b) \operatorname{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{(a+\mathbb{i}\,b)\left(a-\mathbb{i}\,b+\sqrt{-a^2-b^2}\right)\left(1+\mathbb{i}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}{a\left(a+\mathbb{i}\,b+\mathbb{i}\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}\right]-\left(\text{ArcCos}\left[-\frac{\mathbb{i}\,b}{a}\right]+2\right.$$

$$\left.\text{ArcTan}\left[\frac{(a-\mathbb{i}\,b)\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)\text{Log}\left[\frac{\mathbb{i}\,(a+\mathbb{i}\,b)\left(-a+\mathbb{i}\,b+\sqrt{-a^2-b^2}\right)\left(\mathbb{i}+\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}{a\left(a+\mathbb{i}\,b+\mathbb{i}\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{\mathbb{i}\,b}{a}\right]+2\,\text{ArcTan}\left[\frac{(a-\mathbb{i}\,b)\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]-2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{(-\mathbb{i}\,a+b)\,\text{Tan}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\;\mathbb{e}^{\frac{1}{4}\,(-2\,c-\mathbb{i}\,\pi-2\,d\,x)}}{\sqrt{2}\,\sqrt{-\mathbb{i}\,a}\,\sqrt{b+a\,\text{Sinh}[c+d\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{\mathbb{i}\,b}{a}\right]-2\,\text{ArcTan}\left[\frac{(a-\mathbb{i}\,b)\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]+2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{(-\mathbb{i}\,a+b)\,\text{Tan}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\;\mathbb{e}^{\frac{1}{4}\,(2\,c+\mathbb{i}\,\pi+2\,d\,x)}}{\sqrt{2}\,\sqrt{-\mathbb{i}\,a}\,\sqrt{b+a\,\text{Sinh}[c+d\,x]}}\right]+\mathbb{i}\left(\text{PolyLog}\left[2,\frac{\left(\mathbb{i}\,b+\sqrt{-a^2-b^2}\right)\left(a+\mathbb{i}\,b-\mathbb{i}\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}{a\left(a+\mathbb{i}\,b+\mathbb{i}\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{\left(b+\mathbb{i}\,\sqrt{-a^2-b^2}\right)\left(\mathbb{i}\,a-b+\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}{a\left(a+\mathbb{i}\,b+\mathbb{i}\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}\,(2\,\mathbb{i}\,c+\pi+2\,\mathbb{i}\,d\,x)\right]\right)}\right]\right)\right)\right)$$

$$(b+a\,\text{Sinh}[c+d\,x])+\frac{1}{4\,a\,(a+b\,\text{Csch}[c+d\,x])}e\,f^2\,\text{Csch}[$$

$c+$

d

$x]\left(x^3-\right.$

$$\frac{1}{d^3\sqrt{(a^2+b^2)\;\mathbb{e}^{2\,c}}}$$

3

b

$\mathbb{e}^c$

$$\left(d^2\,x^2\,\text{Log}\left[1+\frac{a\,\mathbb{e}^{2\,c+d\,x}}{b\,\mathbb{e}^c-\sqrt{(a^2+b^2)\;\mathbb{e}^{2\,c}}}\right]-d^2\,x^2\,\text{Log}\left[1+\frac{a\,\mathbb{e}^{2\,c+d\,x}}{b\,\mathbb{e}^c+\sqrt{(a^2+b^2)\;\mathbb{e}^{2\,c}}}\right]+\right.$$

$$2\,d\,x\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-2\,d\,x\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-$$

$$2\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+2\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]\Bigg)\Bigg)$$

$$\left(b+a\,\text{Sinh}[c+d\,x]\right)+\frac{1}{16\,a\,\left(a+b\,\text{Csch}[c+d\,x]\right)}$$

$$f^{3}\,\text{Csch}[c+d\,x]$$

$$\Bigg(x^{4}-\frac{1}{d^{4}\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}4\,b\,e^{c}\,\Bigg(d^{3}\,x^{3}\,\text{Log}\left[1+\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-d^{3}\,x^{3}\,\text{Log}\left[1+\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+$$

$$3\,d^{2}\,x^{2}\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-3\,d^{2}\,x^{2}\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-$$

$$6\,d\,x\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+6\,d\,x\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+$$

$$6\,\text{PolyLog}\left[4,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-6\,\text{PolyLog}\left[4,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]\Bigg)\Bigg)$$

$$\left(b+a\,\text{Sinh}[c+d\,x]\right)+\frac{1}{8\,a^{3}\,\left(a+b\,\text{Csch}[c+d\,x]\right)}e\,f^{2}$$

$$\text{Csch}[c+d\,x]$$

$$\Bigg(2\left(a^{2}+4\,b^{2}\right)x^{3}-\frac{1}{d^{3}\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}6\,b\,\left(3\,a^{2}+4\,b^{2}\right)e^{c}$$

$$\Bigg(d^{2}\,x^{2}\,\text{Log}\left[1+\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-d^{2}\,x^{2}\,\text{Log}\left[1+\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+2\,d\,x\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-$$

$$2\,d\,x\,\text{PolyLog}\left[2,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]-2\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}-\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]+2\,\text{PolyLog}\left[3,\,-\frac{a\,e^{2c+dx}}{b\,e^{c}+\sqrt{\left(a^{2}+b^{2}\right)e^{2c}}}\right]\Bigg)-$$

$$\frac{24\, a\, b \,\text{Cosh}[d\, x]\, \left(\left(2+d^2 x^2\right) \text{Cosh}[c]-2\, d\, x\, \text{Sinh}[c]\right)}{d^3}+\frac{3\, a^2 \,\text{Cosh}[2\, d\, x]\, \left(-2\, d\, x\, \text{Cosh}[2\, c]+\left(1+2\, d^2 x^2\right) \text{Sinh}[2\, c]\right)}{d^3}-$$

$$\frac{24\, a\, b\, \left(-2\, d\, x\, \text{Cosh}[c]+\left(2+d^2 x^2\right) \text{Sinh}[c]\right) \text{Sinh}[d\, x]}{d^3}+$$

$$\left.\frac{3\, a^2 \left(\left(1+2\, d^2 x^2\right) \text{Cosh}[2\, c]-2\, d\, x\, \text{Sinh}[2\, c]\right) \text{Sinh}[2\, d\, x]}{d^3}\right)$$

$$\left(b+a\, \text{Sinh}[c+d\, x]\right)+\frac{1}{16\, a^3 \left(a+b\, \text{Csch}[c+d\, x]\right)}$$

$$f^3\ \text{Csch}[c+d\, x]$$

$$\left(\left(a^2+4\, b^2\right) x^4-\frac{1}{d^4 \sqrt{\left(a^2+b^2\right) e^{2\, c}}}\, 4\, b\, \left(3\, a^2+4\, b^2\right) e^c \left(d^3 x^3\, \text{Log}\left[1+\frac{a\, e^{2\, c+d\, x}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]-d^3 x^3\, \text{Log}\left[1+\frac{a\, e^{2\, c+d\, x}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]+\right.\right.$$

$$3\, d^2 x^2\, \text{PolyLog}\left[2,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]-3\, d^2 x^2\, \text{PolyLog}\left[2,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]-6\, d\, x\, \text{PolyLog}\left[3,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]+$$

$$\left.6\, d\, x\, \text{PolyLog}\left[3,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]+6\, \text{PolyLog}\left[4,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]-6\, \text{PolyLog}\left[4,-\frac{a\, e^{2\, c+d\, x}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2\, c}}}\right]\right)-$$

$$\frac{16\, a\, b\, \text{Cosh}[d\, x]\, \left(d\, x\, \left(6+d^2 x^2\right) \text{Cosh}[c]-3\, \left(2+d^2 x^2\right) \text{Sinh}[c]\right)}{d^4}+\frac{a^2\, \text{Cosh}[2\, d\, x]\, \left(-3\, \left(1+2\, d^2 x^2\right) \text{Cosh}[2\, c]+2\, d\, x\, \left(3+2\, d^2 x^2\right) \text{Sinh}[2\, c]\right)}{d^4}-$$

$$\frac{16\, a\, b\, \left(-3\, \left(2+d^2 x^2\right) \text{Cosh}[c]+d\, x\, \left(6+d^2 x^2\right) \text{Sinh}[c]\right) \text{Sinh}[d\, x]}{d^4}+$$

$$\left.\frac{a^2 \left(2\, d\, x\, \left(3+2\, d^2 x^2\right) \text{Cosh}[2\, c]-3\, \left(1+2\, d^2 x^2\right) \text{Sinh}[2\, c]\right) \text{Sinh}[2\, d\, x]}{d^4}\right) \left(b+a\, \text{Sinh}[c+d\, x]\right)+$$

$$\left(e^3\, \text{Csch}[c+d\, x]\, \left(b+a\, \text{Sinh}[c+d\, x]\right) \left(\left(a^2+4\, b^2\right) (c+d\, x)-\frac{2\, b\, \left(3\, a^2+4\, b^2\right) \text{ArcTan}\left[\frac{a-b\, \text{Tanh}\left[\frac{1}{2} (c+d\, x)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}}-4\, a\, b\, \text{Cosh}[c+d\, x]+a^2\, \text{Sinh}\left[2\, (c+d\, x)\right]\right)\right) \Big/$$

$$\left(4\, a^3\, d\, \left(a+b\, \text{Csch}[c+d\, x]\right)\right)+$$

$$\left(3\,e^2\,f\,\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])\left((a^2+4\,b^2)\,(-c+d\,x)\,(c+d\,x)-8\,a\,b\,d\,x\,\text{Cosh}[c+d\,x]-\right.\right.$$

$$a^2\,\text{Cosh}[2\,(c+d\,x)]-4\,b\,(3\,a^2+4\,b^2)\left(-\frac{c\,\text{ArcTan}\left[\frac{b+a\,e^{c+d\,x}}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}}+\frac{1}{2\,\sqrt{a^2+b^2}}\right.$$

$$\left.\left((c+d\,x)\left(\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]-\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]\right)+\text{PolyLog}\left[2,\frac{a\,e^{c+d\,x}}{-b+\sqrt{a^2+b^2}}\right]-\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]\right)\right)+$$

$$\left.\left.8\,a\,b\,\text{Sinh}[c+d\,x]+2\,a^2\,d\,x\,\text{Sinh}[2\,(c+d\,x)]\right)\right)\Big/\left(8\,a^3\,d^2\,(a+b\,\text{Csch}[c+d\,x])\right)$$

Problem 23: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(e+f\,x)^2\,\text{Cosh}[c+d\,x]^2}{a+b\,\text{Csch}[c+d\,x]}\,dx$$

Optimal (type 4, 510 leaves, 21 steps):

$$\frac{f^2\,x}{4\,a\,d^2}+\frac{(e+f\,x)^3}{6\,a\,f}+\frac{b^2\,(e+f\,x)^3}{3\,a^3\,f}-\frac{2\,b\,f^2\,\text{Cosh}[c+d\,x]}{a^2\,d^3}-\frac{b\,(e+f\,x)^2\,\text{Cosh}[c+d\,x]}{a^2\,d}-\frac{f\,(e+f\,x)\,\text{Cosh}[c+d\,x]^2}{2\,a\,d^2}-$$

$$\frac{b\,\sqrt{a^2+b^2}\,(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^3\,d}+\frac{b\,\sqrt{a^2+b^2}\,(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^3\,d}-\frac{2\,b\,\sqrt{a^2+b^2}\,f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^3\,d^2}+$$

$$\frac{2\,b\,\sqrt{a^2+b^2}\,f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^3\,d^2}+\frac{2\,b\,\sqrt{a^2+b^2}\,f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^3\,d^3}-\frac{2\,b\,\sqrt{a^2+b^2}\,f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^3\,d^3}+$$

$$\frac{2\,b\,f\,(e+f\,x)\,\text{Sinh}[c+d\,x]}{a^2\,d^2}+\frac{f^2\,\text{Cosh}[c+d\,x]\,\text{Sinh}[c+d\,x]}{4\,a\,d^3}+\frac{(e+f\,x)^2\,\text{Cosh}[c+d\,x]\,\text{Sinh}[c+d\,x]}{2\,a\,d}$$

Result (type 4, 2497 leaves):

$$\frac{e^2\left(\frac{c}{d}+x-\frac{2\,b\,\text{ArcTan}\left[\frac{a-b\,\text{Tanh}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}\;d}\right)\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])}{4\,a\,(a+b\,\text{Csch}[c+d\,x])}+\frac{1}{4\,a\,(a+b\,\text{Csch}[c+d\,x])}e\,f\,\text{Csch}[c+d\,x]$$

$$\Bigg(x^2+\frac{1}{d^2}2\,b\Bigg(\frac{i\,\pi\,\text{ArcTanh}\left[\frac{-a+b\,\text{Tanh}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}}+\frac{1}{\sqrt{-a^2-b^2}}\Bigg(2\left(c+i\,\text{ArcCos}\left[-\frac{i\,b}{a}\right]\right)\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]+(-2\,i\,c+\pi-2$$

$$i\,d\,x)\,\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]-\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]-2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{(a+i\,b)\left(a-i\,b+\sqrt{-a^2-b^2}\right)\left(1+i\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]-\Bigg(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2$$

$$\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\Bigg)\text{Log}\left[\frac{i\,(a+i\,b)\left(-a+i\,b+\sqrt{-a^2-b^2}\right)\left(i+\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]-2\,i\,\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\;e^{\frac{1}{4}(-2\,c-i\,\pi-2\,d\,x)}}{\sqrt{2}\,\sqrt{-i\,a}\,\sqrt{b+a\,\text{Sinh}[c+d\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]-2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\;e^{\frac{1}{4}(2\,c+i\,\pi+2\,d\,x)}}{\sqrt{2}\,\sqrt{-i\,a}\,\sqrt{b+a\,\text{Sinh}[c+d\,x]}}\right]+i\Bigg(\text{PolyLog}\left[2,\frac{\left(i\,b+\sqrt{-a^2-b^2}\right)\left(a+i\,b-i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]-$$

$$\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{-a^2-b^2}\right)\left(i\,a-b+\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]\Bigg)\Bigg)\Bigg)\Bigg)$$

$$(b+a\,\text{Sinh}[c+d\,x])+\frac{1}{12\,a\,(a+b\,\text{Csch}[c+d\,x])}f^2\,\text{Csch}[c+d\,x]\left(x^3-\frac{1}{d^3\sqrt{(a^2+b^2)\,e^{2\,c}}}\right.$$

$$3\, b\, e^{c} \left(d^2 x^2 \text{Log}\left[1+\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-d^2 x^2 \text{Log}\left[1+\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]+\right.$$

$$2\, d\, x\, \text{PolyLog}\left[2,-\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-2\, d\, x\, \text{PolyLog}\left[2,-\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-$$

$$\left.\left.2\, \text{PolyLog}\left[3,-\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]+2\, \text{PolyLog}\left[3,-\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]\right)\right)$$

$$(b+a\, \text{Sinh}[c+d\, x])+\frac{1}{24\, a^3\, (a+b\, \text{Csch}[c+d\, x])}$$

$$f^2\, \text{Csch}[c+d\, x] \left(2\left(a^2+4\, b^2\right) x^3-\right.$$

$$\frac{1}{d^3 \sqrt{\left(a^2+b^2\right) e^{2c}}}$$

$$6\, b \left(3\, a^2+4\, b^2\right) e^c \left(d^2 x^2 \text{Log}\left[1+\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-d^2 x^2 \text{Log}\left[1+\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]+2\, d\, x\, \text{PolyLog}\left[2,-\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-\right.$$

$$\left.2\, d\, x\, \text{PolyLog}\left[2,-\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]-2\, \text{PolyLog}\left[3,-\frac{a\, e^{2c+dx}}{b\, e^c-\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]+2\, \text{PolyLog}\left[3,-\frac{a\, e^{2c+dx}}{b\, e^c+\sqrt{\left(a^2+b^2\right) e^{2c}}}\right]\right)-$$

$$\frac{24\, a\, b\, \text{Cosh}[d\, x]\left(\left(2+d^2 x^2\right) \text{Cosh}[c]-2\, d\, x\, \text{Sinh}[c]\right)}{d^3}+\frac{3\, a^2\, \text{Cosh}[2\, d\, x]\left(-2\, d\, x\, \text{Cosh}[2\, c]+\left(1+2\, d^2 x^2\right) \text{Sinh}[2\, c]\right)}{d^3}-$$

$$\frac{24\, a\, b\left(-2\, d\, x\, \text{Cosh}[c]+\left(2+d^2 x^2\right) \text{Sinh}[c]\right) \text{Sinh}[d\, x]}{d^3}+$$

$$\left.\frac{3\, a^2\left(\left(1+2\, d^2 x^2\right) \text{Cosh}[2\, c]-2\, d\, x\, \text{Sinh}[2\, c]\right) \text{Sinh}[2\, d\, x]}{d^3}\right) (b+$$

$$a\, \text{Sinh}[c+d\, x])+$$

$$\left(e^2 \text{Csch}[c+d x] (b+a \text{Sinh}[c+d x]) \left((a^2+4 b^2)(c+d x) - \frac{2 b (3 a^2+4 b^2) \text{ArcTan}\left[\frac{a-b \text{Tanh}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}} - 4 a b \text{Cosh}[c+d x] + a^2 \text{Sinh}[2 (c+d x)]\right)\right) \Big/ \left(4 a^3 d (a+b \text{Csch}[c+d x])\right) +$$

$$\left(e f \text{Csch}[c+d x] (b+a \text{Sinh}[c+d x]) \left((a^2+4 b^2)(-c+d x)(c+d x) - 8 a b d x \text{Cosh}[c+d x] - a^2 \text{Cosh}[2 (c+d x)] - 4 b (3 a^2+4 b^2) \left(-\frac{c \text{ArcTan}\left[\frac{b+a e^{c+d x}}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}} + \frac{1}{2 \sqrt{a^2+b^2}} \left((c+d x)\left(\text{Log}\left[1+\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right] - \text{Log}\left[1+\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]\right) + \text{PolyLog}\left[2, \frac{a e^{c+d x}}{-b+\sqrt{a^2+b^2}}\right] - \text{PolyLog}\left[2, -\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]\right)\right) + 8 a b \text{Sinh}[c+d x] + 2 a^2 d x \text{Sinh}[2 (c+d x)]\right)\right) \Big/ \left(4 a^3 d^2 (a+b \text{Csch}[c+d x])\right)$$

Problem 24: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x) \text{Cosh}[c+d x]^2}{a+b \text{Csch}[c+d x]} \, dx$$

Optimal (type 4, 327 leaves, 16 steps) :

$$\frac{e\,x}{2\,a}+\frac{b^2\,e\,x}{a^3}+\frac{f\,x^2}{4\,a}+\frac{b^2\,f\,x^2}{2\,a^3}-\frac{b\,(e+f\,x)\,\text{Cosh}[c+d\,x]}{a^2\,d}-\frac{f\,\text{Cosh}[c+d\,x]^2}{4\,a\,d^2}-$$

$$\frac{b\,\sqrt{a^2+b^2}\,(e+f\,x)\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^3\,d}+\frac{b\,\sqrt{a^2+b^2}\,(e+f\,x)\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^3\,d}-\frac{b\,\sqrt{a^2+b^2}\,f\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^3\,d^2}+$$

$$\frac{b\,\sqrt{a^2+b^2}\,f\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^3\,d^2}+\frac{b\,f\,\text{Sinh}[c+d\,x]}{a^2\,d^2}+\frac{(e+f\,x)\,\text{Cosh}[c+d\,x]\,\text{Sinh}[c+d\,x]}{2\,a\,d}$$

Result (type 4, 1663 leaves) :

$$\frac{e\left(\frac{c}{d}+x-\frac{2\,b\,\text{ArcTan}\left[\frac{a-b\,\text{Tanh}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}\,d}\right)\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])}{4\,a\,(a+b\,\text{Csch}[c+d\,x])}+\frac{1}{8\,a\,(a+b\,\text{Csch}[c+d\,x])}f\,\text{Csch}[c+d\,x]$$

$$\left(x^2+\frac{1}{d^2}2\,b\left(\frac{i\,\pi\,\text{ArcTanh}\left[\frac{-a+b\,\text{Tanh}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}}+\frac{1}{\sqrt{-a^2-b^2}}\left(2\left(c+i\,\text{ArcCos}\left[-\frac{i\,b}{a}\right]\right)\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]+\left(-2\,i\,c+\pi-2\right.\right.\right.\right.$$

$$\left.i\,d\,x\right)\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]-\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]-2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{(a+i\,b)\left(a-i\,b+\sqrt{-a^2-b^2}\right)\left(1+i\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]-\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2\right.$$

$$\left.\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)\text{Log}\left[\frac{i\,(a+i\,b)\left(-a+i\,b+\sqrt{-a^2-b^2}\right)\left(i+\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}{a\left(a+i\,b+i\,\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]-2\,i\,\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\,e^{\frac{1}{4}(-2\,c-i\,\pi-2\,d\,x)}}{\sqrt{2}\,\sqrt{-i\,a}\,\sqrt{b+a\,\text{Sinh}[c+d\,x]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]-2\,\text{ArcTan}\left[\frac{(a-i\,b)\,\text{Cot}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]+2\,i\,\text{ArcTanh}\left[\frac{(-i\,a+b)\,\text{Tan}\left[\frac{1}{4}(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\; e^{\frac{1}{4}(2c+i\pi+2dx)}}{\sqrt{2}\sqrt{-i a}\sqrt{b+a\,\text{Sinh}[c+dx]}}\right]+i\left(\text{PolyLog}\left[2,\frac{\left(i b+\sqrt{-a^2-b^2}\right)\left(a+i b-i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]\right)}{a\left(a+i b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{\left(b+i\sqrt{-a^2-b^2}\right)\left(i a-b+\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]\right)}{a\left(a+i b+i\sqrt{-a^2-b^2}\,\text{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]\right)}\right]\right)\right)\right)\bigg/\left(b+a\,\text{Sinh}[c+dx]\right)+$$

$$\left(e\,\text{Csch}[c+dx]\left(b+a\,\text{Sinh}[c+dx]\right)\left(\left(a^2+4b^2\right)(c+dx)-\frac{2b\left(3a^2+4b^2\right)\text{ArcTan}\left[\frac{a-b\,\text{Tanh}\left[\frac{1}{2}(c+dx)\right]}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}}-\right.\right.$$

$$4ab\,\text{Cosh}[c+dx]+$$

$$\left.\left.a^2\,\text{Sinh}[2(c+dx)]\right)\right)\bigg/$$

$$\left(4a^3 d\left(a+b\,\text{Csch}[c+dx]\right)\right)+\left(f\,\text{Csch}[c+dx]\left(b+a\,\text{Sinh}[c+dx]\right)\right.$$

$$\left(\left(a^2+4b^2\right)(-c+dx)(c+dx)-\right.$$

$$8abdx\,\text{Cosh}[c+dx]-a^2\,\text{Cosh}[2(c+dx)]-$$

$$4b\left(3a^2+4b^2\right)\left(-\frac{c\,\text{ArcTan}\left[\frac{b+a e^{c+dx}}{\sqrt{-a^2-b^2}}\right]}{\sqrt{-a^2-b^2}}+\frac{1}{2\sqrt{a^2+b^2}}\right.$$

$$\left.\left.\left((c+dx)\left(\text{Log}\left[1+\frac{a e^{c+dx}}{b-\sqrt{a^2+b^2}}\right]-\text{Log}\left[1+\frac{a e^{c+dx}}{b+\sqrt{a^2+b^2}}\right]\right)+\text{PolyLog}\left[2,\frac{a e^{c+dx}}{-b+\sqrt{a^2+b^2}}\right]-\text{PolyLog}\left[2,-\frac{a e^{c+dx}}{b+\sqrt{a^2+b^2}}\right]\right)\right)+$$

$$8 a b \text{Sinh}[c+d x]+2 a^2 d x \text{Sinh}[2 (c+d x)]\Big)\Big)\Big/\left(8 a^3 d^2 (a+b \text{Csch}[c+d x])\right)$$

Problem 26: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x)^3 \text{Cosh}[c+d x]^3}{a+b \text{Csch}[c+d x]} \, dx$$

Optimal (type 4, 864 leaves, 31 steps):

$$-\frac{3 b f^3 x}{8 a^2 d^3}-\frac{b (e+f x)^3}{4 a^2 d}+\frac{b \left(a^2+b^2\right) (e+f x)^4}{4 a^4 f}-\frac{40 f^3 \text{Cosh}[c+d x]}{9 a d^4}-\frac{6 b^2 f^3 \text{Cosh}[c+d x]}{a^3 d^4}-\frac{2 f (e+f x)^2 \text{Cosh}[c+d x]}{a d^2}-$$
$$\frac{3 b^2 f (e+f x)^2 \text{Cosh}[c+d x]}{a^3 d^2}-\frac{2 f^3 \text{Cosh}[c+d x]^3}{27 a d^4}-\frac{f (e+f x)^2 \text{Cosh}[c+d x]^3}{3 a d^2}-\frac{b \left(a^2+b^2\right) (e+f x)^3 \text{Log}\left[1+\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d}-$$
$$\frac{b \left(a^2+b^2\right) (e+f x)^3 \text{Log}\left[1+\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d}-\frac{3 b \left(a^2+b^2\right) f (e+f x)^2 \text{PolyLog}\left[2,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d^2}-\frac{3 b \left(a^2+b^2\right) f (e+f x)^2 \text{PolyLog}\left[2,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d^2}+$$
$$\frac{6 b \left(a^2+b^2\right) f^2 (e+f x) \text{PolyLog}\left[3,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d^3}+\frac{6 b \left(a^2+b^2\right) f^2 (e+f x) \text{PolyLog}\left[3,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d^3}-\frac{6 b \left(a^2+b^2\right) f^3 \text{PolyLog}\left[4,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d^4}-$$
$$\frac{6 b \left(a^2+b^2\right) f^3 \text{PolyLog}\left[4,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d^4}+\frac{40 f^2 (e+f x) \text{Sinh}[c+d x]}{9 a d^3}+\frac{6 b^2 f^2 (e+f x) \text{Sinh}[c+d x]}{a^3 d^3}+\frac{2 (e+f x)^3 \text{Sinh}[c+d x]}{3 a d}+$$
$$\frac{b^2 (e+f x)^3 \text{Sinh}[c+d x]}{a^3 d}+\frac{3 b f^3 \text{Cosh}[c+d x] \text{Sinh}[c+d x]}{8 a^2 d^4}+\frac{3 b f (e+f x)^2 \text{Cosh}[c+d x] \text{Sinh}[c+d x]}{4 a^2 d^2}+$$
$$\frac{2 f^2 (e+f x) \text{Cosh}[c+d x]^2 \text{Sinh}[c+d x]}{9 a d^3}+\frac{(e+f x)^3 \text{Cosh}[c+d x]^2 \text{Sinh}[c+d x]}{3 a d}-\frac{3 b f^2 (e+f x) \text{Sinh}[c+d x]^2}{4 a^2 d^3}-\frac{b (e+f x)^3 \text{Sinh}[c+d x]^2}{2 a^2 d}$$

Result (type 4, 5945 leaves):

$$\frac{1}{4 a^2 d^3 (a+b \text{Csch}[c+d x])} e f^2 \text{Csch}[c+d x] \left(-12 b d x \text{PolyLog}\left[2,-\frac{a e^{2 c+d x}}{b e^c-\sqrt{\left(a^2+b^2\right) e^{2 c}}}\right]-12 b d x \text{PolyLog}\left[2,-\frac{a e^{2 c+d x}}{b e^c+\sqrt{\left(a^2+b^2\right) e^{2 c}}}\right]+\right.$$
$$e^{-c} \Big(2 b d^3 e^c x^3-6 a \text{Cosh}[d x]+6 a e^{2 c} \text{Cosh}[d x]-6 a d x \text{Cosh}[d x]-6 a d e^{2 c} x \text{Cosh}[d x]-3 a d^2 x^2 \text{Cosh}[d x]+$$

$$3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x] - 6\,b\,d^2\,e^{c}\,x^2\,\text{Log}\Big[1 + \frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] - 6\,b\,d^2\,e^{c}\,x^2\,\text{Log}\Big[1 + \frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] +$$

$$12\,b\,e^{c}\,\text{PolyLog}\Big[3, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] + 12\,b\,e^{c}\,\text{PolyLog}\Big[3, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] + 6\,a\,\text{Sinh}[d\,x] + 6\,a\,e^{2\,c}\,\text{Sinh}[d\,x] +$$

$$6\,a\,d\,x\,\text{Sinh}[d\,x] - 6\,a\,d\,e^{2\,c}\,x\,\text{Sinh}[d\,x] + 3\,a\,d^2\,x^2\,\text{Sinh}[d\,x] + 3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Sinh}[d\,x]\Bigg)\Bigg)\,(b + a\,\text{Sinh}[c + d\,x]) +$$

$$\frac{1}{8\,a^2\,d^4\,(a + b\,\text{Csch}[c + d\,x])}\,f^3\,\text{Csch}[c + d\,x]\,\Bigg(-12\,b\,d^2\,x^2\,\text{PolyLog}\Big[2, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] +$$

$$e^{-c}\,\Bigg(b\,d^4\,e^{c}\,x^4 - 12\,a\,\text{Cosh}[d\,x] - 12\,a\,e^{2\,c}\,\text{Cosh}[d\,x] - 12\,a\,d\,x\,\text{Cosh}[d\,x] + 12\,a\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x] - 6\,a\,d^2\,x^2\,\text{Cosh}[d\,x] - 6\,a\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x] -$$

$$2\,a\,d^3\,x^3\,\text{Cosh}[d\,x] + 2\,a\,d^3\,e^{2\,c}\,x^3\,\text{Cosh}[d\,x] - 4\,b\,d^3\,e^{c}\,x^3\,\text{Log}\Big[1 + \frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] - 4\,b\,d^3\,e^{c}\,x^3\,\text{Log}\Big[1 + \frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] -$$

$$12\,b\,d^2\,e^{c}\,x^2\,\text{PolyLog}\Big[2, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] + 24\,b\,d\,e^{c}\,x\,\text{PolyLog}\Big[3, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] +$$

$$24\,b\,d\,e^{c}\,x\,\text{PolyLog}\Big[3, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] - 24\,b\,e^{c}\,\text{PolyLog}\Big[4, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} - \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] -$$

$$24\,b\,e^{c}\,\text{PolyLog}\Big[4, -\frac{a\,e^{2\,c+d\,x}}{b\,e^{c} + \sqrt{(a^2+b^2)\,e^{2\,c}}}\Big] + 12\,a\,\text{Sinh}[d\,x] - 12\,a\,e^{2\,c}\,\text{Sinh}[d\,x] + 12\,a\,d\,x\,\text{Sinh}[d\,x] + 12\,a\,d\,e^{2\,c}\,x\,\text{Sinh}[d\,x] +$$

$$6\,a\,d^2\,x^2\,\text{Sinh}[d\,x] - 6\,a\,d^2\,e^{2\,c}\,x^2\,\text{Sinh}[d\,x] + 2\,a\,d^3\,x^3\,\text{Sinh}[d\,x] + 2\,a\,d^3\,e^{2\,c}\,x^3\,\text{Sinh}[d\,x]\Bigg)\Bigg)\,(b + a\,\text{Sinh}[c + d\,x]) +$$

$$\frac{1}{144\,a^4\,d^3\,(a + b\,\text{Csch}[c + d\,x])}\,e\,e^{-3\,c}\,f^2\,\text{Csch}[c + d\,x]\,\Big(72\,a^2\,b\,d^3\,e^{3\,c}\,x^3 + 144\,b^3\,d^3\,e^{3\,c}\,x^3 - 108\,a^3\,e^{2\,c}\,\text{Cosh}[d\,x] - 432\,a\,b^2\,e^{2\,c}\,\text{Cosh}[d\,x] +$$

$$108\,a^3\,e^{4\,c}\,\text{Cosh}[d\,x] + 432\,a\,b^2\,e^{4\,c}\,\text{Cosh}[d\,x] - 108\,a^3\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x] - 432\,a\,b^2\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x] -$$
$$108\,a^3\,d\,e^{4\,c}\,x\,\text{Cosh}[d\,x] - 432\,a\,b^2\,d\,e^{4\,c}\,x\,\text{Cosh}[d\,x] - 54\,a^3\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x] - 216\,a\,b^2\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x] +$$
$$54\,a^3\,d^2\,e^{4\,c}\,x^2\,\text{Cosh}[d\,x] + 216\,a\,b^2\,d^2\,e^{4\,c}\,x^2\,\text{Cosh}[d\,x] - 27\,a^2\,b\,e^{c}\,\text{Cosh}[2\,d\,x] - 27\,a^2\,b\,e^{5\,c}\,\text{Cosh}[2\,d\,x] -$$
$$54\,a^2\,b\,d\,e^{c}\,x\,\text{Cosh}[2\,d\,x] + 54\,a^2\,b\,d\,e^{5\,c}\,x\,\text{Cosh}[2\,d\,x] - 54\,a^2\,b\,d^2\,e^{c}\,x^2\,\text{Cosh}[2\,d\,x] - 54\,a^2\,b\,d^2\,e^{5\,c}\,x^2\,\text{Cosh}[2\,d\,x] -$$
$$4\,a^3\,\text{Cosh}[3\,d\,x] + 4\,a^3\,e^{6\,c}\,\text{Cosh}[3\,d\,x] - 12\,a^3\,d\,x\,\text{Cosh}[3\,d\,x] - 12\,a^3\,d\,e^{6\,c}\,x\,\text{Cosh}[3\,d\,x] - 18\,a^3\,d^2\,x^2\,\text{Cosh}[3\,d\,x] +$$

$$18 a^3 d^2 e^{6c} x^2 \text{Cosh}[3 d x] - 216 a^2 b d^2 e^{3c} x^2 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] - 432 b^3 d^2 e^{3c} x^2 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] -$$

$$216 a^2 b d^2 e^{3c} x^2 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] - 432 b^3 d^2 e^{3c} x^2 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] -$$

$$432 b (a^2 + 2 b^2) d e^{3c} x \text{PolyLog}\left[2, -\frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] - 432 b (a^2 + 2 b^2) d e^{3c} x \text{PolyLog}\left[2, -\frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] +$$

$$432 a^2 b e^{3c} \text{PolyLog}\left[3, -\frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] + 864 b^3 e^{3c} \text{PolyLog}\left[3, -\frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] +$$

$$432 a^2 b e^{3c} \text{PolyLog}\left[3, -\frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] + 864 b^3 e^{3c} \text{PolyLog}\left[3, -\frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] + 108 a^3 e^{2c} \text{Sinh}[d x] +$$

$$432 a b^2 e^{2c} \text{Sinh}[d x] + 108 a^3 e^{4c} \text{Sinh}[d x] + 432 a b^2 e^{4c} \text{Sinh}[d x] + 108 a^3 d e^{2c} x \text{Sinh}[d x] + 432 a b^2 d e^{2c} x \text{Sinh}[d x] -$$
$$108 a^3 d e^{4c} x \text{Sinh}[d x] - 432 a b^2 d e^{4c} x \text{Sinh}[d x] + 54 a^3 d^2 e^{2c} x^2 \text{Sinh}[d x] + 216 a b^2 d^2 e^{2c} x^2 \text{Sinh}[d x] +$$
$$54 a^3 d^2 e^{4c} x^2 \text{Sinh}[d x] + 216 a b^2 d^2 e^{4c} x^2 \text{Sinh}[d x] + 27 a^2 b e^c \text{Sinh}[2 d x] - 27 a^2 b e^{5c} \text{Sinh}[2 d x] + 54 a^2 b d e^c x \text{Sinh}[2 d x] +$$
$$54 a^2 b d e^{5c} x \text{Sinh}[2 d x] + 54 a^2 b d^2 e^c x^2 \text{Sinh}[2 d x] - 54 a^2 b d^2 e^{5c} x^2 \text{Sinh}[2 d x] + 4 a^3 \text{Sinh}[3 d x] + 4 a^3 e^{6c} \text{Sinh}[3 d x] +$$
$$\left.12 a^3 d x \text{Sinh}[3 d x] - 12 a^3 d e^{6c} x \text{Sinh}[3 d x] + 18 a^3 d^2 x^2 \text{Sinh}[3 d x] + 18 a^3 d^2 e^{6c} x^2 \text{Sinh}[3 d x]\right) (b + a \text{Sinh}[c + d x]) +$$

$$\frac{1}{864 a^4 d^4 (a + b \text{Csch}[c + d x])} e^{-3c} f^3 \text{Csch}[c + d x] \left(108 a^2 b d^4 e^{3c} x^4 + 216 b^3 d^4 e^{3c} x^4 - 648 a^3 e^{2c} \text{Cosh}[d x] - 2592 a b^2 e^{2c} \text{Cosh}[d x] -\right.$$
$$648 a^3 e^{4c} \text{Cosh}[d x] - 2592 a b^2 e^{4c} \text{Cosh}[d x] - 648 a^3 d e^{2c} x \text{Cosh}[d x] - 2592 a b^2 d e^{2c} x \text{Cosh}[d x] + 648 a^3 d e^{4c} x \text{Cosh}[d x] +$$
$$2592 a b^2 d e^{4c} x \text{Cosh}[d x] - 324 a^3 d^2 e^{2c} x^2 \text{Cosh}[d x] - 1296 a b^2 d^2 e^{2c} x^2 \text{Cosh}[d x] - 324 a^3 d^2 e^{4c} x^2 \text{Cosh}[d x] -$$
$$1296 a b^2 d^2 e^{4c} x^2 \text{Cosh}[d x] - 108 a^3 d^3 e^{2c} x^3 \text{Cosh}[d x] - 432 a b^2 d^3 e^{2c} x^3 \text{Cosh}[d x] + 108 a^3 d^3 e^{4c} x^3 \text{Cosh}[d x] + 432 a b^2 d^3 e^{4c} x^3 \text{Cosh}[d x] -$$
$$81 a^2 b e^c \text{Cosh}[2 d x] + 81 a^2 b e^{5c} \text{Cosh}[2 d x] - 162 a^2 b d e^c x \text{Cosh}[2 d x] - 162 a^2 b d e^{5c} x \text{Cosh}[2 d x] - 162 a^2 b d^2 e^c x^2 \text{Cosh}[2 d x] +$$
$$162 a^2 b d^2 e^{5c} x^2 \text{Cosh}[2 d x] - 108 a^2 b d^3 e^c x^3 \text{Cosh}[2 d x] - 108 a^2 b d^3 e^{5c} x^3 \text{Cosh}[2 d x] - 8 a^3 \text{Cosh}[3 d x] - 8 a^3 e^{6c} \text{Cosh}[3 d x] -$$
$$24 a^3 d x \text{Cosh}[3 d x] + 24 a^3 d e^{6c} x \text{Cosh}[3 d x] - 36 a^3 d^2 x^2 \text{Cosh}[3 d x] - 36 a^3 d^2 e^{6c} x^2 \text{Cosh}[3 d x] - 36 a^3 d^3 x^3 \text{Cosh}[3 d x] +$$

$$36 a^3 d^3 e^{6c} x^3 \text{Cosh}[3 d x] - 432 a^2 b d^3 e^{3c} x^3 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] - 864 b^3 d^3 e^{3c} x^3 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] -$$

$$432 a^2 b d^3 e^{3c} x^3 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] - 864 b^3 d^3 e^{3c} x^3 \text{Log}\left[1 + \frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] -$$

$$1296 b (a^2 + 2 b^2) d^2 e^{3c} x^2 \text{PolyLog}\left[2, -\frac{a e^{2c+dx}}{b e^c - \sqrt{(a^2+b^2) e^{2c}}}\right] - 1296 b (a^2 + 2 b^2) d^2 e^{3c} x^2 \text{PolyLog}\left[2, -\frac{a e^{2c+dx}}{b e^c + \sqrt{(a^2+b^2) e^{2c}}}\right] +$$

$$2592\, a^2\, b\, d\, e^{3c}\, x\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 5184\, b^3\, d\, e^{3c}\, x\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] +$$
$$2592\, a^2\, b\, d\, e^{3c}\, x\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 5184\, b^3\, d\, e^{3c}\, x\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] -$$
$$2592\, a^2\, b\, e^{3c}\, \text{PolyLog}\left[4, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] - 5184\, b^3\, e^{3c}\, \text{PolyLog}\left[4, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] -$$
$$2592\, a^2\, b\, e^{3c}\, \text{PolyLog}\left[4, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] - 5184\, b^3\, e^{3c}\, \text{PolyLog}\left[4, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 648\, a^3\, e^{2c}\, \text{Sinh}[d\, x] +$$
$$2592\, a\, b^2\, e^{2c}\, \text{Sinh}[d\, x] - 648\, a^3\, e^{4c}\, \text{Sinh}[d\, x] - 2592\, a\, b^2\, e^{4c}\, \text{Sinh}[d\, x] + 648\, a^3\, d\, e^{2c}\, x\, \text{Sinh}[d\, x] + 2592\, a\, b^2\, d\, e^{2c}\, x\, \text{Sinh}[d\, x] +$$
$$648\, a^3\, d\, e^{4c}\, x\, \text{Sinh}[d\, x] + 2592\, a\, b^2\, d\, e^{4c}\, x\, \text{Sinh}[d\, x] + 324\, a^3\, d^2\, e^{2c}\, x^2\, \text{Sinh}[d\, x] + 1296\, a\, b^2\, d^2\, e^{2c}\, x^2\, \text{Sinh}[d\, x] -$$
$$324\, a^3\, d^2\, e^{4c}\, x^2\, \text{Sinh}[d\, x] - 1296\, a\, b^2\, d^2\, e^{4c}\, x^2\, \text{Sinh}[d\, x] + 108\, a^3\, d^3\, e^{2c}\, x^3\, \text{Sinh}[d\, x] + 432\, a\, b^2\, d^3\, e^{2c}\, x^3\, \text{Sinh}[d\, x] +$$
$$108\, a^3\, d^3\, e^{4c}\, x^3\, \text{Sinh}[d\, x] + 432\, a\, b^2\, d^3\, e^{4c}\, x^3\, \text{Sinh}[d\, x] + 81\, a^2\, b\, e^c\, \text{Sinh}[2\, d\, x] + 81\, a^2\, b\, e^{5c}\, \text{Sinh}[2\, d\, x] + 162\, a^2\, b\, d\, e^c\, x\, \text{Sinh}[2\, d\, x] -$$
$$162\, a^2\, b\, d\, e^{5c}\, x\, \text{Sinh}[2\, d\, x] + 162\, a^2\, b\, d^2\, e^c\, x^2\, \text{Sinh}[2\, d\, x] + 162\, a^2\, b\, d^2\, e^{5c}\, x^2\, \text{Sinh}[2\, d\, x] + 108\, a^2\, b\, d^3\, e^c\, x^3\, \text{Sinh}[2\, d\, x] -$$
$$108\, a^2\, b\, d^3\, e^{5c}\, x^3\, \text{Sinh}[2\, d\, x] + 8\, a^3\, \text{Sinh}[3\, d\, x] - 8\, a^3\, e^{6c}\, \text{Sinh}[3\, d\, x] + 24\, a^3\, d\, x\, \text{Sinh}[3\, d\, x] + 24\, a^3\, d\, e^{6c}\, x\, \text{Sinh}[3\, d\, x] +$$
$$\left.36\, a^3\, d^2\, x^2\, \text{Sinh}[3\, d\, x] - 36\, a^3\, d^2\, e^{6c}\, x^2\, \text{Sinh}[3\, d\, x] + 36\, a^3\, d^3\, x^3\, \text{Sinh}[3\, d\, x] + 36\, a^3\, d^3\, e^{6c}\, x^3\, \text{Sinh}[3\, d\, x]\right)\, (b + a\, \text{Sinh}[c + d\, x]) +$$

$$\frac{e^3\, \text{Csch}[c + d\, x]\, (b + a\, \text{Sinh}[c + d\, x])\, \left(-\frac{2\, b\, \text{Log}[b + a\, \text{Sinh}[c + d\, x]]}{a^2\, d} + \frac{2\, \text{Sinh}[c + d\, x]}{a\, d}\right)}{4\, (a + b\, \text{Csch}[c + d\, x])} +$$

$$\frac{1}{2\, a^2\, d^2\, (a + b\, \text{Csch}[c + d\, x])}$$
$$3\, e^2\, f\, \text{Csch}[c + d\, x]\, (b + a\, \text{Sinh}[c + d\, x])$$
$$\left(-a\, \text{Cosh}[c + d\, x] - b\, (c + d\, x)\, \text{Log}[b + a\, \text{Sinh}[c + d\, x]] + b\, c\, \text{Log}\left[1 + \frac{a\, \text{Sinh}[c + d\, x]}{b}\right] +\right.$$
$$i\, b\, \left(-\frac{1}{8}\, i\, (2\, c + i\, \pi + 2\, d\, x)^2 - 4\, i\, \text{ArcSin}\left[\frac{\sqrt{1 + \frac{i\, b}{a}}}{\sqrt{2}}\right]\, \text{ArcTan}\left[\frac{(i\, a + b)\, \text{Cot}\left[\frac{1}{4}\, (2\, i\, c + \pi + 2\, i\, d\, x)\right]}{\sqrt{a^2 + b^2}}\right] -\right.$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x+4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]-$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x-4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\left(\frac{\pi}{2}-i\left(c+d\,x\right)\right)\text{Log}[b+a\,\text{Sinh}[c+d\,x]]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]\right)\Bigg)+a\,d\,x\,\text{Sinh}[c+d\,x]\Bigg)+$$

$$\frac{1}{8\left(a+b\,\text{Csch}[c+d\,x]\right)}e^3\,\text{Csch}[c+d\,x]\left(b+a\,\text{Sinh}[c+d\,x]\right)\left(-\frac{2\,b\,\text{Cosh}\left[2\left(c+d\,x\right)\right]}{a^2\,d}-\frac{4\left(a^2\,b+2\,b^3\right)\text{Log}[b+a\,\text{Sinh}[c+d\,x]]}{a^4\,d}+\right.$$

$$\left.\frac{2\left(a^2+4\,b^2\right)\text{Sinh}[c+d\,x]}{a^3\,d}+\frac{2\,\text{Sinh}\left[3\left(c+d\,x\right)\right]}{3\,a\,d}\right)+$$

$$\frac{1}{24\,a^4\,d^2\left(a+b\,\text{Csch}[c+d\,x]\right)}e^2\,f\,\text{Csch}[c+d\,x]\left(b+a\,\text{Sinh}[c+d\,x]\right)$$

$$\Bigg(-18\,a\left(a^2+4\,b^2\right)\text{Cosh}[c+d\,x]-18\,a^2\,b\,d\,x\,\text{Cosh}\left[2\left(c+d\,x\right)\right]-2\,a^3\,\text{Cosh}\left[3\left(c+d\,x\right)\right]+36\,a^2\,b\,c\,\text{Log}\left[1+\frac{a\,\text{Sinh}[c+d\,x]}{b}\right]+$$

$$72\,b^3\,c\,\text{Log}\left[1+\frac{a\,\text{Sinh}[c+d\,x]}{b}\right]-36\,a^2\,b\left(-\frac{1}{8}\left(2\,c+i\,\pi+2\,d\,x\right)^2-4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{\left(i\,a+b\right)\text{Cot}\left[\frac{1}{4}\left(2\,i\,c+\pi+2\,i\,d\,x\right)\right]}{\sqrt{a^2+b^2}}\right]+\right.$$

$$\frac{1}{2}\left(2\,c+i\,\pi+2\,d\,x+4\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\frac{1}{2}\left(2\,c+i\,\pi+2\,d\,x-4\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)$$

$$\text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-\frac{1}{2} i \pi \text{Log}[b+a \text{Sinh}[c+d x]]+\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]\Bigg)-$$

$$72 b^3 \left(-\frac{1}{8} (2 c+i \pi+2 d x)^2-4 \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \text{ArcTan}\left[\frac{(i a+b) \text{Cot}\left[\frac{1}{4} (2 i c+\pi+2 i d x)\right]}{\sqrt{a^2+b^2}}\right]+\frac{1}{2} \left(2 c+i \pi+2 d x+4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right)\right.$$

$$\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\frac{1}{2} \left(2 c+i \pi+2 d x-4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right) \text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$\left.\frac{1}{2} i \pi \text{Log}[b+a \text{Sinh}[c+d x]]+\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]\right)+$$

$$\left.18 a \left(a^2+4 b^2\right) d x \text{Sinh}[c+d x]+9 a^2 b \text{Sinh}[2 (c+d x)]+6 a^3 d x \text{Sinh}[3 (c+d x)]\right)$$

Problem 27: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x)^2 \text{Cosh}[c+d x]^3}{a+b \text{Csch}[c+d x]} \, dx$$

Optimal (type 4, 636 leaves, 24 steps):

$$-\frac{b\,e\,f\,x}{2\,a^2\,d}-\frac{b\,f^2\,x^2}{4\,a^2\,d}+\frac{b\left(a^2+b^2\right)(e+f\,x)^3}{3\,a^4\,f}-\frac{4\,f\,(e+f\,x)\,\text{Cosh}[c+d\,x]}{3\,a\,d^2}-\frac{2\,b^2\,f\,(e+f\,x)\,\text{Cosh}[c+d\,x]}{a^3\,d^2}-\frac{2\,f\,(e+f\,x)\,\text{Cosh}[c+d\,x]^3}{9\,a\,d^2}-$$

$$\frac{b\left(a^2+b^2\right)(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^4\,d}-\frac{b\left(a^2+b^2\right)(e+f\,x)^2\,\text{Log}\left[1+\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^4\,d}-\frac{2\,b\left(a^2+b^2\right)f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^4\,d^2}-$$

$$\frac{2\,b\left(a^2+b^2\right)f\,(e+f\,x)\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^4\,d^2}+\frac{2\,b\left(a^2+b^2\right)f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b-\sqrt{a^2+b^2}}\right]}{a^4\,d^3}+\frac{2\,b\left(a^2+b^2\right)f^2\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x}}{b+\sqrt{a^2+b^2}}\right]}{a^4\,d^3}+$$

$$\frac{14\,f^2\,\text{Sinh}[c+d\,x]}{9\,a\,d^3}+\frac{2\,b^2\,f^2\,\text{Sinh}[c+d\,x]}{a^3\,d^3}+\frac{2\,(e+f\,x)^2\,\text{Sinh}[c+d\,x]}{3\,a\,d}+\frac{b^2\,(e+f\,x)^2\,\text{Sinh}[c+d\,x]}{a^3\,d}+\frac{b\,f\,(e+f\,x)\,\text{Cosh}[c+d\,x]\,\text{Sinh}[c+d\,x]}{2\,a^2\,d^2}+$$

$$\frac{(e+f\,x)^2\,\text{Cosh}[c+d\,x]^2\,\text{Sinh}[c+d\,x]}{3\,a\,d}-\frac{b\,f^2\,\text{Sinh}[c+d\,x]^2}{4\,a^2\,d^3}-\frac{b\,(e+f\,x)^2\,\text{Sinh}[c+d\,x]^2}{2\,a^2\,d}+\frac{2\,f^2\,\text{Sinh}[c+d\,x]^3}{27\,a\,d^3}$$

Result (type 4, 3303 leaves):

$$\frac{1}{12\,a^2\,d^3\,(a+b\,\text{Csch}[c+d\,x])}\,f^2\,\text{Csch}[c+d\,x]\left(-12\,b\,d\,x\,\text{PolyLog}\left[2,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]-12\,b\,d\,x\,\text{PolyLog}\left[2,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]+\right.$$

$$e^{-c}\left(2\,b\,d^3\,e^c\,x^3-6\,a\,\text{Cosh}[d\,x]+6\,a\,e^{2\,c}\,\text{Cosh}[d\,x]-6\,a\,d\,x\,\text{Cosh}[d\,x]-6\,a\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x]-3\,a\,d^2\,x^2\,\text{Cosh}[d\,x]+\right.$$

$$3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x]-6\,b\,d^2\,e^c\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]-6\,b\,d^2\,e^c\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]+$$

$$12\,b\,e^c\,\text{PolyLog}\left[3,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]+12\,b\,e^c\,\text{PolyLog}\left[3,-\frac{a\,e^{2\,c+d\,x}}{b\,e^c+\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]+6\,a\,\text{Sinh}[d\,x]+6\,a\,e^{2\,c}\,\text{Sinh}[d\,x]+$$

$$\left.\left.6\,a\,d\,x\,\text{Sinh}[d\,x]-6\,a\,d\,e^{2\,c}\,x\,\text{Sinh}[d\,x]+3\,a\,d^2\,x^2\,\text{Sinh}[d\,x]+3\,a\,d^2\,e^{2\,c}\,x^2\,\text{Sinh}[d\,x]\right)\right)(b+a\,\text{Sinh}[c+d\,x])+$$

$$\frac{1}{432\,a^4\,d^3\,(a+b\,\text{Csch}[c+d\,x])}\,e^{-3\,c}\,f^2\,\text{Csch}[c+d\,x]\left(72\,a^2\,b\,d^3\,e^{3\,c}\,x^3+144\,b^3\,d^3\,e^{3\,c}\,x^3-108\,a^3\,e^{2\,c}\,\text{Cosh}[d\,x]-432\,a\,b^2\,e^{2\,c}\,\text{Cosh}[d\,x]+\right.$$

$$108\,a^3\,e^{4\,c}\,\text{Cosh}[d\,x]+432\,a\,b^2\,e^{4\,c}\,\text{Cosh}[d\,x]-108\,a^3\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x]-432\,a\,b^2\,d\,e^{2\,c}\,x\,\text{Cosh}[d\,x]-108\,a^3\,d\,e^{4\,c}\,x\,\text{Cosh}[d\,x]-$$

$$432\,a\,b^2\,d\,e^{4\,c}\,x\,\text{Cosh}[d\,x]-54\,a^3\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x]-216\,a\,b^2\,d^2\,e^{2\,c}\,x^2\,\text{Cosh}[d\,x]+54\,a^3\,d^2\,e^{4\,c}\,x^2\,\text{Cosh}[d\,x]+216\,a\,b^2\,d^2\,e^{4\,c}\,x^2\,\text{Cosh}[d\,x]-$$

$$27\,a^2\,b\,e^c\,\text{Cosh}[2\,d\,x]-27\,a^2\,b\,e^{5\,c}\,\text{Cosh}[2\,d\,x]-54\,a^2\,b\,d\,e^c\,x\,\text{Cosh}[2\,d\,x]+54\,a^2\,b\,d\,e^{5\,c}\,x\,\text{Cosh}[2\,d\,x]-54\,a^2\,b\,d^2\,e^c\,x^2\,\text{Cosh}[2\,d\,x]-$$

$$54\,a^2\,b\,d^2\,e^{5\,c}\,x^2\,\text{Cosh}[2\,d\,x]-4\,a^3\,\text{Cosh}[3\,d\,x]+4\,a^3\,e^{6\,c}\,\text{Cosh}[3\,d\,x]-12\,a^3\,d\,x\,\text{Cosh}[3\,d\,x]-12\,a^3\,d\,e^{6\,c}\,x\,\text{Cosh}[3\,d\,x]-18\,a^3\,d^2\,x^2\,\text{Cosh}[3\,d\,x]+$$

$$18\,a^3\,d^2\,e^{6\,c}\,x^2\,\text{Cosh}[3\,d\,x]-216\,a^2\,b\,d^2\,e^{3\,c}\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]-432\,b^3\,d^2\,e^{3\,c}\,x^2\,\text{Log}\left[1+\frac{a\,e^{2\,c+d\,x}}{b\,e^c-\sqrt{\left(a^2+b^2\right)e^{2\,c}}}\right]-$$

$$216\, a^2\, b\, d^2\, e^{3c}\, x^2\, \text{Log}\left[1 + \frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] - 432\, b^3\, d^2\, e^{3c}\, x^2\, \text{Log}\left[1 + \frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] -$$

$$432\, b\, (a^2 + 2\, b^2)\, d\, e^{3c}\, x\, \text{PolyLog}\left[2, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] - 432\, b\, (a^2 + 2\, b^2)\, d\, e^{3c}\, x\, \text{PolyLog}\left[2, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] +$$

$$432\, a^2\, b\, e^{3c}\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 864\, b^3\, e^{3c}\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c - \sqrt{(a^2+b^2)\, e^{2c}}}\right] +$$

$$432\, a^2\, b\, e^{3c}\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 864\, b^3\, e^{3c}\, \text{PolyLog}\left[3, -\frac{a\, e^{2c+dx}}{b\, e^c + \sqrt{(a^2+b^2)\, e^{2c}}}\right] + 108\, a^3\, e^{2c}\, \text{Sinh}[d\, x] +$$

$$432\, a\, b^2\, e^{2c}\, \text{Sinh}[d\, x] + 108\, a^3\, e^{4c}\, \text{Sinh}[d\, x] + 432\, a\, b^2\, e^{4c}\, \text{Sinh}[d\, x] + 108\, a^3\, d\, e^{2c}\, x\, \text{Sinh}[d\, x] + 432\, a\, b^2\, d\, e^{2c}\, x\, \text{Sinh}[d\, x] -$$
$$108\, a^3\, d\, e^{4c}\, x\, \text{Sinh}[d\, x] - 432\, a\, b^2\, d\, e^{4c}\, x\, \text{Sinh}[d\, x] + 54\, a^3\, d^2\, e^{2c}\, x^2\, \text{Sinh}[d\, x] + 216\, a\, b^2\, d^2\, e^{2c}\, x^2\, \text{Sinh}[d\, x] +$$
$$54\, a^3\, d^2\, e^{4c}\, x^2\, \text{Sinh}[d\, x] + 216\, a\, b^2\, d^2\, e^{4c}\, x^2\, \text{Sinh}[d\, x] + 27\, a^2\, b\, e^c\, \text{Sinh}[2\, d\, x] - 27\, a^2\, b\, e^{5c}\, \text{Sinh}[2\, d\, x] + 54\, a^2\, b\, d\, e^c\, x\, \text{Sinh}[2\, d\, x] +$$
$$54\, a^2\, b\, d\, e^{5c}\, x\, \text{Sinh}[2\, d\, x] + 54\, a^2\, b\, d^2\, e^c\, x^2\, \text{Sinh}[2\, d\, x] - 54\, a^2\, b\, d^2\, e^{5c}\, x^2\, \text{Sinh}[2\, d\, x] + 4\, a^3\, \text{Sinh}[3\, d\, x] + 4\, a^3\, e^{6c}\, \text{Sinh}[3\, d\, x] +$$

$$\left. 12\, a^3\, d\, x\, \text{Sinh}[3\, d\, x] - 12\, a^3\, d\, e^{6c}\, x\, \text{Sinh}[3\, d\, x] + 18\, a^3\, d^2\, x^2\, \text{Sinh}[3\, d\, x] + 18\, a^3\, d^2\, e^{6c}\, x^2\, \text{Sinh}[3\, d\, x] \right) (b + a\, \text{Sinh}[c + d\, x]) +$$

$$\frac{e^2\, \text{Csch}[c + d\, x]\, (b + a\, \text{Sinh}[c + d\, x]) \left(-\frac{2\, b\, \text{Log}[b + a\, \text{Sinh}[c + d\, x]]}{a^2\, d} + \frac{2\, \text{Sinh}[c + d\, x]}{a\, d}\right)}{4\, (a + b\, \text{Csch}[c + d\, x])} +$$

$$\frac{1}{a^2\, d^2\, (a + b\, \text{Csch}[c + d\, x])}$$
$$e\, f\, \text{Csch}[c + d\, x]\, (b + a\, \text{Sinh}[c + d\, x])$$

$$\left(-a\, \text{Cosh}[c + d\, x] - b\, (c + d\, x)\, \text{Log}[b + a\, \text{Sinh}[c + d\, x]] + b\, c\, \text{Log}\left[1 + \frac{a\, \text{Sinh}[c + d\, x]}{b}\right] + \right.$$

$$i\, b \left(-\frac{1}{8}\, i\, (2\, c + i\, \pi + 2\, d\, x)^2 - 4\, i\, \text{ArcSin}\left[\frac{\sqrt{1 + \frac{i\, b}{a}}}{\sqrt{2}}\right] \text{ArcTan}\left[\frac{(i\, a + b)\, \text{Cot}\left[\frac{1}{4}\, (2\, i\, c + \pi + 2\, i\, d\, x)\right]}{\sqrt{a^2 + b^2}}\right] - \right.$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x+4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]-$$

$$\frac{1}{2}\left(-2\,i\,c+\pi-2\,i\,d\,x-4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\left(\frac{\pi}{2}-i\,(c+d\,x)\right)\text{Log}[b+a\,\text{Sinh}[c+d\,x]]+$$

$$i\left(\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]\right)\Bigg)+a\,d\,x\,\text{Sinh}[c+d\,x]\Bigg)+$$

$$\frac{1}{8\,(a+b\,\text{Csch}[c+d\,x])}e^2\,\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])\left(-\frac{2\,b\,\text{Cosh}[2\,(c+d\,x)]}{a^2\,d}-\frac{4\,(a^2\,b+2\,b^3)\,\text{Log}[b+a\,\text{Sinh}[c+d\,x]]}{a^4\,d}+\right.$$

$$\left.\frac{2\,(a^2+4\,b^2)\,\text{Sinh}[c+d\,x]}{a^3\,d}+\frac{2\,\text{Sinh}[3\,(c+d\,x)]}{3\,a\,d}\right)+$$

$$\frac{1}{36\,a^4\,d^2\,(a+b\,\text{Csch}[c+d\,x])}\,e\,f\,\text{Csch}[c+d\,x]\,(b+a\,\text{Sinh}[c+d\,x])$$

$$\Bigg(-18\,a\,(a^2+4\,b^2)\,\text{Cosh}[c+d\,x]-18\,a^2\,b\,d\,x\,\text{Cosh}[2\,(c+d\,x)]-2\,a^3\,\text{Cosh}[3\,(c+d\,x)]+36\,a^2\,b\,c\,\text{Log}\left[1+\frac{a\,\text{Sinh}[c+d\,x]}{b}\right]+$$

$$72\,b^3\,c\,\text{Log}\left[1+\frac{a\,\text{Sinh}[c+d\,x]}{b}\right]-36\,a^2\,b\left(-\frac{1}{8}\,(2\,c+i\,\pi+2\,d\,x)^2-4\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\text{ArcTan}\left[\frac{(i\,a+b)\,\text{Cot}\left[\frac{1}{4}\,(2\,i\,c+\pi+2\,i\,d\,x)\right]}{\sqrt{a^2+b^2}}\right]+\right.$$

$$\frac{1}{2}\left(2\,c+i\,\pi+2\,d\,x+4\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right)e^{c+d\,x}}{a}\right]+\frac{1}{2}\left(2\,c+i\,\pi+2\,d\,x-4\,i\,\text{ArcSin}\left[\frac{\sqrt{1+\frac{i\,b}{a}}}{\sqrt{2}}\right]\right)$$

$$\left.\text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-\frac{1}{2} i \pi \text{Log}[b+a \text{Sinh}[c+d x]]+\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]\right)-$$

$$72 b^3 \left(-\frac{1}{8} (2 c+i \pi+2 d x)^2-4 \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \text{ArcTan}\left[\frac{(i a+b) \text{Cot}\left[\frac{1}{4} (2 i c+\pi+2 i d x)\right]}{\sqrt{a^2+b^2}}\right]+\frac{1}{2} \left(2 c+i \pi+2 d x+4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right)\right.$$

$$\text{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\frac{1}{2} \left(2 c+i \pi+2 d x-4 i \text{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right]\right) \text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$\left.\frac{1}{2} i \pi \text{Log}[b+a \text{Sinh}[c+d x]]+\text{PolyLog}\left[2,\frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+\text{PolyLog}\left[2,\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]\right)+$$

$$\left.18 a \left(a^2+4 b^2\right) d x \text{Sinh}[c+d x]+9 a^2 b \text{Sinh}[2 (c+d x)]+6 a^3 d x \text{Sinh}[3 (c+d x)]\right)$$

Problem 28: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e+f x) \text{Cosh}[c+d x]^3}{a+b \text{Csch}[c+d x]} \, dx$$

Optimal (type 4, 400 leaves, 18 steps) :

$$-\frac{b f x}{4 a^2 d}+\frac{b\left(a^2+b^2\right)(e+f x)^2}{2 a^4 f}-\frac{2 f \operatorname{Cosh}[c+d x]}{3 a d^2}-\frac{b^2 f \operatorname{Cosh}[c+d x]}{a^3 d^2}-\frac{f \operatorname{Cosh}[c+d x]^3}{9 a d^2}-\frac{b\left(a^2+b^2\right)(e+f x) \operatorname{Log}\left[1+\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d}-$$

$$\frac{b\left(a^2+b^2\right)(e+f x) \operatorname{Log}\left[1+\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d}-\frac{b\left(a^2+b^2\right) f \operatorname{PolyLog}\left[2,-\frac{a e^{c+d x}}{b-\sqrt{a^2+b^2}}\right]}{a^4 d^2}-\frac{b\left(a^2+b^2\right) f \operatorname{PolyLog}\left[2,-\frac{a e^{c+d x}}{b+\sqrt{a^2+b^2}}\right]}{a^4 d^2}+\frac{2(e+f x) \operatorname{Sinh}[c+d x]}{3 a d}+$$

$$\frac{b^2(e+f x) \operatorname{Sinh}[c+d x]}{a^3 d}+\frac{b f \operatorname{Cosh}[c+d x] \operatorname{Sinh}[c+d x]}{4 a^2 d^2}+\frac{(e+f x) \operatorname{Cosh}[c+d x]^2 \operatorname{Sinh}[c+d x]}{3 a d}-\frac{b(e+f x) \operatorname{Sinh}[c+d x]^2}{2 a^2 d}$$

Result (type 4, 1315 leaves):

$$\frac{1}{72 a^4 d^2}\Bigg(36 a^2 b c^2 f+36 b^3 c^2 f+36 i a^2 b c f \pi+36 i b^3 c f \pi-9 a^2 b f \pi^2-9 b^3 f \pi^2+72 a^2 b c d f x+72 b^3 c d f x+36 i a^2 b d f \pi x+$$

$$36 i b^3 d f \pi x+36 a^2 b d^2 f x^2+36 b^3 d^2 f x^2+288 a^2 b f \operatorname{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \operatorname{ArcTan}\left[\frac{(i a+b) \operatorname{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]}{\sqrt{a^2+b^2}}\right]+$$

$$288 b^3 f \operatorname{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \operatorname{ArcTan}\left[\frac{(i a+b) \operatorname{Cot}\left[\frac{1}{4}(2 i c+\pi+2 i d x)\right]}{\sqrt{a^2+b^2}}\right]-54 a^3 f \operatorname{Cosh}[c+d x]-$$

$$72 a b^2 f \operatorname{Cosh}[c+d x]-18 a^2 b d e \operatorname{Cosh}[2(c+d x)]-18 a^2 b d f x \operatorname{Cosh}[2(c+d x)]-2 a^3 f \operatorname{Cosh}[3(c+d x)]-$$

$$72 a^2 b c f \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 b^3 c f \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-36 i a^2 b f \pi \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$36 i b^3 f \pi \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 a^2 b d f x \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 b^3 d f x \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$144 i a^2 b f \operatorname{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-144 i b^3 f \operatorname{ArcSin}\left[\frac{\sqrt{1+\frac{i b}{a}}}{\sqrt{2}}\right] \operatorname{Log}\left[1+\frac{\left(-b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$72 a^2 b c f \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 b^3 c f \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-36 i a^2 b f \pi \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-$$

$$36 i b^3 f \pi \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 a^2 b d f x \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]-72 b^3 d f x \operatorname{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d x}}{a}\right]+$$

$$144\, i\, a^2\, b\, f\, \text{ArcSin}\left[\frac{\sqrt{1+\frac{i\, b}{a}}}{\sqrt{2}}\right] \text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d\, x}}{a}\right] + 144\, i\, b^3\, f\, \text{ArcSin}\left[\frac{\sqrt{1+\frac{i\, b}{a}}}{\sqrt{2}}\right] \text{Log}\left[1-\frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d\, x}}{a}\right] -$$
$$72\, a^2\, b\, d\, e\, \text{Log}[b+a\, \text{Sinh}[c+d\, x]] - 72\, b^3\, d\, e\, \text{Log}[b+a\, \text{Sinh}[c+d\, x]] + 36\, i\, a^2\, b\, f\, \pi\, \text{Log}[b+a\, \text{Sinh}[c+d\, x]] + 36\, i\, b^3\, f\, \pi\, \text{Log}[b+a\, \text{Sinh}[c+d\, x]] +$$
$$72\, a^2\, b\, c\, f\, \text{Log}\left[1+\frac{a\, \text{Sinh}[c+d\, x]}{b}\right] + 72\, b^3\, c\, f\, \text{Log}\left[1+\frac{a\, \text{Sinh}[c+d\, x]}{b}\right] - 72\, b\, \left(a^2+b^2\right) f\, \text{PolyLog}\left[2, \frac{\left(b-\sqrt{a^2+b^2}\right) e^{c+d\, x}}{a}\right] -$$
$$72\, b\, \left(a^2+b^2\right) f\, \text{PolyLog}\left[2, \frac{\left(b+\sqrt{a^2+b^2}\right) e^{c+d\, x}}{a}\right] + 54\, a^3\, d\, e\, \text{Sinh}[c+d\, x] + 72\, a\, b^2\, d\, e\, \text{Sinh}[c+d\, x] + 54\, a^3\, d\, f\, x\, \text{Sinh}[c+d\, x] +$$
$$\left. 72\, a\, b^2\, d\, f\, x\, \text{Sinh}[c+d\, x] + 9\, a^2\, b\, f\, \text{Sinh}[2\, (c+d\, x)] + 6\, a^3\, d\, e\, \text{Sinh}[3\, (c+d\, x)] + 6\, a^3\, d\, f\, x\, \text{Sinh}[3\, (c+d\, x)] \right)$$

Test results for the 83 problems in "6.6.2 (e x)^m (a+b csch(c+d x^n))^p.m"

Problem 5: Result more than twice size of optimal antiderivative.

$$\int x \left(a + b\, \text{Csch}\left[c + d\, x^2\right]\right) dx$$

Optimal (type 3, 26 leaves, 4 steps):

$$\frac{a\, x^2}{2} - \frac{b\, \text{ArcTanh}\left[\text{Cosh}\left[c + d\, x^2\right]\right]}{2\, d}$$

Result (type 3, 57 leaves):

$$\frac{a\, x^2}{2} - \frac{b\, \text{Log}\left[\text{Cosh}\left[\frac{c}{2} + \frac{d\, x^2}{2}\right]\right]}{2\, d} + \frac{b\, \text{Log}\left[\text{Sinh}\left[\frac{c}{2} + \frac{d\, x^2}{2}\right]\right]}{2\, d}$$

Problem 10: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int x^3 \left(a + b\, \text{Csch}\left[c + d\, x^2\right]\right)^2 dx$$

Optimal (type 4, 108 leaves, 10 steps):

$$\frac{a^2 x^4}{4}-\frac{2 a b x^2 \text{ArcTanh}\left[e^{c+d x^2}\right]}{d}-\frac{b^2 x^2 \text{Coth}\left[c+d x^2\right]}{2 d}+\frac{b^2 \text{Log}\left[\text{Sinh}\left[c+d x^2\right]\right]}{2 d^2}-\frac{a b \text{PolyLog}\left[2,-e^{c+d x^2}\right]}{d^2}+\frac{a b \text{PolyLog}\left[2,e^{c+d x^2}\right]}{d^2}$$

Result (type 4, 598 leaves) :

$$\frac{b^2 x^2 \text{Coth}[c] \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \text{Sinh}\left[c+d x^2\right]^2}{2 d \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2}+\frac{x^2 \text{Csch}\left[\frac{c}{2}\right] \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \text{Sech}\left[\frac{c}{2}\right] \left(-2 b^2 \text{Cosh}[c]+a^2 d x^2 \text{Sinh}[c]\right) \text{Sinh}\left[c+d x^2\right]^2}{8 d \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2}-$$

$$\left(b^2 \text{Csch}[c] \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \left(-d x^2 \text{Cosh}[c]+\text{Log}\left[\text{Cosh}\left[d x^2\right] \text{Sinh}[c]+\text{Cosh}[c] \text{Sinh}\left[d x^2\right]\right] \text{Sinh}[c]\right) \text{Sinh}\left[c+d x^2\right]^2\right) \Big/$$

$$\left(2 d^2 \left(-\text{Cosh}[c]^2+\text{Sinh}[c]^2\right) \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2\right)+\frac{b^2 x^2 \text{Csch}\left[\frac{c}{2}\right] \text{Csch}\left[\frac{c}{2}+\frac{d x^2}{2}\right] \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \text{Sinh}\left[\frac{d x^2}{2}\right] \text{Sinh}\left[c+d x^2\right]^2}{4 d \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2}-$$

$$\frac{b^2 x^2 \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \text{Sech}\left[\frac{c}{2}\right] \text{Sech}\left[\frac{c}{2}+\frac{d x^2}{2}\right] \text{Sinh}\left[\frac{d x^2}{2}\right] \text{Sinh}\left[c+d x^2\right]^2}{4 d \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2}+\frac{1}{d^2 \left(b+a \text{Sinh}\left[c+d x^2\right]\right)^2}$$

$$a b \left(a+b \text{Csch}\left[c+d x^2\right]\right)^2 \text{Sinh}\left[c+d x^2\right]^2 \left(-\frac{2 \text{ArcTan}\left[\frac{\text{Cosh}[c]+\text{Sinh}[c] \text{Tanh}\left[\frac{d x^2}{2}\right]}{\sqrt{-\text{Cosh}[c]^2+\text{Sinh}[c]^2}}\right] \text{ArcTanh}[\text{Tanh}[c]]}{\sqrt{-\text{Cosh}[c]^2+\text{Sinh}[c]^2}}-\right.$$

$$\frac{1}{\sqrt{1-\text{Tanh}[c]^2}}i \left(i \left(d x^2+\text{ArcTanh}[\text{Tanh}[c]]\right) \left(\text{Log}\left[1-e^{-d x^2-\text{ArcTanh}[\text{Tanh}[c]]}\right]-\text{Log}\left[1+e^{-d x^2-\text{ArcTanh}[\text{Tanh}[c]]}\right]\right)+\right.$$

$$\left.\left. i \left(\text{PolyLog}\left[2,-e^{-d x^2-\text{ArcTanh}[\text{Tanh}[c]]}\right]-\text{PolyLog}\left[2,e^{-d x^2-\text{ArcTanh}[\text{Tanh}[c]]}\right]\right)\right) \text{Sech}[c]\right)$$

Problem 13: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(a+b \text{Csch}\left[c+d x^2\right]\right)^2}{x} \, dx$$

Optimal (type 9, 20 leaves, 0 steps) :

$$\text{Unintegrable}\left[\frac{\left(a+b \text{Csch}\left[c+d x^2\right]\right)^2}{x},x\right]$$

Result (type 1, 1 leaves) :

???

Problem 18: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^3}{a + b\,\mathrm{Csch}\left[c + d\,x^2\right]}\,dx$$

Optimal (type 4, 225 leaves, 11 steps):

$$\frac{x^4}{4\,a} - \frac{b\,x^2\,\mathrm{Log}\left[1 + \frac{a\,e^{c+d\,x^2}}{b-\sqrt{a^2+b^2}}\right]}{2\,a\,\sqrt{a^2+b^2}\,d} + \frac{b\,x^2\,\mathrm{Log}\left[1 + \frac{a\,e^{c+d\,x^2}}{b+\sqrt{a^2+b^2}}\right]}{2\,a\,\sqrt{a^2+b^2}\,d} - \frac{b\,\mathrm{PolyLog}\left[2, -\frac{a\,e^{c+d\,x^2}}{b-\sqrt{a^2+b^2}}\right]}{2\,a\,\sqrt{a^2+b^2}\,d^2} + \frac{b\,\mathrm{PolyLog}\left[2, -\frac{a\,e^{c+d\,x^2}}{b+\sqrt{a^2+b^2}}\right]}{2\,a\,\sqrt{a^2+b^2}\,d^2}$$

Result (type 4, 1321 leaves):

$$\frac{x^4 \,\text{Csch}[c+d x^2]\,(b+a\,\text{Sinh}[c+d x^2])}{4 a\,(a+b\,\text{Csch}[c+d x^2])}+\frac{1}{2 a d^2\,(a+b\,\text{Csch}[c+d x^2])}$$

$$b\,\text{Csch}[c+d x^2]\,\Bigg(\frac{i \pi\,\text{ArcTanh}\Big[\frac{-a+b\,\text{Tanh}[\frac{1}{2}(c+d x^2)]}{\sqrt{a^2+b^2}}\Big]}{\sqrt{a^2+b^2}}+\frac{1}{\sqrt{-a^2-b^2}}\Bigg(2\Big(-i c+\frac{\pi}{2}-i d x^2\Big)\,\text{ArcTanh}\Big[\frac{(-i a+b)\,\text{Cot}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]-$$

$$2\Big(-i c+\text{ArcCos}\Big[-\frac{i b}{a}\Big]\Big)\,\text{ArcTanh}\Big[\frac{(-i a-b)\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]+$$

$$\Bigg(\text{ArcCos}\Big[-\frac{i b}{a}\Big]-2 i\Bigg(\text{ArcTanh}\Big[\frac{(-i a+b)\,\text{Cot}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]-\text{ArcTanh}\Big[\frac{(-i a-b)\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]\Bigg)\Bigg)$$

$$\text{Log}\Big[\frac{\sqrt{-a^2-b^2}\;e^{-\frac{1}{2} i\,(-i c+\frac{\pi}{2}-i d x^2)}}{\sqrt{2}\,\sqrt{-i a}\,\sqrt{b+a\,\text{Sinh}[c+d x^2]}}\Big]+$$

$$\Bigg(\text{ArcCos}\Big[-\frac{i b}{a}\Big]+2 i\Bigg(\text{ArcTanh}\Big[\frac{(-i a+b)\,\text{Cot}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]-\text{ArcTanh}\Big[\frac{(-i a-b)\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]\Bigg)\Bigg)$$

$$\text{Log}\Big[\frac{\sqrt{-a^2-b^2}\;e^{\frac{1}{2} i\,(-i c+\frac{\pi}{2}-i d x^2)}}{\sqrt{2}\,\sqrt{-i a}\,\sqrt{b+a\,\text{Sinh}[c+d x^2]}}\Big]-\Bigg(\text{ArcCos}\Big[-\frac{i b}{a}\Big]+2 i\,\text{ArcTanh}\Big[\frac{(-i a-b)\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]\Bigg)$$

$$\text{Log}\Big[1-\frac{i\,(b-i\sqrt{-a^2-b^2})\,(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}{a\,(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}\Big]+\Bigg(-\text{ArcCos}\Big[-\frac{i b}{a}\Big]+$$

$$2 i\,\text{ArcTanh}\Big[\frac{(-i a-b)\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)]}{\sqrt{-a^2-b^2}}\Big]\Bigg)\,\text{Log}\Big[1-\frac{i\,(b+i\sqrt{-a^2-b^2})\,(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}{a\,(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}\Big]+$$

$$i\,\Bigg(\text{PolyLog}\Big[2,\frac{i\,(b-i\sqrt{-a^2-b^2})\,(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}{a\,(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}\Big]-$$

$$\text{PolyLog}\Big[2,\frac{i\,(b+i\sqrt{-a^2-b^2})\,(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}{a\,(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}[\frac{1}{2}(-i c+\frac{\pi}{2}-i d x^2)])}\Big]\Bigg)\Bigg)\Bigg)\,(b+a\,\text{Sinh}[c+d x^2])$$

Problem 24: Attempted integration timed out after 120 seconds.

$$\int \frac{x^4}{\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2}\,dx$$

Optimal (type 9, 20 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{x^4}{\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 26: Attempted integration timed out after 120 seconds.

$$\int \frac{x^2}{\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2}\,dx$$

Optimal (type 9, 20 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{x^2}{\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 28: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x\,\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2}\,dx$$

Optimal (type 9, 20 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x\,\left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 29: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x^2 \left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2}\,dx$$

Optimal (type 9, 20 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x^2 \left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 30: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x^3 \left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2}\,dx$$

Optimal (type 9, 20 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x^3 \left(a + b\,\text{Csch}\left[c + d\,x^2\right]\right)^2},\ x\right]$$

Result (type 1, 1 leaves):

???

Problem 38: Result more than twice size of optimal antiderivative.

$$\int x \left(a + b\,\text{Csch}\left[c + d\,\sqrt{x}\right]\right)^2\,dx$$

Optimal (type 4, 287 leaves, 18 steps):

$$-\frac{2\,b^2\,x^{3/2}}{d} + \frac{a^2\,x^2}{2} - \frac{8\,a\,b\,x^{3/2}\,\text{ArcTanh}\left[e^{c+d\sqrt{x}}\right]}{d} - \frac{2\,b^2\,x^{3/2}\,\text{Coth}\left[c + d\sqrt{x}\right]}{d} + \frac{6\,b^2\,x\,\text{Log}\left[1 - e^{2\left(c+d\sqrt{x}\right)}\right]}{d^2} - \frac{12\,a\,b\,x\,\text{PolyLog}\left[2,\ -e^{c+d\sqrt{x}}\right]}{d^2} + \frac{12\,a\,b\,x\,\text{PolyLog}\left[2,\ e^{c+d\sqrt{x}}\right]}{d^2} + \frac{6\,b^2\sqrt{x}\,\text{PolyLog}\left[2,\ e^{2\left(c+d\sqrt{x}\right)}\right]}{d^3} + \frac{24\,a\,b\sqrt{x}\,\text{PolyLog}\left[3,\ -e^{c+d\sqrt{x}}\right]}{d^3} - \frac{24\,a\,b\sqrt{x}\,\text{PolyLog}\left[3,\ e^{c+d\sqrt{x}}\right]}{d^3} - \frac{3\,b^2\,\text{PolyLog}\left[3,\ e^{2\left(c+d\sqrt{x}\right)}\right]}{d^4} - \frac{24\,a\,b\,\text{PolyLog}\left[4,\ -e^{c+d\sqrt{x}}\right]}{d^4} + \frac{24\,a\,b\,\text{PolyLog}\left[4,\ e^{c+d\sqrt{x}}\right]}{d^4}$$

Result (type 4, 591 leaves):

$$\frac{a^2 x^2 \left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2 \text{Sinh}\left[c + d\sqrt{x}\right]^2}{2\left(b + a\,\text{Sinh}\left[c + d\sqrt{x}\right]\right)^2} +$$

$$\frac{1}{d^4\left(b + a\,\text{Sinh}\left[c + d\sqrt{x}\right]\right)^2} b\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2 \left(-\frac{4\,b\,d^3\,e^{2\,c}\,x^{3/2}}{-1 + e^{2\,c}} + 12\,b\,d^2\,x\,\text{Log}\left[1 - e^{c+d\sqrt{x}}\right] + 4\,a\,d^3\,x^{3/2}\,\text{Log}\left[1 - e^{c+d\sqrt{x}}\right] + \right.$$

$$12\,b\,d^2\,x\,\text{Log}\left[1 + e^{c+d\sqrt{x}}\right] - 4\,a\,d^3\,x^{3/2}\,\text{Log}\left[1 + e^{c+d\sqrt{x}}\right] - 6\,b\,d^2\,x\,\text{Log}\left[-1 + e^{2\left(c+d\sqrt{x}\right)}\right] - 12\left(-b\,d\sqrt{x} + a\,d^2\,x\right)\text{PolyLog}\left[2, -e^{c+d\sqrt{x}}\right] +$$

$$12\left(b\,d\sqrt{x} + a\,d^2\,x\right)\text{PolyLog}\left[2, e^{c+d\sqrt{x}}\right] + 24\,a\,d\sqrt{x}\,\text{PolyLog}\left[3, -e^{c+d\sqrt{x}}\right] - 24\,a\,d\sqrt{x}\,\text{PolyLog}\left[3, e^{c+d\sqrt{x}}\right] -$$

$$\left.3\,b\,\text{PolyLog}\left[3, e^{2\left(c+d\sqrt{x}\right)}\right] - 24\,a\,\text{PolyLog}\left[4, -e^{c+d\sqrt{x}}\right] + 24\,a\,\text{PolyLog}\left[4, e^{c+d\sqrt{x}}\right]\right)\text{Sinh}\left[c + d\sqrt{x}\right]^2 +$$

$$\frac{b^2 x^{3/2}\,\text{Csch}\left[\frac{c}{2}\right]\text{Csch}\left[\frac{c}{2} + \frac{d\sqrt{x}}{2}\right]\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2 \text{Sinh}\left[c + d\sqrt{x}\right]^2 \text{Sinh}\left[\frac{d\sqrt{x}}{2}\right]}{d\left(b + a\,\text{Sinh}\left[c + d\sqrt{x}\right]\right)^2} -$$

$$\frac{b^2 x^{3/2}\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2 \text{Sech}\left[\frac{c}{2}\right]\text{Sech}\left[\frac{c}{2} + \frac{d\sqrt{x}}{2}\right]\text{Sinh}\left[c + d\sqrt{x}\right]^2 \text{Sinh}\left[\frac{d\sqrt{x}}{2}\right]}{d\left(b + a\,\text{Sinh}\left[c + d\sqrt{x}\right]\right)^2}$$

Problem 39: Attempted integration timed out after 120 seconds.

$$\int \frac{\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2}{x}\,dx$$

Optimal (type 9, 22 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2}{x}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 49: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x\left(a + b\,\text{Csch}\left[c + d\sqrt{x}\right]\right)^2}\,dx$$

Optimal (type 9, 22 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x\left(a+b\,\text{Csch}\left[c+d\sqrt{x}\right]\right)^2},x\right]$$

Result (type 1, 1 leaves):

???

Problem 50: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x^2\left(a+b\,\text{Csch}\left[c+d\sqrt{x}\right]\right)^2}\,dx$$

Optimal (type 9, 22 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x^2\left(a+b\,\text{Csch}\left[c+d\sqrt{x}\right]\right)^2},x\right]$$

Result (type 1, 1 leaves):

???

Problem 57: Result more than twice size of optimal antiderivative.

$$\int \sqrt{x}\left(a+b\,\text{Csch}\left[c+d\sqrt{x}\right]\right)^2\,dx$$

Optimal (type 4, 209 leaves, 15 steps):

$$-\frac{2b^2x}{d}+\frac{2}{3}a^2x^{3/2}-\frac{8abx\,\text{ArcTanh}\left[e^{c+d\sqrt{x}}\right]}{d}-\frac{2b^2x\,\text{Coth}\left[c+d\sqrt{x}\right]}{d}+\frac{4b^2\sqrt{x}\,\text{Log}\left[1-e^{2\left(c+d\sqrt{x}\right)}\right]}{d^2}-\frac{8ab\sqrt{x}\,\text{PolyLog}\left[2,-e^{c+d\sqrt{x}}\right]}{d^2}+\frac{8ab\sqrt{x}\,\text{PolyLog}\left[2,e^{c+d\sqrt{x}}\right]}{d^2}+\frac{2b^2\,\text{PolyLog}\left[2,e^{2\left(c+d\sqrt{x}\right)}\right]}{d^3}+\frac{8ab\,\text{PolyLog}\left[3,-e^{c+d\sqrt{x}}\right]}{d^3}-\frac{8ab\,\text{PolyLog}\left[3,e^{c+d\sqrt{x}}\right]}{d^3}$$

Result (type 4, 470 leaves):

$$\frac{2 a^2 x^{3/2} \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2 \operatorname{Sinh}\left[c+d \sqrt{x}\right]^2}{3 \left(b+a \operatorname{Sinh}\left[c+d \sqrt{x}\right]\right)^2}+\frac{1}{d^3 \left(b+a \operatorname{Sinh}\left[c+d \sqrt{x}\right]\right)^2} 2 b \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2$$

$$\left(-\frac{2 b d^2 e^{2 c} x}{-1+e^{2 c}}+2 a d^2 x \operatorname{Log}\left[1-e^{c+d \sqrt{x}}\right]-2 a d^2 x \operatorname{Log}\left[1+e^{c+d \sqrt{x}}\right]+2 b d \sqrt{x} \operatorname{Log}\left[1-e^{2 \left(c+d \sqrt{x}\right)}\right]-4 a d \sqrt{x} \operatorname{PolyLog}\left[2,-e^{c+d \sqrt{x}}\right]+\right.$$

$$\left.4 a d \sqrt{x} \operatorname{PolyLog}\left[2, e^{c+d \sqrt{x}}\right]+b \operatorname{PolyLog}\left[2, e^{2 \left(c+d \sqrt{x}\right)}\right]+4 a \operatorname{PolyLog}\left[3,-e^{c+d \sqrt{x}}\right]-4 a \operatorname{PolyLog}\left[3, e^{c+d \sqrt{x}}\right]\right) \operatorname{Sinh}\left[c+d \sqrt{x}\right]^2+$$

$$\frac{b^2 x \operatorname{Csch}\left[\frac{c}{2}\right] \operatorname{Csch}\left[\frac{c}{2}+\frac{d \sqrt{x}}{2}\right] \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2 \operatorname{Sinh}\left[c+d \sqrt{x}\right]^2 \operatorname{Sinh}\left[\frac{d \sqrt{x}}{2}\right]}{d \left(b+a \operatorname{Sinh}\left[c+d \sqrt{x}\right]\right)^2}-$$

$$\frac{b^2 x \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2 \operatorname{Sech}\left[\frac{c}{2}\right] \operatorname{Sech}\left[\frac{c}{2}+\frac{d \sqrt{x}}{2}\right] \operatorname{Sinh}\left[c+d \sqrt{x}\right]^2 \operatorname{Sinh}\left[\frac{d \sqrt{x}}{2}\right]}{d \left(b+a \operatorname{Sinh}\left[c+d \sqrt{x}\right]\right)^2}$$

Problem 69: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x^{3/2} \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2} \, dx$$

Optimal (type 9, 24 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x^{3/2} \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 70: Attempted integration timed out after 120 seconds.

$$\int \frac{1}{x^{5/2} \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2} \, dx$$

Optimal (type 9, 24 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{1}{x^{5/2} \left(a+b \operatorname{Csch}\left[c+d \sqrt{x}\right]\right)^2}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 74: Unable to integrate problem.

$$\int (e\,x)^{-1+3\,n}\,\left(a+b\,\text{Csch}\left[c+d\,x^n\right]\right)\,dx$$

Optimal (type 4, 197 leaves, 11 steps):

$$\frac{a\,(e\,x)^{3\,n}}{3\,e\,n}-\frac{2\,b\,x^{-n}\,(e\,x)^{3\,n}\,\text{ArcTanh}\left[e^{c+d\,x^n}\right]}{d\,e\,n}-\frac{2\,b\,x^{-2\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[2,-e^{c+d\,x^n}\right]}{d^2\,e\,n}+\frac{2\,b\,x^{-2\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[2,e^{c+d\,x^n}\right]}{d^2\,e\,n}+\frac{2\,b\,x^{-3\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[3,-e^{c+d\,x^n}\right]}{d^3\,e\,n}-\frac{2\,b\,x^{-3\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[3,e^{c+d\,x^n}\right]}{d^3\,e\,n}$$

Result (type 8, 24 leaves):

$$\int (e\,x)^{-1+3\,n}\,\left(a+b\,\text{Csch}\left[c+d\,x^n\right]\right)\,dx$$

Problem 76: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int (e\,x)^{-1+2\,n}\,\left(a+b\,\text{Csch}\left[c+d\,x^n\right]\right)^2\,dx$$

Optimal (type 4, 198 leaves, 11 steps):

$$\frac{a^2\,(e\,x)^{2\,n}}{2\,e\,n}-\frac{4\,a\,b\,x^{-n}\,(e\,x)^{2\,n}\,\text{ArcTanh}\left[e^{c+d\,x^n}\right]}{d\,e\,n}-\frac{b^2\,x^{-n}\,(e\,x)^{2\,n}\,\text{Coth}\left[c+d\,x^n\right]}{d\,e\,n}+\frac{b^2\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{Log}\left[\text{Sinh}\left[c+d\,x^n\right]\right]}{d^2\,e\,n}-\frac{2\,a\,b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-e^{c+d\,x^n}\right]}{d^2\,e\,n}+\frac{2\,a\,b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,e^{c+d\,x^n}\right]}{d^2\,e\,n}$$

Result (type 4, 696 leaves):

$$\frac{b^2 x^{1-n} (e x)^{-1+2 n} \text{Coth}[c] (a + b \text{Csch}[c + d x^n])^2 \text{Sinh}[c + d x^n]^2}{d n (b + a \text{Sinh}[c + d x^n])^2} +$$

$$\frac{x^{1-n} (e x)^{-1+2 n} \text{Csch}[\frac{c}{2}] (a + b \text{Csch}[c + d x^n])^2 \text{Sech}[\frac{c}{2}] (-2 b^2 \text{Cosh}[c] + a^2 d x^n \text{Sinh}[c]) \text{Sinh}[c + d x^n]^2}{4 d n (b + a \text{Sinh}[c + d x^n])^2} -$$

$$\left(b^2 x^{1-2 n} (e x)^{-1+2 n} \text{Csch}[c] (a + b \text{Csch}[c + d x^n])^2 (-d x^n \text{Cosh}[c] + \text{Log}[\text{Cosh}[d x^n] \text{Sinh}[c] + \text{Cosh}[c] \text{Sinh}[d x^n]] \text{Sinh}[c]) \text{Sinh}[c + d x^n]^2\right) \Big/$$

$$\left(d^2 n (-\text{Cosh}[c]^2 + \text{Sinh}[c]^2) (b + a \text{Sinh}[c + d x^n])^2\right) + \frac{b^2 x^{1-n} (e x)^{-1+2 n} \text{Csch}[\frac{c}{2}] \text{Csch}[\frac{c}{2} + \frac{d x^n}{2}] (a + b \text{Csch}[c + d x^n])^2 \text{Sinh}[\frac{d x^n}{2}] \text{Sinh}[c + d x^n]^2}{2 d n (b + a \text{Sinh}[c + d x^n])^2} -$$

$$\frac{b^2 x^{1-n} (e x)^{-1+2 n} (a + b \text{Csch}[c + d x^n])^2 \text{Sech}[\frac{c}{2}] \text{Sech}[\frac{c}{2} + \frac{d x^n}{2}] \text{Sinh}[\frac{d x^n}{2}] \text{Sinh}[c + d x^n]^2}{2 d n (b + a \text{Sinh}[c + d x^n])^2} +$$

$$\left(2 a b x^{1-2 n} (e x)^{-1+2 n} (a + b \text{Csch}[c + d x^n])^2 \text{Sinh}[c + d x^n]^2 \left(-\frac{2 \text{ArcTan}\left[\frac{\text{Cosh}[c] + \text{Sinh}[c] \text{Tanh}[\frac{d x^n}{2}]}{\sqrt{-\text{Cosh}[c]^2 + \text{Sinh}[c]^2}}\right] \text{ArcTanh}[\text{Tanh}[c]]}{\sqrt{-\text{Cosh}[c]^2 + \text{Sinh}[c]^2}} -\right.\right.$$

$$\frac{1}{\sqrt{1 - \text{Tanh}[c]^2}} i \left(i (d x^n + \text{ArcTanh}[\text{Tanh}[c]]) \left(\text{Log}[1 - e^{-d x^n - \text{ArcTanh}[\text{Tanh}[c]]}] - \text{Log}[1 + e^{-d x^n - \text{ArcTanh}[\text{Tanh}[c]]}]\right) +\right.$$

$$\left.\left.\left. i \left(\text{PolyLog}[2, -e^{-d x^n - \text{ArcTanh}[\text{Tanh}[c]]}] - \text{PolyLog}[2, e^{-d x^n - \text{ArcTanh}[\text{Tanh}[c]]}]\right)\right) \text{Sech}[c]\right)\right) \Big/ \left(d^2 n (b + a \text{Sinh}[c + d x^n])^2\right)$$

Problem 77: Attempted integration timed out after 120 seconds.

$$\int (e x)^{-1+3 n} (a + b \text{Csch}[c + d x^n])^2 \, dx$$

Optimal (type 4, 344 leaves, 16 steps):

$$\frac{a^2 (e x)^{3 n}}{3 e n} - \frac{b^2 x^{-n} (e x)^{3 n}}{d e n} - \frac{4 a b x^{-n} (e x)^{3 n} \text{ArcTanh}[e^{c+d x^n}]}{d e n} - \frac{b^2 x^{-n} (e x)^{3 n} \text{Coth}[c + d x^n]}{d e n} +$$

$$\frac{2 b^2 x^{-2 n} (e x)^{3 n} \text{Log}[1 - e^{2 (c+d x^n)}]}{d^2 e n} - \frac{4 a b x^{-2 n} (e x)^{3 n} \text{PolyLog}[2, -e^{c+d x^n}]}{d^2 e n} + \frac{4 a b x^{-2 n} (e x)^{3 n} \text{PolyLog}[2, e^{c+d x^n}]}{d^2 e n} +$$

$$\frac{b^2 x^{-3 n} (e x)^{3 n} \text{PolyLog}[2, e^{2 (c+d x^n)}]}{d^3 e n} + \frac{4 a b x^{-3 n} (e x)^{3 n} \text{PolyLog}[3, -e^{c+d x^n}]}{d^3 e n} - \frac{4 a b x^{-3 n} (e x)^{3 n} \text{PolyLog}[3, e^{c+d x^n}]}{d^3 e n}$$

Result (type 1, 1 leaves):

???

Problem 79: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e\,x)^{-1+2\,n}}{a+b\,\text{Csch}\left[c+d\,x^n\right]}\,dx$$

Optimal (type 4, 291 leaves, 12 steps):

$$\frac{(e\,x)^{2\,n}}{2\,a\,e\,n}-\frac{b\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d\,e\,n}+\frac{b\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d\,e\,n}-\frac{b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^2\,e\,n}+\frac{b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^2\,e\,n}$$

Result (type 4, 1347 leaves):

$$\frac{x\,(e\,x)^{-1+2\,n}\,\text{Csch}\left[c+d\,x^n\right]\,\left(b+a\,\text{Sinh}\left[c+d\,x^n\right]\right)}{2\,a\,n\,\left(a+b\,\text{Csch}\left[c+d\,x^n\right]\right)}+$$

$$\frac{1}{a\,d^2\,n\,\left(a+b\,\text{Csch}\left[c+d\,x^n\right]\right)}\,b\,x^{1-2\,n}\,(e\,x)^{-1+2\,n}\,\text{Csch}\left[c+d\,x^n\right]\,\left(\frac{i\,\pi\,\text{ArcTanh}\left[\frac{-a+b\,\text{Tanh}\left[\frac{1}{2}\left(c+d\,x^n\right)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}}+\frac{1}{\sqrt{-a^2-b^2}}\,\left(2\,\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right.\right.$$

$$\text{ArcTanh}\left[\frac{\left(-i\,a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-2\,\left(-i\,c+\text{ArcCos}\left[-\frac{i\,b}{a}\right]\right)\,\text{ArcTanh}\left[\frac{\left(-i\,a-b\right)\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]-2\,i\,\left(\text{ArcTanh}\left[\frac{\left(-i\,a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{\left(-i\,a-b\right)\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\,e^{-\frac{1}{2}\,i\,\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)}}{\sqrt{2}\,\sqrt{-i\,a}\,\sqrt{b+a\,\text{Sinh}\left[c+d\,x^n\right]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2\,i\,\left(\text{ArcTanh}\left[\frac{\left(-i\,a+b\right)\,\text{Cot}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{\left(-i\,a-b\right)\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\,e^{\frac{1}{2}\,i\,\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)}}{\sqrt{2}\,\sqrt{-i\,a}\,\sqrt{b+a\,\text{Sinh}\left[c+d\,x^n\right]}}\right]-\left(\text{ArcCos}\left[-\frac{i\,b}{a}\right]+2\,i\,\text{ArcTanh}\left[\frac{\left(-i\,a-b\right)\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[1-\frac{i\,\left(b-i\,\sqrt{-a^2-b^2}\right)\,\left(-i\,a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}{a\,\left(-i\,a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}\right]+\left(-\text{ArcCos}\left[-\frac{i\,b}{a}\right]+\right.$$

$$\left.2\,i\,\text{ArcTanh}\left[\frac{\left(-i\,a-b\right)\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\,\text{Log}\left[1-\frac{i\,\left(b+i\,\sqrt{-a^2-b^2}\right)\,\left(-i\,a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}{a\,\left(-i\,a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}\right]+$$

$$i\,\left(\text{PolyLog}\left[2,\frac{i\,\left(b-i\,\sqrt{-a^2-b^2}\right)\,\left(-i\,a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}{a\,\left(-i\,a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\frac{i\,\left(b+i\,\sqrt{-a^2-b^2}\right)\,\left(-i\,a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}{a\,\left(-i\,a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i\,c+\frac{\pi}{2}-i\,d\,x^n\right)\right]\right)}\right]\right)\right)\right)\,\left(b+a\,\text{Sinh}\left[c+d\,x^n\right]\right)$$

Problem 80: Unable to integrate problem.

$$\int \frac{(e\,x)^{-1+3\,n}}{a+b\,\text{Csch}[c+d\,x^n]}\,dx$$

Optimal (type 4, 428 leaves, 14 steps):

$$\frac{(e\,x)^{3\,n}}{3\,a\,e\,n}-\frac{b\,x^{-n}\,(e\,x)^{3\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d\,e\,n}+\frac{b\,x^{-n}\,(e\,x)^{3\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d\,e\,n}-\frac{2\,b\,x^{-2\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^2\,e\,n}+$$
$$\frac{2\,b\,x^{-2\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^2\,e\,n}+\frac{2\,b\,x^{-3\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^3\,e\,n}-\frac{2\,b\,x^{-3\,n}\,(e\,x)^{3\,n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a\,\sqrt{a^2+b^2}\,d^3\,e\,n}$$

Result (type 8, 26 leaves):

$$\int \frac{(e\,x)^{-1+3\,n}}{a+b\,\text{Csch}[c+d\,x^n]}\,dx$$

Problem 82: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(e\,x)^{-1+2\,n}}{(a+b\,\text{Csch}[c+d\,x^n])^2}\,dx$$

Optimal (type 4, 681 leaves, 23 steps):

$$\frac{(e\,x)^{2\,n}}{2\,a^2\,e\,n}+\frac{b^3\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,(a^2+b^2)^{3/2}\,d\,e\,n}-\frac{2\,b\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d\,e\,n}-\frac{b^3\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,(a^2+b^2)^{3/2}\,d\,e\,n}+\frac{2\,b\,x^{-n}\,(e\,x)^{2\,n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d\,e\,n}+$$
$$\frac{b^2\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{Log}[b+a\,\text{Sinh}[c+d\,x^n]]}{a^2\,(a^2+b^2)\,d^2\,e\,n}+\frac{b^3\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,(a^2+b^2)^{3/2}\,d^2\,e\,n}-\frac{2\,b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^2\,e\,n}-$$
$$\frac{b^3\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,(a^2+b^2)^{3/2}\,d^2\,e\,n}+\frac{2\,b\,x^{-2\,n}\,(e\,x)^{2\,n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^2\,e\,n}-\frac{b^2\,x^{-n}\,(e\,x)^{2\,n}\,\text{Cosh}[c+d\,x^n]}{a\,(a^2+b^2)\,d\,e\,n\,(b+a\,\text{Sinh}[c+d\,x^n])}$$

Result (type 4, 3256 leaves):

$$\frac{b^2\,x^{1-n}\,(e\,x)^{-1+2\,n}\,\text{Csch}\left[\frac{c}{2}\right]\,\text{Csch}[c+d\,x^n]^2\,\text{Sech}\left[\frac{c}{2}\right]\,(b\,\text{Cosh}[c]+a\,\text{Sinh}[d\,x^n])\,(b+a\,\text{Sinh}[c+d\,x^n])}{2\,a^2\,(a^2+b^2)\,d\,n\,(a+b\,\text{Csch}[c+d\,x^n])^2}+$$

$$\frac{b^2 x^{1-n} (e x)^{-1+2n} \text{Coth}[c] \text{Csch}[c+d x^n]^2 (b+a \text{Sinh}[c+d x^n])^2}{a^2 (a^2+b^2) d n (a+b \text{Csch}[c+d x^n])^2} -$$

$$\frac{2 b^3 x^{1-2n} (e x)^{-1+2n} \text{ArcTan}\left[\frac{a-b \text{Tanh}\left[\frac{1}{2}(c+d x^n)\right]}{\sqrt{-a^2-b^2}}\right] \text{Coth}[c] \text{Csch}[c+d x^n]^2 (b+a \text{Sinh}[c+d x^n])^2}{a^2 \sqrt{-a^2-b^2} (a^2+b^2) d^2 n (a+b \text{Csch}[c+d x^n])^2} +$$

$$\frac{1}{(a^2+b^2) d^2 n (a+b \text{Csch}[c+d x^n])^2} 2 b x^{1-2n} (e x)^{-1+2n} \text{Csch}[c+d x^n]^2$$

$$\left(\frac{i \pi \text{ArcTanh}\left[\frac{-a+b \text{Tanh}\left[\frac{1}{2}(c+d x^n)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}} + \frac{1}{\sqrt{-a^2-b^2}} \left(2\left(-i c+\frac{\pi}{2}-i d x^n\right) \text{ArcTanh}\left[\frac{(-i a+b) \text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right] -\right.\right.$$

$$2\left(-i c+\text{ArcCos}\left[-\frac{i b}{a}\right]\right) \text{ArcTanh}\left[\frac{(-i a-b) \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right] +$$

$$\left(\text{ArcCos}\left[-\frac{i b}{a}\right] - 2 i \left(\text{ArcTanh}\left[\frac{(-i a+b) \text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right] - \text{ArcTanh}\left[\frac{(-i a-b) \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\, e^{-\frac{1}{2} i \left(-i c+\frac{\pi}{2}-i d x^n\right)}}{\sqrt{2} \sqrt{-i a} \sqrt{b+a \text{Sinh}[c+d x^n]}}\right] +$$

$$\left(\text{ArcCos}\left[-\frac{i b}{a}\right] + 2 i \left(\text{ArcTanh}\left[\frac{(-i a+b) \text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right] - \text{ArcTanh}\left[\frac{(-i a-b) \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\, e^{\frac{1}{2} i \left(-i c+\frac{\pi}{2}-i d x^n\right)}}{\sqrt{2} \sqrt{-i a} \sqrt{b+a \text{Sinh}[c+d x^n]}}\right] - \left(\text{ArcCos}\left[-\frac{i b}{a}\right] + 2 i \text{ArcTanh}\left[\frac{(-i a-b) \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[1-\frac{i \left(b-i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right] + \left(-\text{ArcCos}\left[-\frac{i b}{a}\right] +\right.$$

$$\left.2 i \text{ArcTanh}\left[\frac{(-i a-b) \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right) \text{Log}\left[1-\frac{i \left(b+i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right] +$$

$$i \left(\text{PolyLog}\left[2, \frac{i \left(b-i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2} \text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right] -\right.$$

$$\text{PolyLog}\left[2, \frac{i\left(b+i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right]\Bigg)\Bigg)\Bigg)\,(b+a\,\text{Sinh}[c+d x^n])^2+$$

$$\frac{1}{a^2\left(a^2+b^2\right)d^2 n\,(a+b\,\text{Csch}[c+d x^n])^2}\,b^3 x^{1-2n}(e x)^{-1+2n}\,\text{Csch}[c+d x^n]^2\left(\frac{i\pi\,\text{ArcTanh}\left[\frac{-a+b\,\text{Tanh}\left[\frac{1}{2}(c+d x^n)\right]}{\sqrt{a^2+b^2}}\right]}{\sqrt{a^2+b^2}}+\right.$$

$$\frac{1}{\sqrt{-a^2-b^2}}\left(2\left(-i c+\frac{\pi}{2}-i d x^n\right)\text{ArcTanh}\left[\frac{(-i a+b)\,\text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-\right.$$

$$2\left(-i c+\text{ArcCos}\left[-\frac{i b}{a}\right]\right)\text{ArcTanh}\left[\frac{(-i a-b)\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i b}{a}\right]-2 i\left(\text{ArcTanh}\left[\frac{(-i a+b)\,\text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(-i a-b)\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\,e^{-\frac{1}{2}i\left(-i c+\frac{\pi}{2}-i d x^n\right)}}{\sqrt{2}\,\sqrt{-i a}\,\sqrt{b+a\,\text{Sinh}[c+d x^n]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{i b}{a}\right]+2 i\left(\text{ArcTanh}\left[\frac{(-i a+b)\,\text{Cot}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]-\text{ArcTanh}\left[\frac{(-i a-b)\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{-a^2-b^2}\,e^{\frac{1}{2}i\left(-i c+\frac{\pi}{2}-i d x^n\right)}}{\sqrt{2}\,\sqrt{-i a}\,\sqrt{b+a\,\text{Sinh}[c+d x^n]}}\right]-\left(\text{ArcCos}\left[-\frac{i b}{a}\right]+2 i\,\text{ArcTanh}\left[\frac{(-i a-b)\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)$$

$$\text{Log}\left[1-\frac{i\left(b-i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right]+\left(-\text{ArcCos}\left[-\frac{i b}{a}\right]+\right.$$

$$\left.2 i\,\text{ArcTanh}\left[\frac{(-i a-b)\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]}{\sqrt{-a^2-b^2}}\right]\right)\text{Log}\left[1-\frac{i\left(b+i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right]+$$

$$i\left(\text{PolyLog}\left[2, \frac{i\left(b-i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right]-\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2, \frac{i\left(b+i\sqrt{-a^2-b^2}\right)\left(-i a+b-\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}{a\left(-i a+b+\sqrt{-a^2-b^2}\,\text{Tan}\left[\frac{1}{2}\left(-i c+\frac{\pi}{2}-i d x^n\right)\right]\right)}\right]\right)\right)\right)\left(b+a\,\text{Sinh}\left[c+d x^n\right]\right)^2+$$

$$\left(x^{1-n}\,(e x)^{-1+2 n}\,\text{Csch}\left[\frac{c}{2}\right]\text{Csch}\left[c+d x^n\right]^2\text{Sech}\left[\frac{c}{2}\right]\left(-2 b^2\,\text{Cosh}[c]+a^2 d x^n\,\text{Sinh}[c]+b^2 d x^n\,\text{Sinh}[c]\right)\right.$$

$$\left.\left(b+a\,\text{Sinh}\left[c+d x^n\right]\right)^2\right)\Big/$$

$$\left(4 a^2\left(a^2+b^2\right) d n\left(a+b\,\text{Csch}\left[c+d x^n\right]\right)^2\right)-\left(b^2 x^{1-2 n}\,(e x)^{-1+2 n}\,\text{Csch}[c]\right.$$

$$\text{Csch}\left[c+d x^n\right]^2$$

$$\left(-a d x^n\,\text{Cosh}[c]+a\,\text{Log}\left[b+a\,\text{Cosh}\left[d x^n\right]\text{Sinh}[c]+a\,\text{Cosh}[c]\,\text{Sinh}\left[d x^n\right]\right]\text{Sinh}[c]+\frac{2 a b\,\text{ArcTan}\left[\frac{a\,\text{Cosh}[c]+(-b+a\,\text{Sinh}[c])\,\text{Tanh}\left[\frac{d x^n}{2}\right]}{\sqrt{-b^2-a^2\,\text{Cosh}[c]^2+a^2\,\text{Sinh}[c]^2}}\right]\text{Cosh}[c]}{\sqrt{-b^2-a^2\,\text{Cosh}[c]^2+a^2\,\text{Sinh}[c]^2}}\right)$$

$$\left.\left(b+a\,\text{Sinh}\left[c+d x^n\right]\right)^2\right)\Big/$$

$$\left(a\left(a^2+b^2\right) d^2 n\left(a+b\,\text{Csch}\left[c+d x^n\right]\right)^2\left(-a^2\,\text{Cosh}[c]^2+a^2\,\text{Sinh}[c]^2\right)\right)$$

Problem 83: Attempted integration timed out after 120 seconds.

$$\int\frac{(e x)^{-1+3 n}}{\left(a+b\,\text{Csch}\left[c+d x^n\right]\right)^2}\,dx$$

Optimal (type 4, 1218 leaves, 32 steps) :

$$\frac{(e\,x)^{3n}}{3\,a^2\,e\,n}-\frac{b^2\,x^{-n}\,(e\,x)^{3n}}{a^2\,\left(a^2+b^2\right)\,d\,e\,n}+\frac{2\,b^2\,x^{-2n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)\,d^2\,e\,n}+\frac{b^3\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d\,e\,n}-$$

$$\frac{2\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d\,e\,n}+\frac{2\,b^2\,x^{-2n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)\,d^2\,e\,n}-\frac{b^3\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d\,e\,n}+$$

$$\frac{2\,b\,x^{-n}\,(e\,x)^{3n}\,\text{Log}\left[1+\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d\,e\,n}+\frac{2\,b^2\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)\,d^3\,e\,n}+\frac{2\,b^3\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d^2\,e\,n}-$$

$$\frac{4\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^2\,e\,n}+\frac{2\,b^2\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)\,d^3\,e\,n}-\frac{2\,b^3\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d^2\,e\,n}+$$

$$\frac{4\,b\,x^{-2n}\,(e\,x)^{3n}\,\text{PolyLog}\left[2,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^2\,e\,n}-\frac{2\,b^3\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d^3\,e\,n}+\frac{4\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b-\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^3\,e\,n}+$$

$$\frac{2\,b^3\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\left(a^2+b^2\right)^{3/2}\,d^3\,e\,n}-\frac{4\,b\,x^{-3n}\,(e\,x)^{3n}\,\text{PolyLog}\left[3,-\frac{a\,e^{c+d\,x^n}}{b+\sqrt{a^2+b^2}}\right]}{a^2\,\sqrt{a^2+b^2}\,d^3\,e\,n}-\frac{b^2\,x^{-n}\,(e\,x)^{3n}\,\text{Cosh}\left[c+d\,x^n\right]}{a\,\left(a^2+b^2\right)\,d\,e\,n\,\left(b+a\,\text{Sinh}\left[c+d\,x^n\right]\right)}$$

Result (type 1, 1 leaves):

???

Test results for the 175 problems in "6.6.3 Hyperbolic cosecant functions.m"

Problem 1: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}[a+b\,x]\,dx$$

Optimal (type 3, 12 leaves, 1 step):

$$-\frac{\text{ArcTanh}[\text{Cosh}[a+b\,x]]}{b}$$

Result (type 3, 38 leaves):

$$-\frac{\text{Log}\left[\text{Cosh}\left[\frac{a}{2}+\frac{b x}{2}\right]\right]}{b}+\frac{\text{Log}\left[\text{Sinh}\left[\frac{a}{2}+\frac{b x}{2}\right]\right]}{b}$$

Problem 3: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}[a+b x]^3 \, dx$$

Optimal (type 3, 34 leaves, 2 steps):

$$\frac{\text{ArcTanh}[\text{Cosh}[a+b x]]}{2 b}-\frac{\text{Coth}[a+b x] \, \text{Csch}[a+b x]}{2 b}$$

Result (type 3, 75 leaves):

$$-\frac{\text{Csch}\left[\frac{1}{2}(a+b x)\right]^2}{8 b}+\frac{\text{Log}\left[\text{Cosh}\left[\frac{1}{2}(a+b x)\right]\right]}{2 b}-\frac{\text{Log}\left[\text{Sinh}\left[\frac{1}{2}(a+b x)\right]\right]}{2 b}-\frac{\text{Sech}\left[\frac{1}{2}(a+b x)\right]^2}{8 b}$$

Problem 5: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}[a+b x]^5 \, dx$$

Optimal (type 3, 55 leaves, 3 steps):

$$-\frac{3 \, \text{ArcTanh}[\text{Cosh}[a+b x]]}{8 b}+\frac{3 \, \text{Coth}[a+b x] \, \text{Csch}[a+b x]}{8 b}-\frac{\text{Coth}[a+b x] \, \text{Csch}[a+b x]^3}{4 b}$$

Result (type 3, 113 leaves):

$$\frac{3 \, \text{Csch}\left[\frac{1}{2}(a+b x)\right]^2}{32 b}-\frac{\text{Csch}\left[\frac{1}{2}(a+b x)\right]^4}{64 b}-\frac{3 \, \text{Log}\left[\text{Cosh}\left[\frac{1}{2}(a+b x)\right]\right]}{8 b}+\frac{3 \, \text{Log}\left[\text{Sinh}\left[\frac{1}{2}(a+b x)\right]\right]}{8 b}+\frac{3 \, \text{Sech}\left[\frac{1}{2}(a+b x)\right]^2}{32 b}+\frac{\text{Sech}\left[\frac{1}{2}(a+b x)\right]^4}{64 b}$$

Problem 23: Result more than twice size of optimal antiderivative.

$$\int \left(-\text{Csch}[x]^2\right)^{3/2} dx$$

Optimal (type 3, 24 leaves, 3 steps):

$$\frac{1}{2} \text{ArcSin}[\text{Coth}[x]]+\frac{1}{2} \text{Coth}[x] \sqrt{-\text{Csch}[x]^2}$$

Result (type 3, 51 leaves):

$$\frac{1}{8}\sqrt{-\text{Csch}[x]^2}\left(\text{Csch}\left[\frac{x}{2}\right]^2-4\,\text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right]+4\,\text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right]+\text{Sech}\left[\frac{x}{2}\right]^2\right)\text{Sinh}[x]$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int\sqrt{-\text{Csch}[x]^2}\,dx$$

Optimal (type 3, 3 leaves, 2 steps):

$$\text{ArcSin}[\text{Coth}[x]]$$

Result (type 3, 30 leaves):

$$\sqrt{-\text{Csch}[x]^2}\left(-\text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right]+\text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right]\right)\text{Sinh}[x]$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\,dx$$

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{2}\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]}{\sqrt{a}\,d}$$

Result (type 3, 254 leaves):

$$\left(\sqrt{a}\,\text{Coth}[c+d\,x]\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}\,\sqrt{a}}{\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}}\right]-i\left(\text{Log}\left[-\frac{2\,a\left(-2\,i\,\sqrt{a}+\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}+i\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)}{-\sqrt{a}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]+\text{Log}\left[\frac{2\,i\,a\left(2\,\sqrt{a}+i\,\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)}{\sqrt{a}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]\right)\right)\right)\Big/\left(d\,\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)$$

Problem 55: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{(a+i\,a\,\text{Csch}[c+d\,x])^{3/2}}\,dx$$

Optimal (type 3, 123 leaves, 6 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]}{a^{3/2}\,d}-\frac{5\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{2}\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]}{2\,\sqrt{2}\,a^{3/2}\,d}-\frac{\text{Coth}[c+d\,x]}{2\,d\,\left(a+i\,a\,\text{Csch}[c+d\,x]\right)^{3/2}}$$

Result (type 3, 380 leaves):

$$\left(i\left(\left(a^{3/2}\,\text{Coth}[c+d\,x]\left(-4\,i\,\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}\,\sqrt{a}}{\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}}\right]+\sqrt{2}\,\text{Log}\left[-\frac{2\left(-i\,\sqrt{2}\,\sqrt{a}+\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}\right)}{\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]-4\left(\text{Log}\left[-\frac{2\,a\left(-2\,i\,\sqrt{a}+\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}+i\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)}{-\sqrt{a}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]+\text{Log}\left[\frac{2\,i\,a\left(2\,\sqrt{a}+i\,\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)}{\sqrt{a}+\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}}\right]\right)\right)\right)\Big/\left(\sqrt{i\,a\,(i+\text{Csch}[c+d\,x])}\right)+\frac{2\,a\left(\text{Cosh}\left[\frac{1}{2}(c+d\,x)\right]+i\,\text{Sinh}\left[\frac{1}{2}(c+d\,x)\right]\right)}{\text{Cosh}\left[\frac{1}{2}(c+d\,x)\right]-i\,\text{Sinh}\left[\frac{1}{2}(c+d\,x)\right]}\right)\right)\Big/\left(4\,a^2\,d\,\sqrt{a+i\,a\,\text{Csch}[c+d\,x]}\right)$$

Problem 57: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}}\,dx$$

Optimal (type 3, 91 leaves, 5 steps):

$$\frac{2\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}}\right]}{\sqrt{a}\,d}-\frac{\sqrt{2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{2}\,\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}}\right]}{\sqrt{a}\,d}$$

Result (type 3, 253 leaves):

$$\left(\sqrt{a}\,\text{Coth}[c+d\,x]\left(\sqrt{2}\,\text{ArcTan}\left[\frac{\sqrt{2}\,\sqrt{a}}{\sqrt{-i\,a\,(-i+\text{Csch}[c+d\,x])}}\right]-i\left(\text{Log}\left[-\frac{2\,a\left(-2\,i\,\sqrt{a}+\sqrt{-i\,a\,(-i+\text{Csch}[c+d\,x])}+i\,\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}\right)}{-\sqrt{a}+\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}}\right]+\text{Log}\left[\frac{2\,i\,a\left(2\,\sqrt{a}+i\,\sqrt{-i\,a\,(-i+\text{Csch}[c+d\,x])}+\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}\right)}{\sqrt{a}+\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}}\right]\right)\right)\right)\Big/\left(d\,\sqrt{a\,(-1-i\,\text{Csch}[c+d\,x])}\,\sqrt{a-i\,a\,\text{Csch}[c+d\,x]}\right)$$

Problem 60: Result more than twice size of optimal antiderivative.

$$\int \sqrt{-3+3\,i\,\text{Csch}[x]}\,dx$$

Optimal (type 3, 23 leaves, 2 steps):

$$-2\sqrt{3}\,\text{ArcTan}\left[\frac{\text{Coth}[x]}{\sqrt{-1+i\,\text{Csch}[x]}}\right]$$

Result (type 3, 67 leaves):

$$\frac{\sqrt{3}\,\text{Coth}[x]\left(\text{Log}\left[1-\sqrt{1+i\,\text{Csch}[x]}\right]-\text{Log}\left[1+\sqrt{1+i\,\text{Csch}[x]}\right]\right)}{\sqrt{-1+i\,\text{Csch}[x]}\,\sqrt{1+i\,\text{Csch}[x]}}$$

Problem 61: Result more than twice size of optimal antiderivative.

$$\int \sqrt{-3-3\,i\,\text{Csch}[x]}\,dx$$

Optimal (type 3, 23 leaves, 2 steps):

$$-2\sqrt{3}\,\text{ArcTan}\left[\frac{\text{Coth}[x]}{\sqrt{-1-i\,\text{Csch}[x]}}\right]$$

Result (type 3, 67 leaves):

$$\frac{\sqrt{3}\,\text{Coth}[x]\left(\text{Log}\left[1-\sqrt{1-i\,\text{Csch}[x]}\right]-\text{Log}\left[1+\sqrt{1-i\,\text{Csch}[x]}\right]\right)}{\sqrt{-1-i\,\text{Csch}[x]}\,\sqrt{1-i\,\text{Csch}[x]}}$$

Problem 67: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Csch}[x]^2}{i+\text{Csch}[x]}\,dx$$

Optimal (type 3, 17 leaves, 3 steps):

$$-\text{ArcTanh}[\text{Cosh}[x]]+\frac{\text{Coth}[x]}{i+\text{Csch}[x]}$$

Result (type 3, 46 leaves):

$$-\text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right]+\text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right]-\frac{2\,i\,\text{Sinh}\left[\frac{x}{2}\right]}{\text{Cosh}\left[\frac{x}{2}\right]+i\,\text{Sinh}\left[\frac{x}{2}\right]}$$

Problem 68: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Csch}[x]^3}{i + \text{Csch}[x]} \, dx$$

Optimal (type 3, 26 leaves, 4 steps):

$$i \,\text{ArcTanh}[\text{Cosh}[x]] - \text{Coth}[x] - \frac{i \,\text{Coth}[x]}{i + \text{Csch}[x]}$$

Result (type 3, 70 leaves):

$$-\frac{1}{2} \text{Coth}\left[\frac{x}{2}\right] + i \,\text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right] - i \,\text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right] - \frac{2 \,\text{Sinh}\left[\frac{x}{2}\right]}{\text{Cosh}\left[\frac{x}{2}\right] + i \,\text{Sinh}\left[\frac{x}{2}\right]} - \frac{1}{2} \text{Tanh}\left[\frac{x}{2}\right]$$

Problem 69: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Csch}[x]^4}{i + \text{Csch}[x]} \, dx$$

Optimal (type 3, 37 leaves, 6 steps):

$$\frac{3}{2} \text{ArcTanh}[\text{Cosh}[x]] + 2 i \,\text{Coth}[x] - \frac{3}{2} \text{Coth}[x] \,\text{Csch}[x] + \frac{\text{Coth}[x] \,\text{Csch}[x]^2}{i + \text{Csch}[x]}$$

Result (type 3, 90 leaves):

$$\frac{1}{8} \left(4 i \,\text{Coth}\left[\frac{x}{2}\right] - \text{Csch}\left[\frac{x}{2}\right]^2 + 12 \,\text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right] - 12 \,\text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right] - \text{Sech}\left[\frac{x}{2}\right]^2 + \frac{16 \,\text{Sinh}\left[\frac{x}{2}\right]}{-i \,\text{Cosh}\left[\frac{x}{2}\right] + \text{Sinh}\left[\frac{x}{2}\right]} + 4 i \,\text{Tanh}\left[\frac{x}{2}\right]\right)$$

Problem 70: Result more than twice size of optimal antiderivative.

$$\int (a + b \,\text{Csch}[c + d x])^4 \, dx$$

Optimal (type 3, 109 leaves, 6 steps):

$$a^4 x - \frac{2 a b \left(2 a^2 - b^2\right) \text{ArcTanh}[\text{Cosh}[c + d x]]}{d} - \frac{b^2 \left(17 a^2 - 2 b^2\right) \text{Coth}[c + d x]}{3 d} - \frac{4 a b^3 \,\text{Coth}[c + d x] \,\text{Csch}[c + d x]}{3 d} - \frac{b^2 \,\text{Coth}[c + d x] \left(a + b \,\text{Csch}[c + d x]\right)^2}{3 d}$$

Result (type 3, 567 leaves):

$$\frac{a^4 (c+d x) (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sinh}[c+d x]^4}{d (b+a \operatorname{Sinh}[c+d x])^4}+\frac{1}{3 d (b+a \operatorname{Sinh}[c+d x])^4}$$

$$\left(-9 a^2 b^2 \operatorname{Cosh}\left[\frac{1}{2} (c+d x)\right]+b^4 \operatorname{Cosh}\left[\frac{1}{2} (c+d x)\right]\right) \operatorname{Csch}\left[\frac{1}{2} (c+d x)\right] (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sinh}[c+d x]^4-$$

$$\frac{a b^3 \operatorname{Csch}\left[\frac{1}{2} (c+d x)\right]^2 (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sinh}[c+d x]^4}{2 d (b+a \operatorname{Sinh}[c+d x])^4}-\frac{b^4 \operatorname{Coth}\left[\frac{1}{2} (c+d x)\right] \operatorname{Csch}\left[\frac{1}{2} (c+d x)\right]^2 (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sinh}[c+d x]^4}{24 d (b+a \operatorname{Sinh}[c+d x])^4}+$$

$$\frac{2 (-2 a^3 b+a b^3) (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Log}\left[\operatorname{Cosh}\left[\frac{1}{2} (c+d x)\right]\right] \operatorname{Sinh}[c+d x]^4}{d (b+a \operatorname{Sinh}[c+d x])^4}-$$

$$\frac{2 (-2 a^3 b+a b^3) (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Log}\left[\operatorname{Sinh}\left[\frac{1}{2} (c+d x)\right]\right] \operatorname{Sinh}[c+d x]^4}{d (b+a \operatorname{Sinh}[c+d x])^4}-\frac{a b^3 (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sech}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Sinh}[c+d x]^4}{2 d (b+a \operatorname{Sinh}[c+d x])^4}+$$

$$\frac{1}{3 d (b+a \operatorname{Sinh}[c+d x])^4} (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sech}\left[\frac{1}{2} (c+d x)\right] \left(-9 a^2 b^2 \operatorname{Sinh}\left[\frac{1}{2} (c+d x)\right]+b^4 \operatorname{Sinh}\left[\frac{1}{2} (c+d x)\right]\right) \operatorname{Sinh}[c+d x]^4+$$

$$\frac{b^4 (a+b \operatorname{Csch}[c+d x])^4 \operatorname{Sech}\left[\frac{1}{2} (c+d x)\right]^2 \operatorname{Sinh}[c+d x]^4 \operatorname{Tanh}\left[\frac{1}{2} (c+d x)\right]}{24 d (b+a \operatorname{Sinh}[c+d x])^4}$$

Problem 71: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Csch}[c+d x])^3 \, dx$$

Optimal (type 3, 75 leaves, 5 steps):

$$a^3 x-\frac{b (6 a^2-b^2) \operatorname{ArcTanh}[\operatorname{Cosh}[c+d x]]}{2 d}-\frac{5 a b^2 \operatorname{Coth}[c+d x]}{2 d}-\frac{b^2 \operatorname{Coth}[c+d x] (a+b \operatorname{Csch}[c+d x])}{2 d}$$

Result (type 3, 151 leaves):

$$-\frac{1}{8 d}\left(-8 a^3 c-8 a^3 d x+12 a b^2 \operatorname{Coth}\left[\frac{1}{2} (c+d x)\right]+b^3 \operatorname{Csch}\left[\frac{1}{2} (c+d x)\right]^2+24 a^2 b \operatorname{Log}\left[\operatorname{Cosh}\left[\frac{1}{2} (c+d x)\right]\right]-4 b^3 \operatorname{Log}\left[\operatorname{Cosh}\left[\frac{1}{2} (c+d x)\right]\right]-\right.$$
$$\left.24 a^2 b \operatorname{Log}\left[\operatorname{Sinh}\left[\frac{1}{2} (c+d x)\right]\right]+4 b^3 \operatorname{Log}\left[\operatorname{Sinh}\left[\frac{1}{2} (c+d x)\right]\right]+b^3 \operatorname{Sech}\left[\frac{1}{2} (c+d x)\right]^2+12 a b^2 \operatorname{Tanh}\left[\frac{1}{2} (c+d x)\right]\right)$$

Problem 72: Result more than twice size of optimal antiderivative.

$$\int (a+b \operatorname{Csch}[c+d x])^2 \, dx$$

Optimal (type 3, 34 leaves, 4 steps):

$$a^2 x - \frac{2 a b \text{ArcTanh}[\text{Cosh}[c + d x]]}{d} - \frac{b^2 \text{Coth}[c + d x]}{d}$$

Result (type 3, 75 leaves):

$$-\frac{1}{2 d}\left(b^2 \text{Coth}\left[\frac{1}{2}(c + d x)\right] - 2 a \left(a c + a d x - 2 b \text{Log}\left[\text{Cosh}\left[\frac{1}{2}(c + d x)\right]\right] + 2 b \text{Log}\left[\text{Sinh}\left[\frac{1}{2}(c + d x)\right]\right]\right) + b^2 \text{Tanh}\left[\frac{1}{2}(c + d x)\right]\right)$$

Problem 73: Result more than twice size of optimal antiderivative.

$$\int (a + b \text{Csch}[c + d x])\, dx$$

Optimal (type 3, 17 leaves, 2 steps):

$$a x - \frac{b \text{ArcTanh}[\text{Cosh}[c + d x]]}{d}$$

Result (type 3, 43 leaves):

$$a x - \frac{b \text{Log}\left[\text{Cosh}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d} + \frac{b \text{Log}\left[\text{Sinh}\left[\frac{c}{2} + \frac{d x}{2}\right]\right]}{d}$$

Problem 89: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sech}[x]^2}{i + \text{Csch}[x]}\, dx$$

Optimal (type 3, 19 leaves, 6 steps):

$$-\frac{1}{3} \text{Sech}[x]^3 - \frac{1}{3} i \text{Tanh}[x]^3$$

Result (type 3, 64 leaves):

$$\frac{-3 + \text{Cosh}[x] + \text{Cosh}[2 x] - 2 i \text{Sinh}[x] + i \text{Cosh}[x] \text{Sinh}[x]}{6 \left(\text{Cosh}\left[\frac{x}{2}\right] - i \text{Sinh}\left[\frac{x}{2}\right]\right) \left(\text{Cosh}\left[\frac{x}{2}\right] + i \text{Sinh}\left[\frac{x}{2}\right]\right)^3}$$

Problem 91: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Sech}[x]^4}{i + \text{Csch}[x]}\, dx$$

Optimal (type 3, 29 leaves, 7 steps):

$-\frac{1}{5}\,\mathrm{Sech}[x]^5-\frac{1}{3}\,i\,\mathrm{Tanh}[x]^3+\frac{1}{5}\,i\,\mathrm{Tanh}[x]^5$

Result (type 3, 96 leaves):

$$\left(-240+54\,\mathrm{Cosh}[x]+32\,\mathrm{Cosh}[2\,x]+18\,\mathrm{Cosh}[3\,x]+16\,\mathrm{Cosh}[4\,x]-96\,i\,\mathrm{Sinh}[x]+18\,i\,\mathrm{Sinh}[2\,x]-32\,i\,\mathrm{Sinh}[3\,x]+9\,i\,\mathrm{Sinh}[4\,x]\right)\Big/\left(960\left(\mathrm{Cosh}\left[\frac{x}{2}\right]-i\,\mathrm{Sinh}\left[\frac{x}{2}\right]\right)^3\left(\mathrm{Cosh}\left[\frac{x}{2}\right]+i\,\mathrm{Sinh}\left[\frac{x}{2}\right]\right)^5\right)$$

Problem 103: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Tanh}[x]^4}{i+\mathrm{Csch}[x]}\,dx$$

Optimal (type 3, 52 leaves, 5 steps):

$$-i\,x+\frac{1}{15}\left(15\,i-8\,\mathrm{Csch}[x]\right)\mathrm{Tanh}[x]+\frac{1}{15}\left(5\,i-4\,\mathrm{Csch}[x]\right)\mathrm{Tanh}[x]^3+\frac{1}{5}\left(i-\mathrm{Csch}[x]\right)\mathrm{Tanh}[x]^5$$

Result (type 3, 126 leaves):

$$\left(-200+6\left(89-120\,i\,x\right)\mathrm{Cosh}[x]-128\,\mathrm{Cosh}[2\,x]+178\,\mathrm{Cosh}[3\,x]-240\,i\,x\,\mathrm{Cosh}[3\,x]-184\,\mathrm{Cosh}[4\,x]+64\,i\,\mathrm{Sinh}[x]+178\,i\,\mathrm{Sinh}[2\,x]+240\,x\,\mathrm{Sinh}[2\,x]+128\,i\,\mathrm{Sinh}[3\,x]+89\,i\,\mathrm{Sinh}[4\,x]+120\,x\,\mathrm{Sinh}[4\,x]\right)\Big/\left(960\left(\mathrm{Cosh}\left[\frac{x}{2}\right]-i\,\mathrm{Sinh}\left[\frac{x}{2}\right]\right)^3\left(\mathrm{Cosh}\left[\frac{x}{2}\right]+i\,\mathrm{Sinh}\left[\frac{x}{2}\right]\right)^5\right)$$

Problem 109: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Coth}[x]^3}{i+\mathrm{Csch}[x]}\,dx$$

Optimal (type 3, 12 leaves, 3 steps):

$-\mathrm{Csch}[x]-i\,\mathrm{Log}[\mathrm{Sinh}[x]]$

Result (type 3, 28 leaves):

$$-\frac{1}{2}\,\mathrm{Coth}\left[\frac{x}{2}\right]-i\,\mathrm{Log}[\mathrm{Sinh}[x]]+\frac{1}{2}\,\mathrm{Tanh}\left[\frac{x}{2}\right]$$

Problem 110: Result more than twice size of optimal antiderivative.

$$\int\frac{\mathrm{Coth}[x]^4}{i+\mathrm{Csch}[x]}\,dx$$

Optimal (type 3, 27 leaves, 4 steps):

$$-i x-\frac{1}{2} \text{ArcTanh}[\text{Cosh}[x]]+\frac{1}{2} \text{Coth}[x] (2 i-\text{Csch}[x])$$

Result (type 3, 76 leaves) :

$$-i x+\frac{1}{2} i \text{Coth}\left[\frac{x}{2}\right]-\frac{1}{8} \text{Csch}\left[\frac{x}{2}\right]^2-\frac{1}{2} \text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right]+\frac{1}{2} \text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right]-\frac{1}{8} \text{Sech}\left[\frac{x}{2}\right]^2+\frac{1}{2} i \text{Tanh}\left[\frac{x}{2}\right]$$

Problem 111: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Coth}[x]^5}{i+\text{Csch}[x]} \, dx$$

Optimal (type 3, 30 leaves, 3 steps) :

$$-\text{Csch}[x]+\frac{1}{2} i \text{Csch}[x]^2-\frac{\text{Csch}[x]^3}{3}-i \text{Log}[\text{Sinh}[x]]$$

Result (type 3, 92 leaves) :

$$-\frac{5}{12} \text{Coth}\left[\frac{x}{2}\right]+\frac{1}{8} i \text{Csch}\left[\frac{x}{2}\right]^2-\frac{1}{24} \text{Coth}\left[\frac{x}{2}\right] \text{Csch}\left[\frac{x}{2}\right]^2-i \text{Log}[\text{Sinh}[x]]-\frac{1}{8} i \text{Sech}\left[\frac{x}{2}\right]^2+\frac{5}{12} \text{Tanh}\left[\frac{x}{2}\right]-\frac{1}{24} \text{Sech}\left[\frac{x}{2}\right]^2 \text{Tanh}\left[\frac{x}{2}\right]$$

Problem 112: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Coth}[x]^6}{i+\text{Csch}[x]} \, dx$$

Optimal (type 3, 43 leaves, 5 steps) :

$$-i x-\frac{3}{8} \text{ArcTanh}[\text{Cosh}[x]]+\frac{1}{12} \text{Coth}[x]^3 (4 i-3 \text{Csch}[x])+\frac{1}{8} \text{Coth}[x] (8 i-3 \text{Csch}[x])$$

Result (type 3, 140 leaves) :

$$-i x+\frac{2}{3} i \text{Coth}\left[\frac{x}{2}\right]-\frac{5}{32} \text{Csch}\left[\frac{x}{2}\right]^2+\frac{1}{24} i \text{Coth}\left[\frac{x}{2}\right] \text{Csch}\left[\frac{x}{2}\right]^2-\frac{1}{64} \text{Csch}\left[\frac{x}{2}\right]^4-$$
$$\frac{3}{8} \text{Log}\left[\text{Cosh}\left[\frac{x}{2}\right]\right]+\frac{3}{8} \text{Log}\left[\text{Sinh}\left[\frac{x}{2}\right]\right]-\frac{5}{32} \text{Sech}\left[\frac{x}{2}\right]^2+\frac{1}{64} \text{Sech}\left[\frac{x}{2}\right]^4+\frac{2}{3} i \text{Tanh}\left[\frac{x}{2}\right]-\frac{1}{24} i \text{Sech}\left[\frac{x}{2}\right]^2 \text{Tanh}\left[\frac{x}{2}\right]$$

Problem 122: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Coth}[x]^5}{a+b \text{Csch}[x]} \, dx$$

Optimal (type 3, 70 leaves, 3 steps) :

$$-\frac{\left(a^2+2 b^2\right) \text{Csch}[x]}{b^3}+\frac{a\, \text{Csch}[x]^2}{2 b^2}-\frac{\text{Csch}[x]^3}{3 b}+\frac{\left(a^2+b^2\right)^2 \text{Log}[a+b\, \text{Csch}[x]]}{a b^4}+\frac{\text{Log}[\text{Sinh}[x]]}{a}$$

Result (type 3, 180 leaves):

$$\frac{1}{48 a b^4}\left(-4 a b \left(6 a^2+11 b^2\right) \text{Coth}\left[\frac{x}{2}\right]+6 a^2 b^2 \text{Csch}\left[\frac{x}{2}\right]^2-48 a^4 \text{Log}[\text{Sinh}[x]]-96 a^2 b^2 \text{Log}[\text{Sinh}[x]]+48 a^4 \text{Log}[b+a\, \text{Sinh}[x]]+96 a^2 b^2 \text{Log}[b+a\, \text{Sinh}[x]]+48 b^4 \text{Log}[b+a\, \text{Sinh}[x]]-6 a^2 b^2 \text{Sech}\left[\frac{x}{2}\right]^2-16 a b^3 \text{Csch}[x]^3 \text{Sinh}\left[\frac{x}{2}\right]^4-a b^3 \text{Csch}\left[\frac{x}{2}\right]^4 \text{Sinh}[x]+24 a^3 b\, \text{Tanh}\left[\frac{x}{2}\right]+44 a b^3 \text{Tanh}\left[\frac{x}{2}\right]\right)$$

Problem 124: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Coth}[x]^7}{a+b\, \text{Csch}[x]}\, dx$$

Optimal (type 3, 119 leaves, 3 steps):

$$-\frac{\left(a^4+3 a^2 b^2+3 b^4\right) \text{Csch}[x]}{b^5}+\frac{a \left(a^2+3 b^2\right) \text{Csch}[x]^2}{2 b^4}-\frac{\left(a^2+3 b^2\right) \text{Csch}[x]^3}{3 b^3}+\frac{a\, \text{Csch}[x]^4}{4 b^2}-\frac{\text{Csch}[x]^5}{5 b}+\frac{\left(a^2+b^2\right)^3 \text{Log}[a+b\, \text{Csch}[x]]}{a b^6}+\frac{\text{Log}[\text{Sinh}[x]]}{a}$$

Result (type 3, 344 leaves):

$$\frac{1}{960 a b^6}\left(-4 a b \left(120 a^4+340 a^2 b^2+309 b^4\right) \text{Coth}\left[\frac{x}{2}\right]+30 a^2 b^2 \left(4 a^2+11 b^2\right) \text{Csch}\left[\frac{x}{2}\right]^2-960 a^6 \text{Log}[\text{Sinh}[x]]-2880 a^4 b^2 \text{Log}[\text{Sinh}[x]]-2880 a^2 b^4 \text{Log}[\text{Sinh}[x]]+960 a^6 \text{Log}[b+a\, \text{Sinh}[x]]+2880 a^4 b^2 \text{Log}[b+a\, \text{Sinh}[x]]+2880 a^2 b^4 \text{Log}[b+a\, \text{Sinh}[x]]+960 b^6 \text{Log}[b+a\, \text{Sinh}[x]]-120 a^4 b^2 \text{Sech}\left[\frac{x}{2}\right]^2-330 a^2 b^4 \text{Sech}\left[\frac{x}{2}\right]^2+15 a^2 b^4 \text{Sech}\left[\frac{x}{2}\right]^4-320 a^3 b^3 \text{Csch}[x]^3 \text{Sinh}\left[\frac{x}{2}\right]^4-816 a b^5 \text{Csch}[x]^3 \text{Sinh}\left[\frac{x}{2}\right]^4-3 a b^5 \text{Csch}\left[\frac{x}{2}\right]^6 \text{Sinh}[x]-a b^3 \text{Csch}\left[\frac{x}{2}\right]^4 \left(-15 a b+20 a^2 \text{Sinh}[x]+51 b^2 \text{Sinh}[x]\right)+480 a^5 b\, \text{Tanh}\left[\frac{x}{2}\right]+1360 a^3 b^3 \text{Tanh}\left[\frac{x}{2}\right]+1236 a b^5 \text{Tanh}\left[\frac{x}{2}\right]+6 a b^5 \text{Sech}\left[\frac{x}{2}\right]^4 \text{Tanh}\left[\frac{x}{2}\right]\right)$$

Problem 132: Result unnecessarily involves higher level functions.

$$\int \frac{x^5}{\sqrt{\text{Csch}[2 \text{Log}[c x]]}}\, dx$$

Optimal (type 4, 81 leaves, 6 steps):

$$-\frac{2\,x^2}{21\,c^4\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}+\frac{x^6}{7\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}+\frac{2\,\mathrm{EllipticF}[\mathrm{ArcCsc}[c\,x],-1]}{21\,c^7\,\sqrt{1-\frac{1}{c^4\,x^4}}\,x\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}$$

Result (type 5, 81 leaves):

$$\frac{\sqrt{\frac{c^2\,x^2}{-2+2\,c^4\,x^4}}\,\left(2-5\,c^4\,x^4+3\,c^8\,x^8-2\,\sqrt{1-c^4\,x^4}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},c^4\,x^4\right]\right)}{21\,c^6}$$

Problem 134: Result unnecessarily involves higher level functions.

$$\int\frac{x^3}{\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}\,dx$$

Optimal (type 4, 119 leaves, 9 steps):

$$-\frac{2}{5\,c^4\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}+\frac{x^4}{5\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}-\frac{2\,\mathrm{EllipticE}[\mathrm{ArcCsc}[c\,x],-1]}{5\,c^5\,\sqrt{1-\frac{1}{c^4\,x^4}}\,x\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}+\frac{2\,\mathrm{EllipticF}[\mathrm{ArcCsc}[c\,x],-1]}{5\,c^5\,\sqrt{1-\frac{1}{c^4\,x^4}}\,x\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}$$

Result (type 5, 76 leaves):

$$\frac{x^2\,\sqrt{\frac{c^2\,x^2}{-2+2\,c^4\,x^4}}\,\left(-3+3\,c^4\,x^4-2\,\sqrt{1-c^4\,x^4}\,\mathrm{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},c^4\,x^4\right]\right)}{15\,c^2}$$

Problem 136: Result unnecessarily involves higher level functions.

$$\int\frac{x}{\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}\,dx$$

Optimal (type 4, 60 leaves, 5 steps):

$$\frac{x^2}{3\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}+\frac{2\,\mathrm{EllipticF}[\mathrm{ArcCsc}[c\,x],-1]}{3\,c^3\,\sqrt{1-\frac{1}{c^4\,x^4}}\,x\,\sqrt{\mathrm{Csch}[2\,\mathrm{Log}[c\,x]]}}$$

Result (type 5, 72 leaves):

$$\frac{\sqrt{\frac{c^2 x^2}{-2+2 c^4 x^4}} \left(-1 + c^4 x^4 - 2 \sqrt{1 - c^4 x^4}\ \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, c^4 x^4\right]\right)}{3 c^2}$$

Problem 140: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\sqrt{\text{Csch}[2 \text{Log}[c x]]}}{x^3} \, dx$$

Optimal (type 4, 74 leaves, 7 steps):

$$-c^3 \sqrt{1 - \frac{1}{c^4 x^4}}\ x \sqrt{\text{Csch}[2 \text{Log}[c x]]}\ \text{EllipticE}[\text{ArcCsc}[c x], -1] + c^3 \sqrt{1 - \frac{1}{c^4 x^4}}\ x \sqrt{\text{Csch}[2 \text{Log}[c x]]}\ \text{EllipticF}[\text{ArcCsc}[c x], -1]$$

Result (type 4, 56 leaves):

$$c^2 \sqrt{\text{Csch}[2 \text{Log}[c x]]} \left(-\text{EllipticE}\left[\frac{\pi}{4} - i \text{Log}[c x], 2\right] \sqrt{i \text{Sinh}[2 \text{Log}[c x]]} + \text{Sinh}[2 \text{Log}[c x]]\right)$$

Problem 142: Result unnecessarily involves higher level functions.

$$\int \frac{\sqrt{\text{Csch}[2 \text{Log}[c x]]}}{x^5} \, dx$$

Optimal (type 4, 64 leaves, 5 steps):

$$\frac{1}{3} \left(c^4 - \frac{1}{x^4}\right) \sqrt{\text{Csch}[2 \text{Log}[c x]]} - \frac{1}{3} c^5 \sqrt{1 - \frac{1}{c^4 x^4}}\ x \sqrt{\text{Csch}[2 \text{Log}[c x]]}\ \text{EllipticF}[\text{ArcCsc}[c x], -1]$$

Result (type 5, 81 leaves):

$$\frac{\sqrt{2} \sqrt{\frac{c^2 x^2}{-1+c^4 x^4}} \left(-1 + c^4 x^4 + c^4 x^4 \sqrt{1 - c^4 x^4}\ \text{Hypergeometric2F1}\left[\frac{1}{4}, \frac{1}{2}, \frac{5}{4}, c^4 x^4\right]\right)}{3 x^4}$$

Problem 144: Result unnecessarily involves higher level functions.

$$\int \frac{x^7}{\text{Csch}[2 \text{Log}[c x]]^{3/2}} \, dx$$

Optimal (type 4, 118 leaves, 7 steps):

$$\frac{4}{77\,c^4\left(c^4-\frac{1}{x^4}\right)\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}-\frac{6\,x^4}{77\left(c^4-\frac{1}{x^4}\right)\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}+\frac{x^8}{11\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}-\frac{4\,\text{EllipticF}[\text{ArcCsc}[c\,x],-1]}{77\,c^{11}\left(1-\frac{1}{c^4x^4}\right)^{3/2}x^3\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}$$

Result (type 5, 89 leaves):

$$\frac{\sqrt{\frac{c^2x^2}{-2+2c^4x^4}}\left(-4+17\,c^4x^4-20\,c^8x^8+7\,c^{12}x^{12}+4\sqrt{1-c^4x^4}\,\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},c^4x^4\right]\right)}{154\,c^8}$$

Problem 146: Result unnecessarily involves higher level functions.

$$\int\frac{x^5}{\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}\,dx$$

Optimal (type 4, 162 leaves, 10 steps):

$$\frac{4}{15\,c^4\left(c^4-\frac{1}{x^4}\right)x^2\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}-\frac{2\,x^2}{15\left(c^4-\frac{1}{x^4}\right)\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}+\frac{x^6}{9\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}+\frac{4\,\text{EllipticE}[\text{ArcCsc}[c\,x],-1]}{15\,c^9\left(1-\frac{1}{c^4x^4}\right)^{3/2}x^3\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}-\frac{4\,\text{EllipticF}[\text{ArcCsc}[c\,x],-1]}{15\,c^9\left(1-\frac{1}{c^4x^4}\right)^{3/2}x^3\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}$$

Result (type 5, 84 leaves):

$$\frac{x^2\sqrt{\frac{c^2x^2}{-2+2c^4x^4}}\left(11-16\,c^4x^4+5\,c^8x^8+4\sqrt{1-c^4x^4}\,\text{Hypergeometric2F1}\left[\frac{1}{2},\frac{3}{4},\frac{7}{4},c^4x^4\right]\right)}{90\,c^4}$$

Problem 148: Result unnecessarily involves higher level functions.

$$\int\frac{x^3}{\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}\,dx$$

Optimal (type 4, 86 leaves, 6 steps):

$$-\frac{2}{7\left(c^4-\frac{1}{x^4}\right)\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}+\frac{x^4}{7\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}-\frac{4\,\text{EllipticF}[\text{ArcCsc}[c\,x],-1]}{7\,c^7\left(1-\frac{1}{c^4x^4}\right)^{3/2}x^3\,\text{Csch}[2\,\text{Log}[c\,x]]^{3/2}}$$

Result (type 5, 80 leaves):

$$\frac{\sqrt{\frac{c^2 x^2}{-2+2 c^4 x^4}} \left(3-4 c^4 x^4+c^8 x^8+4 \sqrt{1-c^4 x^4}\ \texttt{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},c^4 x^4\right]\right)}{14 c^4}$$

Problem 150: Result unnecessarily involves higher level functions.

$$\int \frac{x}{\text{Csch}[2 \text{Log}[c x]]^{3/2}} \, dx$$

Optimal (type 4, 130 leaves, 9 steps):

$$-\frac{6}{5 \left(c^4-\frac{1}{x^4}\right) x^2 \text{Csch}[2 \text{Log}[c x]]^{3/2}}+\frac{x^2}{5 \text{Csch}[2 \text{Log}[c x]]^{3/2}}-\frac{12 \text{EllipticE}[\text{ArcCsc}[c x],-1]}{5 c^5 \left(1-\frac{1}{c^4 x^4}\right)^{3/2} x^3 \text{Csch}[2 \text{Log}[c x]]^{3/2}}+\frac{12 \text{EllipticF}[\text{ArcCsc}[c x],-1]}{5 c^5 \left(1-\frac{1}{c^4 x^4}\right)^{3/2} x^3 \text{Csch}[2 \text{Log}[c x]]^{3/2}}$$

Result (type 5, 83 leaves):

$$\frac{\sqrt{\frac{c^2 x^2}{-2+2 c^4 x^4}} \left(7-8 c^4 x^4+c^8 x^8-12 \sqrt{1-c^4 x^4}\ \texttt{Hypergeometric2F1}\left[-\frac{1}{4},\frac{1}{2},\frac{3}{4},c^4 x^4\right]\right)}{10 c^4 x^2}$$

Problem 154: Result unnecessarily involves higher level functions.

$$\int \frac{\text{Csch}[2 \text{Log}[c x]]^{3/2}}{x^3} \, dx$$

Optimal (type 4, 69 leaves, 5 steps):

$$-\frac{1}{2} \left(c^4-\frac{1}{x^4}\right) x^2 \text{Csch}[2 \text{Log}[c x]]^{3/2}+\frac{1}{2} c^5 \left(1-\frac{1}{c^4 x^4}\right)^{3/2} x^3 \text{Csch}[2 \text{Log}[c x]]^{3/2} \text{EllipticF}[\text{ArcCsc}[c x],-1]$$

Result (type 5, 66 leaves):

$$-\sqrt{2}\ c^2 \sqrt{\frac{c^2 x^2}{-1+c^4 x^4}} \left(1+\sqrt{1-c^4 x^4}\ \texttt{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{2},\frac{5}{4},c^4 x^4\right]\right)$$

Problem 159: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}[a+b \text{Log}[c x^n]]^4 \, dx$$

Optimal (type 5, 68 leaves, 4 steps):

$$\frac{16\, e^{4a}\, x\, (c\, x^n)^{4b}\, \text{Hypergeometric2F1}\left[4, \frac{1}{2}\left(4+\frac{1}{b\, n}\right), \frac{1}{2}\left(6+\frac{1}{b\, n}\right), e^{2a}\, (c\, x^n)^{2b}\right]}{1+4\, b\, n}$$

Result (type 5, 488 leaves):

$$-\frac{1}{6\, b^3\, n^3}\left(-1+4\, b^2\, n^2\right) x\, \text{Csch}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right] \text{Csch}\left[a+b\, n\, \text{Log}[x]+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right] \text{Sinh}[b\, n\, \text{Log}[x]]+$$
$$\frac{1}{3\, b\, n} x\, \text{Csch}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right] \text{Csch}\left[a+b\, n\, \text{Log}[x]+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]^3 \text{Sinh}[b\, n\, \text{Log}[x]]-$$
$$\frac{1}{6\, b^2\, n^2} x\, \text{Csch}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right] \text{Csch}\left[a+b\, n\, \text{Log}[x]+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]^2$$
$$\left(2\, b\, n\, \text{Cosh}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]+\text{Sinh}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]\right)+$$
$$\frac{1}{6\, b^3\, n^3\, (1+2\, b\, n)} e^{-\frac{a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)}{b\, n}} \left(-1+4\, b^2\, n^2\right) \text{Csch}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]$$
$$\left(e^{\left(2+\frac{1}{b\, n}\right)\left(a+b\, \text{Log}[c\, x^n]\right)} \text{Hypergeometric2F1}\left[1, 1+\frac{1}{2\, b\, n}, 2+\frac{1}{2\, b\, n}, e^{2\left(a+b\, \text{Log}[c\, x^n]\right)}\right] \text{Sinh}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]+\right.$$
$$e^{\frac{a}{b\, n}+\frac{-n\, \text{Log}[x]+\text{Log}[c\, x^n]}{n}} (1+2\, b\, n)\, x \left(\text{Cosh}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]+\right.$$
$$\left.\left.\text{Hypergeometric2F1}\left[1, \frac{1}{2\, b\, n}, 1+\frac{1}{2\, b\, n}, e^{2\left(a+b\, n\, \text{Log}[x]+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right)}\right] \text{Sinh}\left[a+b\left(-n\, \text{Log}[x]+\text{Log}[c\, x^n]\right)\right]\right)\right)$$

Problem 161: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}\left[a+2\, \text{Log}\left[c\, \sqrt{x}\right]\right]^3 dx$$

Optimal (type 1, 26 leaves, 3 steps):

$$-\frac{2\, c^6\, e^{-a}}{\left(c^4-\frac{e^{-2a}}{x^2}\right)^2}$$

Result (type 1, 62 leaves):

$$\frac{2\, (\text{Cosh}[a]-\text{Sinh}[a])\left(-2\, c^4\, x^2+\text{Cosh}[a]^2-2\, \text{Cosh}[a]\, \text{Sinh}[a]+\text{Sinh}[a]^2\right)}{c^2\left(\left(-1+c^4\, x^2\right) \text{Cosh}[a]+\left(1+c^4\, x^2\right) \text{Sinh}[a]\right)^2}$$

Problem 162: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}\left[a+2\, \text{Log}\left[\frac{c}{\sqrt{x}}\right]\right]^3 dx$$

Optimal (type 1, 26 leaves, 4 steps):

$$\frac{2\, c^2\, e^{-3 a}}{\left(e^{-2 a} - \frac{c^4}{x^2}\right)^2}$$

Result (type 1, 65 leaves):

$$-\frac{2\, c^6 \left(\left(c^4 - 2\, x^2\right) \text{Cosh}[a] + \left(c^4 + 2\, x^2\right) \text{Sinh}[a]\right) \left(\text{Cosh}[2\, a] + \text{Sinh}[2\, a]\right)}{\left(\left(-c^4 + x^2\right) \text{Cosh}[a] - \left(c^4 + x^2\right) \text{Sinh}[a]\right)^2}$$

Problem 164: Result more than twice size of optimal antiderivative.

$$\int \text{Csch}\left[a - \frac{\text{Log}[c\, x^n]}{n\, (-2 + p)}\right]^p \, dx$$

Optimal (type 3, 66 leaves, 3 steps):

$$\frac{(2 - p)\, x \left(1 - e^{-2 a} \left(c\, x^n\right)^{-\frac{2}{n\, (2-p)}}\right) \text{Csch}\left[a + \frac{\text{Log}[c\, x^n]}{n\, (2-p)}\right]^p}{2\, (1 - p)}$$

Result (type 3, 140 leaves):

$$\frac{2^{-1+p}\, e^{-\frac{2 a p}{-2+p}} (-2 + p)\, x \left(e^{\frac{2 a p}{-2+p}} - e^{\frac{4 a}{-2+p}} \left(c\, x^n\right)^{\frac{2}{n\, (-2+p)}}\right) \left(-\frac{e^{\frac{a\, (2+p)}{-2+p}} \left(c\, x^n\right)^{\frac{1}{n\, (-2+p)}}}{-e^{\frac{2 a p}{-2+p}} + e^{\frac{4 a}{-2+p}} \left(c\, x^n\right)^{\frac{2}{n\, (-2+p)}}}\right)^p}{-1 + p}$$

Problem 165: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Csch}[a + b\, \text{Log}[c\, x^n]]}{x} \, dx$$

Optimal (type 3, 20 leaves, 2 steps):

$$-\frac{\text{ArcTanh}[\text{Cosh}[a + b\, \text{Log}[c\, x^n]]]}{b\, n}$$

Result (type 3, 54 leaves):

$$-\frac{\text{Log}\left[\text{Cosh}\left[\frac{a}{2} + \frac{1}{2}\, b\, \text{Log}[c\, x^n]\right]\right]}{b\, n} + \frac{\text{Log}\left[\text{Sinh}\left[\frac{a}{2} + \frac{1}{2}\, b\, \text{Log}[c\, x^n]\right]\right]}{b\, n}$$

Test results for the 27 problems in "6.6.7 (d hyper)^m (a+b (c csch)^n)^p.m"

Problem 2: Result more than twice size of optimal antiderivative.

$$\int \left(a+b\,\text{Csch}[c+d\,x]^2\right)^3 dx$$

Optimal (type 3, 74 leaves, 4 steps):

$$a^3 x-\frac{b\left(3 a^2-3 a b+b^2\right) \text{Coth}[c+d\,x]}{d}-\frac{(3 a-2 b)\, b^2\, \text{Coth}[c+d\,x]^3}{3 d}-\frac{b^3\, \text{Coth}[c+d\,x]^5}{5 d}$$

Result (type 3, 266 leaves):

$$-\frac{8 b^3 \text{Cosh}[c+d\,x]\left(a+b\,\text{Csch}[c+d\,x]^2\right)^3 \text{Sinh}[c+d\,x]}{5 d\left(-a+2 b+a\,\text{Cosh}[2(c+d\,x)]\right)^3}-\frac{8\left(15 a b^2 \text{Cosh}[c+d\,x]-4 b^3 \text{Cosh}[c+d\,x]\right)\left(a+b\,\text{Csch}[c+d\,x]^2\right)^3 \text{Sinh}[c+d\,x]^3}{15 d\left(-a+2 b+a\,\text{Cosh}[2(c+d\,x)]\right)^3}-\frac{8\left(45 a^2 b\,\text{Cosh}[c+d\,x]-30 a b^2 \text{Cosh}[c+d\,x]+8 b^3 \text{Cosh}[c+d\,x]\right)\left(a+b\,\text{Csch}[c+d\,x]^2\right)^3 \text{Sinh}[c+d\,x]^5}{15 d\left(-a+2 b+a\,\text{Cosh}[2(c+d\,x)]\right)^3}+\frac{8 a^3 (c+d\,x)\left(a+b\,\text{Csch}[c+d\,x]^2\right)^3 \text{Sinh}[c+d\,x]^6}{d\left(-a+2 b+a\,\text{Cosh}[2(c+d\,x)]\right)^3}$$

Problem 9: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \left(a+b\,\text{Csch}[c+d\,x]^2\right)^{5/2} dx$$

Optimal (type 3, 174 leaves, 8 steps):

$$\frac{a^{5/2}\,\text{ArcTanh}\left[\frac{\sqrt{a}\,\text{Coth}[c+d\,x]}{\sqrt{a-b+b\,\text{Coth}[c+d\,x]^2}}\right]}{d}-\frac{\sqrt{b}\left(15 a^2-10 a b+3 b^2\right) \text{ArcTanh}\left[\frac{\sqrt{b}\,\text{Coth}[c+d\,x]}{\sqrt{a-b+b\,\text{Coth}[c+d\,x]^2}}\right]}{8 d}-\frac{(7 a-3 b)\, b\,\text{Coth}[c+d\,x]\sqrt{a-b+b\,\text{Coth}[c+d\,x]^2}}{8 d}-\frac{b\,\text{Coth}[c+d\,x]\left(a-b+b\,\text{Coth}[c+d\,x]^2\right)^{3/2}}{4 d}$$

Result (type 3, 391 leaves):

$$-\left(\left(\left(-4 a^3+15 a^2 b-10 a b^2+3 b^3\right) \text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{b} \text{ Cosh}[c+d x]}{\sqrt{-a+2 b-a \text{ Cos}\left[2 \left(\frac{\pi}{2}-i (c+d x)\right)\right]}}\right] \left(a+b \text{ Csch}[c+d x]^2\right)^{5/2} \text{Sinh}[c+d x]^5\right) \Big/ \left(\sqrt{2} \sqrt{b} d \left(-a+2 b+a \text{ Cosh}[2 (c+d x)]\right)^{5/2}\right)\right)+$$

$$\left(\left(a+b \text{ Csch}[c+d x]^2\right)^{5/2} \left(-\frac{3}{2} \left(3 a b \text{ Cosh}[c+d x]-b^2 \text{ Cosh}[c+d x]\right) \text{Csch}[c+d x]^2-b^2 \text{ Coth}[c+d x] \text{ Csch}[c+d x]^3\right) \text{Sinh}[c+d x]^5\right) \Big/ \left(d \left(-a+2 b+a \text{ Cosh}[2 (c+d x)]\right)^2\right)+$$

$$\left(4 a^3 \left(a+b \text{ Csch}[c+d x]^2\right)^{5/2} \left(-\frac{\text{ArcTanh}\left[\frac{\sqrt{2} \sqrt{b} \text{ Cosh}[c+d x]}{\sqrt{-a+2 b+a \text{ Cosh}[2 (c+d x)]}}\right]}{\sqrt{2} \sqrt{b}}+\frac{\sqrt{2} \text{ Log}\left[\sqrt{2} \sqrt{a} \text{ Cosh}[c+d x]+\sqrt{-a+2 b+a \text{ Cosh}[2 (c+d x)]}\right]}{\sqrt{a}}\right) \text{Sinh}[c+d x]^5\right) \Big/ \left(d \left(-a+2 b+a \text{ Cosh}[2 (c+d x)]\right)^{5/2}\right)$$

Problem 12: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{a+b \text{ Csch}[c+d x]^2}} \, dx$$

Optimal (type 3, 38 leaves, 3 steps):

$$\frac{\text{ArcTanh}\left[\frac{\sqrt{a} \text{ Coth}[c+d x]}{\sqrt{a+b \text{ Csch}[c+d x]^2}}\right]}{\sqrt{a} d}$$

Result (type 3, 97 leaves):

$$\left(\sqrt{-a+2 b+a \text{ Cosh}[2 (c+d x)]} \text{ Csch}[c+d x] \text{ Log}\left[\sqrt{2} \sqrt{a} \text{ Cosh}[c+d x]+\sqrt{-a+2 b+a \text{ Cosh}[2 (c+d x)]}\right]\right) \Big/ \left(\sqrt{2} \sqrt{a} d \sqrt{a+b \text{ Csch}[c+d x]^2}\right)$$

Problem 20: Result more than twice size of optimal antiderivative.

$$\int \sqrt{1-\text{Csch}[x]^2}\, dx$$

Optimal (type 3, 26 leaves, 5 steps):

$$\text{ArcSin}\left[\frac{\text{Coth}[x]}{\sqrt{2}}\right]+\text{ArcTanh}\left[\frac{\text{Coth}[x]}{\sqrt{2-\text{Coth}[x]^2}}\right]$$

Result (type 3, 65 leaves):

$$\frac{\sqrt{2-2\,\text{Csch}[x]^2}\left(\text{ArcTan}\left[\frac{\sqrt{2}\,\text{Cosh}[x]}{\sqrt{-3+\text{Cosh}[2x]}}\right]+\text{Log}\left[\sqrt{2}\,\text{Cosh}[x]+\sqrt{-3+\text{Cosh}[2x]}\right]\right)\text{Sinh}[x]}{\sqrt{-3+\text{Cosh}[2x]}}$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{1-\text{Csch}[x]^2}}\, dx$$

Optimal (type 3, 16 leaves, 3 steps):

$$\text{ArcTanh}\left[\frac{\text{Coth}[x]}{\sqrt{2-\text{Coth}[x]^2}}\right]$$

Result (type 3, 45 leaves):

$$\frac{\sqrt{-3+\text{Cosh}[2x]}\,\text{Csch}[x]\,\text{Log}\left[\sqrt{2}\,\text{Cosh}[x]+\sqrt{-3+\text{Cosh}[2x]}\right]}{\sqrt{2-2\,\text{Csch}[x]^2}}$$

Problem 23: Result more than twice size of optimal antiderivative.

$$\int \sqrt{-1+\text{Csch}[x]^2}\, dx$$

Optimal (type 3, 33 leaves, 6 steps):

$$-\text{ArcTan}\left[\frac{\text{Coth}[x]}{\sqrt{-2+\text{Coth}[x]^2}}\right]-\text{ArcTanh}\left[\frac{\text{Coth}[x]}{\sqrt{-2+\text{Coth}[x]^2}}\right]$$

Result (type 3, 68 leaves):

$$\frac{\sqrt{2}\,\sqrt{-1+\text{Csch}[x]^2}\,\left(\text{ArcTan}\left[\frac{\sqrt{2}\,\text{Cosh}[x]}{\sqrt{-3+\text{Cosh}[2\,x]}}\right]+\text{Log}\left[\sqrt{2}\,\text{Cosh}[x]+\sqrt{-3+\text{Cosh}[2\,x]}\right]\right)\,\text{Sinh}[x]}{\sqrt{-3+\text{Cosh}[2\,x]}}$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\sqrt{-1+\text{Csch}[x]^2}}\,dx$$

Optimal (type 3, 14 leaves, 3 steps):

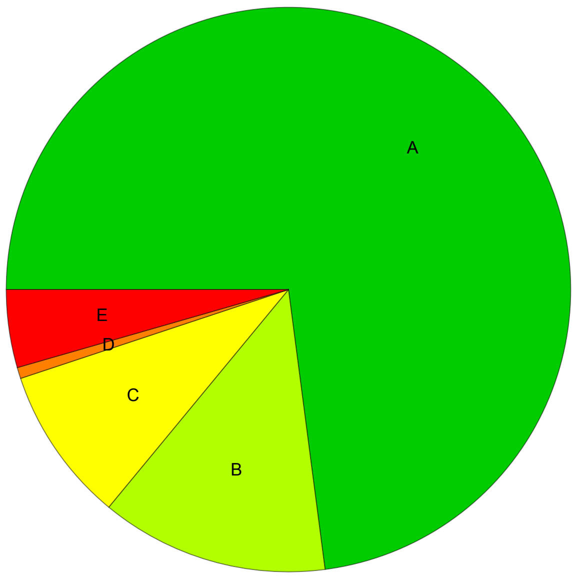
$$\text{ArcTan}\left[\frac{\text{Coth}[x]}{\sqrt{-2+\text{Coth}[x]^2}}\right]$$

Result (type 3, 48 leaves):

$$\frac{\sqrt{-3+\text{Cosh}[2\,x]}\,\text{Csch}[x]\,\text{Log}\left[\sqrt{2}\,\text{Cosh}[x]+\sqrt{-3+\text{Cosh}[2\,x]}\right]}{\sqrt{2}\,\sqrt{-1+\text{Csch}[x]^2}}$$

Summary of Integration Test Results

314 integration problems



A - 229 optimal antiderivatives

B - 41 more than twice size of optimal antiderivatives

C - 28 unnecessarily complex antiderivatives

D - 2 unable to integrate problems

E - 14 integration timeouts