Mathematica 11.3 Integration Test Results

Test results for the 61 problems in "4.4.10 (c+d x)^m (a+b cot)^n.m"

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

$$\int x \operatorname{Cot}[a+b x]\, dx$$

Optimal (type 4, 53 leaves, 4 steps):

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

Result (type 4, 166 leaves):

$$\frac{1}{2} x^2 \operatorname{Cot}[a]-\left(\operatorname{Csc}[a] \operatorname{Sec}[a] \left(b^2 e^{i \operatorname{ArcTan}[\operatorname{Tan}[a]]} x^2+\frac{1}{\sqrt{1+\operatorname{Tan}[a]^2}}\left(i b x \left(-\pi+2 \operatorname{ArcTan}[\operatorname{Tan}[a]]\right)-\pi \operatorname{Log}\left[1+e^{-2 i b x}\right]-2 \left(b x+\operatorname{ArcTan}[\operatorname{Tan}[a]]\right) \operatorname{Log}\left[1-e^{2 i (b x+\operatorname{ArcTan}[\operatorname{Tan}[a]])}\right]+\pi \operatorname{Log}[\operatorname{Cos}[b x]]+2 \operatorname{ArcTan}[\operatorname{Tan}[a]] \operatorname{Log}[\operatorname{Sin}[b x+\operatorname{ArcTan}[\operatorname{Tan}[a]]]]+i \operatorname{PolyLog}\left[2, e^{2 i (b x+\operatorname{ArcTan}[\operatorname{Tan}[a]])}\right]\right) \operatorname{Tan}[a]\right)\right) \Big/ \left(2 b^2 \sqrt{\operatorname{Sec}[a]^2 \left(\operatorname{Cos}[a]^2+\operatorname{Sin}[a]^2\right)}\right)$$

Problem 7: Result more than twice size of optimal antiderivative.

$$\int x^2 \operatorname{Cot}[a+b x]^2\, dx$$

Optimal (type 4, 74 leaves, 6 steps):

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

Result (type 4, 181 leaves):

$$-\frac{x^3}{3}+\frac{x^2\,\text{Csc}[a]\,\text{Csc}[a+b\,x]\,\text{Sin}[b\,x]}{b}-\left(\text{Csc}[a]\,\text{Sec}[a]\left(b^2\,e^{i\,\text{ArcTan}[\text{Tan}[a]]}\,x^2+\frac{1}{\sqrt{1+\text{Tan}[a]^2}}\left(i\,b\,x\,\left(-\pi+2\,\text{ArcTan}[\text{Tan}[a]]\right)-\pi\,\text{Log}\left[1+e^{-2\,i\,b\,x}\right]-2\,\left(b\,x+\text{ArcTan}[\text{Tan}[a]]\right)\,\text{Log}\left[1-e^{2\,i\,(b\,x+\text{ArcTan}[\text{Tan}[a]])}\right]+\pi\,\text{Log}[\text{Cos}[b\,x]]+2\,\text{ArcTan}[\text{Tan}[a]]\,\text{Log}[\text{Sin}[b\,x+\text{ArcTan}[\text{Tan}[a]]]]+i\,\text{PolyLog}\left[2,\,e^{2\,i\,(b\,x+\text{ArcTan}[\text{Tan}[a]])}\right]\right)\text{Tan}[a]\right)\right)\Big/\left(b^3\,\sqrt{\text{Sec}[a]^2\,\left(\text{Cos}[a]^2+\text{Sin}[a]^2\right)}\right)$$

Problem 13: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 91 leaves, 7 steps):

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

Result (type 4, 201 leaves):

$$-\frac{1}{2}\,x^2\,\text{Cot}[a]-\frac{x\,\text{Csc}[a+b\,x]^2}{2\,b}+\frac{\text{Csc}[a]\,\text{Csc}[a+b\,x]\,\text{Sin}[b\,x]}{2\,b^2}+\left(\text{Csc}[a]\,\text{Sec}[a]\left(b^2\,e^{i\,\text{ArcTan}[\text{Tan}[a]]}\,x^2+\frac{1}{\sqrt{1+\text{Tan}[a]^2}}\left(i\,b\,x\,\left(-\pi+2\,\text{ArcTan}[\text{Tan}[a]]\right)-\pi\,\text{Log}\left[1+e^{-2\,i\,b\,x}\right]-2\,\left(b\,x+\text{ArcTan}[\text{Tan}[a]]\right)\,\text{Log}\left[1-e^{2\,i\,(b\,x+\text{ArcTan}[\text{Tan}[a]])}\right]+\pi\,\text{Log}[\text{Cos}[b\,x]]+2\,\text{ArcTan}[\text{Tan}[a]]\,\text{Log}[\text{Sin}[b\,x+\text{ArcTan}[\text{Tan}[a]]]]+i\,\text{PolyLog}\left[2,\,e^{2\,i\,(b\,x+\text{ArcTan}[\text{Tan}[a]])}\right]\right)\text{Tan}[a]\right)\right)\Big/\left(2\,b^2\,\sqrt{\text{Sec}[a]^2\,\left(\text{Cos}[a]^2+\text{Sin}[a]^2\right)}\right)$$

Problem 37: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 147 leaves, 8 steps):

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

Result (type 4, 524 leaves):

$$-\frac{1}{4 f^3} b c d^2 e^{-i e} \operatorname{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x + 3 i \left(-1 + e^{2 i e}\right) \operatorname{Log}\left[1 - e^{2 i (e+f x)}\right]\right) + 6 \left(-1 + e^{2 i e}\right) f x \operatorname{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 3 i \left(-1 + e^{2 i e}\right) \operatorname{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right) - \frac{1}{4} b d^3 e^{i e} \operatorname{Csc}[e] \left(x^4 + \left(-1 + e^{-2 i e}\right) x^4 + \frac{1}{2 f^4} e^{-2 i e} \left(-1 + e^{2 i e}\right) \left(2 f^4 x^4 + 4 i f^3 x^3 \operatorname{Log}\left[1 - e^{2 i (e+f x)}\right] + 6 f^2 x^2 \operatorname{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 6 i f x \operatorname{PolyLog}\left[3, e^{2 i (e+f x)}\right] - 3 \operatorname{PolyLog}\left[4, e^{2 i (e+f x)}\right]\right)\right) + \frac{1}{4} x \left(4 c^3 + 6 c^2 d x + 4 c d^2 x^2 + d^3 x^3\right) \operatorname{Csc}[e] \left(b \operatorname{Cos}[e] + a \operatorname{Sin}[e]\right) + \left(b c^3 \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) - \left(3 b c^2 d \operatorname{Csc}[e] \operatorname{Sec}[e] \left(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) - \pi \operatorname{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) \operatorname{Log}\left[1 - e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right] + \pi \operatorname{Log}[\operatorname{Cos}[f x]] + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]] \operatorname{Log}[\operatorname{Sin}[f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]]] + i \operatorname{PolyLog}\left[2, e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right]\right) \operatorname{Tan}[e]\right)\right) \Big/ \left(2 f^2 \sqrt{\operatorname{Sec}[e]^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)}\right)$$

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

$$\int (c + d x)^2 \left(a + b \operatorname{Cot}[e + f x]\right) dx$$

Optimal (type 4, 112 leaves, 7 steps):

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

Result (type 4, 361 leaves):

$$-\frac{1}{12 f^3} b d^2 e^{-i e} \mathrm{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x + 3 i \left(-1 + e^{2 i e}\right) \mathrm{Log}\left[1 - e^{2 i (e+f x)}\right]\right) + 6 \left(-1 + e^{2 i e}\right) f x \,\mathrm{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 3 i \left(-1 + e^{2 i e}\right) \mathrm{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right) + \frac{1}{3} x \left(3 c^2 + 3 c d x + d^2 x^2\right) \mathrm{Csc}[e] \left(b \mathrm{Cos}[e] + a \mathrm{Sin}[e]\right) + \left(b c^2 \mathrm{Csc}[e] \left(-f x \mathrm{Cos}[e] + \mathrm{Log}[\mathrm{Cos}[f x] \mathrm{Sin}[e] + \mathrm{Cos}[e] \mathrm{Sin}[f x]] \mathrm{Sin}[e]\right)\right) \Big/ \left(f \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)\right) - \left(b c d \,\mathrm{Csc}[e] \mathrm{Sec}[e] \left(e^{i \mathrm{ArcTan}[\mathrm{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \mathrm{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) - \pi \mathrm{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) \mathrm{Log}\left[1 - e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right] + \pi \mathrm{Log}[\mathrm{Cos}[f x]] + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]] \mathrm{Log}[\mathrm{Sin}[f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]]] + i \,\mathrm{PolyLog}\left[2, e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right]\right) \mathrm{Tan}[e]\right)\right) \Big/ \left(f^2 \sqrt{\mathrm{Sec}[e]^2 \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)}\right)$$

Problem 39: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 83 leaves, 6 steps):

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

Result (type 4, 196 leaves):

$$a c x + \frac{1}{2} a d x^2 + \frac{1}{2} b d x^2 \mathrm{Cot}[e] + \frac{b c \mathrm{Log}[\mathrm{Sin}[e + f x]]}{f} - \left(b d \,\mathrm{Csc}[e] \mathrm{Sec}[e] \left(e^{i \mathrm{ArcTan}[\mathrm{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \mathrm{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) - \pi \mathrm{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) \mathrm{Log}\left[1 - e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right] + \pi \mathrm{Log}[\mathrm{Cos}[f x]] + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]] \mathrm{Log}[\mathrm{Sin}[f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]]] + i \,\mathrm{PolyLog}\left[2, e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right]\right) \mathrm{Tan}[e]\right)\right) \Big/ \left(2 f^2 \sqrt{\mathrm{Sec}[e]^2 \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)}\right)$$

Problem 42: Result more than twice size of optimal antiderivative.

$$\int (c + d x)^3 \left(a + b \mathrm{Cot}[e + f x]\right)^2 dx$$

Optimal (type 4, 295 leaves, 15 steps):

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

Result (type 4, 1313 leaves) :

$$-\frac{1}{4 f^4} b^2 d^3 e^{-i e} \mathrm{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x + 3 i \left(-1 + e^{2 i e}\right) \mathrm{Log}\left[1 - e^{2 i (e+f x)}\right]\right) + 6 \left(-1 + e^{2 i e}\right) f x \,\mathrm{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 3 i \left(-1 + e^{2 i e}\right) \mathrm{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right) -$$

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

$$\mathrm{Csc}[e] \left(x^4 + \left(-1 + e^{-2 i e}\right) x^4 + \frac{1}{2 f^4} e^{-2 i e} \left(-1 + e^{2 i e}\right) \left(2 f^4 x^4 + 4 i f^3 x^3 \mathrm{Log}\left[1 - e^{2 i (e+f x)}\right] + 6 f^2 x^2 \mathrm{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 6 i f x \,\mathrm{PolyLog}\left[3, e^{2 i (e+f x)}\right] - 3 \mathrm{PolyLog}\left[4, e^{2 i (e+f x)}\right]\right)\right) +$$

$$\left(3 b^2 c^2 d \,\mathrm{Csc}[e] \left(-f x \mathrm{Cos}[e] + \mathrm{Log}[\mathrm{Cos}[f x] \mathrm{Sin}[e] + \mathrm{Cos}[e] \mathrm{Sin}[f x]] \mathrm{Sin}[e]\right)\right) \Big/ \left(f^2 \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)\right) +$$

$$\left(2 a b c^3 \mathrm{Csc}[e] \left(-f x \mathrm{Cos}[e] + \mathrm{Log}[\mathrm{Cos}[f x] \mathrm{Sin}[e] + \mathrm{Cos}[e] \mathrm{Sin}[f x]] \mathrm{Sin}[e]\right)\right) \Big/ \left(f \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)\right) +$$

$$\frac{1}{8 f} \mathrm{Csc}[e] \mathrm{Csc}[e + f x] \left(4 a^2 c^3 f x \mathrm{Cos}[f x] - 4 b^2 c^3 f x \mathrm{Cos}[f x] + 6 a^2 c^2 d f x^2 \mathrm{Cos}[f x] - 6 b^2 c^2 d f x^2 \mathrm{Cos}[f x] + 4 a^2 c d^2 f x^3 \mathrm{Cos}[f x] - 4 b^2 c d^2 f x^3 \mathrm{Cos}[f x] + a^2 d^3 f x^4 \mathrm{Cos}[f x] - b^2 d^3 f x^4 \mathrm{Cos}[f x] - 4 a^2 c^3 f x \mathrm{Cos}[2 e + f x] + 4 b^2 c^3 f x \mathrm{Cos}[2 e + f x] - 6 a^2 c^2 d f x^2 \mathrm{Cos}[2 e + f x] + 6 b^2 c^2 d f x^2 \mathrm{Cos}[2 e + f x] - 4 a^2 c d^2 f x^3 \mathrm{Cos}[2 e + f x] + 4 b^2 c d^2 f x^3 \mathrm{Cos}[2 e + f x] - a^2 d^3 f x^4 \mathrm{Cos}[2 e + f x] + b^2 d^3 f x^4 \mathrm{Cos}[2 e + f x] + 8 b^2 c^3 \mathrm{Sin}[f x] + 24 b^2 c^2 d x \mathrm{Sin}[f x] + 8 a b c^3 f x \mathrm{Sin}[f x] + 24 b^2 c d^2 x^2 \mathrm{Sin}[f x] + 12 a b c^2 d f x^2 \mathrm{Sin}[f x] + 8 b^2 d^3 x^3 \mathrm{Sin}[f x] + 8 a b c d^2 f x^3 \mathrm{Sin}[f x] + 2 a b d^3 f x^4 \mathrm{Sin}[f x] + 8 a b c^3 f x \mathrm{Sin}[2 e + f x] + 12 a b c^2 d f x^2 \mathrm{Sin}[2 e + f x] + 8 a b c d^2 f x^3 \mathrm{Sin}[2 e + f x] + 2 a b d^3 f x^4 \mathrm{Sin}[2 e + f x]\right) -$$

$$\left(3 b^2 c d^2 \mathrm{Csc}[e] \mathrm{Sec}[e] \left(e^{i \mathrm{ArcTan}[\mathrm{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \mathrm{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) - \pi \mathrm{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) \mathrm{Log}\left[1 - e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right] + \pi \mathrm{Log}[\mathrm{Cos}[f x]] + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]] \mathrm{Log}[\mathrm{Sin}[f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]]] + i \mathrm{PolyLog}\left[2, e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right]\right) \mathrm{Tan}[e]\right)\right) \Big/$$

$$\left(f^3 \sqrt{\mathrm{Sec}[e]^2 \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)}\right) - \left(3 a b c^2 d \,\mathrm{Csc}[e] \mathrm{Sec}[e] \left(e^{i \mathrm{ArcTan}[\mathrm{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \mathrm{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) - \pi \mathrm{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]\right) \mathrm{Log}\left[1 - e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right] + \pi \mathrm{Log}[\mathrm{Cos}[f x]] + 2 \mathrm{ArcTan}[\mathrm{Tan}[e]] \mathrm{Log}[\mathrm{Sin}[f x + \mathrm{ArcTan}[\mathrm{Tan}[e]]]] + i \mathrm{PolyLog}\left[2, e^{2 i (f x + \mathrm{ArcTan}[\mathrm{Tan}[e]])}\right]\right) \mathrm{Tan}[e]\right)\right) \Big/ \left(f^2 \sqrt{\mathrm{Sec}[e]^2 \left(\mathrm{Cos}[e]^2 + \mathrm{Sin}[e]^2\right)}\right)$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int (c+d x)^2 \left(a+b \operatorname{Cot}[e+f x]\right)^2 \, dx$$

Optimal (type 4, 227 leaves, 13 steps):

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

Result (type 4, 635 leaves):

$$-\frac{1}{6 f^3} a\, b\, d^2\, e^{-i e} \operatorname{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x + 3 i \left(-1 + e^{2 i e}\right) \operatorname{Log}\left[1 - e^{2 i (e+f x)}\right]\right) + 6 \left(-1 + e^{2 i e}\right) f x \operatorname{PolyLog}\left[2, e^{2 i (e+f x)}\right] + 3 i \left(-1 + e^{2 i e}\right) \operatorname{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right) +$$

$$\frac{1}{3} x \left(3 c^2 + 3 c d x + d^2 x^2\right) \operatorname{Csc}[e] \left(2 a b \operatorname{Cos}[e] + a^2 \operatorname{Sin}[e] - b^2 \operatorname{Sin}[e]\right) +$$

$$\left(2 b^2 c d \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) +$$

$$\left(2 a b c^2 \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) + \frac{1}{f}$$

$$\operatorname{Csc}[e] \operatorname{Csc}[e + f x] \left(b^2 c^2 \operatorname{Sin}[f x] + 2 b^2 c d x \operatorname{Sin}[f x] + b^2 d^2 x^2 \operatorname{Sin}[f x]\right) -$$

$$\left(b^2 d^2 \operatorname{Csc}[e] \operatorname{Sec}[e] \left(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) - \pi \operatorname{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) \operatorname{Log}\left[1 - e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right] + \pi \operatorname{Log}[\operatorname{Cos}[f x]] + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]] \operatorname{Log}[\operatorname{Sin}[f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]]] + i \operatorname{PolyLog}\left[2, e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right]\right) \operatorname{Tan}[e]\right)\right) \Big/$$

$$\left(f^3 \sqrt{\operatorname{Sec}[e]^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)}\right) - \left(2 a b c d \operatorname{Csc}[e] \operatorname{Sec}[e]\right.$$

$$\left.\left(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \left(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) - \pi \operatorname{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) \operatorname{Log}\left[1 - e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right] + \pi \operatorname{Log}[\operatorname{Cos}[f x]] + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]] \operatorname{Log}[\operatorname{Sin}[f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]]] + i \operatorname{PolyLog}\left[2, e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right]\right) \operatorname{Tan}[e]\right)\right) \Big/ \left(f^2 \sqrt{\operatorname{Sec}[e]^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)}\right)$$

Problem 47: Result more than twice size of optimal antiderivative.

$$\int (c + d x)^3 \left(a + b \operatorname{Cot}[e + f x]\right)^3 dx$$

Optimal (type 4, 603 leaves, 28 steps):

$$-\frac{3 i b^3 d (c+d x)^2}{2 f^2}-\frac{3 i a b^2 (c+d x)^3}{f}-\frac{b^3 (c+d x)^3}{2 f}+\frac{a^3 (c+d x)^4}{4 d}-\frac{3 i a^2 b (c+d x)^4}{4 d}-\frac{3 a b^2 (c+d x)^4}{4 d}+\frac{i b^3 (c+d x)^4}{4 d}-\frac{3 b^3 d (c+d x)^2 \text{Cot}[e+f x]}{2 f^2}-\frac{3 a b^2 (c+d x)^3 \text{Cot}[e+f x]}{f}-\frac{b^3 (c+d x)^3 \text{Cot}[e+f x]^2}{2 f}+\frac{3 b^3 d^2 (c+d x) \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f^3}+\frac{9 a b^2 d (c+d x)^2 \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f^2}+\frac{3 a^2 b (c+d x)^3 \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f}-\frac{b^3 (c+d x)^3 \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f}-\frac{3 i b^3 d^3 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{2 f^4}-\frac{9 i a b^2 d^2 (c+d x) \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{f^3}-\frac{9 i a^2 b d (c+d x)^2 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{2 f^2}+\frac{3 i b^3 d (c+d x)^2 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{2 f^2}+\frac{9 a b^2 d^3 \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]}{2 f^4}+\frac{9 a^2 b d^2 (c+d x) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]}{2 f^3}-\frac{3 b^3 d^2 (c+d x) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]}{2 f^3}+\frac{9 i a^2 b d^3 \text{PolyLog}\left[4, e^{2 i (e+f x)}\right]}{4 f^4}-\frac{3 i b^3 d^3 \text{PolyLog}\left[4, e^{2 i (e+f x)}\right]}{4 f^4}$$

Result (type 4, 2539 leaves):

$$\frac{\left(-b^3 c^3-3 b^3 c^2 d x-3 b^3 c d^2 x^2-b^3 d^3 x^3\right) \text{Csc}[e+f x]^2}{2 f}-\frac{1}{4 f^4} 3 a b^2 d^3 e^{-i e} \text{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x+3 i \left(-1+e^{2 i e}\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]\right)+6 \left(-1+e^{2 i e}\right) f x \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+3 i \left(-1+e^{2 i e}\right) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right)-\frac{1}{4 f^3} 3 a^2 b c d^2 e^{-i e} \text{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x+3 i \left(-1+e^{2 i e}\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]\right)+6 \left(-1+e^{2 i e}\right) f x \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+3 i \left(-1+e^{2 i e}\right) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right)+\frac{1}{4 f^3} b^3 c d^2 e^{-i e} \text{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x+3 i \left(-1+e^{2 i e}\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]\right)+6 \left(-1+e^{2 i e}\right) f x \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+3 i \left(-1+e^{2 i e}\right) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right)-\frac{3}{4} a^2 b d^3 e^{i e} \text{Csc}[e] \left(x^4+\left(-1+e^{-2 i e}\right) x^4+\frac{1}{2 f^4} e^{-2 i e} \left(-1+e^{2 i e}\right) \left(2 f^4 x^4+4 i f^3 x^3 \text{Log}\left[1-e^{2 i (e+f x)}\right]+6 f^2 x^2 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+6 i f x \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]-3 \text{PolyLog}\left[4, e^{2 i (e+f x)}\right]\right)\right)+\frac{1}{4} b^3 d^3 e^{i e} \text{Csc}[e] \left(x^4+\left(-1+e^{-2 i e}\right) x^4+\frac{1}{2 f^4} e^{-2 i e} \left(-1+e^{2 i e}\right) \left(2 f^4 x^4+4 i f^3 x^3 \text{Log}\left[1-e^{2 i (e+f x)}\right]+6 f^2 x^2 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+6 i f x \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]-3 \text{PolyLog}\left[4, e^{2 i (e+f x)}\right]\right)\right)+\left(3 b^3 c d^2 \text{Csc}[e] \left(-f x \text{Cos}[e]+\text{Log}[\text{Cos}[f x] \text{Sin}[e]+\text{Cos}[e] \text{Sin}[f x]] \text{Sin}[e]\right)\right) / \left(f^3 \left(\text{Cos}[e]^2+\text{Sin}[e]^2\right)\right)+\left(9 a b^2 c^2 d \text{Csc}[e] \left(-f x \text{Cos}[e]+\text{Log}[\text{Cos}[f x] \text{Sin}[e]+\text{Cos}[e] \text{Sin}[f x]] \text{Sin}[e]\right)\right) / \left(f^2 \left(\text{Cos}[e]^2+\text{Sin}[e]^2\right)\right)+\left(3 a^2 b c^3 \text{Csc}[e] \left(-f x \text{Cos}[e]+\text{Log}[\text{Cos}[f x] \text{Sin}[e]+\text{Cos}[e] \text{Sin}[f x]] \text{Sin}[e]\right)\right) /$$

$$(f (Cos[e]^2 + Sin[e]^2)) -$$
$$(b^3 c^3 Csc[e] (-f x Cos[e] + Log[Cos[f x] Sin[e] + Cos[e] Sin[f x]] Sin[e])) /$$
$$(f (Cos[e]^2 + Sin[e]^2)) +$$
$$(3 x^2 (-a^3 c^2 d + 3 i a^2 b c^2 d + 3 a b^2 c^2 d - i b^3 c^2 d + a^3 c^2 d Cos[2 e] + 3 i a^2 b c^2 d Cos[2 e] - 3 a b^2 c^2 d Cos[2 e] - i b^3 c^2 d Cos[2 e] + i a^3 c^2 d Sin[2 e] - 3 a^2 b c^2 d Sin[2 e] - 3 i a b^2 c^2 d Sin[2 e] + b^3 c^2 d Sin[2 e])) / (2 (-1 + Cos[2 e] + i Sin[2 e])) +$$
$$(x^3 (-a^3 c d^2 + 3 i a^2 b c d^2 + 3 a b^2 c d^2 - i b^3 c d^2 + a^3 c d^2 Cos[2 e] + 3 i a^2 b c d^2 Cos[2 e] - 3 a b^2 c d^2 Cos[2 e] - i b^3 c d^2 Cos[2 e] + i a^3 c d^2 Sin[2 e] - 3 a^2 b c d^2 Sin[2 e] - 3 i a b^2 c d^2 Sin[2 e] + b^3 c d^2 Sin[2 e])) / (-1 + Cos[2 e] + i Sin[2 e]) +$$
$$(x^4 (-a^3 d^3 + 3 i a^2 b d^3 + 3 a b^2 d^3 - i b^3 d^3 + a^3 d^3 Cos[2 e] + 3 i a^2 b d^3 Cos[2 e] - 3 a b^2 d^3 Cos[2 e] - i b^3 d^3 Cos[2 e] + i a^3 d^3 Sin[2 e] - 3 a^2 b d^3 Sin[2 e] - 3 i a b^2 d^3 Sin[2 e] + b^3 d^3 Sin[2 e])) /$$
$$(4 (-1 + Cos[2 e] + i Sin[2 e])) + x \left(a^3 c^3 - 3 a b^2 c^3 + \frac{3 i a^2 b c^3}{-1 + Cos[2 e] + i Sin[2 e]} + \frac{3 i a^2 b c^3 Cos[2 e] - 3 a^2 b c^3 Sin[2 e]}{-1 + Cos[2 e] + i Sin[2 e]} + (-2 i b^3 c^3 Cos[2 e] + 2 b^3 c^3 Sin[2 e]) /\right.$$
$$((-1 + Cos[2 e] + i Sin[2 e]) (1 + Cos[2 e] + Cos[4 e] + i Sin[2 e] + i Sin[4 e])) +$$
$$(-2 i b^3 c^3 Cos[4 e] + 2 b^3 c^3 Sin[4 e]) /$$
$$((-1 + Cos[2 e] + i Sin[2 e]) (1 + Cos[2 e] + Cos[4 e] + i Sin[2 e] + i Sin[4 e])) -$$
$$\left.\frac{i b^3 c^3}{-1 + Cos[6 e] + i Sin[6 e]} + \frac{-i b^3 c^3 Cos[6 e] + b^3 c^3 Sin[6 e]}{-1 + Cos[6 e] + i Sin[6 e]}\right) + \frac{1}{2 f^2}$$
$$3 Csc[e] Csc[e + f x] (b^3 c^2 d Sin[f x] + 2 a b^2 c^3 f Sin[f x] + 2 b^3 c d^2 x Sin[f x] + 6 a b^2 c^2 d f x Sin[f x] + b^3 d^3 x^2 Sin[f x] + 6 a b^2 c d^2 f x^2 Sin[f x] + 2 a b^2 d^3 f x^3 Sin[f x]) -$$
$$\left(3 b^3 d^3 Csc[e] Sec[e] \left(e^{i ArcTan[Tan[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + Tan[e]^2}} (i f x (-\pi + 2 ArcTan[Tan[e]]) - \pi Log[1 + e^{-2 i f x}] - 2 (f x + ArcTan[Tan[e]]) Log[1 - e^{2 i (f x + ArcTan[Tan[e]])}] + \pi Log[Cos[f x]] + 2 ArcTan[Tan[e]] Log[Sin[f x + ArcTan[Tan[e]]]] + i PolyLog[2, e^{2 i (f x + ArcTan[Tan[e]])}]) Tan[e]\right)\right) /$$
$$\left(2 f^4 \sqrt{Sec[e]^2 (Cos[e]^2 + Sin[e]^2)}\right) - \left(9 a b^2 c d^2 Csc[e] Sec[e] \left(e^{i ArcTan[Tan[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + Tan[e]^2}} (i f x (-\pi + 2 ArcTan[Tan[e]]) - \pi Log[1 + e^{-2 i f x}] - 2 (f x + ArcTan[Tan[e]]) Log[1 - e^{2 i (f x + ArcTan[Tan[e]])}] + \pi Log[Cos[f x]] + 2 ArcTan[Tan[e]] Log[Sin[f x + ArcTan[Tan[e]]]] + i PolyLog[2, e^{2 i (f x + ArcTan[Tan[e]])}]) Tan[e]\right)\right) /$$
$$\left(f^3 \sqrt{Sec[e]^2 (Cos[e]^2 + Sin[e]^2)}\right) - \left(9 a^2 b c^2 d Csc[e] Sec[e] \left(e^{i ArcTan[Tan[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + Tan[e]^2}} (i f x (-\pi + 2 ArcTan[Tan[e]]) - \pi Log[1 + e^{-2 i f x}] - 2 (f x + ArcTan[Tan[e]])\right.\right.$$

$$\text{Log}\left[1-e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]+\pi \text{Log}[\text{Cos}[f x]]+2 \text{ArcTan}[\text{Tan}[e]]$$
$$\left.\left.\text{Log}[\text{Sin}[f x+\text{ArcTan}[\text{Tan}[e]]]]+i \text{PolyLog}\left[2, e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]\right) \text{Tan}[e]\right)\right) \Big/$$
$$\left(2 f^2 \sqrt{\text{Sec}[e]^2 \left(\text{Cos}[e]^2+\text{Sin}[e]^2\right)}\right)+\Bigg(3 b^3 c^2 d \text{Csc}[e] \text{Sec}[e]$$
$$\Bigg(e^{i \text{ArcTan}[\text{Tan}[e]]} f^2 x^2+\frac{1}{\sqrt{1+\text{Tan}[e]^2}}\Big(i f x (-\pi+2 \text{ArcTan}[\text{Tan}[e]])-\pi \text{Log}\left[1+e^{-2 i f x}\right]-$$
$$2 (f x+\text{ArcTan}[\text{Tan}[e]]) \text{Log}\left[1-e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]+\pi \text{Log}[\text{Cos}[f x]]+$$
$$2 \text{ArcTan}[\text{Tan}[e]] \text{Log}[\text{Sin}[f x+\text{ArcTan}[\text{Tan}[e]]]]+i \text{PolyLog}\left[2, e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]\Big)$$
$$\left.\left.\text{Tan}[e]\right)\right) \Big/ \left(2 f^2 \sqrt{\text{Sec}[e]^2 \left(\text{Cos}[e]^2+\text{Sin}[e]^2\right)}\right)$$

Problem 48: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 433 leaves, 22 steps):

$$-\frac{b^3 c d x}{f}-\frac{b^3 d^2 x^2}{2 f}-\frac{3 i a b^2 (c+d x)^2}{f}+\frac{a^3 (c+d x)^3}{3 d}-\frac{i a^2 b (c+d x)^3}{d}-$$
$$\frac{a b^2 (c+d x)^3}{d}+\frac{i b^3 (c+d x)^3}{3 d}-\frac{b^3 d (c+d x) \text{Cot}[e+f x]}{f^2}-\frac{3 a b^2 (c+d x)^2 \text{Cot}[e+f x]}{f}-$$
$$\frac{b^3 (c+d x)^2 \text{Cot}[e+f x]^2}{2 f}+\frac{6 a b^2 d (c+d x) \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f^2}+$$
$$\frac{3 a^2 b (c+d x)^2 \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f}-\frac{b^3 (c+d x)^2 \text{Log}\left[1-e^{2 i (e+f x)}\right]}{f}+$$
$$\frac{b^3 d^2 \text{Log}[\text{Sin}[e+f x]]}{f^3}-\frac{3 i a b^2 d^2 \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{f^3}-$$
$$\frac{3 i a^2 b d (c+d x) \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{f^2}+\frac{i b^3 d (c+d x) \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]}{f^2}+$$
$$\frac{3 a^2 b d^2 \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]}{2 f^3}-\frac{b^3 d^2 \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]}{2 f^3}$$

Result (type 4, 1825 leaves):

$$-\frac{1}{4 f^3} a^2 b d^2 e^{-i e} \text{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x+3 i \left(-1+e^{2 i e}\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]\right)+\right.$$
$$\left.6 \left(-1+e^{2 i e}\right) f x \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+3 i \left(-1+e^{2 i e}\right) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right)+$$
$$\frac{1}{12 f^3} b^3 d^2 e^{-i e} \text{Csc}[e] \left(2 f^2 x^2 \left(2 e^{2 i e} f x+3 i \left(-1+e^{2 i e}\right) \text{Log}\left[1-e^{2 i (e+f x)}\right]\right)+\right.$$
$$\left.6 \left(-1+e^{2 i e}\right) f x \text{PolyLog}\left[2, e^{2 i (e+f x)}\right]+3 i \left(-1+e^{2 i e}\right) \text{PolyLog}\left[3, e^{2 i (e+f x)}\right]\right)+$$

$$\left(b^3 d^2 \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f^3 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) +$$

$$\left(6 a b^2 c d \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) +$$

$$\left(3 a^2 b c^2 \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) -$$

$$\left(b^3 c^2 \operatorname{Csc}[e] \left(-f x \operatorname{Cos}[e] + \operatorname{Log}[\operatorname{Cos}[f x] \operatorname{Sin}[e] + \operatorname{Cos}[e] \operatorname{Sin}[f x]] \operatorname{Sin}[e]\right)\right) \Big/ \left(f \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)\right) +$$

$$\frac{1}{12 f^2} \operatorname{Csc}[e] \operatorname{Csc}[e + f x]^2 \big(6 b^3 c d \operatorname{Cos}[e] + 18 a b^2 c^2 f \operatorname{Cos}[e] + 6 b^3 d^2 x \operatorname{Cos}[e] +$$
$$36 a b^2 c d f x \operatorname{Cos}[e] + 18 a^2 b c^2 f^2 x \operatorname{Cos}[e] - 6 b^3 c^2 f^2 x \operatorname{Cos}[e] + 18 a b^2 d^2 f x^2 \operatorname{Cos}[e] +$$
$$18 a^2 b c d f^2 x^2 \operatorname{Cos}[e] - 6 b^3 c d f^2 x^2 \operatorname{Cos}[e] + 6 a^2 b d^2 f^2 x^3 \operatorname{Cos}[e] - 2 b^3 d^2 f^2 x^3 \operatorname{Cos}[e] -$$
$$6 b^3 c d \operatorname{Cos}[e + 2 f x] - 18 a b^2 c^2 f \operatorname{Cos}[e + 2 f x] - 6 b^3 d^2 x \operatorname{Cos}[e + 2 f x] -$$
$$36 a b^2 c d f x \operatorname{Cos}[e + 2 f x] - 9 a^2 b c^2 f^2 x \operatorname{Cos}[e + 2 f x] + 3 b^3 c^2 f^2 x \operatorname{Cos}[e + 2 f x] -$$
$$18 a b^2 d^2 f x^2 \operatorname{Cos}[e + 2 f x] - 9 a^2 b c d f^2 x^2 \operatorname{Cos}[e + 2 f x] + 3 b^3 c d f^2 x^2 \operatorname{Cos}[e + 2 f x] -$$
$$3 a^2 b d^2 f^2 x^3 \operatorname{Cos}[e + 2 f x] + b^3 d^2 f^2 x^3 \operatorname{Cos}[e + 2 f x] - 9 a^2 b c^2 f^2 x \operatorname{Cos}[3 e + 2 f x] +$$
$$3 b^3 c^2 f^2 x \operatorname{Cos}[3 e + 2 f x] - 9 a^2 b c d f^2 x^2 \operatorname{Cos}[3 e + 2 f x] + 3 b^3 c d f^2 x^2 \operatorname{Cos}[3 e + 2 f x] -$$
$$3 a^2 b d^2 f^2 x^3 \operatorname{Cos}[3 e + 2 f x] + b^3 d^2 f^2 x^3 \operatorname{Cos}[3 e + 2 f x] - 6 b^3 c^2 f \operatorname{Sin}[e] -$$
$$12 b^3 c d f x \operatorname{Sin}[e] + 6 a^3 c^2 f^2 x \operatorname{Sin}[e] - 18 a b^2 c^2 f^2 x \operatorname{Sin}[e] - 6 b^3 d^2 f x^2 \operatorname{Sin}[e] +$$
$$6 a^3 c d f^2 x^2 \operatorname{Sin}[e] - 18 a b^2 c d f^2 x^2 \operatorname{Sin}[e] + 2 a^3 d^2 f^2 x^3 \operatorname{Sin}[e] - 6 a b^2 d^2 f^2 x^3 \operatorname{Sin}[e] +$$
$$3 a^3 c^2 f^2 x \operatorname{Sin}[e + 2 f x] - 9 a b^2 c^2 f^2 x \operatorname{Sin}[e + 2 f x] + 3 a^3 c d f^2 x^2 \operatorname{Sin}[e + 2 f x] -$$
$$9 a b^2 c d f^2 x^2 \operatorname{Sin}[e + 2 f x] + a^3 d^2 f^2 x^3 \operatorname{Sin}[e + 2 f x] - 3 a b^2 d^2 f^2 x^3 \operatorname{Sin}[e + 2 f x] -$$
$$3 a^3 c^2 f^2 x \operatorname{Sin}[3 e + 2 f x] + 9 a b^2 c^2 f^2 x \operatorname{Sin}[3 e + 2 f x] - 3 a^3 c d f^2 x^2 \operatorname{Sin}[3 e + 2 f x] +$$
$$9 a b^2 c d f^2 x^2 \operatorname{Sin}[3 e + 2 f x] - a^3 d^2 f^2 x^3 \operatorname{Sin}[3 e + 2 f x] + 3 a b^2 d^2 f^2 x^3 \operatorname{Sin}[3 e + 2 f x]\big) -$$

$$\Bigg(3 a b^2 d^2 \operatorname{Csc}[e] \operatorname{Sec}[e] \Bigg(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \Big(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) - \pi \operatorname{Log}\left[1 + e^{-2 i f x}\right] - 2 \left(f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) \operatorname{Log}\left[1 - e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right] + \pi \operatorname{Log}[\operatorname{Cos}[f x]] + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]] \operatorname{Log}[\operatorname{Sin}[f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]]] + i \operatorname{PolyLog}\left[2, e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right]\Big) \operatorname{Tan}[e]\Bigg)\Bigg) \Bigg/$$
$$\left(f^3 \sqrt{\operatorname{Sec}[e]^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)}\right) - \Bigg(3 a^2 b c d \operatorname{Csc}[e] \operatorname{Sec}[e]$$
$$\Bigg(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \Big(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) - \pi \operatorname{Log}\left[1 + e^{-2 i f x}\right] -$$
$$2 \left(f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) \operatorname{Log}\left[1 - e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right] + \pi \operatorname{Log}[\operatorname{Cos}[f x]] +$$
$$2 \operatorname{ArcTan}[\operatorname{Tan}[e]] \operatorname{Log}[\operatorname{Sin}[f x + \operatorname{ArcTan}[\operatorname{Tan}[e]]]] + i \operatorname{PolyLog}\left[2, e^{2 i (f x + \operatorname{ArcTan}[\operatorname{Tan}[e]])}\right]\Big)$$
$$\operatorname{Tan}[e]\Bigg)\Bigg) \Bigg/ \left(f^2 \sqrt{\operatorname{Sec}[e]^2 \left(\operatorname{Cos}[e]^2 + \operatorname{Sin}[e]^2\right)}\right) +$$

$$\Bigg(b^3 c d \operatorname{Csc}[e] \operatorname{Sec}[e] \Bigg(e^{i \operatorname{ArcTan}[\operatorname{Tan}[e]]} f^2 x^2 + \frac{1}{\sqrt{1 + \operatorname{Tan}[e]^2}} \Big(i f x \left(-\pi + 2 \operatorname{ArcTan}[\operatorname{Tan}[e]]\right) -$$

$$\pi \,\text{Log}\left[1+e^{-2 i f x}\right]-2 \left(f x+\text{ArcTan}[\text{Tan}[e]]\right) \text{Log}\left[1-e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]+\pi \,\text{Log}[\text{Cos}[f x]]+2 \,\text{ArcTan}[\text{Tan}[e]] \,\text{Log}[\text{Sin}[f x+\text{ArcTan}[\text{Tan}[e]]]]+i \,\text{PolyLog}\left[2,e^{2 i (f x+\text{ArcTan}[\text{Tan}[e]])}\right]\Big) \text{Tan}[e]\Big)\Big) \Big/ \left(f^2 \sqrt{\text{Sec}[e]^2 \left(\text{Cos}[e]^2+\text{Sin}[e]^2\right)}\right)$$

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

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

Optimal (type 4, 839 leaves, 21 steps):

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

Result (type 4, 2706 leaves):

$$\frac{1}{2 (a-i b)^3 (a+i b)^2 \left(-i a \left(-1+e^{2 i e}\right)+b \left(1+e^{2 i e}\right)\right) f^4}$$

$$b \,e^{2 i e} \Big(4 (a-i b) (a+i b) c^2 f^3 (-3 b d+2 a c f) x-4 (a-i b) c^2 e^{-2 i e} \left(a \left(-1+e^{2 i e}\right)+i b \left(1+e^{2 i e}\right)\right) f^3 (-3 b d+2 a c f) x+12 a (a-i b) b c d^2 f^3 x^2+12 b^2 (i a+b) c d^2 f^3 x^2-12 a (a-i b) b c d^2 e^{-2 i e} f^3 x^2+12 b^2 (i a+b) c d^2 e^{-2 i e} f^3 x^2-12 a^2 (a-i b) c^2 d f^4 x^2-12 i a (a-i b) b c^2 d f^4 x^2+12 a^2 (a-i b) c^2 d e^{-2 i e} f^4 x^2-12 i a (a-i b) b c^2 d e^{-2 i e} f^4 x^2+12 (a-i b) (a+i b) c d f^3 (-b d+a c f) x^2+4 a (a-i b) b d^3 f^3 x^3+4 b^2 (i a+b) d^3 f^3 x^3-4 a (a-i b) b d^3 e^{-2 i e} f^3 x^3+4 b^2 (i a+b) d^3 e^{-2 i e} f^3 x^3-8 a^2 (a-i b) c d^2 f^4 x^3-8 i a (a-i b) b c d^2 f^4 x^3+8 a^2 (a-i b) c d^2 e^{-2 i e} f^4 x^3-$$

$$8 i a (a - i b) b c d^2 e^{-2 i e} f^4 x^3 + 4 (a - i b) (a + i b) d^2 f^3 (-b d + 2 a c f) x^3 - 2 a^2 (a - i b) d^3 f^4 x^4 + 2 a (a - i b) (a + i b) d^3 f^4 x^4 - 2 i a (a - i b) b d^3 f^4 x^4 + 2 a^2 (a - i b) d^3 e^{-2 i e} f^4 x^4 - 2 i a (a - i b) b d^3 e^{-2 i e} f^4 x^4 - 3 (a - i b) b c^2 d e^{-2 i e} \left(a \left(-1 + e^{2 i e}\right) + i b \left(1 + e^{2 i e}\right)\right) f^2 \left(4 f x - 2 \text{ArcTan}\left[\frac{2 a b e^{2 i (e+f x)}}{a^2 \left(-1 + e^{2 i (e+f x)}\right) - b^2 \left(1 + e^{2 i (e+f x)}\right)}\right] + i \text{Log}\left[a^2 \left(-1 + e^{2 i (e+f x)}\right)^2 + b^2 \left(1 + e^{2 i (e+f x)}\right)^2\right]\right) + 2 a (a - i b) c^3 e^{-2 i e} \left(a \left(-1 + e^{2 i e}\right) + i b \left(1 + e^{2 i e}\right)\right) f^3 \left(4 f x - 2 \text{ArcTan}\left[\frac{2 a b e^{2 i (e+f x)}}{a^2 \left(-1 + e^{2 i (e+f x)}\right) - b^2 \left(1 + e^{2 i (e+f x)}\right)}\right] + i \text{Log}\left[a^2 \left(-1 + e^{2 i (e+f x)}\right)^2 + b^2 \left(1 + e^{2 i (e+f x)}\right)^2\right]\right) - 6 b (i a + b) c d^2 e^{-2 i e} \left(-i a \left(-1 + e^{2 i e}\right) + b \left(1 + e^{2 i e}\right)\right) f \left(2 f x \left(f x + i \text{Log}\left[1 - \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + \text{PolyLog}\left[2, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + 6 a (a - i b) c^2 d e^{-2 i e} \left(a \left(-1 + e^{2 i e}\right) + i b \left(1 + e^{2 i e}\right)\right) f^2 \left(2 f x \left(f x + i \text{Log}\left[1 - \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + \text{PolyLog}\left[2, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) - b (i a + b) d^3 e^{-2 i e} \left(-i a \left(-1 + e^{2 i e}\right) + b \left(1 + e^{2 i e}\right)\right) \left(2 f^2 x^2 \left(2 f x + 3 i \text{Log}\left[1 - \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + 6 f x \text{PolyLog}\left[2, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right] + 3 i \text{PolyLog}\left[3, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + 2 a (a - i b) c d^2 e^{-2 i e} \left(a \left(-1 + e^{2 i e}\right) + i b \left(1 + e^{2 i e}\right)\right) f \left(2 f^2 x^2 \left(2 f x + 3 i \text{Log}\left[1 - \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + 6 f x \text{PolyLog}\left[2, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right] + 3 i \text{PolyLog}\left[3, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right) + a (a - i b) d^3 e^{-2 i e} \left(a \left(-1 + e^{2 i e}\right) + i b \left(1 + e^{2 i e}\right)\right) \left(2 f^4 x^4 + 4 i f^3 x^3 \text{Log}\left[1 - \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right] + 6 f^2 x^2 \text{PolyLog}\left[2, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right] + 6 i f x \text{PolyLog}\left[3, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right] - 3 \text{PolyLog}\left[4, \frac{(a + i b) e^{2 i (e+f x)}}{a - i b}\right]\right)\Bigg) +$$

$$\left(3 x^2 \left(-a c^2 d - i b c^2 d + a c^2 d \text{Cos}[2 e] - i b c^2 d \text{Cos}[2 e] + i a c^2 d \text{Sin}[2 e] + b c^2 d \text{Sin}[2 e]\right)\right) / \left(2 (a - i b) (a + i b) \left(-a + i b + a \text{Cos}[2 e] + i b \text{Cos}[2 e] + i a \text{Sin}[2 e] - b \text{Sin}[2 e]\right)\right) +$$

$$\left(x^3 \left(-a c d^2 - i b c d^2 + a c d^2 \text{Cos}[2 e] - i b c d^2 \text{Cos}[2 e] + i a c d^2 \text{Sin}[2 e] + b c d^2 \text{Sin}[2 e]\right)\right) / \left((a - i b) (a + i b) \left(-a + i b + a \text{Cos}[2 e] + i b \text{Cos}[2 e] + i a \text{Sin}[2 e] - b \text{Sin}[2 e]\right)\right) +$$

$$\left(x^4 \left(-a d^3 - i b d^3 + a d^3 \text{Cos}[2 e] - i b d^3 \text{Cos}[2 e] + i a d^3 \text{Sin}[2 e] + b d^3 \text{Sin}[2 e]\right)\right) / \left(4 (a - i b) (a + i b) \left(-a + i b + a \text{Cos}[2 e] + i b \text{Cos}[2 e] + i a \text{Sin}[2 e] - b \text{Sin}[2 e]\right)\right) +$$

$$x \Big(c^3 / \left(a^2 - 2 i a b - b^2 + a^2 \text{Cos}[4 e] + 2 i a b \text{Cos}[4 e] - b^2 \text{Cos}[4 e] + i a^2 \text{Sin}[4 e] - 2 a b \text{Sin}[4 e] - i b^2 \text{Sin}[4 e]\right) + \left(\left(-i a - b - i a \text{Cos}[2 e] + b \text{Cos}[2 e] + a \text{Sin}[2 e] + i b \text{Sin}[2 e]\right) \left(4 a b c^3 \text{Cos}[2 e] + 4 i a b c^3 \text{Sin}[2 e]\right)\right) / \Big((a - i b) (a + i b) \left(-a + i b + a \text{Cos}[2 e] + i b \text{Cos}[2 e] + i a \text{Sin}[2 e] - b \text{Sin}[2 e]\right) \left(a^2 - 2 i a b - b^2 + a^2 \text{Cos}[4 e] + 2 i a b \text{Cos}[4 e] - b^2 \text{Cos}[4 e] + i a^2 \text{Sin}[4 e] - 2 a b \text{Sin}[4 e] - i b^2 \text{Sin}[4 e]\right)\Big) +$$

$$\left(c^3 \operatorname{Cos}[4 e]+i c^3 \operatorname{Sin}[4 e]\right) \Big/ \left(a^2-2 i a b-b^2+a^2 \operatorname{Cos}[4 e]+2 i a b \operatorname{Cos}[4 e]-b^2 \operatorname{Cos}[4 e]+i a^2 \operatorname{Sin}[4 e]-2 a b \operatorname{Sin}[4 e]-i b^2 \operatorname{Sin}[4 e]\right)\right)+$$
$$\left(b^2 c^3 \operatorname{Sin}[f x]+3 b^2 c^2 d x \operatorname{Sin}[f x]+3 b^2 c d^2 x^2 \operatorname{Sin}[f x]+b^2 d^3 x^3 \operatorname{Sin}[f x]\right) \Big/ \left((a-i b)(a+i b) f (b \operatorname{Cos}[e]+a \operatorname{Sin}[e])(b \operatorname{Cos}[e+f x]+a \operatorname{Sin}[e+f x])\right)$$

Problem 58: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 650 leaves, 18 steps):

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

Result (type 4, 1309 leaves):

$$\frac{1}{3\left(a^2+b^2\right)^2\left(-i a\left(-1+e^{2 i e}\right)+b\left(1+e^{2 i e}\right)\right) f^3}$$

$$b\left(f\left(-12 a b c d e^{2 i e} f x-12 i b^2 c d e^{2 i e} f x+12 a^2 c^2 e^{2 i e} f^2 x+12 i a b c^2 e^{2 i e} f^2 x-\right.\right.$$
$$6 a b d^2 e^{2 i e} f x^2-6 i b^2 d^2 e^{2 i e} f x^2+12 a^2 c d e^{2 i e} f^2 x^2+12 i a b c d e^{2 i e} f^2 x^2+$$
$$4 a^2 d^2 e^{2 i e} f^2 x^3+4 i a b d^2 e^{2 i e} f^2 x^3-6 c\left(a\left(-1+e^{2 i e}\right)+i b\left(1+e^{2 i e}\right)\right)$$
$$\left(-b d+a c f\right) \text{ArcTan}\left[\frac{2 a b e^{2 i (e+f x)}}{a^2\left(-1+e^{2 i (e+f x)}\right)-b^2\left(1+e^{2 i (e+f x)}\right)}\right]+$$
$$6 i d\left(a\left(-1+e^{2 i e}\right)+i b\left(1+e^{2 i e}\right)\right) x\left(-b d+a f\left(2 c+d x\right)\right) \text{Log}\left[1-\frac{(a+i b) e^{2 i (e+f x)}}{a-i b}\right]+$$
$$3 i a b c d \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]+$$
$$3 b^2 c d \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]-$$
$$3 i a b c d e^{2 i e} \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]+$$
$$3 b^2 c d e^{2 i e} \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]-$$
$$3 i a^2 c^2 f \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]-$$
$$3 a b c^2 f \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]+$$
$$3 i a^2 c^2 e^{2 i e} f \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]-$$
$$\left.3 a b c^2 e^{2 i e} f \text{Log}\left[a^2\left(-1+e^{2 i (e+f x)}\right)^2+b^2\left(1+e^{2 i (e+f x)}\right)^2\right]\right)+$$
$$3 d\left(a\left(-1+e^{2 i e}\right)+i b\left(1+e^{2 i e}\right)\right)\left(-b d+2 a f\left(c+d x\right)\right) \text{PolyLog}\left[2,\frac{(a+i b) e^{2 i (e+f x)}}{a-i b}\right]+$$
$$\left.3 i a d^2\left(a\left(-1+e^{2 i e}\right)+i b\left(1+e^{2 i e}\right)\right) \text{PolyLog}\left[3,\frac{(a+i b) e^{2 i (e+f x)}}{a-i b}\right]\right)+$$
$$\left(3 a^2 c^2 f x \text{Cos}[f x]-3 b^2 c^2 f x \text{Cos}[f x]+3 a^2 c d f x^2 \text{Cos}[f x]-\right.$$
$$3 b^2 c d f x^2 \text{Cos}[f x]+$$
$$a^2 d^2 f x^3 \text{Cos}[f x]-$$
$$b^2 d^2 f x^3 \text{Cos}[f x]-$$
$$3 a^2 c^2 f x \text{Cos}[2 e+f x]-$$
$$3 b^2 c^2 f x \text{Cos}[2 e+f x]-$$
$$3 a^2 c d f x^2 \text{Cos}[2 e+f x]-$$
$$3 b^2 c d f x^2 \text{Cos}[2 e+f x]-$$
$$a^2 d^2 f x^3 \text{Cos}[2 e+f x]-b^2 d^2 f x^3 \text{Cos}[2 e+f x]+$$
$$6 b^2 c^2 \text{Sin}[f x]+12 b^2 c d x \text{Sin}[f x]-$$
$$6 a b c^2 f x \text{Sin}[f x]+6 b^2 d^2 x^2 \text{Sin}[f x]-$$
$$\left.6 a b c d f x^2 \text{Sin}[f x]-2 a b d^2 f x^3 \text{Sin}[f x]\right) /$$
$$\left(6 (a-i b)(a+i b) f\left(b \text{Cos}[e]+a \text{Sin}[e]\right)\left(b \text{Cos}[e+f x]+a \text{Sin}[e+f x]\right)\right)$$

Problem 59: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 213 leaves, 5 steps):

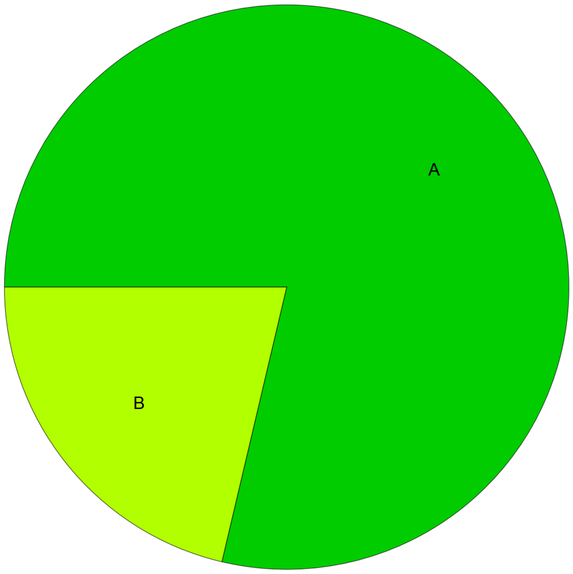
$$-\frac{(c+d x)^2}{2 (a^2+b^2) d}+\frac{(b d-2 a c f-2 a d f x)^2}{4 a (a-i b)^2 (a+i b) d f^2}+\frac{b (c+d x)}{(a^2+b^2) f (a+b \text{Cot}[e+f x])}+\frac{b (b d-2 a c f-2 a d f x) \text{Log}\left[1-\frac{(a+i b) e^{2 i (e+f x)}}{a-i b}\right]}{(a^2+b^2)^2 f^2}+\frac{i a b d \text{PolyLog}\left[2,\frac{(a+i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

Result (type 4, 730 leaves):

$$-\Big(\Big(\big((e+f x) (-2 d e+2 c f+d (e+f x)) \text{Csc}[e+f x]^2 (b \text{Cos}[e+f x]+a \text{Sin}[e+f x])^2\big) \Big/ \big(2 (-i a+b) (i a+b) f^2 (a+b \text{Cot}[e+f x])^2\big)\Big)+$$
$$\big(b d \text{Csc}[e+f x]^2 (-a (e+f x)+b \text{Log}[b \text{Cos}[e+f x]+a \text{Sin}[e+f x]])$$
$$(b \text{Cos}[e+f x]+a \text{Sin}[e+f x])^2\big) \Big/ \big((-i a+b) (i a+b) (a^2+b^2) f^2 (a+b \text{Cot}[e+f x])^2\big)+$$
$$\big(2 a d e \text{Csc}[e+f x]^2 (-a (e+f x)+b \text{Log}[b \text{Cos}[e+f x]+a \text{Sin}[e+f x]])$$
$$(b \text{Cos}[e+f x]+a \text{Sin}[e+f x])^2\big) \Big/ \big((-i a+b) (i a+b) (a^2+b^2) f^2 (a+b \text{Cot}[e+f x])^2\big)-$$
$$\big(2 a c \text{Csc}[e+f x]^2 (-a (e+f x)+b \text{Log}[b \text{Cos}[e+f x]+a \text{Sin}[e+f x]])$$
$$(b \text{Cos}[e+f x]+a \text{Sin}[e+f x])^2\big) \Big/$$
$$\big((-i a+b) (i a+b) (a^2+b^2) f (a+b \text{Cot}[e+f x])^2\big)+\Bigg(d \text{Csc}[e+f x]^2$$
$$\Bigg(e^{i \text{ArcTan}\left[\frac{b}{a}\right]} (e+f x)^2+\frac{1}{a \sqrt{1+\frac{b^2}{a^2}}} b \Big(i (e+f x) \Big(-\pi+2 \text{ArcTan}\Big[\frac{b}{a}\Big]\Big)-\pi \text{Log}\big[1+e^{-2 i (e+f x)}\big]-$$
$$2 \Big(e+f x+\text{ArcTan}\Big[\frac{b}{a}\Big]\Big) \text{Log}\Big[1-e^{2 i \left(e+f x+\text{ArcTan}\left[\frac{b}{a}\right]\right)}\Big]+\pi \text{Log}[\text{Cos}[e+f x]]+$$
$$2 \text{ArcTan}\Big[\frac{b}{a}\Big] \text{Log}\Big[\text{Sin}\Big[e+f x+\text{ArcTan}\Big[\frac{b}{a}\Big]\Big]\Big]+i \text{PolyLog}\Big[2, e^{2 i \left(e+f x+\text{ArcTan}\left[\frac{b}{a}\right]\right)}\Big]\Big)\Bigg)$$
$$(b \text{Cos}[e+f x]+a \text{Sin}[e+f x])^2\Bigg) \Bigg/ \left((-i a+b) (i a+b) \sqrt{\frac{a^2+b^2}{a^2}} f^2 (a+b \text{Cot}[e+f x])^2\right)+$$
$$\big(\text{Csc}[e+f x]^2 (b \text{Cos}[e+f x]+a \text{Sin}[e+f x])$$
$$(-b d e \text{Sin}[e+f x]+b c f \text{Sin}[e+f x]+b d (e+f x) \text{Sin}[e+f x])\big) \Big/$$
$$\big((-i a+b) (i a+b) f^2 (a+b \text{Cot}[e+f x])^2\big)$$

Summary of Integration Test Results

61 integration problems



A - 48 optimal antiderivatives

B - 13 more than twice size of optimal antiderivatives

C - 0 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 0 integration timeouts