

CAS integration tests regression report

Maple 2020 and Maple 2019.2.1

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April 11, 2020 Compiled on April 11, 2020 at 1:05pm

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0.1 Test number 55

Test folder name

test_cases/2_Exponentials/2.3_Exponential_functions

0.1.1 Problem number 591

$$\int \frac{F^{f(a+b \log^2(c(d+ex)^n))}}{dg + egx} dx$$

Optimal antiderivative

$$\frac{\sqrt{\pi} F^{af} \operatorname{Erfi}\left(\sqrt{b} \sqrt{f} \sqrt{\log(F)} \log(c(d+ex)^n)\right)}{2\sqrt{be} \sqrt{f} g n \sqrt{\log(F)}}$$

command

```
int(F^(f*(a+b*ln(c*(e*x+d)^n)^2))/(e*g*x+d*g),x)
```

Maple 2020 output

$$\int \frac{F^{f(a+b(\ln(c(ex+d)^n))^2)}}{egx + dg} dx$$

Maple 2019.2.1 output

$$\frac{\sqrt{\pi}F^{af}}{2neg} \operatorname{Erf}\left(\sqrt{-\ln(F)}bf \ln((ex+d)^n) - \frac{bf(2\ln(c) - i\pi \operatorname{csgn}(ic(ex+d)^n)(-\operatorname{csgn}(ic(ex+d)^n) + \operatorname{csgn}(ic))(-\operatorname{csgn}(ic(ex+d)^n) + \operatorname{csgn}(i(ex+d)^n)))}{2}\right)$$

0.1.2 Problem number 606

$$\int \frac{F^{f(a+b\log(c(d+ex)^n))^2}}{dg + egx} dx$$

Optimal antiderivative

$$\frac{\sqrt{\pi}\operatorname{Erfi}\left(a\sqrt{f}\sqrt{\log(F)} + b\sqrt{f}\sqrt{\log(F)}\log(c(d+ex)^n)\right)}{2be\sqrt{f}gn\sqrt{\log(F)}}$$

command

```
int(F^(f*(a+b*ln(c*(e*x+d)^n))^2)/(e*g*x+d*g),x)
```

Maple 2020 output

$$\int \frac{F^{f(a+b\ln(c(ex+d)^n))^2}}{egx + dg} dx$$

Maple 2019.2.1 output

$$-\frac{\sqrt{\pi}}{2negb} \operatorname{Erf}\left(-b\sqrt{-f\ln(F)}\ln((ex+d)^n) + f\left(a + b\left(\ln(c) - \frac{i}{2}\pi \operatorname{csgn}(ic(ex+d)^n)(-\operatorname{csgn}(ic(ex+d)^n) + \operatorname{csgn}(ic))(-\operatorname{csgn}(ic(ex+d)^n) + \operatorname{csgn}(i(ex+d)^n))\right)\right)$$

0.2 Test number 63

Test folder name

```
test_cases/3_Logarithms/3.4_u-a+b_log-c-d+e_x^m-^n-^p
```

0.2.1 Problem number 68

$$\int (fx)^{-1-n} \log(c(d+ex^n)^p) dx$$

Optimal antiderivative

$$-\frac{(fx)^{-n} \log(c(d+ex^n)^p)}{fn} + \frac{epx^n \log(x)(fx)^{-n}}{df} - \frac{epx^n (fx)^{-n} \log(d+ex^n)}{dfn}$$

command

```
int((f*x)^(-1-n)*ln(c*(d+e*x^n)^p),x)
```

Maple 2020 output

$$\int (fx)^{-1-n} \ln(c(d+ex^n)^p) dx$$

Maple 2019.2.1 output

$$-\frac{x \ln((d+ex^n)^p)}{n} e^{-\frac{(1+n)(-i\pi(\operatorname{csgn}(ifx))^3 + i\pi(\operatorname{csgn}(ifx))^2 \operatorname{csgn}(if) + i\pi(\operatorname{csgn}(ifx))^2 \operatorname{csgn}(ix) - i\pi \operatorname{csgn}(if) \operatorname{csgn}(ix) \operatorname{csgn}(ifx) + 2\ln(f) + 2\ln(a))}{2}} + \frac{pe \ln(x^n)}{dn} e^{-\frac{(1+n)(-i\pi \operatorname{csgn}(ifx) \operatorname{csgn}(if) \operatorname{csgn}(ix) + i\pi(\operatorname{csgn}(ifx))^2 \operatorname{csgn}(ix))}{2}}$$

0.3 Test number 135

Test folder name

```
test_cases/4_Trig_functions/4.7_Miscellaneous/4.7.1-c_trig-^m-d_trig-^n
```

0.3.1 Problem number 177

$$\int \cos^3(a + bx) \sin^{\frac{3}{2}}(2a + 2bx) dx$$

Optimal antiderivative

$$\frac{7 \sin(a + bx) \sin^{\frac{3}{2}}(2a + 2bx)}{48b} + \frac{\sin^{\frac{5}{2}}(2a + 2bx) \cos(a + bx)}{12b} - \frac{7 \sin^{-1}(\cos(a + bx) - \sin(a + bx))}{64b} - \frac{7 \sqrt{\sin(2a + 2bx)} \cos(a + bx)}{32b} + \frac{7 \log(\sin(a + bx))}{64b}$$

command

```
int(cos(b*x+a)^3*sin(2*b*x+2*a)^(3/2),x)
```

Maple 2020 output

$$\int (\cos(bx + a))^3 (\sin(2bx + 2a))^{\frac{3}{2}} dx$$

Maple 2019.2.1 output

output too large to display

0.4 Test number 178

Test folder name

test_cases/6_Hyperbolic_functions/6.5_Hyperbolic_secant/6.5.2-e_x^-m-a+b_sech-c+d_x^n-
^p

0.4.1 Problem number 77

$$\int (ex)^{-1+2n} (a + b \operatorname{sech}(c + dx^n))^2 dx$$

Optimal antiderivative

$$-\frac{2iabx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -ie^{c+dx^n}\right)}{d^2en} + \frac{2iabx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, ie^{c+dx^n}\right)}{d^2en} + \frac{a^2(ex)^{2n}}{2en} + \frac{4abx^{-n}(ex)^{2n}\tan^{-1}\left(e^{c+dx^n}\right)}{den} - \frac{b^2x^{-2n}(ex)^{2n}\log(\cosh(c+dx^n))}{d^2en}$$

command

```
int((e*x)^(-1+2*n)*(a+b*sech(c+d*x^n))^2,x)
```

Maple 2020 output

$$\int (ex)^{-1+2n} (a + b \operatorname{sech}(c + dx^n))^2 dx$$

Maple 2019.2.1 output

$$\frac{a^2xe^{(-1+2n)(\ln(e)+\ln(x)-\frac{i}{2}\pi\operatorname{csgn}(ix)-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix))}}{2n} - 2\frac{b^2xe^{(-1+2n)(\ln(e)+\ln(x)-i/2\pi\operatorname{csgn}(ix)-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix))}}{nde^{\ln(x)^n}\left(\left(e^{c+d\ln(x)^n}\right)^2+1\right)} - \frac{b^2e^{2n}e^{-\frac{i}{2}\pi\operatorname{csgn}(ix)(-1+2n)}}{d^2en}$$

0.4.2 Problem number 83

$$\int \frac{(ex)^{-1+2n}}{(a + b \operatorname{sech}(c + dx^n))^2} dx$$

Optimal antiderivative

$$-\frac{2bx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{b-\sqrt{b^2-a^2}}\right)}{a^2d^2en\sqrt{b^2-a^2}} + \frac{b^3x^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{b-\sqrt{b^2-a^2}}\right)}{a^2d^2en(b^2-a^2)^{3/2}} + \frac{2bx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{\sqrt{b^2-a^2}+b}\right)}{a^2d^2en\sqrt{b^2-a^2}} - \frac{b^3x^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{\sqrt{b^2-a^2}+b}\right)}{a^2d^2en(b^2-a^2)}$$

command

```
int((e*x)^(-1+2*n)/(a+b*sech(c+d*x^n))^2,x)
```

Maple 2020 output

$$\int \frac{(ex)^{-1+2n}}{(a + b \operatorname{sech}(c + dx^n))^2} dx$$

Maple 2019.2.1 output

$$\frac{x e^{(-1+2n)(\ln(e)+\ln(x)-\frac{i}{2}\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{2 a^2 n} - 2 \frac{b^2 e^{(-1+2n)(\ln(e)+\ln(x)-i/2\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{n d (a^2 - b^2) a^2 e^{\ln(x)n} \left((e^{c+de^{\ln(x)n}})^2 a + 2 b e^{c+de^{\ln(x)n}} + a \right)} x (b e^{c+de^{\ln(x)n}} + a) - 2 \frac{b e^{2n}}{2 a^2 n}$$

0.5 Test number 182

Test folder name

test_cases/6_Hyperbolic_functions/6.6_Hyperbolic_cosecant/6.6.2-e_x^-m-a+b_csch-c+d_x^n-^p

0.5.1 Problem number 76

$$\int (ex)^{-1+2n} (a + b \operatorname{csch}(c + dx^n))^2 dx$$

Optimal antiderivative

$$-\frac{2abx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -e^{c+dx^n}\right)}{d^2en} + \frac{2abx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, e^{c+dx^n}\right)}{d^2en} + \frac{a^2(ex)^{2n}}{2en} - \frac{4abx^{-n}(ex)^{2n}\tanh^{-1}\left(e^{c+dx^n}\right)}{den} + \frac{b^2x^{-2n}(ex)^{2n}\log(\sinh(c + dx^n))}{d^2en}$$

command

int((e*x)^(-1+2*n)*(a+b*csch(c+d*x^n))^2,x)

Maple 2020 output

$$\int (ex)^{-1+2n} (a + b \operatorname{csch}(c + dx^n))^2 dx$$

Maple 2019.2.1 output

$$\frac{a^2 x e^{(-1+2n)(\ln(e)+\ln(x)-\frac{i}{2}\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{2 n} - 2 \frac{b^2 x e^{(-1+2n)(\ln(e)+\ln(x)-i/2\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{n d e^{\ln(x)n} \left((e^{c+de^{\ln(x)n}})^2 - 1 \right)} - \frac{b^2 e^{2n} e^{-\frac{i}{2}\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))}}{2 n}$$

0.5.2 Problem number 82

$$\int \frac{(ex)^{-1+2n}}{(a + b \operatorname{csch}(c + dx^n))^2} dx$$

Optimal antiderivative

$$-\frac{2bx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^2en\sqrt{a^2+b^2}} + \frac{b^3x^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{b-\sqrt{a^2+b^2}}\right)}{a^2d^2en(a^2+b^2)^{3/2}} + \frac{2bx^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{\sqrt{a^2+b^2}+b}\right)}{a^2d^2en\sqrt{a^2+b^2}} - \frac{b^3x^{-2n}(ex)^{2n}\operatorname{PolyLog}\left(2, -\frac{ae^{c+dx^n}}{\sqrt{a^2+b^2}+b}\right)}{a^2d^2en(a^2+b^2)^{3/2}}$$

command

int((e*x)^(-1+2*n)/(a+b*csch(c+d*x^n))^2,x)

Maple 2020 output

$$\int \frac{(ex)^{-1+2n}}{(a + b \operatorname{csch}(c + dx^n))^2} dx$$

Maple 2019.2.1 output

$$\frac{x e^{(-1+2n)(\ln(e)+\ln(x)-\frac{i}{2}\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{2 a^2 n} - 2 \frac{b^2 e^{(-1+2n)(\ln(e)+\ln(x)-i/2\pi \operatorname{csgn}(ix)(-\operatorname{csgn}(ix)+\operatorname{csgn}(ie))(-\operatorname{csgn}(ix)+\operatorname{csgn}(ix)))}}{n d (a^2 + b^2) a^2 e^{\ln(x)n} \left((e^{c+de^{\ln(x)n}})^2 a + 2 b e^{c+de^{\ln(x)n}} - a \right)} x (-b e^{c+de^{\ln(x)n}} + a) - 2 \frac{b e^{2n}}{2 a^2 n}$$

0.6 Test number 194

Test folder name

test_cases/7_Inverse_hyperbolic_functions/7.3_Inverse_hyperbolic_tangent/7.3.4_u-a+b_arctanh-c_x-^p

0.6.1 Problem number 528

$$\int \frac{(a + b \tanh^{-1}(cx)) (d + e \log(1 - c^2x^2))}{x^2} dx$$

Optimal antiderivative

$$-\frac{1}{2}bce\text{PolyLog}\left(2, \frac{1}{1-c^2x^2}\right) - \frac{(a + b \tanh^{-1}(cx))(e \log(1 - c^2x^2) + d)}{x} - \frac{ce(a + b \tanh^{-1}(cx))^2}{b} + \frac{1}{2}bc \log\left(1 - \frac{1}{1-c^2x^2}\right) (e \log(1 - c^2x^2) + d)$$

command

int((a+b*arctanh(c*x))*(d+e*ln(-c^2*x^2+1))/x^2,x)

Maple 2020 output

$$\int \frac{(a + b \text{Artanh}(cx)) (d + e \ln(-c^2x^2 + 1))}{x^2} dx$$

Maple 2019.2.1 output

$$\frac{\left(a - \frac{i}{2}b\pi\right) e \ln(-c^2x^2 + 1)}{x} - \frac{\left(a - \frac{i}{2}b\pi\right) (ce \ln(-cx - 1)x - ce \ln(-cx + 1)x + d)}{x}$$

0.6.2 Problem number 529

$$\int \frac{(a + b \tanh^{-1}(cx)) (d + e \log(1 - c^2x^2))}{x^3} dx$$

Optimal antiderivative

$$\frac{1}{2}bc^2e\text{PolyLog}(2, -cx) - \frac{1}{2}bc^2e\text{PolyLog}(2, cx) - \frac{(a + b \tanh^{-1}(cx))(e \log(1 - c^2x^2) + d)}{2x^2} + \frac{1}{2}c^2e(a+b) \log(1-cx) + \frac{1}{2}c^2e(a-b) \log(cx+1) - ac^2e \log(1-cx)$$

command

int((a+b*arctanh(c*x))*(d+e*ln(-c^2*x^2+1))/x^3,x)

Maple 2020 output

$$\int \frac{(a + b \text{Artanh}(cx)) (d + e \ln(-c^2x^2 + 1))}{x^3} dx$$

Maple 2019.2.1 output

$$-\frac{\left(a - \frac{i}{2}b\pi\right) e \ln(-c^2x^2 + 1)}{2x^2} + \frac{\left(a - \frac{i}{2}b\pi\right) (ec^2 \ln(-c^2x^2 + 1)x^2 - 2ec^2 \ln(x)x^2 - d)}{2x^2}$$

0.6.3 Problem number 530

$$\int \frac{(a + b \tanh^{-1}(cx)) (d + e \log(1 - c^2x^2))}{x^4} dx$$

Optimal antiderivative

$$-\frac{1}{6}bc^3e\text{PolyLog}\left(2, \frac{1}{1-c^2x^2}\right) - \frac{(a + b \tanh^{-1}(cx))(e \log(1 - c^2x^2) + d)}{3x^3} - \frac{c^3e(a + b \tanh^{-1}(cx))^2}{3b} + \frac{2c^2e(a + b \tanh^{-1}(cx))}{3x} + \frac{1}{6}bc^3 \log\left(1 - \frac{1}{1-c^2x^2}\right)$$

command

int((a+b*arctanh(c*x))*(d+e*ln(-c^2*x^2+1))/x^4,x)

Maple 2020 output

$$\int \frac{(a + b \operatorname{Artanh}(cx)) (d + e \ln(-c^2 x^2 + 1))}{x^4} dx$$

Maple 2019.2.1 output

$$-\frac{\left(a - \frac{i}{2} b \pi\right) e \ln(-c^2 x^2 + 1)}{3 x^3} - \frac{\left(a - \frac{i}{2} b \pi\right) \left(c^3 e \ln(-cx - 1) x^3 - c^3 e \ln(-cx + 1) x^3 - 2 e c^2 x^2 + d\right)}{3 x^3}$$

0.6.4 Problem number 531

$$\int \frac{(a + b \tanh^{-1}(cx)) (d + e \log(1 - c^2 x^2))}{x^5} dx$$

Optimal antiderivative

$$\frac{1}{4} b c^4 e \operatorname{PolyLog}(2, -cx) - \frac{1}{4} b c^4 e \operatorname{PolyLog}(2, cx) - \frac{(a + b \tanh^{-1}(cx)) (e \log(1 - c^2 x^2) + d)}{4 x^4} + \frac{1}{12} c^4 e (3a + 4b) \log(1 - cx) + \frac{1}{12} c^4 e (3a - 4b) \log(cx + 1)$$

command

```
int((a+b*arctanh(c*x))*(d+e*ln(-c^2*x^2+1))/x^5,x)
```

Maple 2020 output

$$\int \frac{(a + b \operatorname{Artanh}(cx)) (d + e \ln(-c^2 x^2 + 1))}{x^5} dx$$

Maple 2019.2.1 output

$$-\frac{\left(a - \frac{i}{2} b \pi\right) e \ln(-c^2 x^2 + 1)}{4 x^4} - \frac{\left(a - \frac{i}{2} b \pi\right) \left(2 c^4 e \ln(x) x^4 - c^4 e \ln(-c^2 x^2 + 1) x^4 - e c^2 x^2 + d\right)}{4 x^4}$$

0.6.5 Problem number 532

$$\int \frac{(a + b \tanh^{-1}(cx)) (d + e \log(1 - c^2 x^2))}{x^6} dx$$

Optimal antiderivative

$$-\frac{1}{10} b c^5 e \operatorname{PolyLog}\left(2, \frac{1}{1 - c^2 x^2}\right) - \frac{(a + b \tanh^{-1}(cx)) (e \log(1 - c^2 x^2) + d)}{5 x^5} + \frac{2 c^2 e (a + b \tanh^{-1}(cx))}{15 x^3} - \frac{c^5 e (a + b \tanh^{-1}(cx))^2}{5 b} + \frac{2 c^4 e (a + b \tanh^{-1}(cx))}{5 x}$$

command

```
int((a+b*arctanh(c*x))*(d+e*ln(-c^2*x^2+1))/x^6,x)
```

Maple 2020 output

$$\int \frac{(a + b \operatorname{Artanh}(cx)) (d + e \ln(-c^2 x^2 + 1))}{x^6} dx$$

Maple 2019.2.1 output

$$-\frac{\left(a - \frac{i}{2} b \pi\right) e \ln(-c^2 x^2 + 1)}{5 x^5} - \frac{\left(a - \frac{i}{2} b \pi\right) \left(3 c^5 e \ln(-cx - 1) x^5 - 3 c^5 e \ln(-cx + 1) x^5 - 6 c^4 e x^4 - 2 e c^2 x^2 + 3 d\right)}{15 x^5}$$

0.7 Test number 198

Test folder name

test_cases/7_Inverse_hyperbolic_functions/7.4_Inverse_hyperbolic_cotangent/7.4.1_Inverse_hyp

0.7.1 Problem number 172

$$\int \frac{1}{x \coth^{-1}(\tanh(a + bx))^2} dx$$

Optimal antiderivative

$$\frac{1}{(bx - \coth^{-1}(\tanh(a + bx))) \coth^{-1}(\tanh(a + bx))} + \frac{\log(x)}{(bx - \coth^{-1}(\tanh(a + bx)))^2} - \frac{\log(\coth^{-1}(\tanh(a + bx)))}{(bx - \coth^{-1}(\tanh(a + bx)))^2}$$

command

```
int(1/x/arccoth(tanh(b*x+a))^2,x)
```

Maple 2020 output

$$\int \frac{1}{x (\operatorname{arccoth}(\tanh(bx + a)))^2} dx$$

Maple 2019.2.1 output

$$\frac{4i}{bx} \left(2\pi \left(\operatorname{csgn}\left(\frac{i}{(e^{bx+a})^2 + 1}\right) \right)^2 - \pi \operatorname{csgn}\left(\frac{i}{(e^{bx+a})^2 + 1}\right) \operatorname{csgn}\left(i(e^{bx+a})^2\right) \operatorname{csgn}\left(\frac{i(e^{bx+a})^2}{(e^{bx+a})^2 + 1}\right) + \pi \operatorname{csgn}\left(\frac{i}{(e^{bx+a})^2 + 1}\right) \left(\operatorname{csgn}\left(\frac{i(e^{bx+a})^2}{(e^{bx+a})^2 + 1}\right) \right)^2 - 2\pi \left(\operatorname{csgn}\left(\frac{i}{(e^{bx+a})^2 + 1}\right) \right)^2 \right)$$

0.7.2 Problem number 173

$$\int \frac{1}{x^2 \coth^{-1}(\tanh(a + bx))^2} dx$$

Optimal antiderivative

$$\frac{2b}{(bx - \coth^{-1}(\tanh(a + bx)))^2 \coth^{-1}(\tanh(a + bx))} + \frac{1}{x(bx - \coth^{-1}(\tanh(a + bx))) \coth^{-1}(\tanh(a + bx))} + \frac{2b \log(x)}{(bx - \coth^{-1}(\tanh(a + bx)))^2}$$

command

```
int(1/x^2/arccoth(tanh(b*x+a))^2,x)
```

Maple 2020 output

$$\int \frac{1}{x^2 (\operatorname{arccoth}(\tanh(bx + a)))^2} dx$$

Maple 2019.2.1 output

output too large to display

0.7.3 Problem number 181

$$\int \frac{1}{x \coth^{-1}(\tanh(a + bx))^3} dx$$

Optimal antiderivative

$$\frac{1}{(bx - \coth^{-1}(\tanh(a + bx)))^2 \coth^{-1}(\tanh(a + bx))} - \frac{1}{2(bx - \coth^{-1}(\tanh(a + bx))) \coth^{-1}(\tanh(a + bx))^2} - \frac{\log(x)}{(bx - \coth^{-1}(\tanh(a + bx)))^3}$$

command

```
int(1/x/arccoth(tanh(b*x+a))^3,x)
```

Maple 2020 output

$$\int \frac{1}{x (\operatorname{arccoth}(\tanh(bx + a)))^3} dx$$

Maple 2019.2.1 output

output too large to display

0.7.4 Problem number 182

$$\int \frac{1}{x^2 \coth^{-1}(\tanh(a + bx))^3} dx$$

Optimal antiderivative

$$\frac{3b}{(bx - \coth^{-1}(\tanh(a + bx)))^3 \coth^{-1}(\tanh(a + bx))} - \frac{3b}{2(bx - \coth^{-1}(\tanh(a + bx)))^2 \coth^{-1}(\tanh(a + bx))^2} + \frac{1}{x(bx - \coth^{-1}(\tanh(a + bx)))}$$

command

```
int(1/x^2/arccoth(tanh(b*x+a))^3,x)
```

Maple 2020 output

$$\int \frac{1}{x^2 (\operatorname{arccoth}(\tanh(bx + a)))^3} dx$$

Maple 2019.2.1 output

output too large to display

0.7.5 Problem number 270

$$\int \frac{(a + b \coth^{-1}(cx))(d + e \log(1 - c^2x^2))}{x^3} dx$$

Optimal antiderivative

$$\frac{1}{2}bc^2e\operatorname{PolyLog}\left(2, 1 - \frac{2}{1 - cx}\right) + \frac{1}{2}bc^2e\operatorname{PolyLog}\left(2, \frac{2}{cx + 1} - 1\right) - \frac{(a + b \coth^{-1}(cx))(e \log(1 - c^2x^2) + d)}{2x^2} + \frac{1}{2}c^2e(a+b) \log(1 - cx) + \frac{1}{2}c^2e(a-b) \log(1 + cx)$$

command

```
int((a+b*arccoth(c*x))*(d+e*ln(-c^2*x^2+1))/x^3,x)
```

Maple 2020 output

$$\int \frac{(a + b \operatorname{arccoth}(cx))(d + e \ln(-c^2x^2 + 1))}{x^3} dx$$

Maple 2019.2.1 output

$$-\frac{\ln(-c^2x^2 + 1)ae}{2x^2} - \frac{a(2ec^2 \ln(x)x^2 - ec^2 \ln(-c^2x^2 + 1)x^2 + d)}{2x^2}$$

0.7.6 Problem number 271

$$\int \frac{(a + b \coth^{-1}(cx))(d + e \log(1 - c^2x^2))}{x^5} dx$$

Optimal antiderivative

$$\frac{1}{4}bc^4e\operatorname{PolyLog}\left(2, 1 - \frac{2}{1 - cx}\right) + \frac{1}{4}bc^4e\operatorname{PolyLog}\left(2, \frac{2}{cx + 1} - 1\right) - \frac{(a + b \coth^{-1}(cx))(e \log(1 - c^2x^2) + d)}{4x^4} + \frac{1}{12}c^4e(3a+4b) \log(1 - cx) + \frac{1}{12}c^4e(3a-4b) \log(1 + cx)$$

command

```
int((a+b*arccoth(c*x))*(d+e*ln(-c^2*x^2+1))/x^5,x)
```

Maple 2020 output

$$\int \frac{(a + b \operatorname{arccoth}(cx))(d + e \ln(-c^2x^2 + 1))}{x^5} dx$$

Maple 2019.2.1 output

$$-\frac{\ln(-c^2x^2 + 1)ae}{4x^4} - \frac{a(2c^4e \ln(x)x^4 - c^4e \ln(-c^2x^2 + 1)x^4 - ec^2x^2 + d)}{4x^4}$$

0.7.7 Problem number 275

$$\int \frac{(a + b \coth^{-1}(cx))(d + e \log(1 - c^2x^2))}{x^2} dx$$

Optimal antiderivative

$$-\frac{1}{2}bce\text{PolyLog}\left(2, \frac{1}{1 - c^2x^2}\right) - \frac{(a + b \coth^{-1}(cx))(e \log(1 - c^2x^2) + d)}{x} - \frac{ce(a + b \coth^{-1}(cx))^2}{b} + \frac{1}{2}bc \log\left(1 - \frac{1}{1 - c^2x^2}\right)(e \log(1 - c^2x^2) + d)$$

command

`int((a+b*arccoth(c*x))*(d+e*ln(-c^2*x^2+1))/x^2,x)`

Maple 2020 output

$$\int \frac{(a + b \operatorname{arccoth}(cx))(d + e \ln(-c^2x^2 + 1))}{x^2} dx$$

Maple 2019.2.1 output

$$-\frac{\ln(-c^2x^2 + 1)ae}{x} + \frac{a(ce \ln(-cx + 1)x - ce \ln(-cx - 1)x - d)}{x}$$

0.7.8 Problem number 276

$$\int \frac{(a + b \coth^{-1}(cx))(d + e \log(1 - c^2x^2))}{x^4} dx$$

Optimal antiderivative

$$-\frac{1}{6}bc^3e\text{PolyLog}\left(2, \frac{1}{1 - c^2x^2}\right) - \frac{(a + b \coth^{-1}(cx))(e \log(1 - c^2x^2) + d)}{3x^3} - \frac{c^3e(a + b \coth^{-1}(cx))^2}{3b} + \frac{2c^2e(a + b \coth^{-1}(cx))}{3x} + \frac{1}{6}bc^3 \log\left(1 - \frac{1}{1 - c^2x^2}\right)(e \log(1 - c^2x^2) + d)$$

command

`int((a+b*arccoth(c*x))*(d+e*ln(-c^2*x^2+1))/x^4,x)`

Maple 2020 output

$$\int \frac{(a + b \operatorname{arccoth}(cx))(d + e \ln(-c^2x^2 + 1))}{x^4} dx$$

Maple 2019.2.1 output

$$-\frac{\ln(-c^2x^2 + 1)ae}{3x^3} - \frac{a(c^3e \ln(-cx - 1)x^3 - c^3e \ln(-cx + 1)x^3 - 2ec^2x^2 + d)}{3x^3}$$

0.7.9 Problem number 277

$$\int \frac{(a + b \coth^{-1}(cx))(d + e \log(1 - c^2x^2))}{x^6} dx$$

Optimal antiderivative

$$-\frac{1}{10}bc^5e\text{PolyLog}\left(2, \frac{1}{1 - c^2x^2}\right) - \frac{(a + b \coth^{-1}(cx))(e \log(1 - c^2x^2) + d)}{5x^5} + \frac{2c^2e(a + b \coth^{-1}(cx))}{15x^3} - \frac{c^5e(a + b \coth^{-1}(cx))^2}{5b} + \frac{2c^4e(a + b \coth^{-1}(cx))}{5x}$$

command

`int((a+b*arccoth(c*x))*(d+e*ln(-c^2*x^2+1))/x^6,x)`

Maple 2020 output

$$\int \frac{(a + b \operatorname{arccoth}(cx))(d + e \ln(-c^2x^2 + 1))}{x^6} dx$$

Maple 2019.2.1 output

$$-\frac{\ln(-c^2x^2 + 1)ae}{5x^5} + \frac{a(3c^5e \ln(-cx + 1)x^5 - 3c^5e \ln(-cx - 1)x^5 + 6c^4ex^4 + 2ec^2x^2 - 3d)}{15x^5}$$