CAS integration tests regression report
Maple 2020 and Maple 2019.2.1

Nasser M. Abbasi

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

Contents

0.1 Test number *55*

Test folder name

`test_cases/2_Exponentials/2.3_Exponential_functions`

0.1.1 Problem number 591

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.1.2 Problem number 606

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

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

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

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

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

command

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

Maple 2020 output

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

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

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.4.2 Problem number 83

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

Optimal antiderivative

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

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

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

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

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.5.2 Problem number 82

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

Optimal antiderivative

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

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

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

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

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.6.2 Problem number 529

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.6.3 Problem number 530

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.6.4 Problem number 531

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.6.5 Problem number 532

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7 Test number 198

Test folder name

```
test_cases/7_Inverse_hyperbolic_functions/7.4_Inverse_hyperbolic_cotangent/7.4.1_Inverse_hype
```

0.7.1 Problem number 172

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7.2 Problem number 173

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

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

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

command

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

Maple 2020 output

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

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

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

output too large to display

0.7.5 Problem number 270

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7.6 Problem number 271

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7.7 Problem number 275

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7.8 Problem number 276

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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

0.7.9 Problem number 277

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

Optimal antiderivative

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

command

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

Maple 2020 output

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

Maple 2019.2.1 output

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