

CAS integration tests regression report Mathematica 12.1 and Mathematica 12

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0.1 Test number 103

Test folder name

test_cases/4_Trig_functions/4.3_Tangent/4.3.2.1-a+b_tan^m-c+d_tanⁿ

0.1.1 Problem number 1180

$$\int (a + ia \tan(e + fx))^m (c + d \tan(e + fx))^3 dx$$

Optimal antiderivative

$$\frac{2d(c^2(-(m+3)) + icdm + d^2)(a + ia \tan(e + fx))^m}{fm(m+2)} - \frac{d^2(dm + ic(m+4))(a + ia \tan(e + fx))^{m+1}}{af(m+1)(m+2)} + \frac{(d+ic)^3(a + ia \tan(e + fx))^m {}_2F_1(1, m; m+3, -e^{2i(e+fx)})}{2fm}$$

command

Integrate[(a + I*a*Tan[e + f*x])^m*(c + d*Tan[e + f*x])³, x]

Mathematica 12.1 output

$$\int (a + ia \tan(e + fx))^m (c + d \tan(e + fx))^3 dx$$

Mathematica 12 output

$$\frac{2^{m-1} (e^{ifx})^m e^{-im(e+2fx)} \left(\frac{e^{i(e+fx)}}{1+e^{2i(e+fx)}} \right)^m \sec^{-m}(e+fx) (\cos(fx) + i \sin(fx))^{-m} (a + ia \tan(e + fx))^m \left(\frac{(d+ic)^3 e^{i(e(m+6)+2f(m+3)x)} {}_2F_1(1, 1; m+4; -e^{2i(e+fx)})}{m+3} + \frac{(-d+ic)^3 e^{im(e+2fx)} (2(m+2)e^{2i(e+fx)})}{m(m+1)(m+3)} \right)}{f(1 + e^{2i(e+fx)})^2}$$

0.2 Test number 104

Test folder name

test_cases/4_Trig_functions/4.3_Tangent/4.3.3.1-a+b_tan^m-c+d_tanⁿ-A+B_tanⁿ

0.2.1 Problem number 715

$$\int \frac{(A + B \tan(e + fx))(c - ic \tan(e + fx))^n}{(a + ia \tan(e + fx))^2} dx$$

Optimal antiderivative

$$\frac{(B(n+2) + iA(2-n))(c - ic \tan(e + fx))^n {}_2F_1(2, n; n+1; \frac{1}{2}(1 - i \tan(e + fx)))}{16a^2 fn} + \frac{(-B + iA)(c - ic \tan(e + fx))^n}{4a^2 f(1 + i \tan(e + fx))^2}$$

command

Integrate[((A + B*Tan[e + f*x])*(c - I*c*Tan[e + f*x])^n)/(a + I*a*Tan[e + f*x])^2,x]

Mathematica 12.1 output

$$\int \frac{(A + B \tan(e + fx))(c - ic \tan(e + fx))^n}{(a + ia \tan(e + fx))^2} dx$$

Mathematica 12 output

$$\frac{2^{n-2} \left(\frac{c}{1+e^{2i(e+fx)}} \right)^n \left(i(A(n-2) + iB(n+2))e^{4i(e+fx)} {}_2F_1(2, 2-n; 3-n; 1 + e^{2i(e+fx)}) + (n-2)(B - iA) \right)}{a^2 f(n-2)(\tan(e + fx) - i)^2}$$