Código Taylor 1 (Seno)

f(x):=sin(x);

p(x):= taylor(f(x), x, 0, 1);

t(x):= taylor(f(x), x, 0, 3);

a(x):= taylor(f(x), x, 0, 5);

b(x):= taylor(f(x), x, 0, 7);

plot2d([f(x),p(x), t(x), a(x), b(x)],[x,-%pi,%pi],[color,red,green,blue,orange,black], [legend, "f(x)","y=P1(x)","y=P3(x)","y=P5(x)","y=P7(x)"]);

tex(p(x));

tex(t(x));

tex(a(x));

tex(b(x));

fortran(p(x));

fortran(t(x));

fortran(a(x));

fortran(b(x));

(%i7)

$$+x+\cdots $$

(%o7) false

(%i8) tex(t(x));

$$x-{{x^3}\over{6}}+\cdots $$

(%o8) false

(%i9) tex(a(x));

$$x-{{x^3}\over{6}}+{{x^5}\over{120}}+\cdots $$

(%o9) false

(%i10) tex(b(x));

$$x-{{x^3}\over{6}}+{{x^5}\over{120}}-{{x^7}\over{5040}}+\cdots $$

(%o10) false

(%i11)

(%o10) false

(%i11) fortran(p(x));

x

(%o11) done

(%i12) fortran(t(x));

x-x\*\*3/6.0E+0

(%o12) done

(%i13) fortran(a(x));

x\*\*5/1.2E+2-x\*\*3/6.0E+0+x

(%o13) done

(%i14) fortran(b(x));

-x\*\*7/5.04E+3+x\*\*5/1.2E+2-x\*\*3/6.0E+0+x

(%o14) done

(%i15)

OK

**Taylor 2 (log)**

f(x):=log(1+x);

p(x):= taylor(f(x), x, 0, 4);

t(x):= taylor(f(x), x, 0, 7);

a(x):= taylor(f(x), x, 0, 11);

b(x):= taylor(f(x), x, 0, 16);

plot2d([f(x),p(x), t(x), a(x), b(x)],[x,-1.5,1.5],[y,-4,2],[color,red,green,blue,orange,black], [legend,"f(x)","T4","T7","T11","T16"]);

tex(p(x));

tex(t(x));

tex(a(x));

tex(b(x));

fortran(p(x));

fortran(t(x));

fortran(a(x));

fortran(b(x));

(%i7)

$$x-{{x^2}\over{2}}+{{x^3}\over{3}}-{{x^4}\over{4}}+\cdots $$

(%o7) false

(%i8) tex(t(x));

$$x-{{x^2}\over{2}}+{{x^3}\over{3}}-{{x^4}\over{4}}+{{x^5}\over{5}}-

{{x^6}\over{6}}+{{x^7}\over{7}}+\cdots $$

(%o8) false

(%i9) tex(a(x));

$$x-{{x^2}\over{2}}+{{x^3}\over{3}}-{{x^4}\over{4}}+{{x^5}\over{5}}-

{{x^6}\over{6}}+{{x^7}\over{7}}-{{x^8}\over{8}}+{{x^9}\over{9}}-{{x

^{10}}\over{10}}+{{x^{11}}\over{11}}+\cdots $$

(%o9) false

(%i10) tex(b(x));

$$x-{{x^2}\over{2}}+{{x^3}\over{3}}-{{x^4}\over{4}}+{{x^5}\over{5}}-

{{x^6}\over{6}}+{{x^7}\over{7}}-{{x^8}\over{8}}+{{x^9}\over{9}}-{{x

^{10}}\over{10}}+{{x^{11}}\over{11}}-{{x^{12}}\over{12}}+{{x^{13}

}\over{13}}-{{x^{14}}\over{14}}+{{x^{15}}\over{15}}-{{x^{16}}\over{

16}}+\cdots $$

(%o10) false

(%i11) fortran(p(x));

-x\*\*4/4.0E+0+x\*\*3/3.0E+0-x\*\*2/2.0E+0+x

(%o11) done

(%i12) fortran(t(x));

x\*\*7/7.0E+0-x\*\*6/6.0E+0+x\*\*5/5.0E+0-x\*\*4/4.0E+0+x\*\*3/3.0E+0-x\*\*2/2

1 .0E+0+x

(%o12) done

(%i13) fortran(a(x));

x\*\*11/1.1E+1-x\*\*10/1.0E+1+x\*\*9/9.0E+0-x\*\*8/8.0E+0+x\*\*7/7.0E+0-x\*\*6

1 /6.0E+0+x\*\*5/5.0E+0-x\*\*4/4.0E+0+x\*\*3/3.0E+0-x\*\*2/2.0E+0+x

(%o13) done

(%i14) fortran(b(x));

-x\*\*16/1.6E+1+x\*\*15/1.5E+1-x\*\*14/1.4E+1+x\*\*13/1.3E+1-x\*\*12/1.2E+1+

1 x\*\*11/1.1E+1-x\*\*10/1.0E+1+x\*\*9/9.0E+0-x\*\*8/8.0E+0+x\*\*7/7.0E+0-x

2 \*\*6/6.0E+0+x\*\*5/5.0E+0-x\*\*4/4.0E+0+x\*\*3/3.0E+0-x\*\*2/2.0E+0+x

(%o14) done

(%i15)

**Taylor 3**

f(x):=log(cos(x));

p(x):= taylor(f(x), x, 0, 1);

t(x):= taylor(f(x), x, 0, 3);

a(x):= taylor(f(x), x, 0, 5);

b(x):= taylor(f(x), x, 0, 7);

plot2d([f(x),p(x), t(x), a(x), b(x)],[x,-0.5\*%pi,0.5\*%pi],[y,-5,5],[color,red,green,blue,orange,black], [legend,"f(x)","T1","T3","T5","T7"]);

tex(p(x));

tex(t(x));

tex(a(x));

tex(b(x));

fortran(p(x));

fortran(t(x));

fortran(a(x));

fortran(b(x));

**(%i7)**

$$+0+\cdots $$

(%o7) false

(%i8) tex(t(x));

$$+\left(-{{x^2}\over{2}}\right)+\cdots $$

(%o8) false

(%i9) tex(a(x));

$$-{{x^2}\over{2}}-{{x^4}\over{12}}+\cdots $$

(%o9) false

(%i10) tex(b(x));

$$-{{x^2}\over{2}}-{{x^4}\over{12}}-{{x^6}\over{45}}+\cdots $$

(%o10) false

(%i11) fortran(p(x));

0

(%o11) done

(%i12) fortran(t(x));

-x\*\*2/2.0E+0

(%o12) done

(%i13) fortran(a(x));

-x\*\*4/1.2E+1-x\*\*2/2.0E+0

(%o13) done

(%i14) fortran(b(x));

-x\*\*6/4.5E+1-x\*\*4/1.2E+1-x\*\*2/2.0E+0

(%o14) done

(%i15)

**Taylor 4**

f(x):=exp(x)/cos(x);

p(x):= taylor(f(x), x, 0, 1);

t(x):= taylor(f(x), x, 0, 3);

a(x):= taylor(f(x), x, 0, 5);

b(x):= taylor(f(x), x, 0, 7);

plot2d([f(x),p(x), t(x), a(x), b(x)],[x,-3,3],[y,-5,5],[color,red,green,blue,orange,black], [legend,"f(x)","T1","T3","T5","T7"]);

tex(p(x));

tex(t(x));

tex(a(x));

tex(b(x));

fortran(p(x));

fortran(t(x));

fortran(a(x));

fortran(b(x));

$$1+x+\cdots $$

(%o7) false

(%i8) tex(t(x));

$$1+x+x^2+{{2\,x^3}\over{3}}+\cdots $$

(%o8) false

(%i9) tex(a(x));

$$1+x+x^2+{{2\,x^3}\over{3}}+{{x^4}\over{2}}+{{3\,x^5}\over{10}}

+\cdots $$

(%o9) false

(%i10) tex(b(x));

$$1+x+x^2+{{2\,x^3}\over{3}}+{{x^4}\over{2}}+{{3\,x^5}\over{10}}+{{19

\,x^6}\over{90}}+{{13\,x^7}\over{105}}+\cdots $$

(%o10) false

(%i11) fortran(p(x));

x+1

(%o11) done

(%i12) fortran(t(x));

2.0E+0\*x\*\*3/3.0E+0+x\*\*2+x+1

(%o12) done

(%i13) fortran(a(x));

3.0E+0\*x\*\*5/1.0E+1+x\*\*4/2.0E+0+2.0E+0\*x\*\*3/3.0E+0+x\*\*2+x+1

(%o13) done

(%i14) fortran(b(x));

1.3E+1\*x\*\*7/1.05E+2+1.9E+1\*x\*\*6/9.0E+1+3.0E+0\*x\*\*5/1.0E+1+x\*\*4/2.0

1 E+0+2.0E+0\*x\*\*3/3.0E+0+x\*\*2+x+1

(%o14) done

(%i15)

**Taylor 5**

f(x):=(1+x)\*exp(x);

p(x):= taylor(f(x), x, 0, 1);

t(x):= taylor(f(x), x, 0, 3);

a(x):= taylor(f(x), x, 0, 5);

b(x):= taylor(f(x), x, 0, 7);

plot2d([f(x),p(x), t(x), a(x), b(x)],[x,-3,3],[y,-5,5],[color,red,green,blue,orange,black], [legend,"f(x)","T1","T3","T5","T7"]);

tex(p(x));

tex(t(x));

tex(a(x));

tex(b(x));

fortran(p(x));

fortran(t(x));

fortran(a(x));

fortran(b(x));

**(%7i)**

$$1+2\,x+\cdots $$

(%o7) false

(%i8) tex(t(x));

$$1+2\,x+{{3\,x^2}\over{2}}+{{2\,x^3}\over{3}}+\cdots $$

(%o8) false

(%i9) tex(a(x));

$$1+2\,x+{{3\,x^2}\over{2}}+{{2\,x^3}\over{3}}+{{5\,x^4}\over{24}}+{{

x^5}\over{20}}+\cdots $$

(%o9) false

(%i10) tex(b(x));

$$1+2\,x+{{3\,x^2}\over{2}}+{{2\,x^3}\over{3}}+{{5\,x^4}\over{24}}+{{

x^5}\over{20}}+{{7\,x^6}\over{720}}+{{x^7}\over{630}}+\cdots $$

(%o10) false

(%i11) fortran(p(x));

2\*x+1

(%o11) done

(%i12) fortran(t(x));

2.0E+0\*x\*\*3/3.0E+0+3.0E+0\*x\*\*2/2.0E+0+2\*x+1

(%o12) done

(%i13) fortran(a(x));

x\*\*5/2.0E+1+5.0E+0\*x\*\*4/2.4E+1+2.0E+0\*x\*\*3/3.0E+0+3.0E+0\*x\*\*2/2.0E

1 +0+2\*x+1

(%o13) done

(%i14) fortran(b(x));

x\*\*7/6.3E+2+7.0E+0\*x\*\*6/7.2E+2+x\*\*5/2.0E+1+5.0E+0\*x\*\*4/2.4E+1+2.0E

1 +0\*x\*\*3/3.0E+0+3.0E+0\*x\*\*2/2.0E+0+2\*x+1

(%o14) done

(%i15)