Lösungen

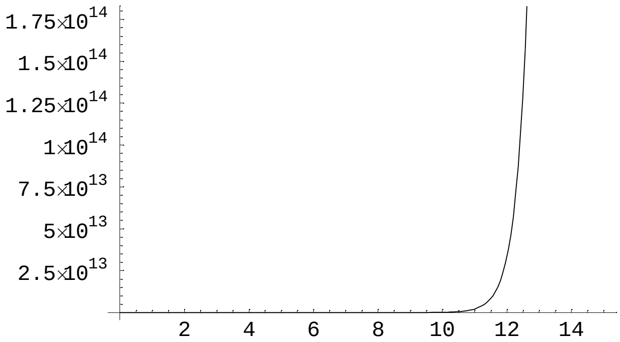
1 Anfangswertproblem

a Evaluierung einer Lösung, welche näher untersucht werden soll

```
Remove["Global`*"];
m[k1_,k2_,k3_,y0_,y1_]:=Module[{x,y},
solv =
DSolve[{y''[x]+ k1 y'[x]+ k2 y[x]==Cos[k3 x-1], y[0]==y0, y'[0]==y1},y,x];
y = y/.solv[[1]];
Print["k1 = ",k1,"  k2 = ",k2,"  k3 = ",k3];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[y[x],{x,0,15}]];

Table[m[k1,k2,k3,1,0],{k1,-2,2},{k2,-2,2},{k3,-3,3}];
```

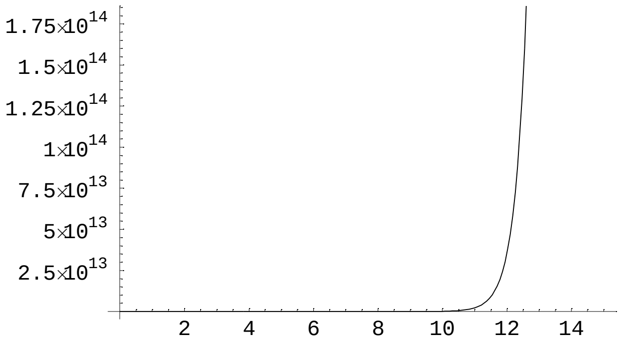
k1 = -2 k2 = -2 k3 = -3

==> y[x] = $\frac{1}{942}\Big(-66\,\mathrm{Cos}[1+3\,x\$326]+ e^{-\sqrt{3}\,x\$326}\Big(e^{x\$326}\Big(471+157\sqrt{3}+(33-7\sqrt{3})\,\mathrm{Cos}[1]+18\,\mathrm{Sin}[1]+39\sqrt{3}\,\mathrm{Sin}[1]+e^{2\sqrt{3}\,x\$326}\,(-157\,(-3+\sqrt{3})+(33+7\sqrt{3})\,\mathrm{Cos}[1]+(18-39\sqrt{3})\,\mathrm{Sin}[1])\Big)-36\,e^{\sqrt{3}\,x\$326}\,\mathrm{Sin}[1+3\,x\$326]\Big)\Big)$



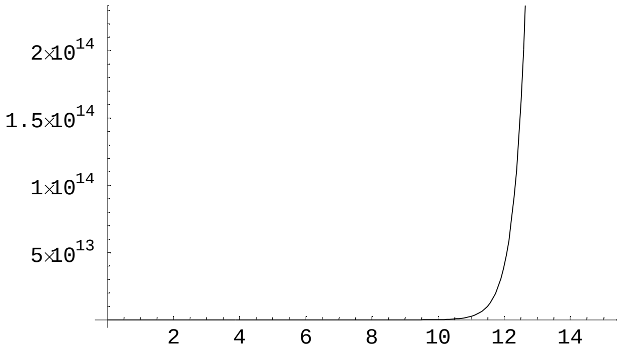
k1 = -2 k2 = -2 k3 = -2

==> y[x] = $\frac{1}{156}\Big(-18\,\mathrm{Cos}[1+2\,x\$365]+ e^{-\sqrt{3}\,x\$365}\Big(e^{x\$365}\Big(78+26\sqrt{3}-(-9+\sqrt{3})\,\mathrm{Cos}[1]+6\,\mathrm{Sin}[1]+8\sqrt{3}\,\mathrm{Sin}[1]+e^{2\sqrt{3}\,x\$365}\,(78-26\sqrt{3}+(9+\sqrt{3})\,\mathrm{Cos}[1]+6\,\mathrm{Sin}[1]-8\sqrt{3}\,\mathrm{Sin}[1])\Big)-12\,e^{\sqrt{3}\,x\$365}\,\mathrm{Sin}[1+2\,x\$365]\Big)\Big)$



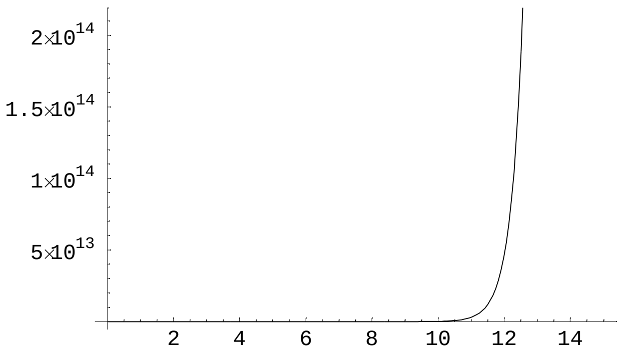
k1 = -2 k2 = -2 k3 = -1

$$\text{==>}\quad y[x] = \frac{1}{78}\left(-18\,\mathrm{Cos}[1 + x\$395] + e^{-\sqrt{3}\,x\$395}\left(e^{x\$395}\left(39 + 13\sqrt{3} + (9 + \sqrt{3})\,\mathrm{Cos}[1] + 6\,\mathrm{Sin}[1] + 5\sqrt{3}\,\mathrm{Sin}[1] + e^{2\sqrt{3}\,x\$395}\left(39 - 13\sqrt{3} - (-9 + \sqrt{3})\,\mathrm{Cos}[1] + 6\,\mathrm{Sin}[1] - 5\sqrt{3}\,\mathrm{Sin}[1]\right)\right) - 12\,e^{\sqrt{3}\,x\$395}\,\mathrm{Sin}[1 + x\$395]\right)\right)$$



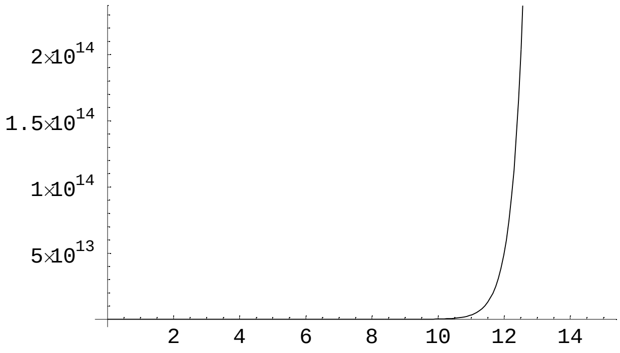
k1 = -2 k2 = -2 k3 = 0

$$\text{==>}\quad y[x] = \frac{1}{12}\,e^{-\sqrt{3}\,x\$423}\left(-6\,e^{\sqrt{3}\,x\$423}\,\mathrm{Cos}[1] + (3 + \sqrt{3})\,e^{x\$423}\,(2 + \mathrm{Cos}[1]) - (-3 + \sqrt{3})\,e^{x\$423 + 2\sqrt{3}\,x\$423}\,(2 + \mathrm{Cos}[1])\right)$$



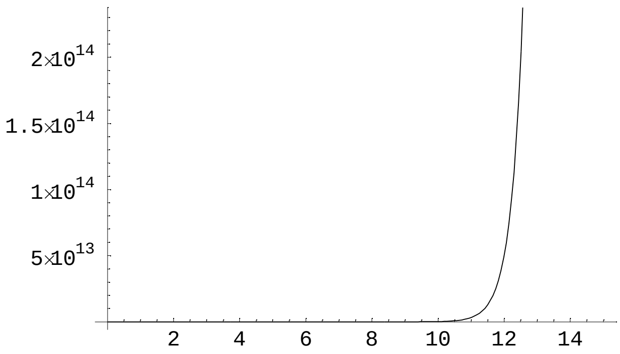
k1 = -2 k2 = -2 k3 = 1

$$\text{==>}\quad y[x] = \frac{1}{78}\left(-18\,\mathrm{Cos}[1 - x\$430] + e^{-\sqrt{3}\,x\$430}\left(e^{x\$430}\left(39 + 13\sqrt{3} + (9 + \sqrt{3})\,\mathrm{Cos}[1] - 6\,\mathrm{Sin}[1] - 5\sqrt{3}\,\mathrm{Sin}[1] + e^{2\sqrt{3}\,x\$430}\left(39 - 13\sqrt{3} - (-9 + \sqrt{3})\,\mathrm{Cos}[1] - 6\,\mathrm{Sin}[1] + 5\sqrt{3}\,\mathrm{Sin}[1]\right)\right) + 12\,e^{\sqrt{3}\,x\$430}\,\mathrm{Sin}[1 - x\$430]\right)\right)$$



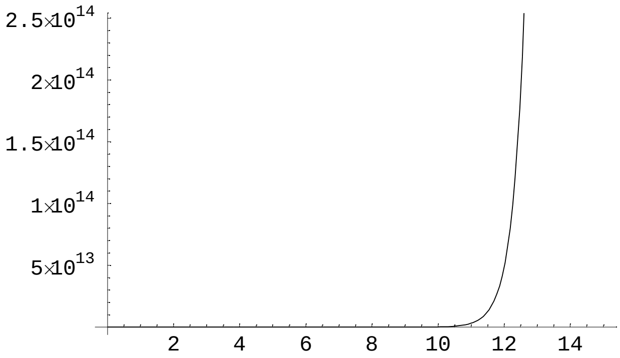
k1 = −2 k2 = −2 k3 = 2

$$==> \quad y[x] = \frac{1}{156}\Big(-18\,\text{Cos}[1-2\,x\$458] + e^{-\sqrt{3}\,x\$458}\Big(e^{x\$458}\Big(78+26\sqrt{3}-(-9+\sqrt{3})\,\text{Cos}[1]-6\,\text{Sin}[1]-8\sqrt{3}\,\text{Sin}[1]+e^{2\sqrt{3}\,x\$458}\,(78-26\sqrt{3}+(9+\sqrt{3})\,\text{Cos}[1]-6\,\text{Sin}[1]+8\sqrt{3}\,\text{Sin}[1])\Big)+12\,e^{\sqrt{3}\,x\$458}\,\text{Sin}[1-2\,x\$458]\Big)\Big)$$



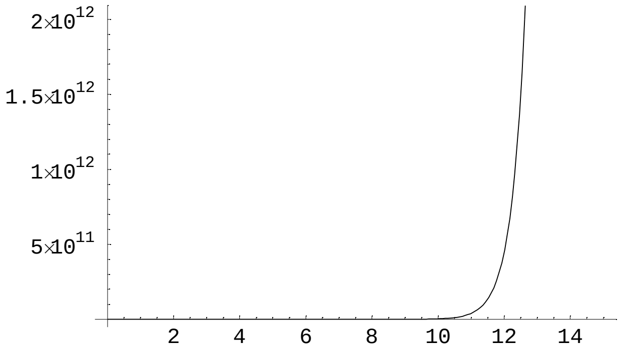
k1 = −2 k2 = −2 k3 = 3

$$==> \quad y[x] = \frac{1}{942}\Big(-66\,\text{Cos}[1-3\,x\$486] + e^{-\sqrt{3}\,x\$486}\Big(e^{x\$486}\Big(471+157\sqrt{3}+(33-7\sqrt{3})\,\text{Cos}[1]-18\,\text{Sin}[1]-39\sqrt{3}\,\text{Sin}[1]+e^{2\sqrt{3}\,x\$486}\,(-157\,(-3+\sqrt{3})+(33+7\sqrt{3})\,\text{Cos}[1]+3\,(-6+13\sqrt{3})\,\text{Sin}[1])\Big)+36\,e^{\sqrt{3}\,x\$486}\,\text{Sin}[1-3\,x\$486]\Big)\Big)$$



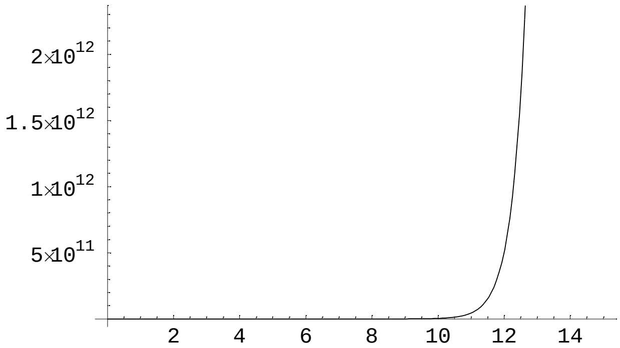
k1 = −2 k2 = −1 k3 = −3

$$==> \quad y[x] = \frac{1}{136}\Big(-10\,\text{Cos}[1+3\,x\$514] + e^{-\sqrt{2}\,x\$514}\Big(e^{x\$514}\Big(68+34\sqrt{2}+(5-2\sqrt{2})\,\text{Cos}[1]+3\,\text{Sin}[1]+9\sqrt{2}\,\text{Sin}[1]+e^{2\sqrt{2}\,x\$514}\,(68-34\sqrt{2}+(5+2\sqrt{2})\,\text{Cos}[1]+3\,\text{Sin}[1]-9\sqrt{2}\,\text{Sin}[1])\Big)-6\,e^{\sqrt{2}\,x\$514}\,\text{Sin}[1+3\,x\$514]\Big)\Big)$$



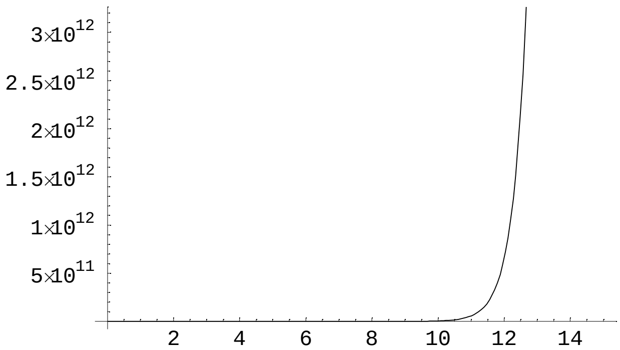
k1 = -2 k2 = -1 k3 = -2

$$==> \quad y[x] = \frac{1}{164}\Big(-20\,\mathrm{Cos}[1+2\,x\$553] + e^{-\sqrt{2}\,x\$553}\Big(e^{x\$553}\Big(82+41\sqrt{2}+(10-3\sqrt{2})\,\mathrm{Cos}[1]+8\,\mathrm{Sin}[1]+14\sqrt{2}\,\mathrm{Sin}[1]+e^{2\sqrt{2}\,x\$553}(82-41\sqrt{2}+(10+3\sqrt{2})\,\mathrm{Cos}[1]+8\,\mathrm{Sin}[1]-14\sqrt{2}\,\mathrm{Sin}[1])\Big)-16\,e^{\sqrt{2}\,x\$553}\,\mathrm{Sin}[1+2\,x\$553]\Big)\Big)$$



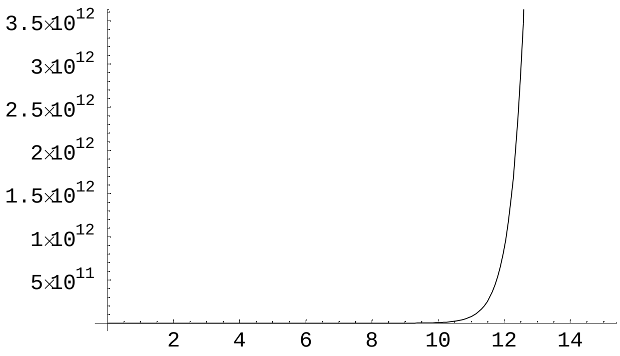
k1 = -2 k2 = -1 k3 = -1

$$==> \quad y[x] = \frac{1}{8}\,e^{-\sqrt{2}\,x\$583}\Big(-2\,e^{\sqrt{2}\,x\$583}\,\mathrm{Cos}[1+x\$583] + e^{x\$583}\Big(4+2\sqrt{2}+\mathrm{Cos}[1]+\mathrm{Sin}[1]+\sqrt{2}\,\mathrm{Sin}[1]+e^{2\sqrt{2}\,x\$583}(4-2\sqrt{2}+\mathrm{Cos}[1]+\mathrm{Sin}[1]-\sqrt{2}\,\mathrm{Sin}[1])\Big) - 2\,e^{\sqrt{2}\,x\$583}\,\mathrm{Sin}[1+x\$583]\Big)$$



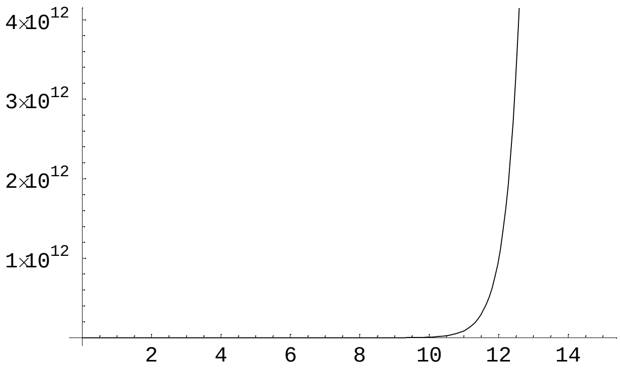
k1 = -2 k2 = -1 k3 = 0

$$==> \quad y[x] = \frac{1}{4}\,e^{-\sqrt{2}\,x\$611}\Big(-4\,e^{\sqrt{2}\,x\$611}\,\mathrm{Cos}[1]+(2+\sqrt{2})\,e^{x\$611}(1+\mathrm{Cos}[1])-(-2+\sqrt{2})\,e^{x\$611+2\sqrt{2}\,x\$611}(1+\mathrm{Cos}[1])\Big)$$



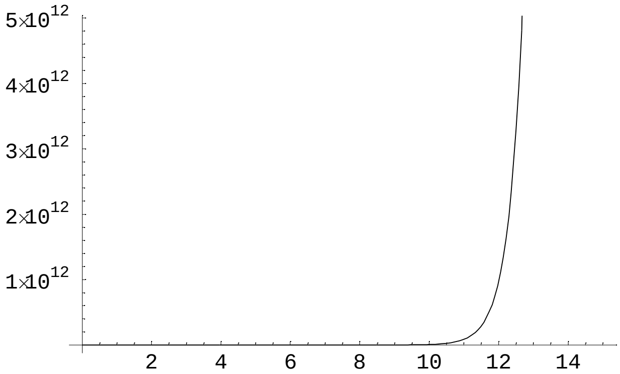
k1 = −2 k2 = −1 k3 = 1

$$==> \; y[x] = \frac{1}{8}\left(-2\,\text{Cos}[1-x\$618] + e^{-\sqrt{2}\,x\$618}\left(e^{x\$618}\left(4+2\sqrt{2}+\text{Cos}[1]-\text{Sin}[1]-\sqrt{2}\,\text{Sin}[1]+e^{2\sqrt{2}\,x\$618}\left(4-2\sqrt{2}+\text{Cos}[1]+\left(-1+\sqrt{2}\right)\text{Sin}[1]\right)\right)+2\,e^{\sqrt{2}\,x\$618}\,\text{Sin}[1-x\$618]\right)\right)$$



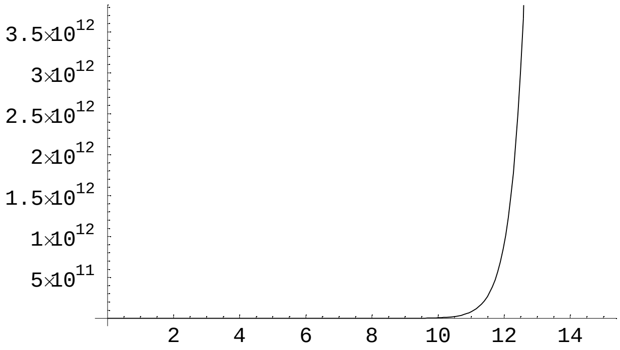
k1 = −2 k2 = −1 k3 = 2

$$==> \; y[x] = \frac{1}{164}\left(-20\,\text{Cos}[1-2\,x\$646] + e^{-\sqrt{2}\,x\$646}\left(e^{x\$646}\left(82+41\sqrt{2}+\left(10-3\sqrt{2}\right)\text{Cos}[1]-8\,\text{Sin}[1]-14\sqrt{2}\,\text{Sin}[1]+e^{2\sqrt{2}\,x\$646}\left(82-41\sqrt{2}+\left(10+3\sqrt{2}\right)\text{Cos}[1]-8\,\text{Sin}[1]+14\sqrt{2}\,\text{Sin}[1]\right)\right)+16\,e^{\sqrt{2}\,x\$646}\,\text{Sin}[1-2\,x\$646]\right)\right)$$



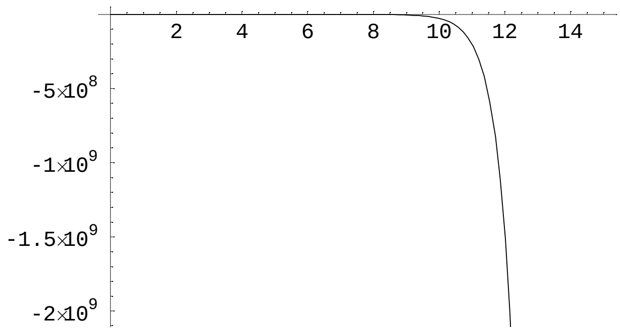
k1 = −2 k2 = −1 k3 = 3

$$==> \; y[x] = \frac{1}{136}\left(-10\,\text{Cos}[1-3\,x\$674] + e^{-\sqrt{2}\,x\$674}\left(e^{x\$674}\left(68+34\sqrt{2}+\left(5-2\sqrt{2}\right)\text{Cos}[1]-3\,\text{Sin}[1]-9\sqrt{2}\,\text{Sin}[1]+e^{2\sqrt{2}\,x\$674}\left(68-34\sqrt{2}+\left(5+2\sqrt{2}\right)\text{Cos}[1]-3\,\text{Sin}[1]+9\sqrt{2}\,\text{Sin}[1]\right)\right)+6\,e^{\sqrt{2}\,x\$674}\,\text{Sin}[1-3\,x\$674]\right)\right)$$



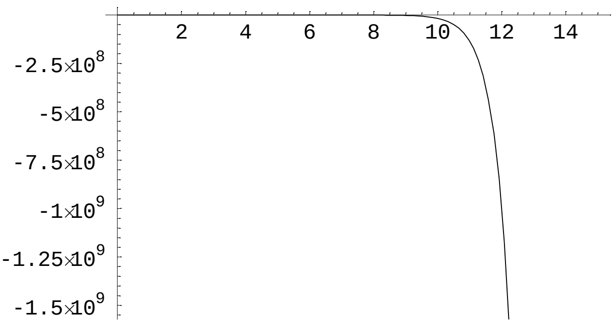
k1 = -2 k2 = 0 k3 = -3

==> y[x] =
$\frac{1}{78}$ (78 + 6 $e^{2 x\$702}$ Cos[1] - 6 Cos[1 + 3 x$702] + 13 Sin[1] - 9 $e^{2 x\$702}$ Sin[1] - 4 Sin[1 + 3 x$702])



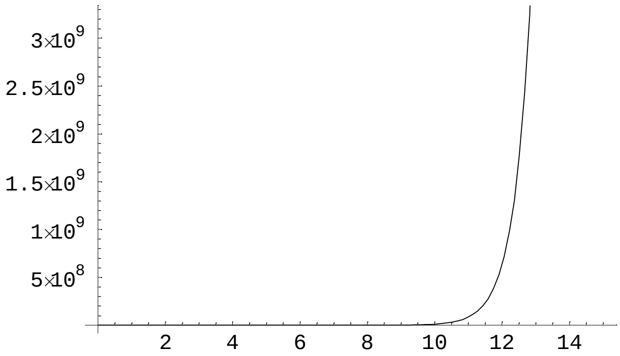
k1 = -2 k2 = 0 k3 = -2

==> y[x] = $\frac{1}{8}$ (8 + $e^{2 x\$717}$ Cos[1] - Cos[1 + 2 x$717] + 2 Sin[1] - $e^{2 x\$717}$ Sin[1] - Sin[1 + 2 x$717])



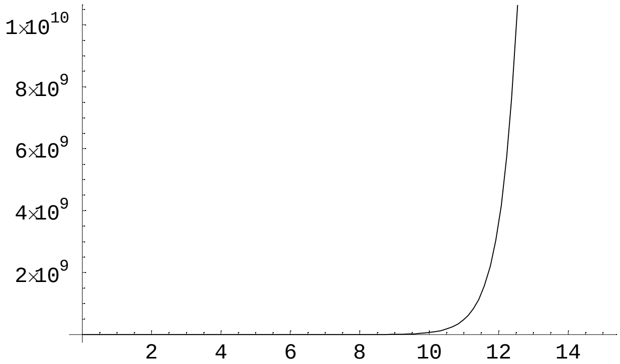
k1 = -2 k2 = 0 k3 = -1

==> y[x] = $\frac{1}{10}$ (10 + 2 $e^{2 x\$731}$ Cos[1] - 2 Cos[1 + x$731] + 5 Sin[1] - $e^{2 x\$731}$ Sin[1] - 4 Sin[1 + x$731])



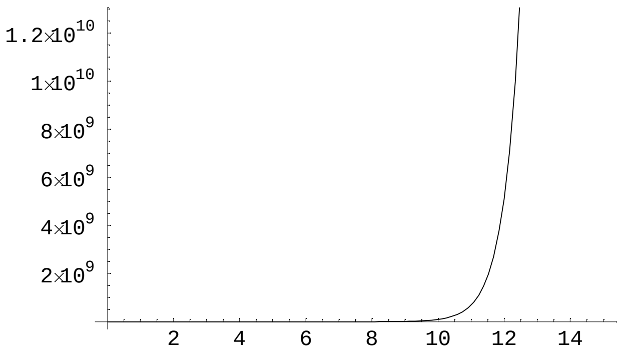
k1 = -2 k2 = 0 k3 = 0

==> $y[x] = \frac{1}{4} (4 - Cos[1] + e^{2\,x\$742} Cos[1] - 2\,x\$742\,Cos[1])$



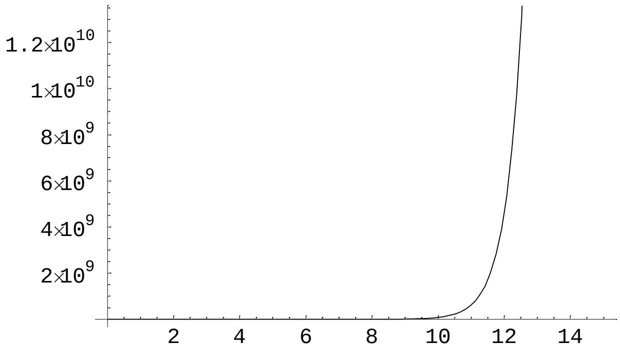
k1 = -2 k2 = 0 k3 = 1

==> $y[x] = \frac{1}{10} (10 + 2\,e^{2\,x\$751} Cos[1] - 2\,Cos[1 - x\$751] - 5\,Sin[1] + e^{2\,x\$751} Sin[1] + 4\,Sin[1 - x\$751])$



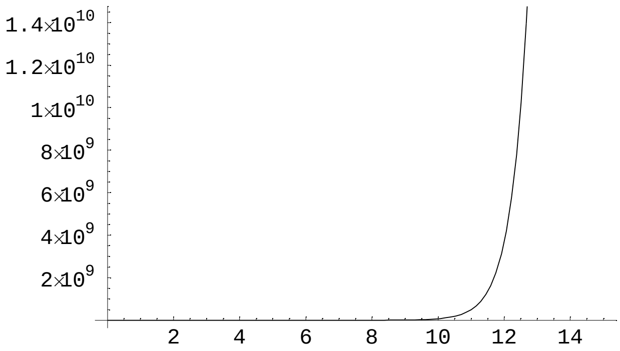
k1 = -2 k2 = 0 k3 = 2

==> $y[x] = \frac{1}{8} (8 + e^{2\,x\$762} Cos[1] - Cos[1 - 2\,x\$762] - 2\,Sin[1] + e^{2\,x\$762} Sin[1] + Sin[1 - 2\,x\$762])$



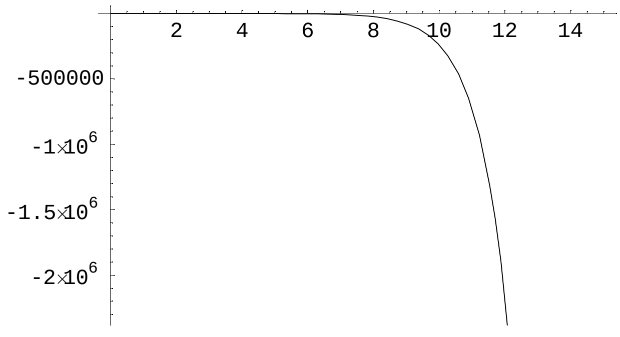
k1 = -2 k2 = 0 k3 = 3

==> y[x] =
$\frac{1}{78}$ (78 + 6 $e^{2\,x\$773}$ Cos[1] - 6 Cos[1 - 3 x$773] - 13 Sin[1] + 9 $e^{2\,x\$773}$ Sin[1] + 4 Sin[1 - 3 x$773])



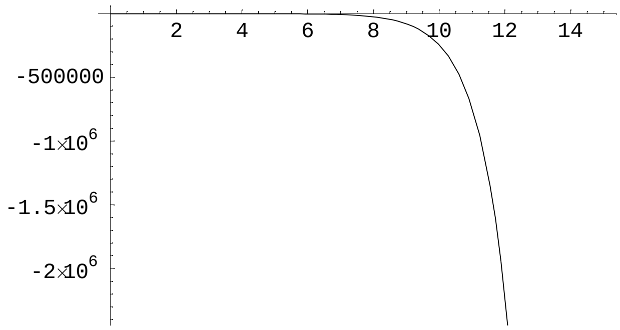
k1 = -2 k2 = 1 k3 = -3

==> y[x] = $\frac{1}{50}$ (-4 Cos[1 + 3 x$784] +
$e^{x\$784}$ (50 + 4 Cos[1] + 5 x$784 (-10 + Cos[1] - 3 Sin[1]) + 3 Sin[1]) - 3 Sin[1 + 3 x$784])



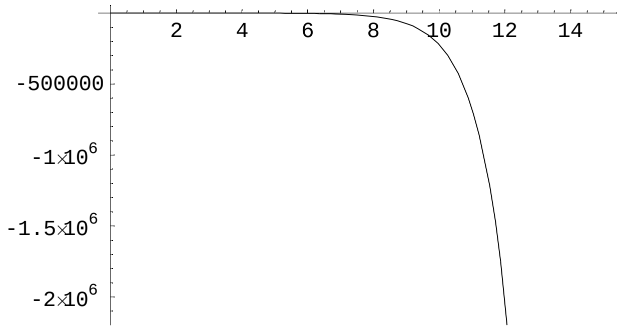
k1 = -2 k2 = 1 k3 = -2

==> y[x] = $\frac{1}{25}$ (-3 Cos[1 + 2 x$803] +
$e^{x\$803}$ (25 + 3 Cos[1] + 5 x$803 (-5 + Cos[1] - 2 Sin[1]) + 4 Sin[1]) - 4 Sin[1 + 2 x$803])



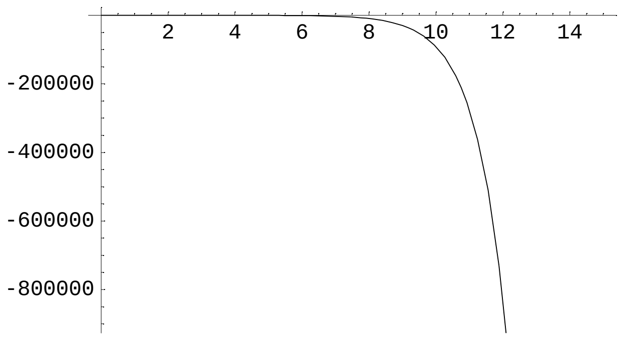
k1 = −2 k2 = 1 k3 = −1

==> y[x] = $\frac{1}{2}$ (e^x$822 (2 + x$822 (−2 + Cos[1] − Sin[1]) + Sin[1]) − Sin[1 + x$822])



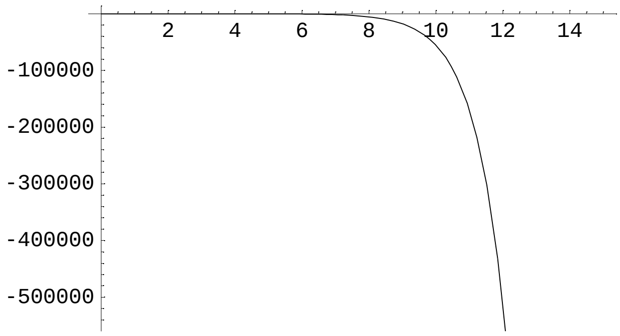
k1 = −2 k2 = 1 k3 = 0

==> y[x] = e^x$838 (−1 + x$838) (−1 + Cos[1]) + Cos[1]

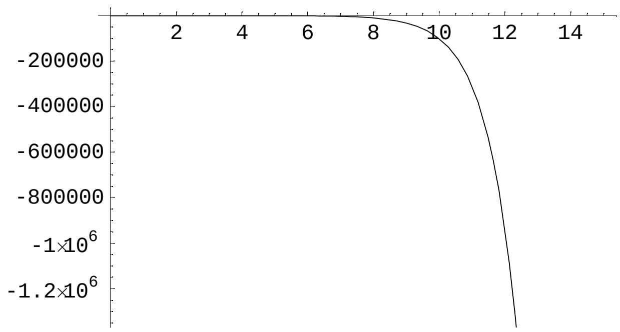


k1 = −2 k2 = 1 k3 = 1

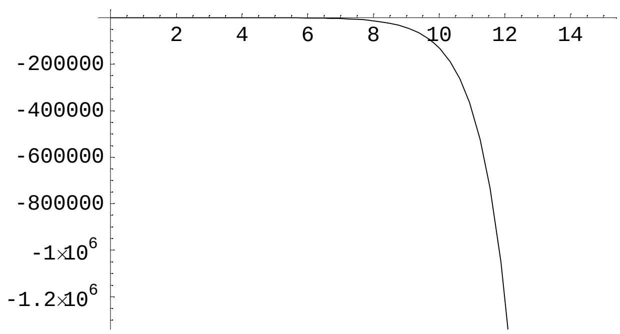
==> y[x] = $\frac{1}{2}$ (e^x$844 (2 − Sin[1] + x$844 (−2 + Cos[1] + Sin[1])) + Sin[1 − x$844])



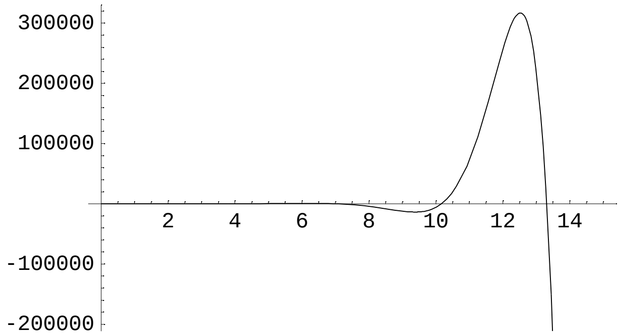

```
k1 = -2   k2 = 1   k3 = 2

==>  y[x] = 1/25 (-3 Cos[1 - 2 x$860] +
     e^(x$860) (25 + 3 Cos[1] - 4 Sin[1] + 5 x$860 (-5 + Cos[1] + 2 Sin[1])) + 4 Sin[1 - 2 x$860])
```




```
k1 = -2   k2 = 1   k3 = 3

==>  y[x] = 1/50 (-4 Cos[1 - 3 x$877] +
     e^(x$877) (50 + 4 Cos[1] - 3 Sin[1] + 5 x$877 (-10 + Cos[1] + 3 Sin[1])) + 3 Sin[1 - 3 x$877])
```



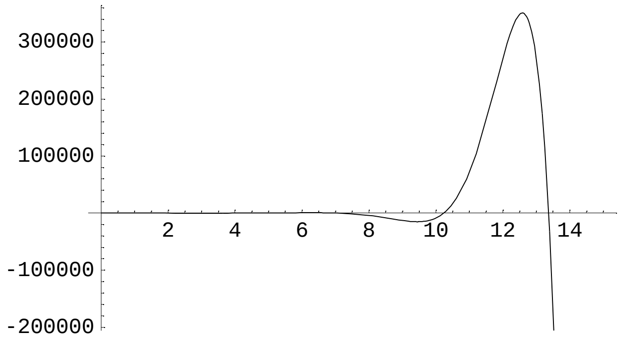

```
k1 = -2   k2 = 2   k3 = -3

==>  y[x] =
 1/170 (-20 e^(x$894) Cos[1 - x$894] + 170 e^(x$894) Cos[x$894] + 34 e^(x$894) Cos[1 + x$894] - 14 Cos[1 + 3 x$894] -
     5 e^(x$894) Sin[1 - x$894] - 170 e^(x$894) Sin[x$894] + 17 e^(x$894) Sin[1 + x$894] - 12 Sin[1 + 3 x$894])
```



k1 = -2   k2 = 2   k3 = -2

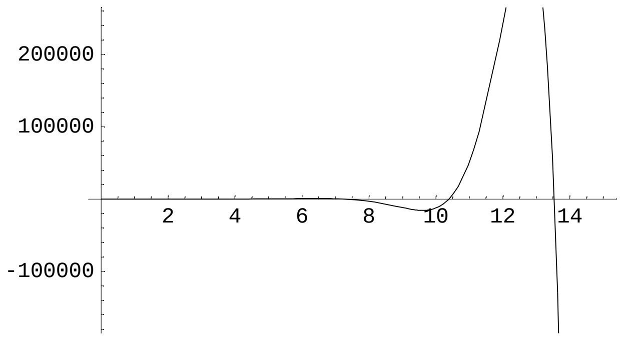
==> y[x] =

$$\frac{1}{20}\left(-3\, e^{x\$925} \mathrm{Cos}[1 - x\$925] + 20\, e^{x\$925} \mathrm{Cos}[x\$925] + 5\, e^{x\$925} \mathrm{Cos}[1 + x\$925] - 2\, \mathrm{Cos}[1 + 2\, x\$925] - e^{x\$925} \mathrm{Sin}[1 - x\$925] - 20\, e^{x\$925} \mathrm{Sin}[x\$925] + 5\, e^{x\$925} \mathrm{Sin}[1 + x\$925] - 4\, \mathrm{Sin}[1 + 2\, x\$925]\right)$$



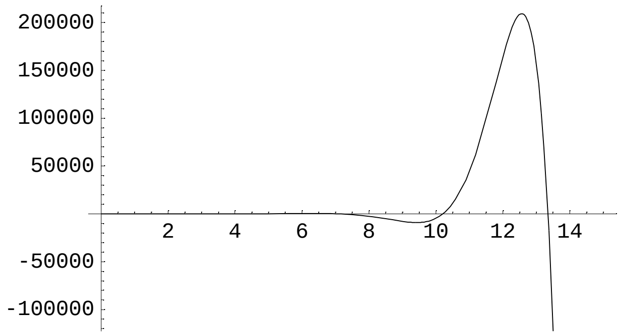
k1 = -2   k2 = 2   k3 = -1

==> y[x] = $$\frac{1}{10}\left(-2\, e^{x\$955} \mathrm{Cos}[1 - x\$955] + 10\, e^{x\$955} \mathrm{Cos}[x\$955] + 2\, \mathrm{Cos}[1 + x\$955] - e^{x\$955} \mathrm{Sin}[1 - x\$955] - 10\, e^{x\$955} \mathrm{Sin}[x\$955] - 4\, \mathrm{Sin}[1 + x\$955] + 5\, e^{x\$955} \mathrm{Sin}[1 + x\$955]\right)$$



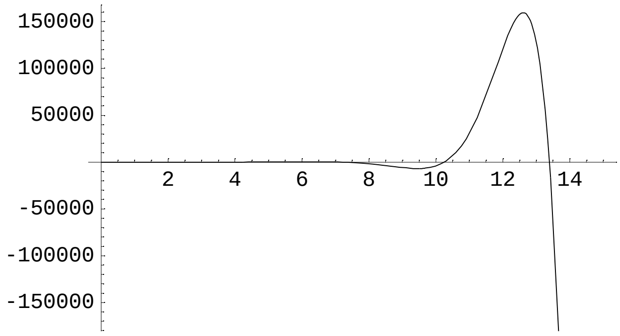
k1 = -2   k2 = 2   k3 = 0

==> y[x] = $$\frac{1}{2}\left(\mathrm{Cos}[1] - e^{x\$984} (-2 + \mathrm{Cos}[1])\, \mathrm{Cos}[x\$984] + e^{x\$984} (-2 + \mathrm{Cos}[1])\, \mathrm{Sin}[x\$984]\right)$$



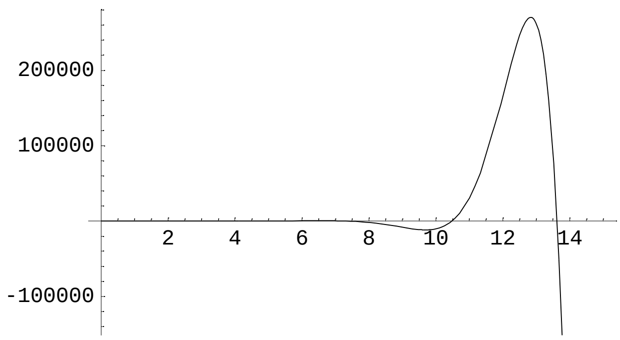
k1 = -2   k2 = 2   k3 = 1

$$==> \quad y[x] = \frac{1}{10}\left(2\,\mathrm{Cos}[1 - x\$991] + 10\, e^{x\$991}\,\mathrm{Cos}[x\$991] - 2\, e^{x\$991}\,\mathrm{Cos}[1 + x\$991] + 4\,\mathrm{Sin}[1 - x\$991] - 5\, e^{x\$991}\,\mathrm{Sin}[1 - x\$991] - 10\, e^{x\$991}\,\mathrm{Sin}[x\$991] + e^{x\$991}\,\mathrm{Sin}[1 + x\$991]\right)$$



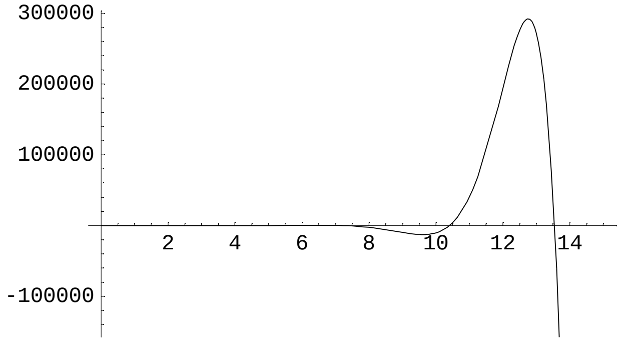
k1 = -2   k2 = 2   k3 = 2

$$==> \quad y[x] = \frac{1}{20}\left(-2\,\mathrm{Cos}[1 - 2\, x\$1018] + 5\, e^{x\$1018}\,\mathrm{Cos}[1 - x\$1018] + 20\, e^{x\$1018}\,\mathrm{Cos}[x\$1018] - 3\, e^{x\$1018}\,\mathrm{Cos}[1 + x\$1018] + 4\,\mathrm{Sin}[1 - 2\, x\$1018] - 5\, e^{x\$1018}\,\mathrm{Sin}[1 - x\$1018] - 20\, e^{x\$1018}\,\mathrm{Sin}[x\$1018] + e^{x\$1018}\,\mathrm{Sin}[1 + x\$1018]\right)$$



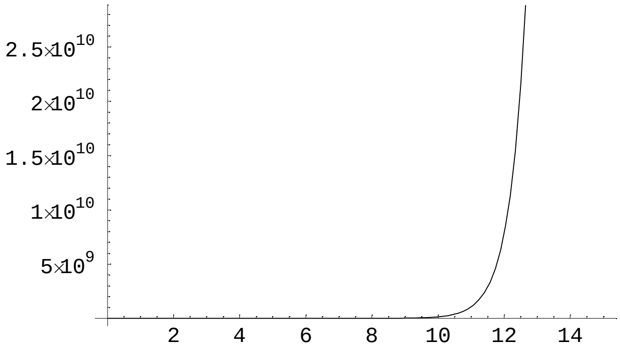
k1 = -2   k2 = 2   k3 = 3

$$==> \quad y[x] = \frac{1}{170}\left(-14\,\mathrm{Cos}[1 - 3\, x\$1046] + 34\, e^{x\$1046}\,\mathrm{Cos}[1 - x\$1046] + 170\, e^{x\$1046}\,\mathrm{Cos}[x\$1046] - 20\, e^{x\$1046}\,\mathrm{Cos}[1 + x\$1046] + 12\,\mathrm{Sin}[1 - 3\, x\$1046] - 17\, e^{x\$1046}\,\mathrm{Sin}[1 - x\$1046] - 170\, e^{x\$1046}\,\mathrm{Sin}[x\$1046] + 5\, e^{x\$1046}\,\mathrm{Sin}[1 + x\$1046]\right)$$



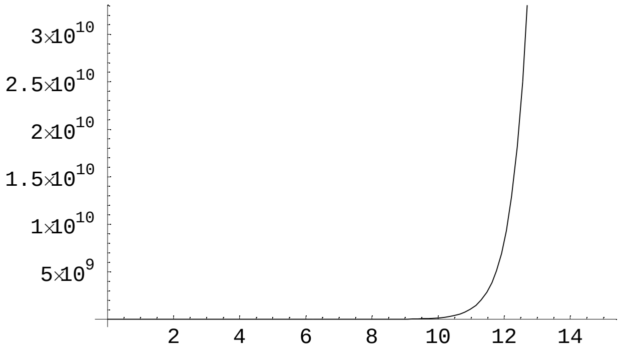
k1 = −1 k2 = −2 k3 = −3

==> $y[x] = \frac{1}{390} e^{-x\$1073} (260 + 130 e^{3 x\$1073} + 13 \text{Cos}[1] + 20 e^{3 x\$1073} \text{Cos}[1] - 33 e^{x\$1073} \text{Cos}[1 + 3 x\$1073] + 39 \text{Sin}[1] - 30 e^{3 x\$1073} \text{Sin}[1] - 9 e^{x\$1073} \text{Sin}[1 + 3 x\$1073])$



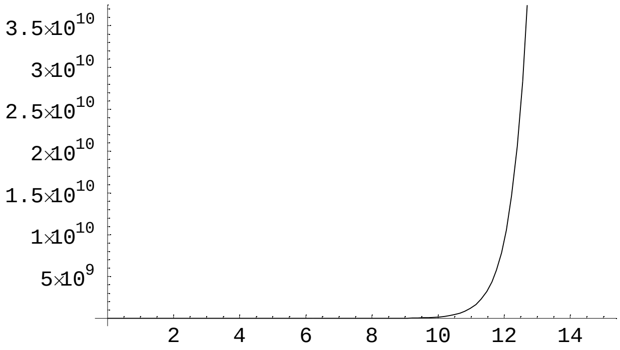
k1 = −1 k2 = −2 k3 = −2

==> $y[x] = \frac{1}{60} e^{-x\$1094} (40 + 20 e^{3 x\$1094} + 4 \text{Cos}[1] + 5 e^{3 x\$1094} \text{Cos}[1] - 9 e^{x\$1094} \text{Cos}[1 + 2 x\$1094] + 8 \text{Sin}[1] - 5 e^{3 x\$1094} \text{Sin}[1] - 3 e^{x\$1094} \text{Sin}[1 + 2 x\$1094])$



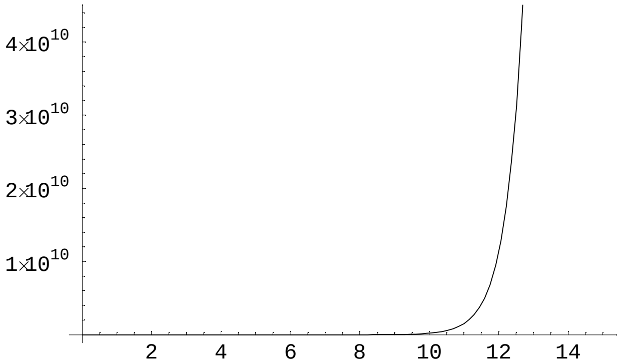
k1 = −1 k2 = −2 k3 = −1

==> $y[x] = \frac{1}{30} e^{-x\$1115} (20 + 10 e^{3 x\$1115} + 5 \text{Cos}[1] + 4 e^{3 x\$1115} \text{Cos}[1] - 9 e^{x\$1115} \text{Cos}[1 + x\$1115] + 5 \text{Sin}[1] - 2 e^{3 x\$1115} \text{Sin}[1] - 3 e^{x\$1115} \text{Sin}[1 + x\$1115])$



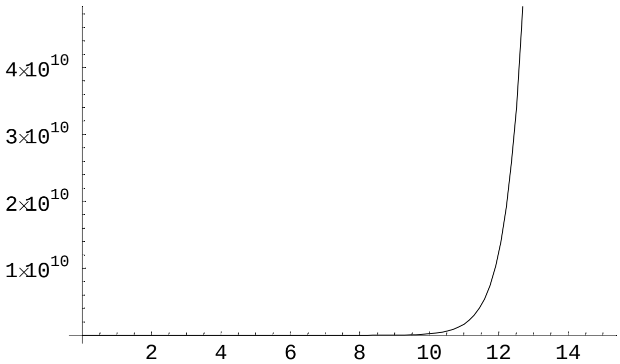
k1 = −1 k2 = −2 k3 = 0

==> $y[x] = \frac{1}{6} e^{-x\$1134} (-3 e^{x\$1134} \mathrm{Cos}[1] + 2 (2 + \mathrm{Cos}[1]) + e^{3 x\$1134} (2 + \mathrm{Cos}[1]))$



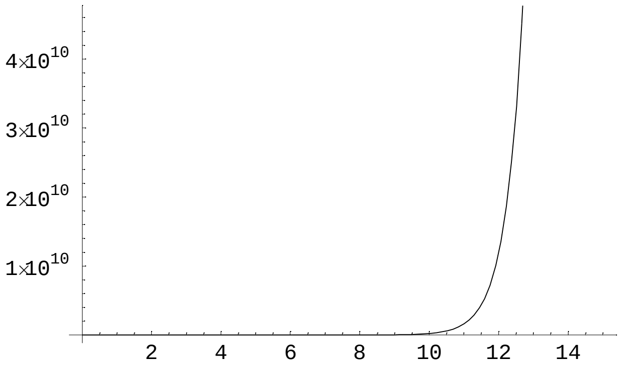
k1 = −1 k2 = −2 k3 = 1

==> $y[x] = \frac{1}{30} e^{-x\$1141} (20 + 10 e^{3 x\$1141} + 5 \mathrm{Cos}[1] + 4 e^{3 x\$1141} \mathrm{Cos}[1] - 9 e^{x\$1141} \mathrm{Cos}[1 - x\$1141] - 5 \mathrm{Sin}[1] + 2 e^{3 x\$1141} \mathrm{Sin}[1] + 3 e^{x\$1141} \mathrm{Sin}[1 - x\$1141])$



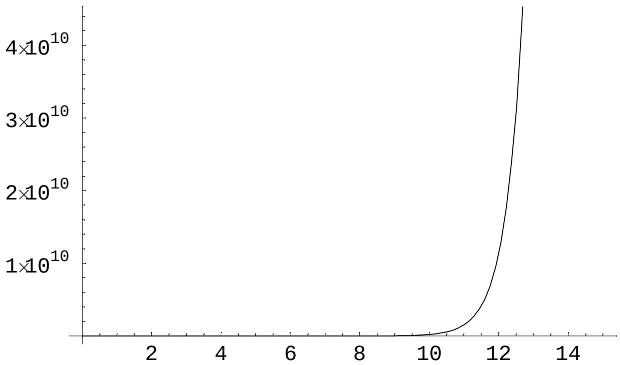
k1 = −1 k2 = −2 k3 = 2

==> $y[x] = \frac{1}{60} e^{-x\$1160} (40 + 20 e^{3 x\$1160} + 4 \mathrm{Cos}[1] + 5 e^{3 x\$1160} \mathrm{Cos}[1] - 9 e^{x\$1160} \mathrm{Cos}[1 - 2 x\$1160] - 8 \mathrm{Sin}[1] + 5 e^{3 x\$1160} \mathrm{Sin}[1] + 3 e^{x\$1160} \mathrm{Sin}[1 - 2 x\$1160])$



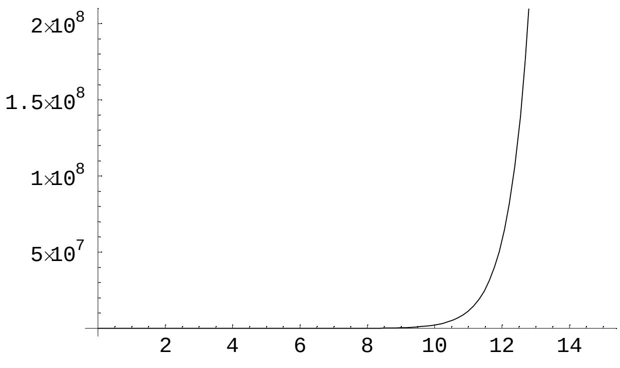
k1 = -1 k2 = -2 k3 = 3

==> $y[x] = \frac{1}{390} e^{-x\$1179} (260 + 130 e^{3 x\$1179} + 13 \text{Cos}[1] + 20 e^{3 x\$1179} \text{Cos}[1] - 33 e^{x\$1179} \text{Cos}[1 - 3 x\$1179] - 39 \text{Sin}[1] + 30 e^{3 x\$1179} \text{Sin}[1] + 9 e^{x\$1179} \text{Sin}[1 - 3 x\$1179])$



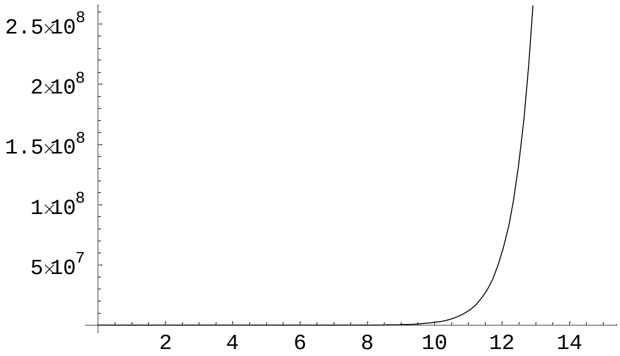
k1 = -1 k2 = -1 k3 = -3

==> $y[x] = \frac{1}{1090} \left(e^{-\frac{1}{2} (-1+\sqrt{5}) x\$1198} \left(545 + 109 \sqrt{5} + 545 e^{\sqrt{5} x\$1198} - 109 \sqrt{5} e^{\sqrt{5} x\$1198} + 50 \text{Cos}[1] - 8 \sqrt{5} \text{Cos}[1] + 50 e^{\sqrt{5} x\$1198} \text{Cos}[1] + 8 \sqrt{5} e^{\sqrt{5} x\$1198} \text{Cos}[1] - 100 e^{\frac{1}{2} (-1+\sqrt{5}) x\$1198} \text{Cos}[1 + 3 x\$1198] + 15 \text{Sin}[1] + 63 \sqrt{5} \text{Sin}[1] + 15 e^{\sqrt{5} x\$1198} \text{Sin}[1] - 63 \sqrt{5} e^{\sqrt{5} x\$1198} \text{Sin}[1] - 30 e^{\frac{1}{2} (-1+\sqrt{5}) x\$1198} \text{Sin}[1 + 3 x\$1198]\right)\right)$



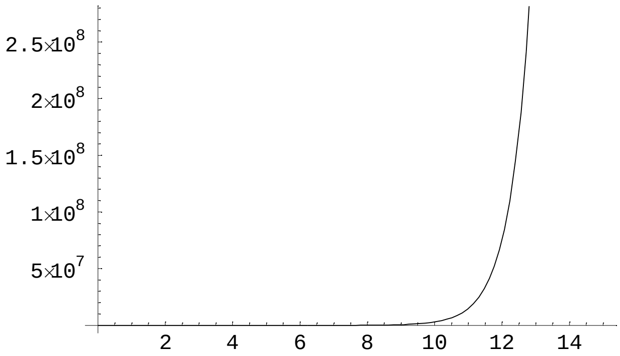
k1 = -1 k2 = -1 k3 = -2

==> $y[x] = \frac{1}{580} \left(-100 \text{Cos}[1 + 2 x\$1234] + e^{-\frac{1}{2} (-1+\sqrt{5}) x\$1234} \left(290 + 58 \sqrt{5} + 50 \text{Cos}[1] - 6 \sqrt{5} \text{Cos}[1] + 20 \text{Sin}[1] + 44 \sqrt{5} \text{Sin}[1] + e^{\sqrt{5} x\$1234} (-58 (-5 + \sqrt{5}) + (50 + 6 \sqrt{5}) \text{Cos}[1] + (20 - 44 \sqrt{5}) \text{Sin}[1]) - 40 e^{\frac{1}{2} (-1+\sqrt{5}) x\$1234} \text{Sin}[1 + 2 x\$1234]\right)\right)$



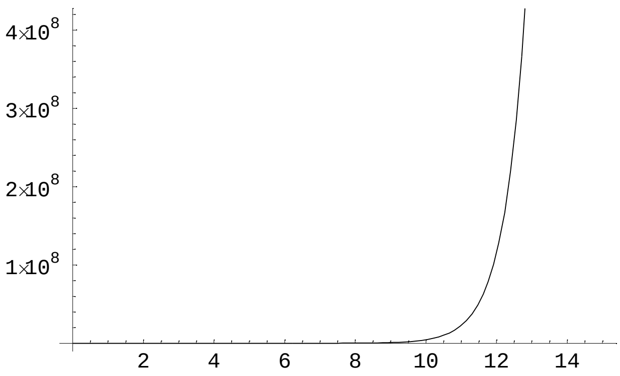
k1 = -1 k2 = -1 k3 = -1

==> $y[x] = \frac{1}{10} e^{-\frac{1}{2}(-1+\sqrt{5})\, x\$1261} \Big(5+\sqrt{5}+5\, e^{\sqrt{5}\, x\$1261}-\sqrt{5}\, e^{\sqrt{5}\, x\$1261}+2\, \text{Cos}[1]+2\, e^{\sqrt{5}\, x\$1261}\, \text{Cos}[1]-4\, e^{\frac{1}{2}(-1+\sqrt{5})\, x\$1261}\, \text{Cos}[1+x\$1261]+ \text{Sin}[1]+\sqrt{5}\, \text{Sin}[1]+e^{\sqrt{5}\, x\$1261}\, \text{Sin}[1]-\sqrt{5}\, e^{\sqrt{5}\, x\$1261}\, \text{Sin}[1]-2\, e^{\frac{1}{2}(-1+\sqrt{5})\, x\$1261}\, \text{Sin}[1+x\$1261]\Big)$



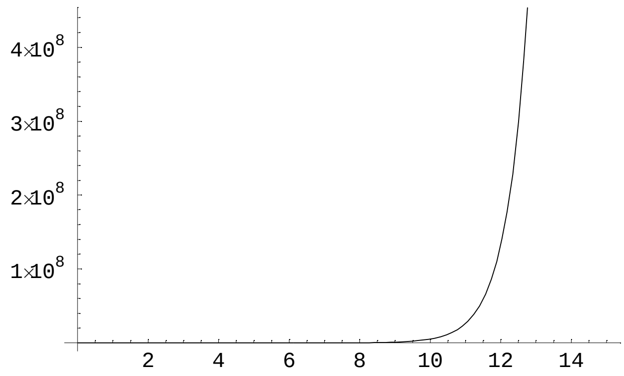
k1 = -1 k2 = -1 k3 = 0

==> $y[x] = \frac{1}{10} e^{-\frac{1}{2}(-1+\sqrt{5})\, x\$1286} \Big(-10\, e^{\frac{1}{2}(-1+\sqrt{5})\, x\$1286}\, \text{Cos}[1]+(5+\sqrt{5})\,(1+\text{Cos}[1])-(-5+\sqrt{5})\, e^{\sqrt{5}\, x\$1286}\,(1+\text{Cos}[1])\Big)$



k1 = -1 k2 = -1 k3 = 1

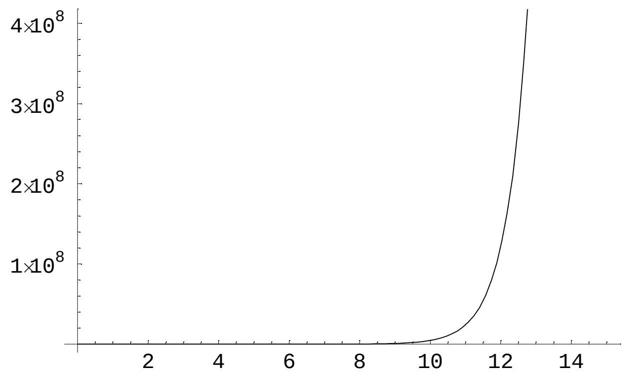
==> $y[x] = \frac{1}{10} e^{-\frac{1}{2}(-1+\sqrt{5})\, x\$1293} \Big(5+\sqrt{5}+5\, e^{\sqrt{5}\, x\$1293}-\sqrt{5}\, e^{\sqrt{5}\, x\$1293}+2\, \text{Cos}[1]+2\, e^{\sqrt{5}\, x\$1293}\, \text{Cos}[1]-4\, e^{\frac{1}{2}(-1+\sqrt{5})\, x\$1293}\, \text{Cos}[1-x\$1293]- \text{Sin}[1]-\sqrt{5}\, \text{Sin}[1]-e^{\sqrt{5}\, x\$1293}\, \text{Sin}[1]+\sqrt{5}\, e^{\sqrt{5}\, x\$1293}\, \text{Sin}[1]+2\, e^{\frac{1}{2}(-1+\sqrt{5})\, x\$1293}\, \text{Sin}[1-x\$1293]\Big)$



k1 = -1 k2 = -1 k3 = 2

==> y[x] =

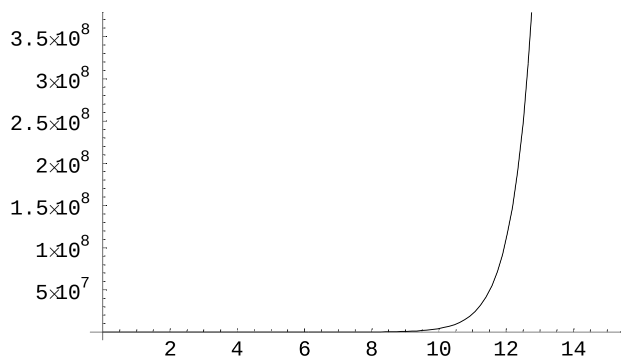
$\frac{1}{580}\left(-100\,\text{Cos}[1-2\,x\$1318]+e^{-\frac{1}{2}(-1+\sqrt{5})\,x\$1318}\left(290+58\sqrt{5}+50\,\text{Cos}[1]-6\sqrt{5}\,\text{Cos}[1]-20\,\text{Sin}[1]-44\sqrt{5}\,\text{Sin}[1]+e^{\sqrt{5}\,x\$1318}\left(-58(-5+\sqrt{5})+(50+6\sqrt{5})\,\text{Cos}[1]+4(-5+11\sqrt{5})\,\text{Sin}[1]\right)+40\,e^{\frac{1}{2}(-1+\sqrt{5})\,x\$1318}\,\text{Sin}[1-2\,x\$1318]\right)\right)$



k1 = -1 k2 = -1 k3 = 3

==> y[x] =

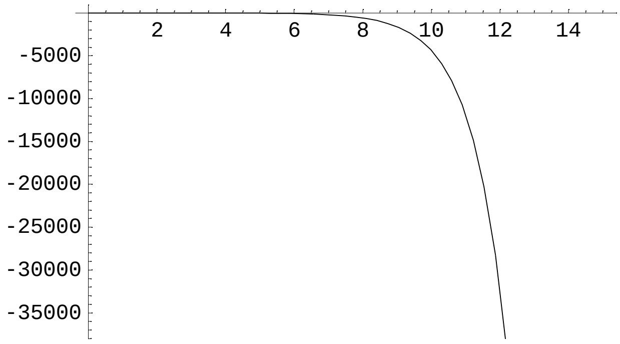
$\frac{1}{1090}\left(e^{-\frac{1}{2}(-1+\sqrt{5})\,x\$1343}\left(545+109\sqrt{5}+545\,e^{\sqrt{5}\,x\$1343}-109\sqrt{5}\,e^{\sqrt{5}\,x\$1343}+50\,\text{Cos}[1]-8\sqrt{5}\,\text{Cos}[1]+50\,e^{\sqrt{5}\,x\$1343}\,\text{Cos}[1]+8\sqrt{5}\,e^{\sqrt{5}\,x\$1343}\,\text{Cos}[1]-100\,e^{\frac{1}{2}(-1+\sqrt{5})\,x\$1343}\,\text{Cos}[1-3\,x\$1343]-15\,\text{Sin}[1]-63\sqrt{5}\,\text{Sin}[1]-15\,e^{\sqrt{5}\,x\$1343}\,\text{Sin}[1]+63\sqrt{5}\,e^{\sqrt{5}\,x\$1343}\,\text{Sin}[1]+30\,e^{\frac{1}{2}(-1+\sqrt{5})\,x\$1343}\,\text{Sin}[1-3\,x\$1343]\right)\right)$



k1 = -1 k2 = 0 k3 = -3

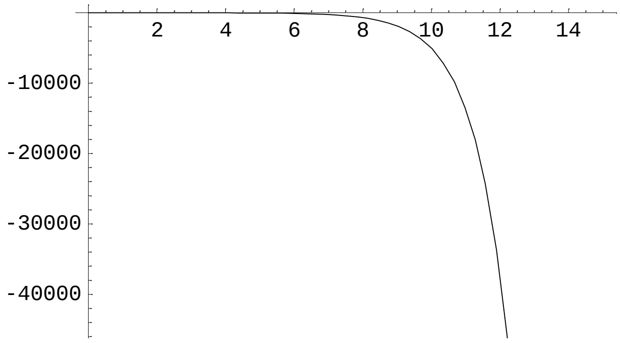
==> y[x] =

$\frac{1}{30}\left(30+3\,e^{x\$1368}\,\text{Cos}[1]-3\,\text{Cos}[1+3\,x\$1368]+10\,\text{Sin}[1]-9\,e^{x\$1368}\,\text{Sin}[1]-\text{Sin}[1+3\,x\$1368]\right)$



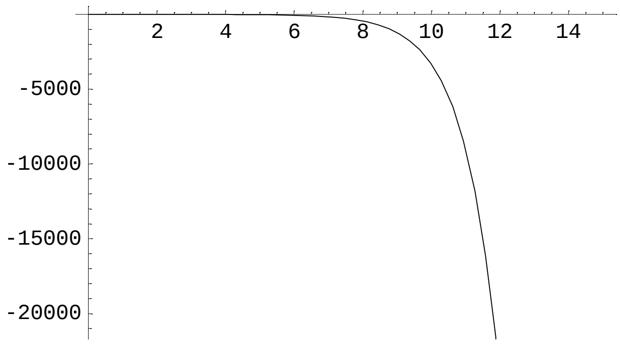
k1 = -1 k2 = 0 k3 = -2

==> y[x] =
$\frac{1}{10}$ (10 + 2 $e^{x\$1382}$ Cos[1] - 2 Cos[1 + 2 x$1382] + 5 Sin[1] - 4 $e^{x\$1382}$ Sin[1] - Sin[1 + 2 x$1382])



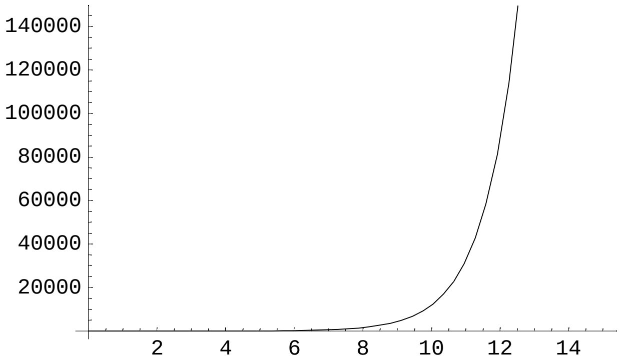
k1 = -1 k2 = 0 k3 = -1

==> y[x] = $\frac{1}{2}$ (2 + $e^{x\$1396}$ Cos[1] - Cos[1 + x$1396] + 2 Sin[1] - $e^{x\$1396}$ Sin[1] - Sin[1 + x$1396])



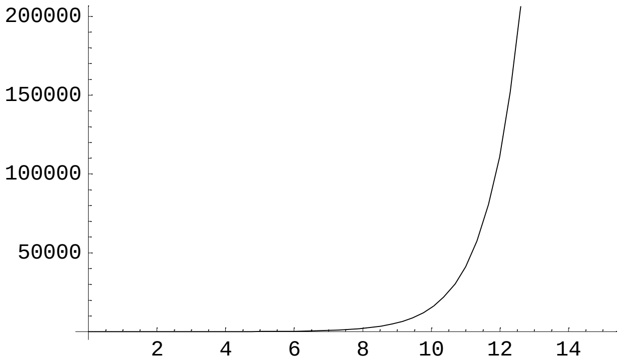
k1 = -1 k2 = 0 k3 = 0

==> y[x] = 1 - Cos[1] + $e^{x\$1407}$ Cos[1] - x$1407 Cos[1]



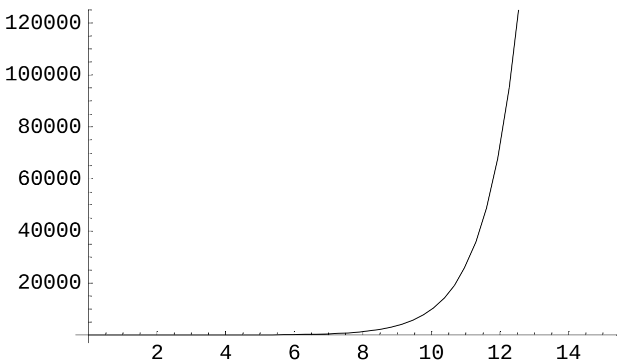
k1 = -1 k2 = 0 k3 = 1

==> y[x] = $\frac{1}{2}$ (2 + e^x$1415 Cos[1] - Cos[1 - x$1415] - 2 Sin[1] + e^x$1415 Sin[1] + Sin[1 - x$1415])



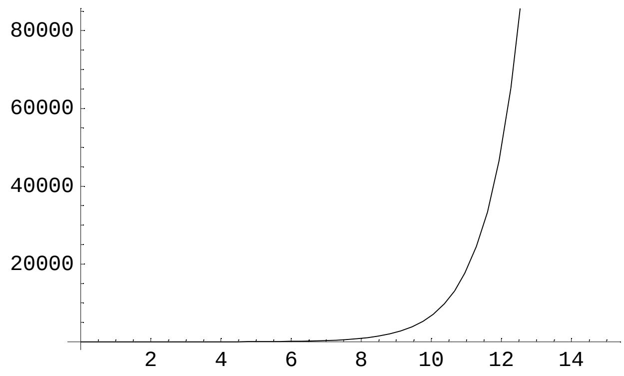
k1 = -1 k2 = 0 k3 = 2

==> y[x] =
$\frac{1}{10}$ (10 + 2 e^x$1426 Cos[1] - 2 Cos[1 - 2 x$1426] - 5 Sin[1] + 4 e^x$1426 Sin[1] + Sin[1 - 2 x$1426])



k1 = -1 k2 = 0 k3 = 3

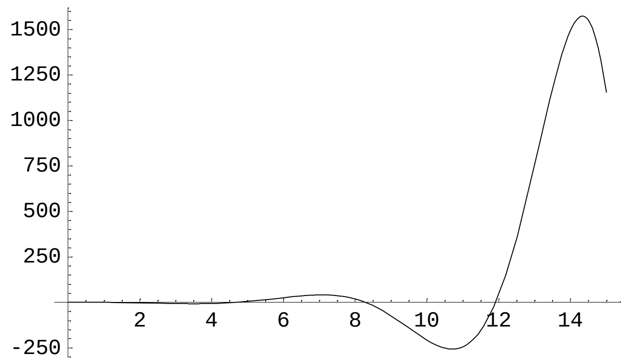
==> y[x] =
$\frac{1}{30}$ (30 + 3 e^x$1437 Cos[1] - 3 Cos[1 - 3 x$1437] - 10 Sin[1] + 9 e^x$1437 Sin[1] + Sin[1 - 3 x$1437])



k1 = -1 k2 = 1 k3 = -3

==> y[x] =

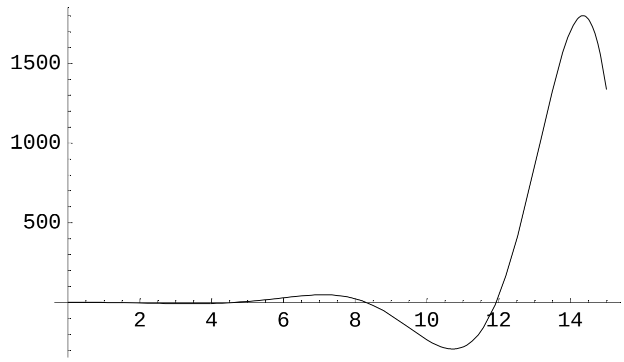
$$\frac{1}{219}\left(-3\,\mathrm{Cos}[x\$1448]^3\,(8\,\mathrm{Cos}[1]+3\,\mathrm{Sin}[1])+3\,e^{x\$1448/2}\,\mathrm{Cos}\left[\frac{\sqrt{3}\ x\$1448}{2}\right](73+8\,\mathrm{Cos}[1]+3\,\mathrm{Sin}[1])-9\,\mathrm{Cos}[x\$1448]^2\,(3\,\mathrm{Cos}[1]-8\,\mathrm{Sin}[1])\,\mathrm{Sin}[x\$1448]+9\,\mathrm{Cos}[x\$1448]\,(8\,\mathrm{Cos}[1]+3\,\mathrm{Sin}[1])\,\mathrm{Sin}[x\$1448]^2+9\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1448]^3-24\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$1448]^3-73\sqrt{3}\,e^{x\$1448/2}\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1448}{2}\right]+10\sqrt{3}\,e^{x\$1448/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1448}{2}\right]-51\sqrt{3}\,e^{x\$1448/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1448}{2}\right]\right)$$



k1 = -1 k2 = 1 k3 = -2

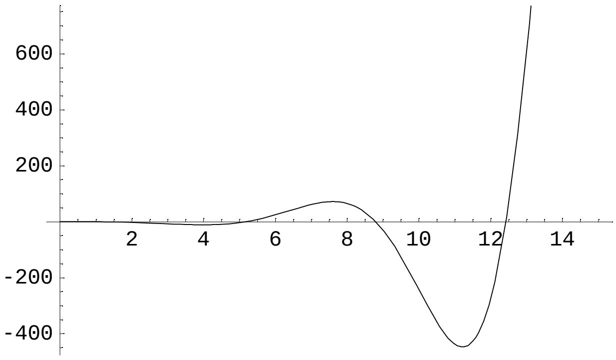
==> y[x] =

$$\frac{1}{39}\left(-3\,\mathrm{Cos}[x\$1492]^2\,(3\,\mathrm{Cos}[1]+2\,\mathrm{Sin}[1])+3\,e^{x\$1492/2}\,\mathrm{Cos}\left[\frac{\sqrt{3}\ x\$1492}{2}\right](13+3\,\mathrm{Cos}[1]+2\,\mathrm{Sin}[1])+9\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1492]^2+6\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$1492]^2-6\,\mathrm{Cos}[1]\,\mathrm{Sin}[2\,x\$1492]+9\,\mathrm{Sin}[1]\,\mathrm{Sin}[2\,x\$1492]-13\sqrt{3}\,e^{x\$1492/2}\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1492}{2}\right]+5\sqrt{3}\,e^{x\$1492/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1492}{2}\right]-14\sqrt{3}\,e^{x\$1492/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1492}{2}\right]\right)$$



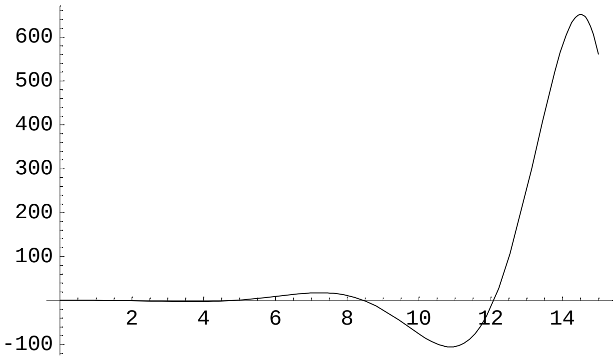
k1 = -1 k2 = 1 k3 = -1

$$\text{==>}\quad y[x] = \frac{1}{3}\left(-3\,\mathrm{Cos}[x\$1527]\,\mathrm{Sin}[1] + 3\,e^{x\$1527/2}\,\mathrm{Cos}\left[\frac{\sqrt{3}\ x\$1527}{2}\right](1+\mathrm{Sin}[1]) - 3\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1527] - \sqrt{3}\,e^{x\$1527/2}\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1527}{2}\right] + 2\sqrt{3}\,e^{x\$1527/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1527}{2}\right] - \sqrt{3}\,e^{x\$1527/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1527}{2}\right]\right)$$



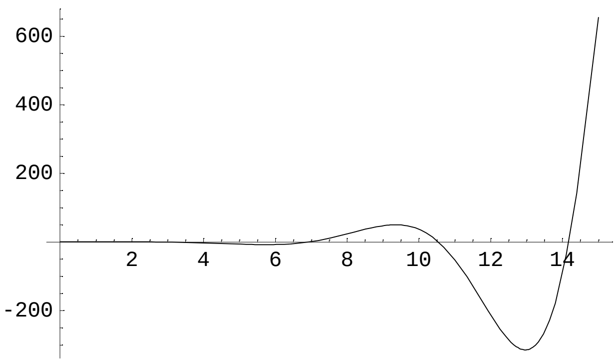
k1 = -1 k2 = 1 k3 = 0

$$\text{==>}\quad y[x] = \mathrm{Cos}[1] + 2\,e^{x\$1558/2}\,\mathrm{Cos}\left[\frac{\sqrt{3}\ x\$1558}{2}\right]\mathrm{Sin}\left[\frac{1}{2}\right]^2 + \frac{e^{x\$1558/2}\,(-1+\mathrm{Cos}[1])\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1558}{2}\right]}{\sqrt{3}}$$



k1 = -1 k2 = 1 k3 = 1

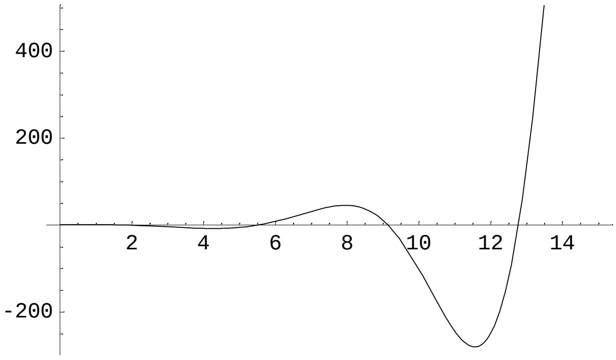
$$\text{==>}\quad y[x] = \frac{1}{3}\left(-3\,e^{x\$1564/2}\,\mathrm{Cos}\left[\frac{\sqrt{3}\ x\$1564}{2}\right](-1+\mathrm{Sin}[1]) + 3\,\mathrm{Cos}[x\$1564]\,\mathrm{Sin}[1] - 3\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1564] - \sqrt{3}\,e^{x\$1564/2}\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1564}{2}\right] + 2\sqrt{3}\,e^{x\$1564/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1564}{2}\right] + \sqrt{3}\,e^{x\$1564/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{3}\ x\$1564}{2}\right]\right)$$



k1 = -1 k2 = 1 k3 = 2

==> y[x] =

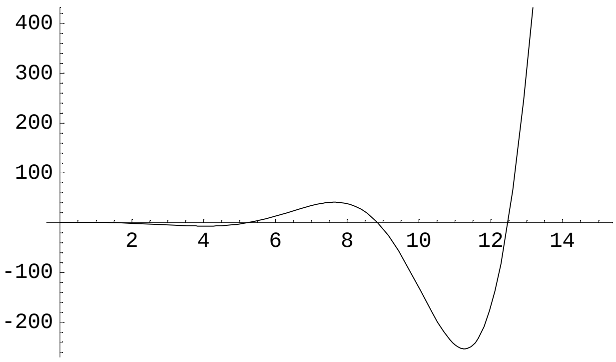
$$\frac{1}{39}\left(3\,e^{x\$1599/2}\,\text{Cos}\left[\frac{\sqrt{3}\ x\$1599}{2}\right](13+3\,\text{Cos}[1]-2\,\text{Sin}[1])+\text{Cos}[x\$1599]^2\,(-9\,\text{Cos}[1]+6\,\text{Sin}[1])+\right.$$
$$9\,\text{Cos}[1]\,\text{Sin}[x\$1599]^2-6\,\text{Sin}[1]\,\text{Sin}[x\$1599]^2-6\,\text{Cos}[1]\,\text{Sin}[2\,x\$1599]-$$
$$9\,\text{Sin}[1]\,\text{Sin}[2\,x\$1599]-13\sqrt{3}\,e^{x\$1599/2}\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1599}{2}\right]+$$
$$\left.5\sqrt{3}\,e^{x\$1599/2}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1599}{2}\right]+14\sqrt{3}\,e^{x\$1599/2}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1599}{2}\right]\right)$$



k1 = -1 k2 = 1 k3 = 3

==> y[x] =

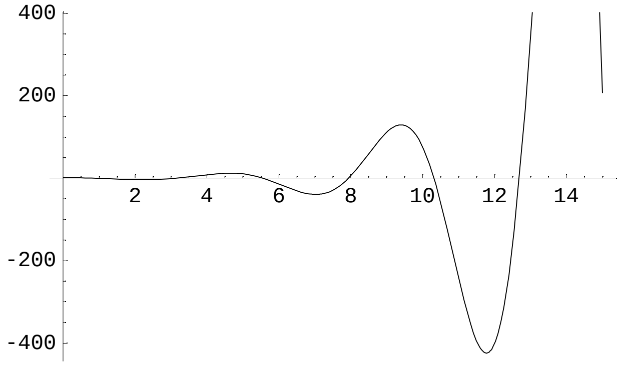
$$\frac{1}{219}\left(3\,e^{x\$1634/2}\,\text{Cos}\left[\frac{\sqrt{3}\ x\$1634}{2}\right](73+8\,\text{Cos}[1]-3\,\text{Sin}[1])+\text{Cos}[x\$1634]^3\,(-24\,\text{Cos}[1]+9\,\text{Sin}[1])-\right.$$
$$9\,\text{Cos}[x\$1634]^2\,(3\,\text{Cos}[1]+8\,\text{Sin}[1])\,\text{Sin}[x\$1634]+9\,\text{Cos}[x\$1634]\,(8\,\text{Cos}[1]-3\,\text{Sin}[1])$$
$$\text{Sin}[x\$1634]^2+9\,\text{Cos}[1]\,\text{Sin}[x\$1634]^3+24\,\text{Sin}[1]\,\text{Sin}[x\$1634]^3-73\sqrt{3}\,e^{x\$1634/2}\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1634}{2}\right]+$$
$$\left.10\sqrt{3}\,e^{x\$1634/2}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1634}{2}\right]+51\sqrt{3}\,e^{x\$1634/2}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$1634}{2}\right]\right)$$



k1 = -1 k2 = 2 k3 = -3

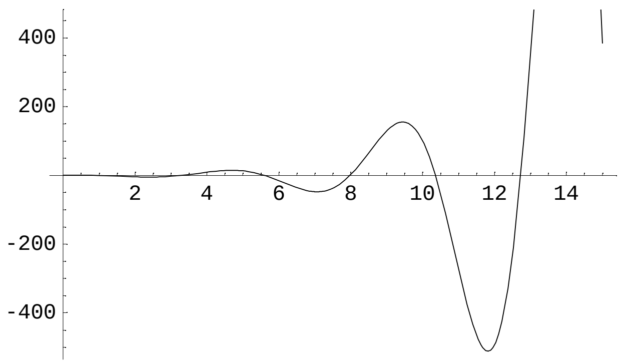
==> y[x] =

$$\frac{1}{406}\left(-7\,\text{Cos}[x\$1669]^3\,(7\,\text{Cos}[1]+3\,\text{Sin}[1])+7\,e^{x\$1669/2}\,\text{Cos}\left[\frac{\sqrt{7}\ x\$1669}{2}\right](58+7\,\text{Cos}[1]+3\,\text{Sin}[1])-\right.$$
$$21\,\text{Cos}[x\$1669]^2\,(3\,\text{Cos}[1]-7\,\text{Sin}[1])\,\text{Sin}[x\$1669]+21\,\text{Cos}[x\$1669]\,(7\,\text{Cos}[1]+3\,\text{Sin}[1])$$
$$\text{Sin}[x\$1669]^2+21\,\text{Cos}[1]\,\text{Sin}[x\$1669]^3-49\,\text{Sin}[1]\,\text{Sin}[x\$1669]^3-58\sqrt{7}\,e^{x\$1669/2}\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1669}{2}\right]+$$
$$\left.11\sqrt{7}\,e^{x\$1669/2}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1669}{2}\right]-45\sqrt{7}\,e^{x\$1669/2}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1669}{2}\right]\right)$$



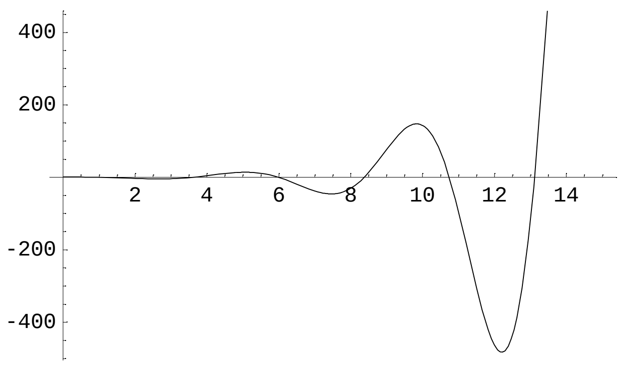
k1 = -1   k2 = 2   k3 = -2

$$\texttt{==>}\quad y[x] = \frac{1}{28}\Big(-7\,\mathrm{Cos}[x\$1704]^2\,(\mathrm{Cos}[1]+\mathrm{Sin}[1]) + 7\,e^{x\$1704/2}\,\mathrm{Cos}\Big[\frac{\sqrt{7}\;x\$1704}{2}\Big]\,(4+\mathrm{Cos}[1]+\mathrm{Sin}[1]) + 7\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1704]^2 + 7\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$1704]^2 - 7\,\mathrm{Cos}[1]\,\mathrm{Sin}[2\,x\$1704] + 7\,\mathrm{Sin}[1]\,\mathrm{Sin}[2\,x\$1704] - 4\sqrt{7}\,e^{x\$1704/2}\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1704}{2}\Big] + 3\sqrt{7}\,e^{x\$1704/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1704}{2}\Big] - 5\sqrt{7}\,e^{x\$1704/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1704}{2}\Big]\Big)$$



k1 = -1   k2 = 2   k3 = -1

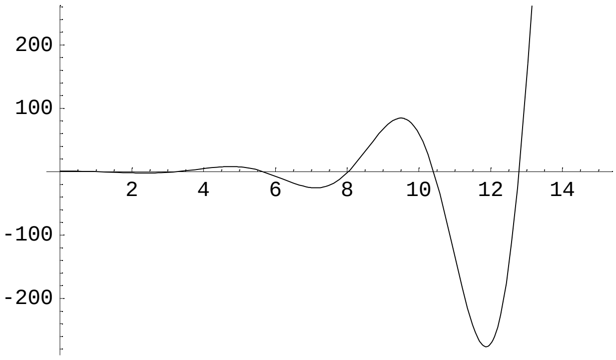
$$\texttt{==>}\quad y[x] = \frac{1}{14}\Big(-7\,e^{x\$1739/2}\,\mathrm{Cos}\Big[\frac{\sqrt{7}\;x\$1739}{2}\Big]\,(-2+\mathrm{Cos}[1]-\mathrm{Sin}[1]) + 7\,\mathrm{Cos}[x\$1739]\,(\mathrm{Cos}[1]-\mathrm{Sin}[1]) - 7\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1739] - 7\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$1739] - 2\sqrt{7}\,e^{x\$1739/2}\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1739}{2}\Big] + 3\sqrt{7}\,e^{x\$1739/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1739}{2}\Big] + \sqrt{7}\,e^{x\$1739/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\Big[\frac{\sqrt{7}\;x\$1739}{2}\Big]\Big)$$



k1 = -1   k2 = 2   k3 = 0

==> y[x] =

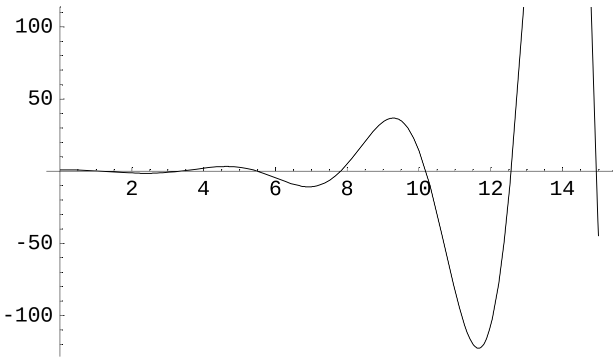
$$\frac{1}{14}\left(7\,\text{Cos}[1]-7\,e^{x\$1775/2}\,(-2+\text{Cos}[1])\,\text{Cos}\left[\frac{\sqrt{7}\ x\$1775}{2}\right]+\sqrt{7}\ e^{x\$1775/2}\,(-2+\text{Cos}[1])\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1775}{2}\right]\right)$$



k1 = -1 k2 = 2 k3 = 1

==> y[x] =

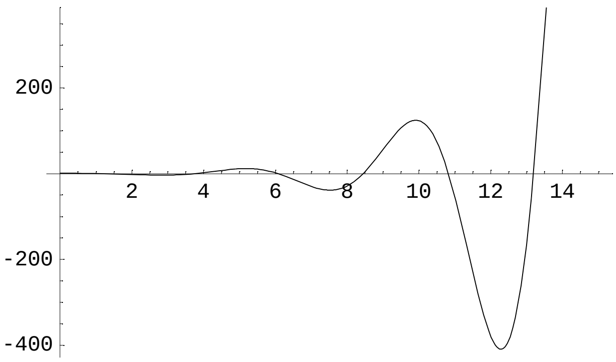
$$\frac{1}{14}\left(-7\,e^{x\$1782/2}\,\text{Cos}\left[\frac{\sqrt{7}\ x\$1782}{2}\right](-2+\text{Cos}[1]+\text{Sin}[1])+7\,\text{Cos}[x\$1782]\,(\text{Cos}[1]+\text{Sin}[1])-7\,\text{Cos}[1]\,\text{Sin}[x\$1782]+7\,\text{Sin}[1]\,\text{Sin}[x\$1782]-2\sqrt{7}\ e^{x\$1782/2}\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1782}{2}\right]+3\sqrt{7}\ e^{x\$1782/2}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1782}{2}\right]-\sqrt{7}\ e^{x\$1782/2}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1782}{2}\right]\right)$$



k1 = -1 k2 = 2 k3 = 2

==> y[x] =

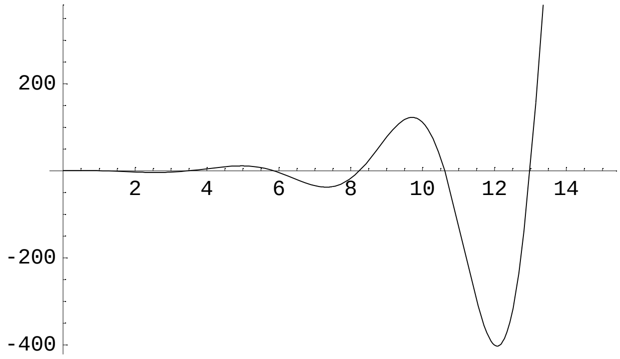
$$\frac{1}{28}\left(-7\,\text{Cos}[x\$1817]^2\,(\text{Cos}[1]-\text{Sin}[1])+7\,e^{x\$1817/2}\,\text{Cos}\left[\frac{\sqrt{7}\ x\$1817}{2}\right](4+\text{Cos}[1]-\text{Sin}[1])+7\,\text{Cos}[1]\,\text{Sin}[x\$1817]^2-7\,\text{Sin}[1]\,\text{Sin}[x\$1817]^2-7\,\text{Cos}[1]\,\text{Sin}[2\,x\$1817]-7\,\text{Sin}[1]\,\text{Sin}[2\,x\$1817]-4\sqrt{7}\ e^{x\$1817/2}\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1817}{2}\right]+3\sqrt{7}\ e^{x\$1817/2}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1817}{2}\right]+5\sqrt{7}\ e^{x\$1817/2}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{7}\ x\$1817}{2}\right]\right)$$



k1 = -1 k2 = 2 k3 = 3

==> y[x] =

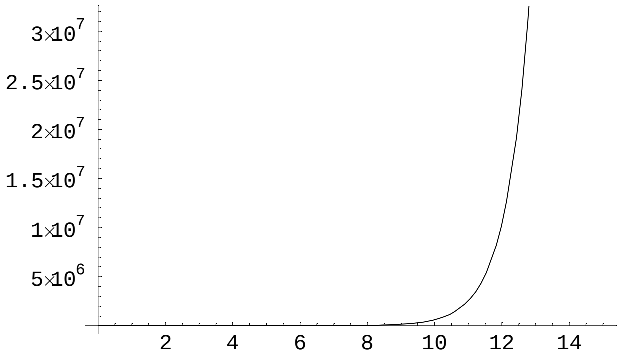
$$\frac{1}{406}\left(-7\,\mathrm{Cos}[x\$1856]^3\,(7\,\mathrm{Cos}[1]-3\,\mathrm{Sin}[1])+7\,e^{x\$1856/2}\,\mathrm{Cos}\left[\frac{\sqrt{7}\;x\$1856}{2}\right](58+7\,\mathrm{Cos}[1]-3\,\mathrm{Sin}[1])-21\,\mathrm{Cos}[x\$1856]^2\,(3\,\mathrm{Cos}[1]+7\,\mathrm{Sin}[1])\,\mathrm{Sin}[x\$1856]+21\,\mathrm{Cos}[x\$1856]\,(7\,\mathrm{Cos}[1]-3\,\mathrm{Sin}[1])\,\mathrm{Sin}[x\$1856]^2+21\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$1856]^3+49\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$1856]^3-58\sqrt{7}\,e^{x\$1856/2}\,\mathrm{Sin}\left[\frac{\sqrt{7}\;x\$1856}{2}\right]+11\sqrt{7}\,e^{x\$1856/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\;x\$1856}{2}\right]+45\sqrt{7}\,e^{x\$1856/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\;x\$1856}{2}\right]\right)$$



k1 = 0 k2 = -2 k3 = -3

==> y[x] =

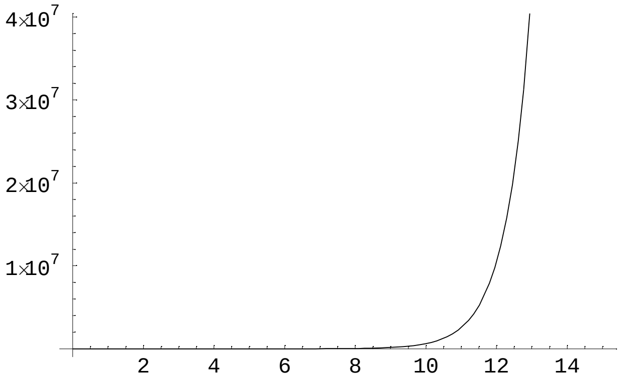
$$\frac{1}{44}\,e^{-\sqrt{2}\;x\$1891}\left(22+2\,\mathrm{Cos}[1]-4\,e^{\sqrt{2}\;x\$1891}\,\mathrm{Cos}[1+3\,x\$1891]+3\sqrt{2}\,\mathrm{Sin}[1]+e^{2\sqrt{2}\;x\$1891}\,(22+2\,\mathrm{Cos}[1]-3\sqrt{2}\,\mathrm{Sin}[1])\right)$$



k1 = 0 k2 = -2 k3 = -2

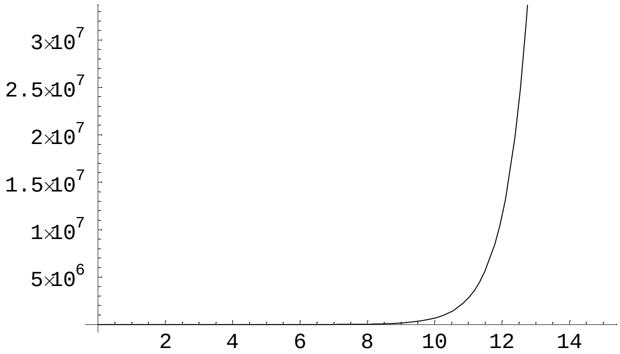
==> y[x] =

$$\frac{1}{12}\,e^{-\sqrt{2}\;x\$1911}\left(6+\mathrm{Cos}[1]-2\,e^{\sqrt{2}\;x\$1911}\,\mathrm{Cos}[1+2\,x\$1911]+\sqrt{2}\,\mathrm{Sin}[1]+e^{2\sqrt{2}\;x\$1911}\,(6+\mathrm{Cos}[1]-\sqrt{2}\,\mathrm{Sin}[1])\right)$$



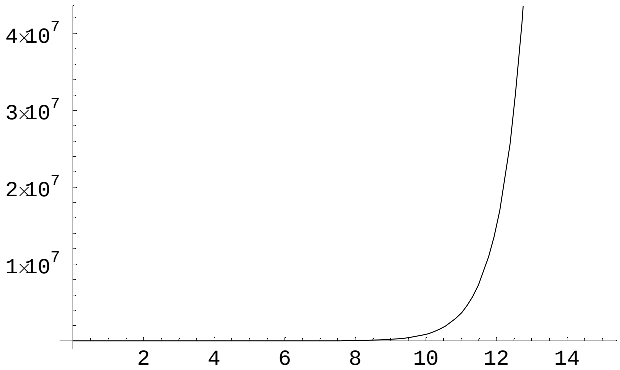
k1 = 0   k2 = −2   k3 = −1

==> $y[x] = \frac{1}{12} e^{-\sqrt{2}\, x\$1922} \left(6 + 2\,\mathrm{Cos}[1] - 4\, e^{\sqrt{2}\, x\$1922}\, \mathrm{Cos}[1 + x\$1922] + \sqrt{2}\, \mathrm{Sin}[1] + e^{2\sqrt{2}\, x\$1922} \left(6 + 2\,\mathrm{Cos}[1] - \sqrt{2}\, \mathrm{Sin}[1]\right)\right)$



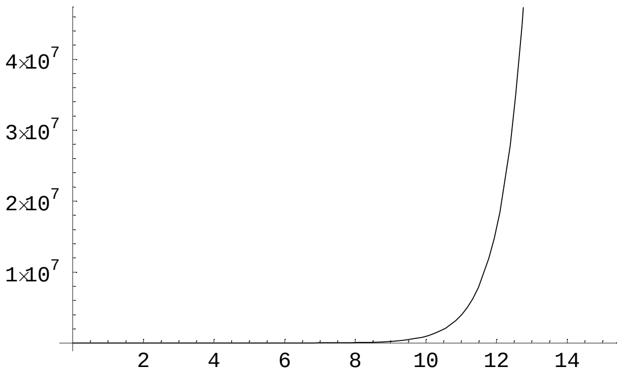
k1 = 0   k2 = −2   k3 = 0

==> $y[x] = \frac{1}{4} e^{-\sqrt{2}\, x\$1931} \left(2 + \mathrm{Cos}[1] - 2\, e^{\sqrt{2}\, x\$1931}\, \mathrm{Cos}[1] + e^{2\sqrt{2}\, x\$1931} \left(2 + \mathrm{Cos}[1]\right)\right)$



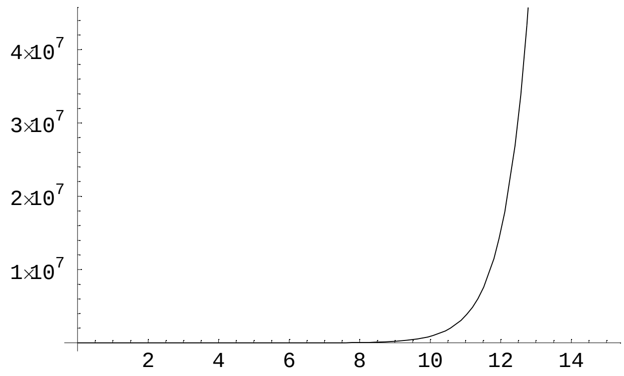
k1 = 0   k2 = −2   k3 = 1

==> $y[x] = \frac{1}{12} e^{-\sqrt{2}\, x\$1937} \left(6 + 2\,\mathrm{Cos}[1] - 4\, e^{\sqrt{2}\, x\$1937}\, \mathrm{Cos}[1 - x\$1937] - \sqrt{2}\, \mathrm{Sin}[1] + e^{2\sqrt{2}\, x\$1937} \left(6 + 2\,\mathrm{Cos}[1] + \sqrt{2}\, \mathrm{Sin}[1]\right)\right)$



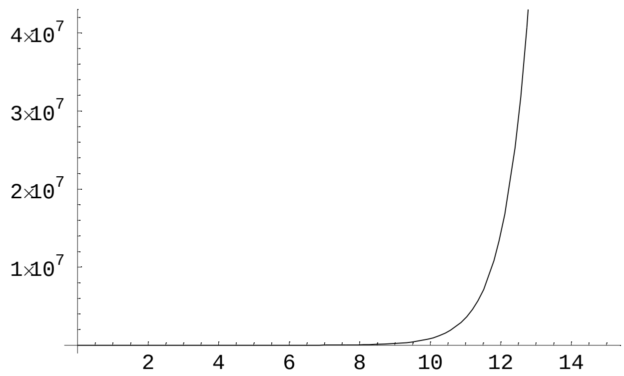
k1 = 0   k2 = −2   k3 = 2

==> $y[x] = \frac{1}{12} e^{-\sqrt{2}\, x\$1946} \left(6 + \mathrm{Cos}[1] - 2\, e^{\sqrt{2}\, x\$1946}\, \mathrm{Cos}[1 - 2\, x\$1946] - \sqrt{2}\, \mathrm{Sin}[1] + e^{2\sqrt{2}\, x\$1946} \left(6 + \mathrm{Cos}[1] + \sqrt{2}\, \mathrm{Sin}[1]\right)\right)$



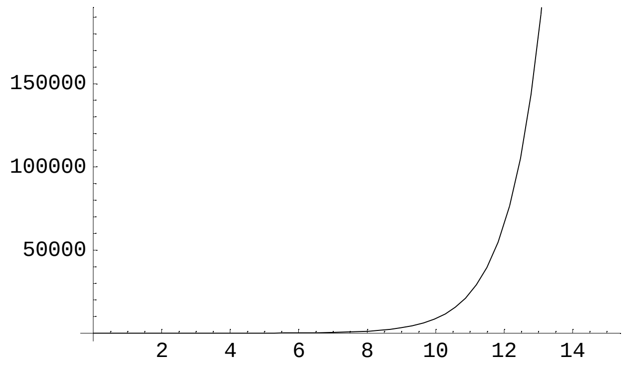
k1 = 0 k2 = −2 k3 = 3

==> $y[x] = \frac{1}{44} e^{-\sqrt{2}\ x\$1955} \left(22 + 2\, \mathrm{Cos}[1] - 4\, e^{\sqrt{2}\ x\$1955}\, \mathrm{Cos}[1 - 3\, x\$1955] - 3\sqrt{2}\, \mathrm{Sin}[1] + e^{2\sqrt{2}\ x\$1955} \left(22 + 2\, \mathrm{Cos}[1] + 3\sqrt{2}\, \mathrm{Sin}[1]\right)\right)$



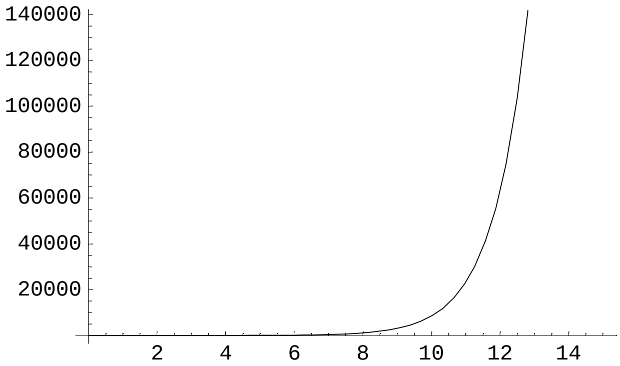
k1 = 0 k2 = −1 k3 = −3

==> $y[x] = \frac{1}{20} e^{-x\$1964} \left(10 + \mathrm{Cos}[1] - 2\, e^{x\$1964}\, \mathrm{Cos}[1 + 3\, x\$1964] + e^{2\, x\$1964} \left(10 + \mathrm{Cos}[1] - 3\, \mathrm{Sin}[1]\right) + 3\, \mathrm{Sin}[1]\right)$



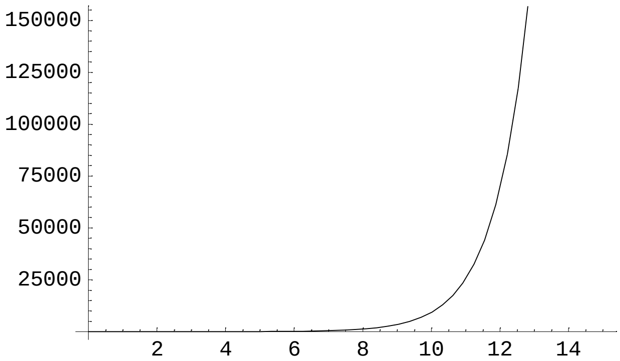
k1 = 0 k2 = −1 k3 = −2

==> $y[x] = \frac{1}{10} e^{-x\$1975} \left(5 + \mathrm{Cos}[1] - 2\, e^{x\$1975}\, \mathrm{Cos}[1 + 2\, x\$1975] + e^{2\, x\$1975} \left(5 + \mathrm{Cos}[1] - 2\, \mathrm{Sin}[1]\right) + 2\, \mathrm{Sin}[1]\right)$



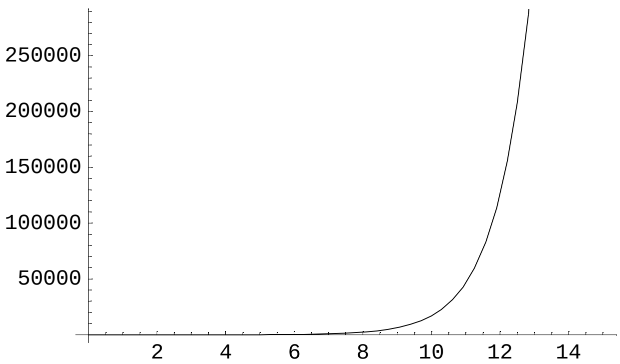
k1 = 0 k2 = -1 k3 = -1

==> $y[x] = \frac{1}{4} e^{-x\$1986} (2 + Cos[1] - 2 e^{x\$1986} Cos[1 + x\$1986] + e^{2 x\$1986} (2 + Cos[1] - Sin[1]) + Sin[1])$



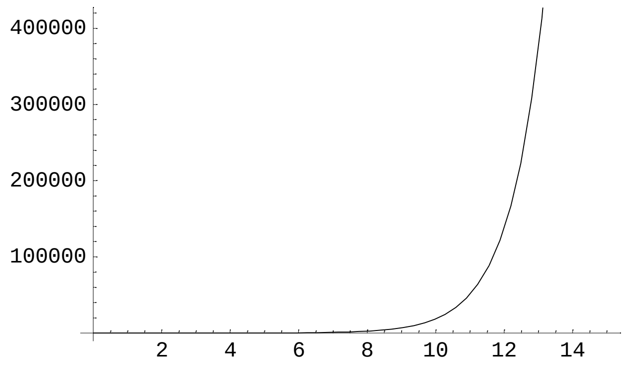
k1 = 0 k2 = -1 k3 = 0

==> $y[x] = \frac{1}{2} e^{-x\$1995} (1 + Cos[1] - 2 e^{x\$1995} Cos[1] + e^{2 x\$1995} (1 + Cos[1]))$



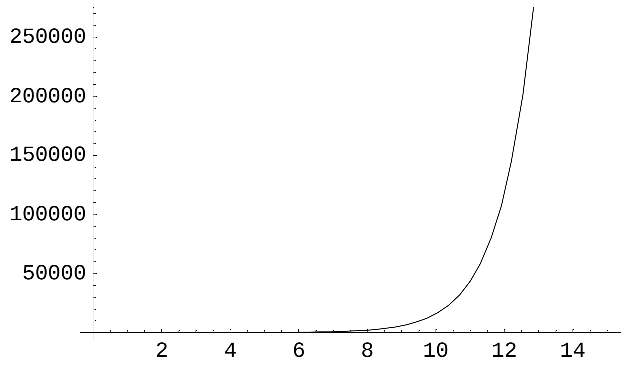
k1 = 0 k2 = -1 k3 = 1

==> $y[x] = \frac{1}{4} e^{-x\$2002} (2 + Cos[1] - 2 e^{x\$2002} Cos[1 - x\$2002] - Sin[1] + e^{2 x\$2002} (2 + Cos[1] + Sin[1]))$



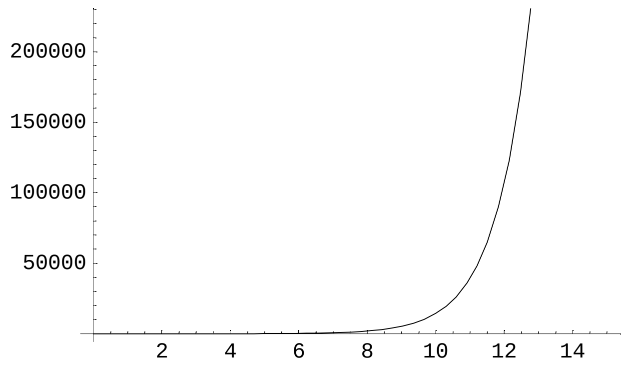
k1 = 0 k2 = -1 k3 = 2

==> y[x] =
$\frac{1}{10}$ e^(-x$2011) (5 + Cos[1] - 2 e^(x$2011) Cos[1 - 2 x$2011] - 2 Sin[1] + e^(2 x$2011) (5 + Cos[1] + 2 Sin[1]))



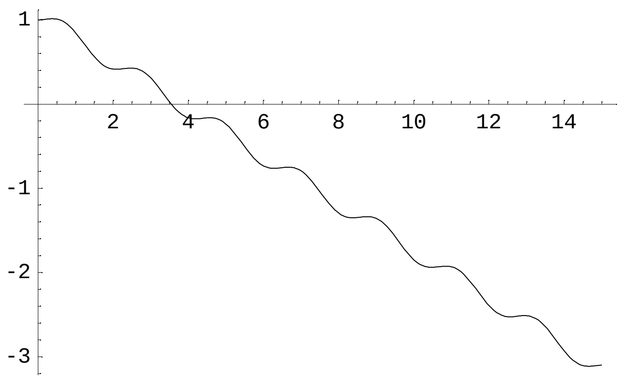
k1 = 0 k2 = -1 k3 = 3

==> y[x] =
$\frac{1}{20}$ e^(-x$2020) (10 + Cos[1] - 2 e^(x$2020) Cos[1 - 3 x$2020] - 3 Sin[1] + e^(2 x$2020) (10 + Cos[1] + 3 Sin[1]))



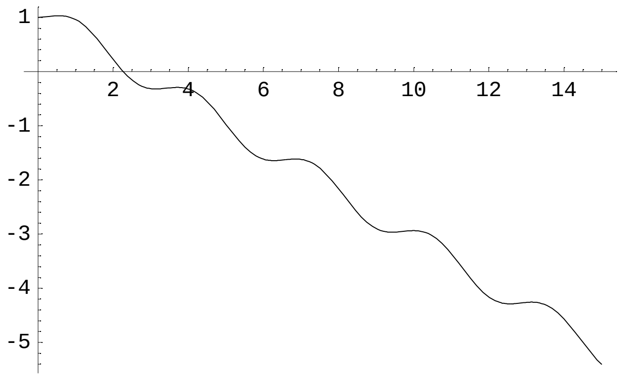
k1 = 0 k2 = 0 k3 = -3

==> y[x] = $\frac{1}{9}$ (9 + Cos[1] - Cos[1 + 3 x$2029] - 3 x$2029 Sin[1])



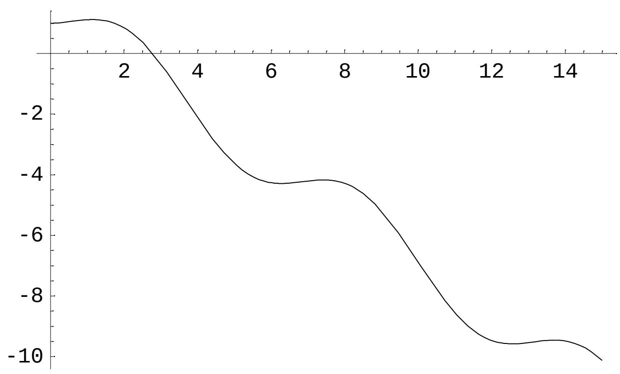
k1 = 0   k2 = 0   k3 = −2

==>   y[x] = $\frac{1}{4}$ (4 + Cos[1] − Cos[1 + 2 x$2039] − 2 x$2039 Sin[1])



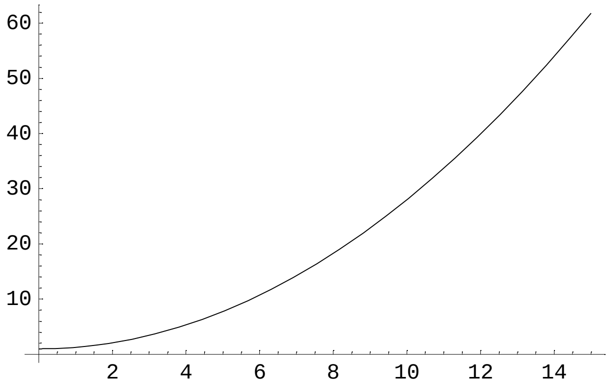
k1 = 0   k2 = 0   k3 = −1

==>   y[x] = 1 + Cos[1] − Cos[1 + x$2049] − x$2049 Sin[1]



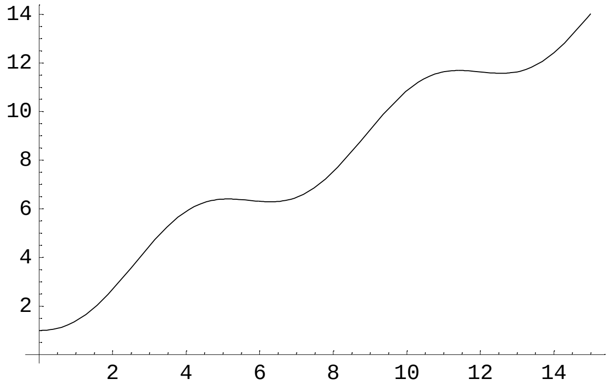
k1 = 0   k2 = 0   k3 = 0

==>   y[x] = 1 + $\frac{1}{2}$ x$2057^2 Cos[1]



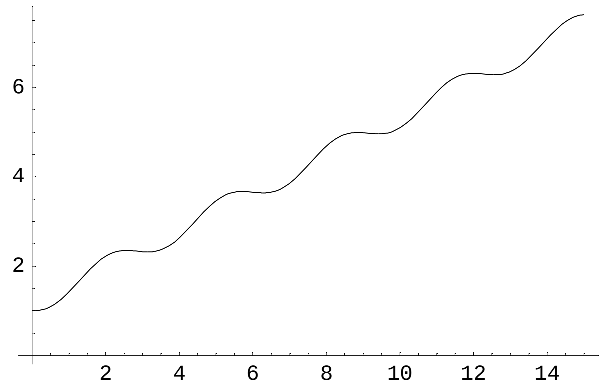
k1 = 0 k2 = 0 k3 = 1

==> y[x] = 1 + Cos[1] - Cos[1 - x$2063] + x$2063 Sin[1]



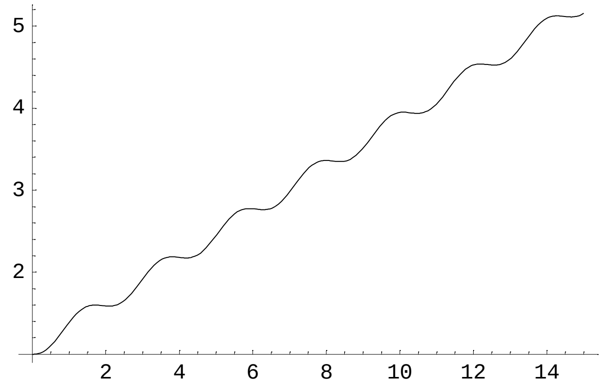
k1 = 0 k2 = 0 k3 = 2

==> y[x] = $\frac{1}{4}$ (4 + Cos[1] - Cos[1 - 2 x$2071] + 2 x$2071 Sin[1])



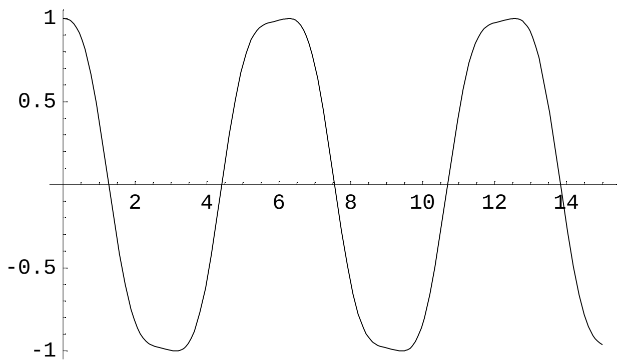
k1 = 0 k2 = 0 k3 = 3

==> y[x] = $\frac{1}{9}$ (9 + Cos[1] - Cos[1 - 3 x$2079] + 3 x$2079 Sin[1])



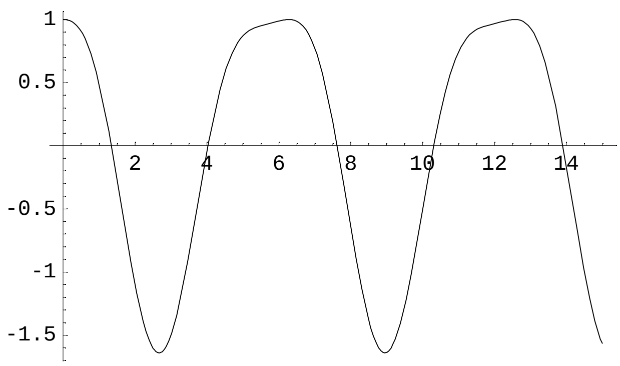
k1 = 0 k2 = 1 k3 = −3

==> y[x] = $\frac{1}{8}$ (−Cos[1 − x$2087] + 8 Cos[x$2087] + 2 Cos[1 + x$2087] − Cos[1 + 3 x$2087])



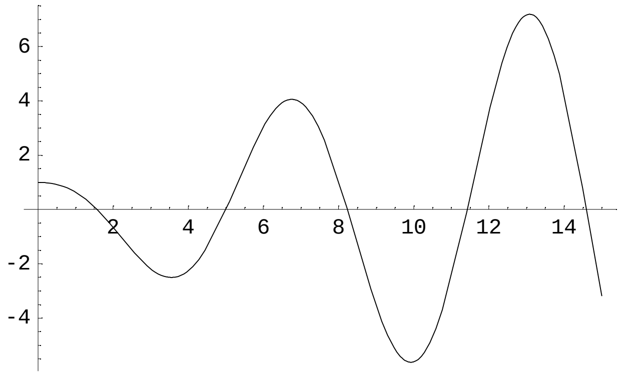
k1 = 0 k2 = 1 k3 = −2

==> y[x] = $\frac{1}{6}$ (−Cos[1 − x$2105] + 6 Cos[x$2105] + 3 Cos[1 + x$2105] − 2 Cos[1 + 2 x$2105])



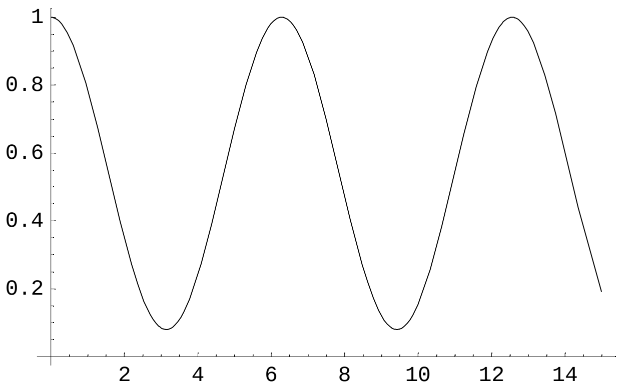
k1 = 0 k2 = 1 k3 = −1

==> y[x] = $\frac{1}{2}$ (Cos[x$2121] (2 + x$2121 Sin[1]) + (x$2121 Cos[1] − Sin[1]) Sin[x$2121])



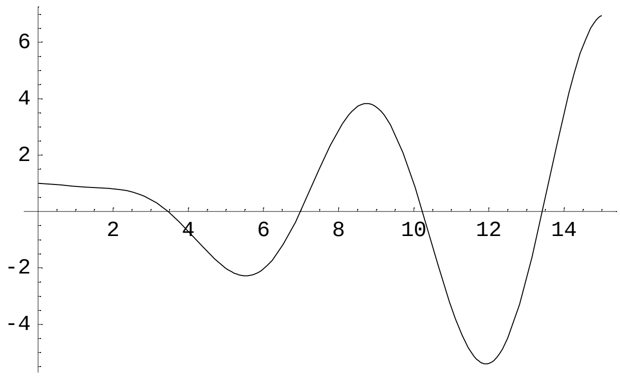
k1 = 0 k2 = 1 k3 = 0

==> y[x] = Cos[1] + Cos[x$2135] - Cos[1] Cos[x$2135]



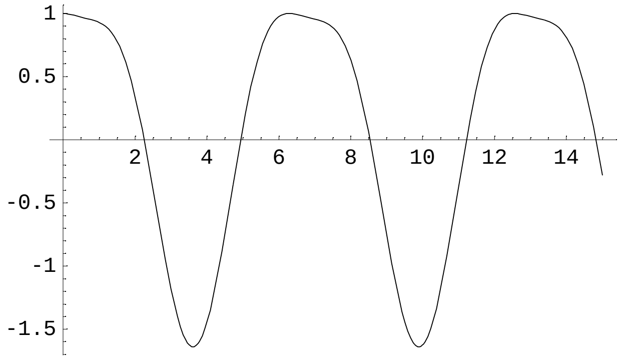
k1 = 0 k2 = 1 k3 = 1

==> y[x] = $\frac{1}{2}$ (Cos[x$2141] (2 - x$2141 Sin[1]) + (x$2141 Cos[1] + Sin[1]) Sin[x$2141])



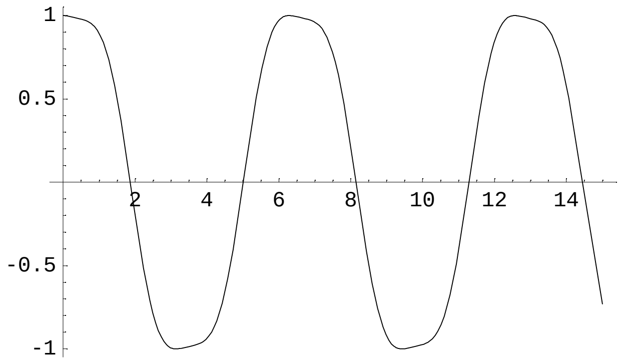
k1 = 0 k2 = 1 k3 = 2

==> y[x] = $\frac{1}{3}$ (-Cos[1 - 2 x$2153] + (3 + Cos[1]) Cos[x$2153] + 2 Sin[1] Sin[x$2153])



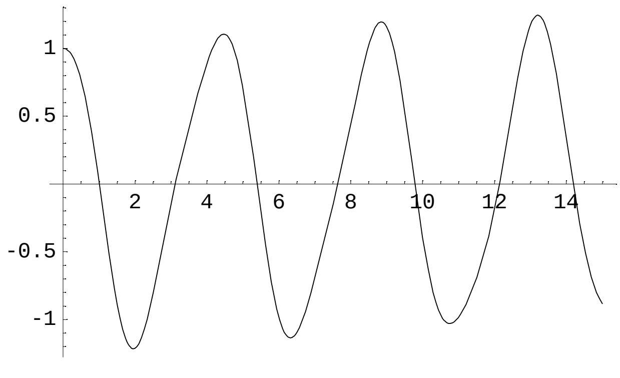
k1 = 0 k2 = 1 k3 = 3

$$\texttt{==>}\quad y[x] = \frac{1}{8}\left(-\text{Cos}[1-3\,x\$2167] + (8+\text{Cos}[1])\,\text{Cos}[x\$2167] + 3\,\text{Sin}[1]\,\text{Sin}[x\$2167]\right)$$



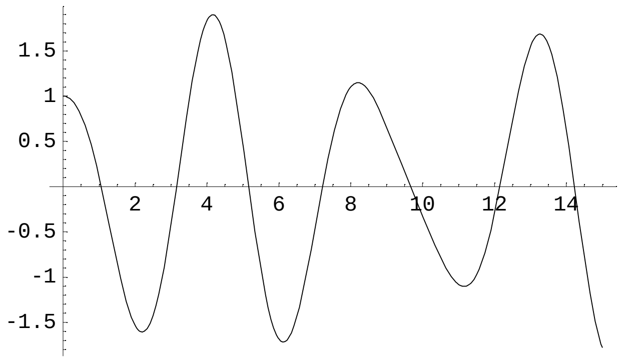
k1 = 0 k2 = 2 k3 = −3

$$\texttt{==>}\quad y[x] = \frac{1}{14}\left(-2\,\text{Cos}[1]\,\text{Cos}[x\$2181]^3 + 2\,(7+\text{Cos}[1])\,\text{Cos}[\sqrt{2}\,x\$2181] + 6\,\text{Cos}[x\$2181]^2\,\text{Sin}[1]\,\text{Sin}[x\$2181] + 6\,\text{Cos}[1]\,\text{Cos}[x\$2181]\,\text{Sin}[x\$2181]^2 - \text{Sin}[1]\,(2\,\text{Sin}[x\$2181]^3 + 3\sqrt{2}\,\text{Sin}[\sqrt{2}\,x\$2181])\right)$$



k1 = 0 k2 = 2 k3 = −2

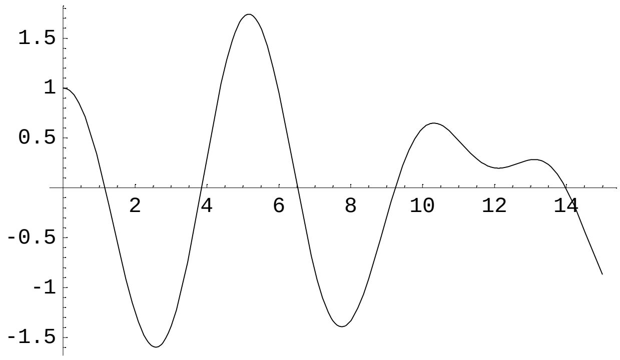
$$\texttt{==>}\quad y[x] = \frac{1}{2}\left(-\text{Cos}[1]\,\text{Cos}[x\$2195]^2 + (2+\text{Cos}[1])\,\text{Cos}[\sqrt{2}\,x\$2195] + \text{Cos}[1]\,\text{Sin}[x\$2195]^2 + \text{Sin}[1]\,\text{Sin}[2\,x\$2195] - \sqrt{2}\,\text{Sin}[1]\,\text{Sin}[\sqrt{2}\,x\$2195]\right)$$



k1 = 0 k2 = 2 k3 = -1

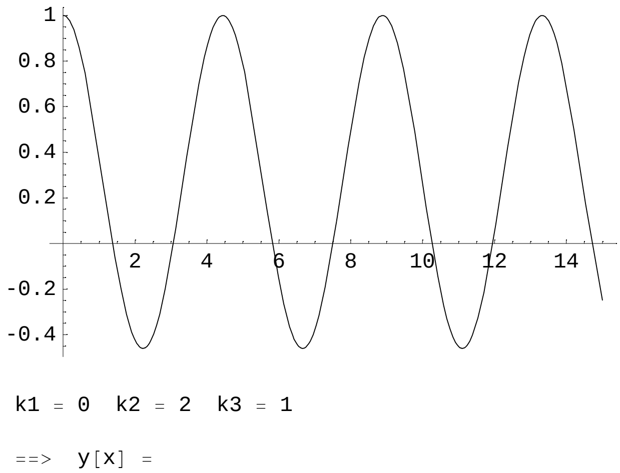
==> y[x] =

$\text{Cos}[1]\,\text{Cos}[x\$2209] + 2\,\text{Cos}[\sqrt{2}\ x\$2209]\,\text{Sin}\left[\frac{1}{2}\right]^2 - \text{Sin}[1]\,\text{Sin}[x\$2209] + \frac{\text{Sin}[1]\,\text{Sin}[\sqrt{2}\ x\$2209]}{\sqrt{2}}$



k1 = 0 k2 = 2 k3 = 0

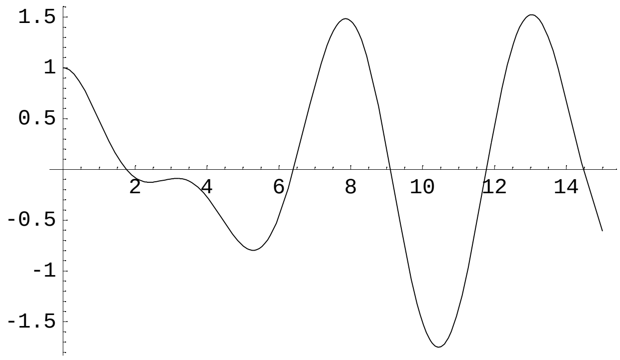
==> y[x] = $\frac{1}{2}\,(\text{Cos}[1] - (-2 + \text{Cos}[1])\,\text{Cos}[\sqrt{2}\ x\$2223])$



k1 = 0 k2 = 2 k3 = 1

==> y[x] =

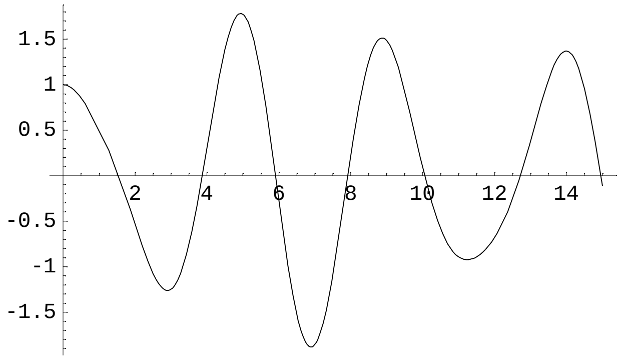
$\text{Cos}[1]\,\text{Cos}[x\$2229] + 2\,\text{Cos}[\sqrt{2}\ x\$2229]\,\text{Sin}\left[\frac{1}{2}\right]^2 + \text{Sin}[1]\,\text{Sin}[x\$2229] - \frac{\text{Sin}[1]\,\text{Sin}[\sqrt{2}\ x\$2229]}{\sqrt{2}}$



k1 = 0 k2 = 2 k3 = 2

==> y[x] =

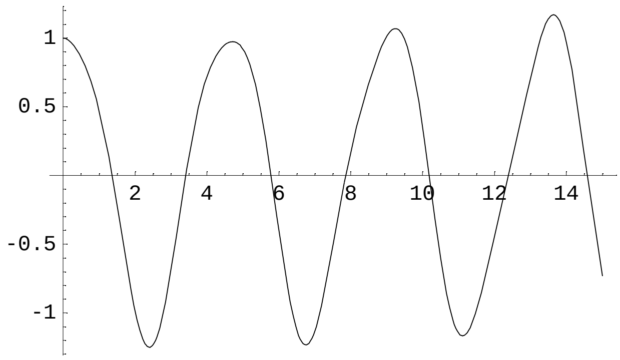
$$\frac{1}{2}\left(-\text{Cos}[1]\,\text{Cos}[x\$2243]^2+(2+\text{Cos}[1])\,\text{Cos}[\sqrt{2}\;x\$2243]-2\,\text{Cos}[x\$2243]\,\text{Sin}[1]\,\text{Sin}[x\$2243]+\text{Cos}[1]\,\text{Sin}[x\$2243]^2+\sqrt{2}\,\text{Sin}[1]\,\text{Sin}[\sqrt{2}\;x\$2243]\right)$$



k1 = 0 k2 = 2 k3 = 3

==> y[x] =

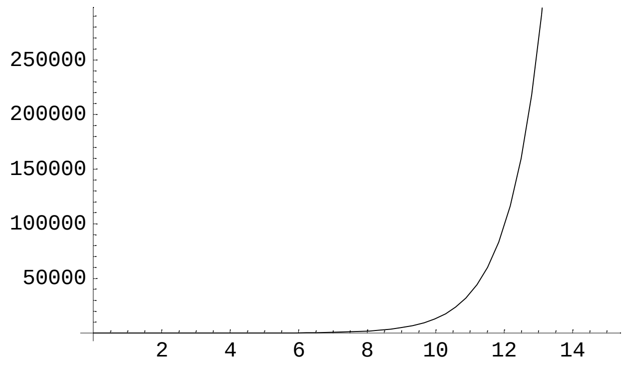
$$\frac{1}{14}\left(-2\,\text{Cos}[1]\,\text{Cos}[x\$2257]^3+2\,(7+\text{Cos}[1])\,\text{Cos}[\sqrt{2}\;x\$2257]-6\,\text{Cos}[x\$2257]^2\,\text{Sin}[1]\,\text{Sin}[x\$2257]+6\,\text{Cos}[1]\,\text{Cos}[x\$2257]\,\text{Sin}[x\$2257]^2+\text{Sin}[1]\,(2\,\text{Sin}[x\$2257]^3+3\,\sqrt{2}\,\text{Sin}[\sqrt{2}\;x\$2257])\right)$$



k1 = 1 k2 = -2 k3 = -3

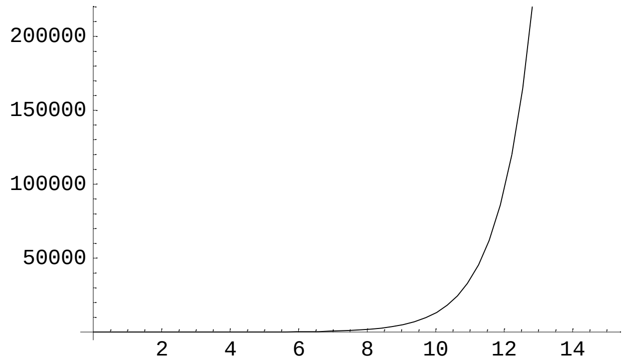
==> y[x] =

$$\frac{1}{390}\,e^{-2\,x\$2271}\left(130+260\,e^{3\,x\$2271}+20\,\text{Cos}[1]+13\,e^{3\,x\$2271}\,\text{Cos}[1]-33\,e^{2\,x\$2271}\,\text{Cos}[1+3\,x\$2271]+30\,\text{Sin}[1]-39\,e^{3\,x\$2271}\,\text{Sin}[1]+9\,e^{2\,x\$2271}\,\text{Sin}[1+3\,x\$2271]\right)$$



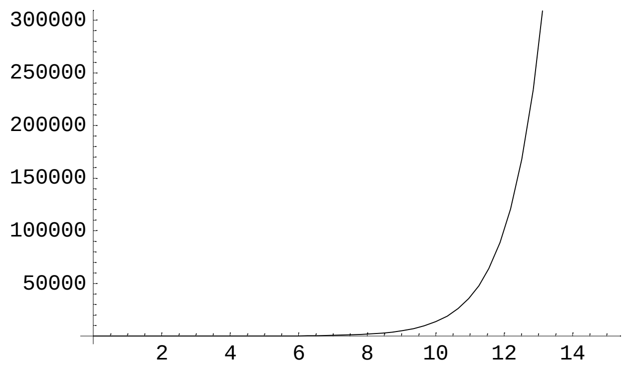
k1 = 1 k2 = -2 k3 = -2

==> $y[x] = \frac{1}{60} e^{-2 x\$2295} (20 + 40 e^{3 x\$2295} + 5 \mathrm{Cos}[1] + 4 e^{3 x\$2295} \mathrm{Cos}[1] - 9 e^{2 x\$2295} \mathrm{Cos}[1 + 2 x\$2295] + 5 \mathrm{Sin}[1] - 8 e^{3 x\$2295} \mathrm{Sin}[1] + 3 e^{2 x\$2295} \mathrm{Sin}[1 + 2 x\$2295])$



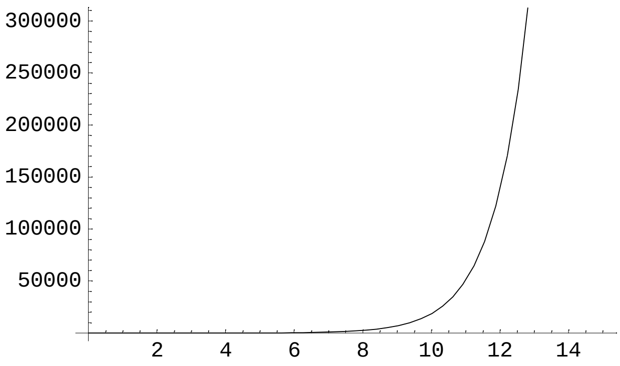
k1 = 1 k2 = -2 k3 = -1

==> $y[x] = \frac{1}{30} e^{-2 x\$2319} (10 + 20 e^{3 x\$2319} + 4 \mathrm{Cos}[1] + 5 e^{3 x\$2319} \mathrm{Cos}[1] - 9 e^{2 x\$2319} \mathrm{Cos}[1 + x\$2319] + 2 \mathrm{Sin}[1] - 5 e^{3 x\$2319} \mathrm{Sin}[1] + 3 e^{2 x\$2319} \mathrm{Sin}[1 + x\$2319])$



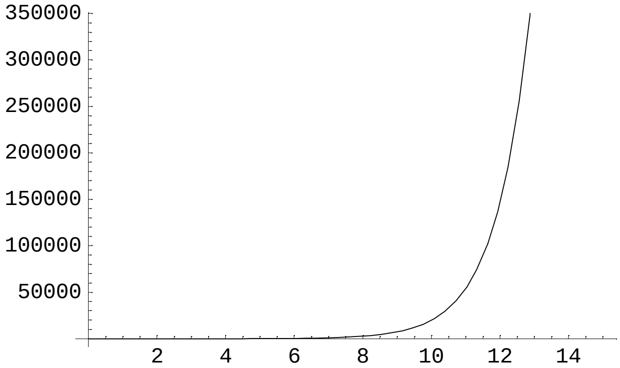
k1 = 1 k2 = -2 k3 = 0

==> $y[x] = \frac{1}{6} e^{-2 x\$2341} (2 + \mathrm{Cos}[1] - 3 e^{2 x\$2341} \mathrm{Cos}[1] + 2 e^{3 x\$2341} (2 + \mathrm{Cos}[1]))$



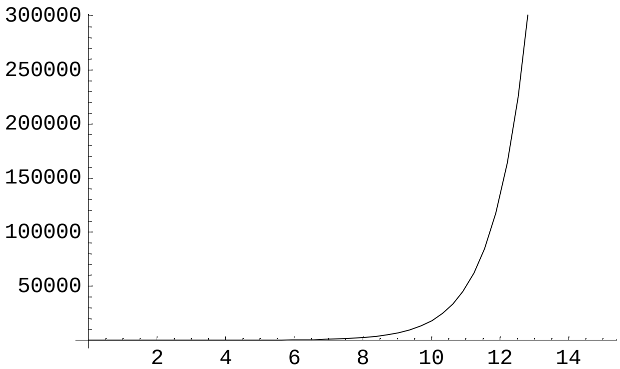
k1 = 1   k2 = −2   k3 = 1

$$==> \quad y[x] = \frac{1}{30} e^{-2\,x\$2348} \left(10 + 20\, e^{3\,x\$2348} + 4\, \text{Cos}[1] + 5\, e^{3\,x\$2348}\, \text{Cos}[1] - 9\, e^{2\,x\$2348}\, \text{Cos}[1 - x\$2348] - 2\, \text{Sin}[1] + 5\, e^{3\,x\$2348}\, \text{Sin}[1] - 3\, e^{2\,x\$2348}\, \text{Sin}[1 - x\$2348]\right)$$



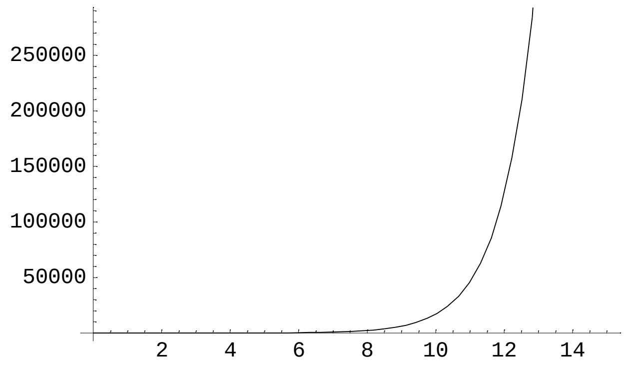
k1 = 1   k2 = −2   k3 = 2

$$==> \quad y[x] = \frac{1}{60} e^{-2\,x\$2370} \left(20 + 40\, e^{3\,x\$2370} + 5\, \text{Cos}[1] + 4\, e^{3\,x\$2370}\, \text{Cos}[1] - 9\, e^{2\,x\$2370}\, \text{Cos}[1 - 2\,x\$2370] - 5\, \text{Sin}[1] + 8\, e^{3\,x\$2370}\, \text{Sin}[1] - 3\, e^{2\,x\$2370}\, \text{Sin}[1 - 2\,x\$2370]\right)$$



k1 = 1   k2 = −2   k3 = 3

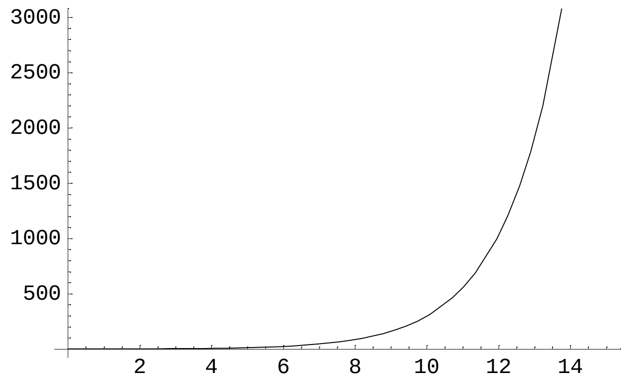
$$==> \quad y[x] = \frac{1}{390} e^{-2\,x\$2392} \left(130 + 260\, e^{3\,x\$2392} + 20\, \text{Cos}[1] + 13\, e^{3\,x\$2392}\, \text{Cos}[1] - 33\, e^{2\,x\$2392}\, \text{Cos}[1 - 3\,x\$2392] - 30\, \text{Sin}[1] + 39\, e^{3\,x\$2392}\, \text{Sin}[1] - 9\, e^{2\,x\$2392}\, \text{Sin}[1 - 3\,x\$2392]\right)$$



k1 = 1 k2 = -1 k3 = -3

==> y[x] =

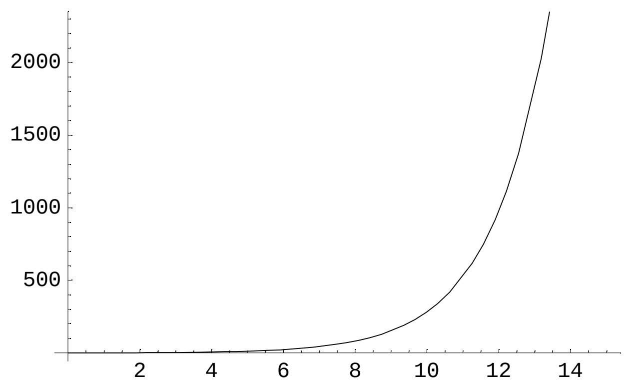
$$\frac{1}{1090}\left(e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2414}}\left(545-109\sqrt{5}+545\,e^{\sqrt{5}\,\text{x\$2414}}+109\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2414}}+50\,\text{Cos}[1]+8\sqrt{5}\,\text{Cos}[1]+50\,e^{\sqrt{5}\,\text{x\$2414}}\,\text{Cos}[1]-8\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2414}}\,\text{Cos}[1]-100\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2414}}\,\text{Cos}[1+3\,\text{x\$2414}]-15\,\text{Sin}[1]+63\sqrt{5}\,\text{Sin}[1]-15\,e^{\sqrt{5}\,\text{x\$2414}}\,\text{Sin}[1]-63\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2414}}\,\text{Sin}[1]+30\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2414}}\,\text{Sin}[1+3\,\text{x\$2414}]\right)\right)$$



k1 = 1 k2 = -1 k3 = -2

==> y[x] =

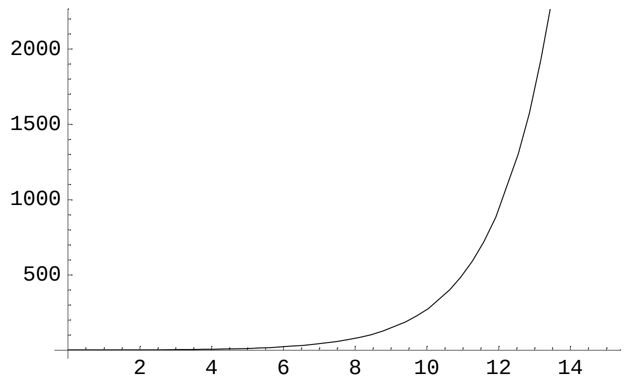
$$\frac{1}{290}\,e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2453}}\left(145-29\sqrt{5}+145\,e^{\sqrt{5}\,\text{x\$2453}}+29\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2453}}+25\,\text{Cos}[1]+3\sqrt{5}\,\text{Cos}[1]+25\,e^{\sqrt{5}\,\text{x\$2453}}\,\text{Cos}[1]-3\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2453}}\,\text{Cos}[1]-50\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2453}}\,\text{Cos}[1+2\,\text{x\$2453}]-10\,\text{Sin}[1]+22\sqrt{5}\,\text{Sin}[1]-10\,e^{\sqrt{5}\,\text{x\$2453}}\,\text{Sin}[1]-22\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2453}}\,\text{Sin}[1]+20\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2453}}\,\text{Sin}[1+2\,\text{x\$2453}]\right)$$



k1 = 1 k2 = -1 k3 = -1

==> y[x] =

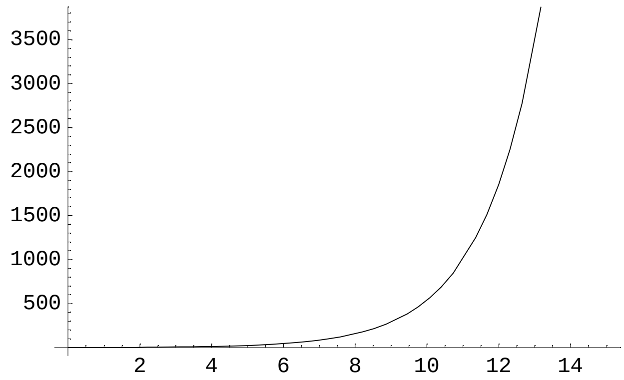
$$-\frac{1}{10}\,e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2483}}\left(-5+\sqrt{5}-5\,e^{\sqrt{5}\,\text{x\$2483}}-\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2483}}-2\,\text{Cos}[1]-2\,e^{\sqrt{5}\,\text{x\$2483}}\,\text{Cos}[1]+4\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2483}}\,\text{Cos}[1+\text{x\$2483}]+\text{Sin}[1]-\sqrt{5}\,\text{Sin}[1]+e^{\sqrt{5}\,\text{x\$2483}}\,\text{Sin}[1]+\sqrt{5}\,e^{\sqrt{5}\,\text{x\$2483}}\,\text{Sin}[1]-2\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,\text{x\$2483}}\,\text{Sin}[1+\text{x\$2483}]\right)$$



k1 = 1 k2 = -1 k3 = 0

==> y[x] =

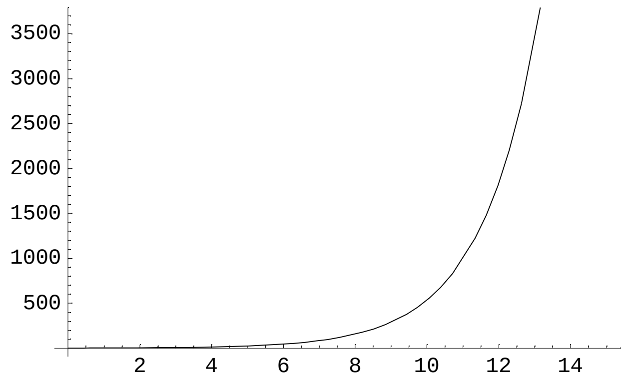
$$\frac{1}{10}\,e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2511}\left(-10\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2511}\,\mathrm{Cos}[1]-\left(-5+\sqrt{5}\right)\,(1+\mathrm{Cos}[1])+\left(5+\sqrt{5}\right)\,e^{\sqrt{5}\,x\$2511}\,(1+\mathrm{Cos}[1])\right)$$



k1 = 1 k2 = -1 k3 = 1

==> y[x] =

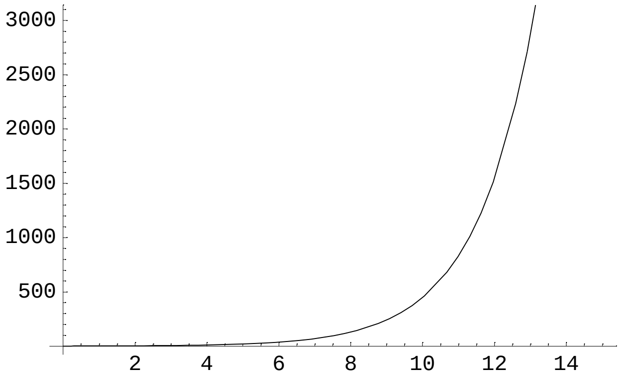
$$\frac{1}{10}\,e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2518}\Big(5-\sqrt{5}+5\,e^{\sqrt{5}\,x\$2518}+\sqrt{5}\,e^{\sqrt{5}\,x\$2518}+2\,\mathrm{Cos}[1]+2\,e^{\sqrt{5}\,x\$2518}\,\mathrm{Cos}[1]-4\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2518}\,\mathrm{Cos}[1-x\$2518]+\mathrm{Sin}[1]-\sqrt{5}\,\mathrm{Sin}[1]+e^{\sqrt{5}\,x\$2518}\,\mathrm{Sin}[1]+\sqrt{5}\,e^{\sqrt{5}\,x\$2518}\,\mathrm{Sin}[1]-2\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2518}\,\mathrm{Sin}[1-x\$2518]\Big)$$



k1 = 1 k2 = -1 k3 = 2

==> y[x] =

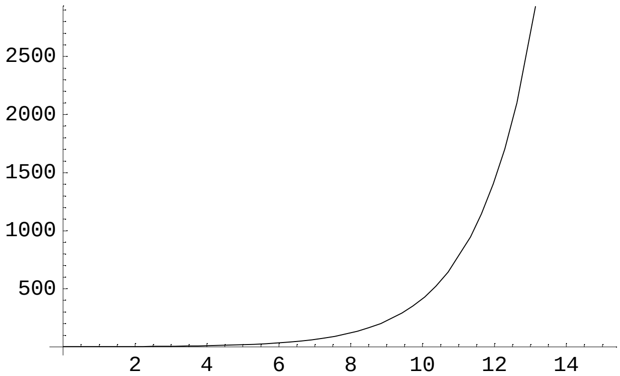
$$\frac{1}{290}\,e^{-\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2546}\Big(145-29\,\sqrt{5}+145\,e^{\sqrt{5}\,x\$2546}+29\,\sqrt{5}\,e^{\sqrt{5}\,x\$2546}+25\,\mathrm{Cos}[1]+3\,\sqrt{5}\,\mathrm{Cos}[1]+25\,e^{\sqrt{5}\,x\$2546}\,\mathrm{Cos}[1]-3\,\sqrt{5}\,e^{\sqrt{5}\,x\$2546}\,\mathrm{Cos}[1]-50\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2546}\,\mathrm{Cos}[1-2\,x\$2546]+10\,\mathrm{Sin}[1]-22\,\sqrt{5}\,\mathrm{Sin}[1]+10\,e^{\sqrt{5}\,x\$2546}\,\mathrm{Sin}[1]+22\,\sqrt{5}\,e^{\sqrt{5}\,x\$2546}\,\mathrm{Sin}[1]-20\,e^{\frac{1}{2}\left(1+\sqrt{5}\right)\,x\$2546}\,\mathrm{Sin}[1-2\,x\$2546]\Big)$$



k1 = 1 k2 = −1 k3 = 3

==> y[x] =

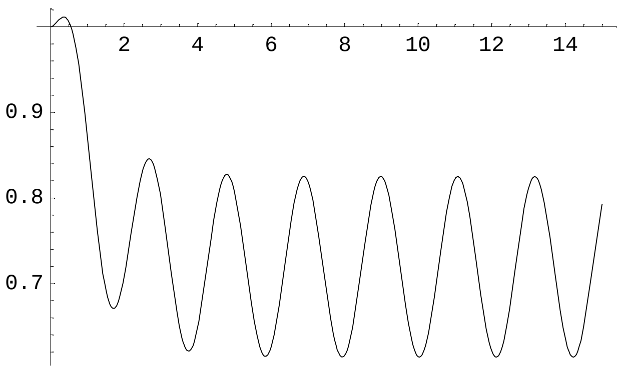
$$\frac{1}{1090}\left(e^{-\frac{1}{2}(1+\sqrt{5})\,x\$2574}\left(545-109\sqrt{5}+545\,e^{\sqrt{5}\,x\$2574}+109\sqrt{5}\,e^{\sqrt{5}\,x\$2574}+50\,\text{Cos}[1]+8\sqrt{5}\,\text{Cos}[1]+50\,e^{\sqrt{5}\,x\$2574}\,\text{Cos}[1]-8\sqrt{5}\,e^{\sqrt{5}\,x\$2574}\,\text{Cos}[1]-100\,e^{\frac{1}{2}(1+\sqrt{5})\,x\$2574}\,\text{Cos}[1-3\,x\$2574]+15\,\text{Sin}[1]-63\sqrt{5}\,\text{Sin}[1]+15\,e^{\sqrt{5}\,x\$2574}\,\text{Sin}[1]+63\sqrt{5}\,e^{\sqrt{5}\,x\$2574}\,\text{Sin}[1]-30\,e^{\frac{1}{2}(1+\sqrt{5})\,x\$2574}\,\text{Sin}[1-3\,x\$2574]\right)\right)$$



k1 = 1 k2 = 0 k3 = −3

==> y[x] = $\frac{1}{30}\,e^{-x\$2602}$

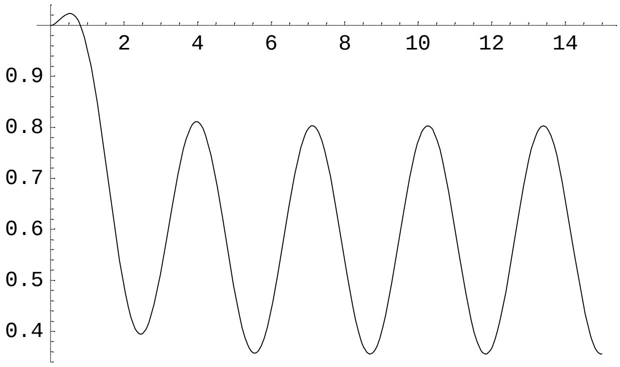
$$\left(30\,e^{x\$2602}+3\,\text{Cos}[1]-3\,e^{x\$2602}\,\text{Cos}[1+3\,x\$2602]+9\,\text{Sin}[1]-10\,e^{x\$2602}\,\text{Sin}[1]+e^{x\$2602}\,\text{Sin}[1+3\,x\$2602]\right)$$



k1 = 1 k2 = 0 k3 = −2

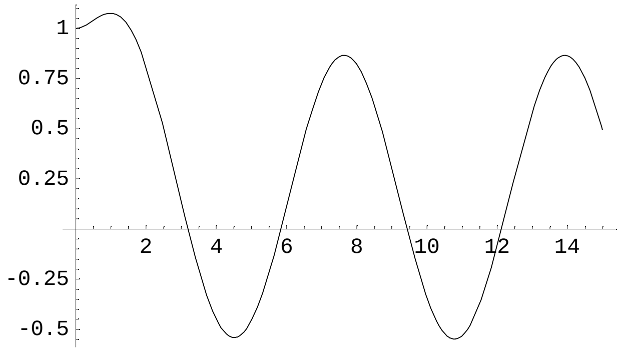
==> y[x] =

$$\frac{1}{10}\left(10+2\,e^{-x\$2612}\,\text{Cos}[1]-2\,\text{Cos}[1+2\,x\$2612]-5\,\text{Sin}[1]+4\,e^{-x\$2612}\,\text{Sin}[1]+\text{Sin}[1+2\,x\$2612]\right)$$



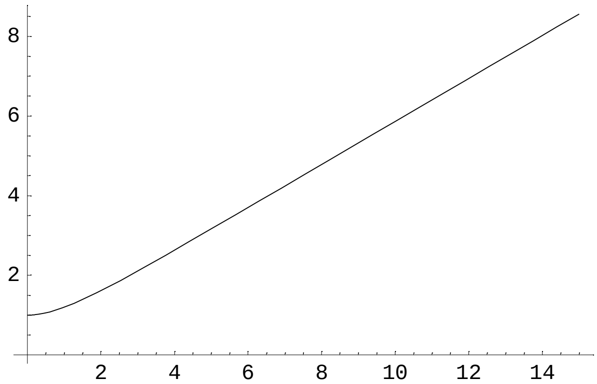
k1 = 1 k2 = 0 k3 = −1

==> y[x] =
$\frac{1}{2} e^{-x\$2622} (2 e^{x\$2622} + Cos[1] - e^{x\$2622} Cos[1 + x\$2622] + Sin[1] - 2 e^{x\$2622} Sin[1] + e^{x\$2622} Sin[1 + x\$2622])$



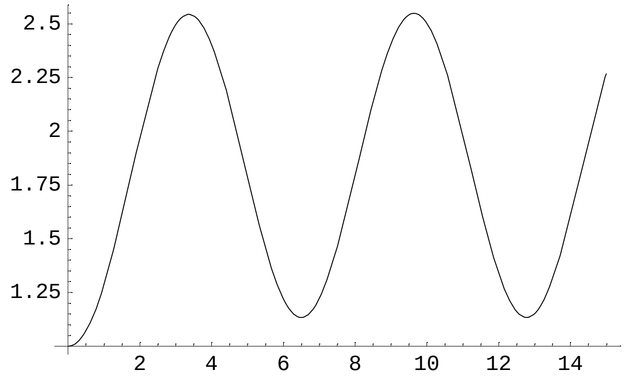
k1 = 1 k2 = 0 k3 = 0

==> y[x] = $1 - Cos[1] + e^{-x\$2631} Cos[1] + x\$2631 Cos[1]$



k1 = 1 k2 = 0 k3 = 1

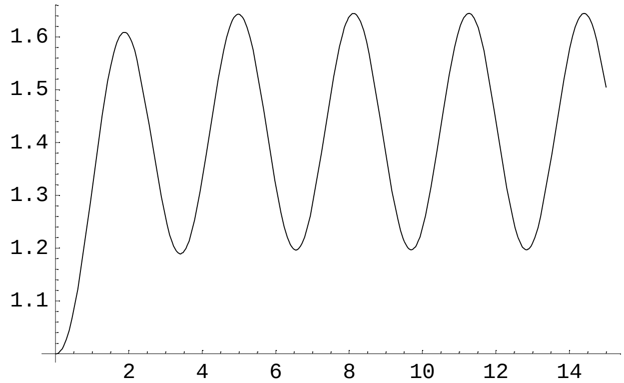
==> y[x] = $\frac{1}{2} (2 + e^{-x\$2638} Cos[1] - Cos[1 - x\$2638] + 2 Sin[1] - e^{-x\$2638} Sin[1] - Sin[1 - x\$2638])$



k1 = 1 k2 = 0 k3 = 2

==> y[x] =

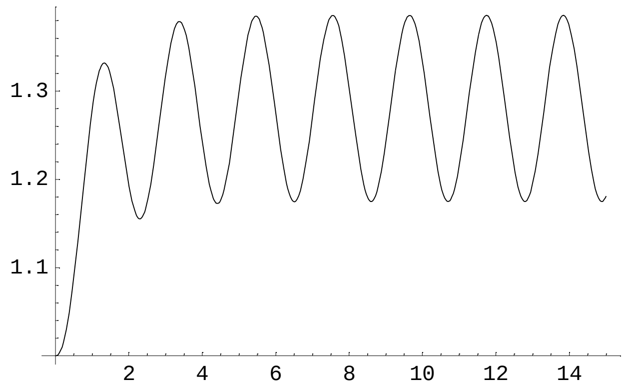
$$\frac{1}{10}\left(10+2\,e^{-x\$2647}\,\mathrm{Cos}[1]-2\,\mathrm{Cos}[1-2\,x\$2647]+5\,\mathrm{Sin}[1]-4\,e^{-x\$2647}\,\mathrm{Sin}[1]-\mathrm{Sin}[1-2\,x\$2647]\right)$$



k1 = 1 k2 = 0 k3 = 3

==> y[x] =

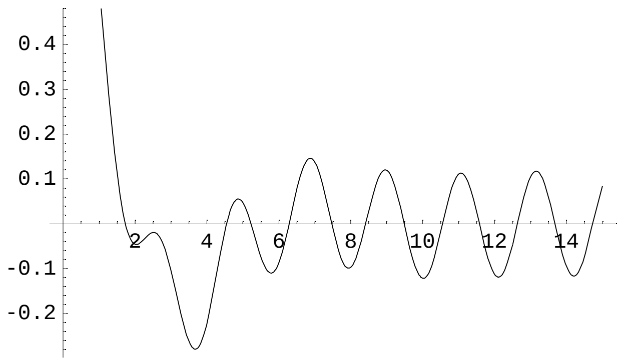
$$-\frac{1}{30}\,e^{-x\$2656}\left(-30\,e^{x\$2656}-3\,\mathrm{Cos}[1]+3\,e^{x\$2656}\,\mathrm{Cos}[1-3\,x\$2656]+9\,\mathrm{Sin}[1]-10\,e^{x\$2656}\,\mathrm{Sin}[1]+e^{x\$2656}\,\mathrm{Sin}[1-3\,x\$2656]\right)$$



k1 = 1 k2 = 1 k3 = -3

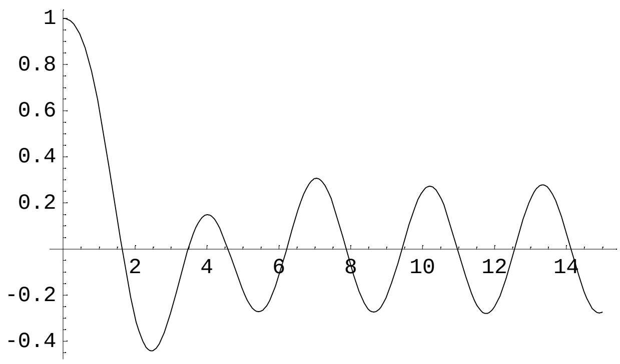
==> y[x] =

$$\frac{1}{438}\,e^{-x\$2665/2}\Big(-48\,e^{x\$2665/2}\,\mathrm{Cos}[1+3\,x\$2665]-51\sqrt{3}\,\mathrm{Cos}\Big[1-\frac{\sqrt{3}\,x\$2665}{2}\Big]+51\sqrt{3}\,\mathrm{Cos}\Big[1+\frac{\sqrt{3}\,x\$2665}{2}\Big]+$$
$$6\,\mathrm{Cos}\Big[\frac{\sqrt{3}\,x\$2665}{2}\Big]\,(73+8\,\mathrm{Cos}[1]-3\,\mathrm{Sin}[1])+146\sqrt{3}\,\mathrm{Sin}\Big[\frac{\sqrt{3}\,x\$2665}{2}\Big]+$$
$$18\,e^{x\$2665/2}\,\mathrm{Sin}[1+3\,x\$2665]+10\sqrt{3}\,\mathrm{Sin}\Big[1-\frac{\sqrt{3}\,x\$2665}{2}\Big]-10\sqrt{3}\,\mathrm{Sin}\Big[1+\frac{\sqrt{3}\,x\$2665}{2}\Big]\Big)$$



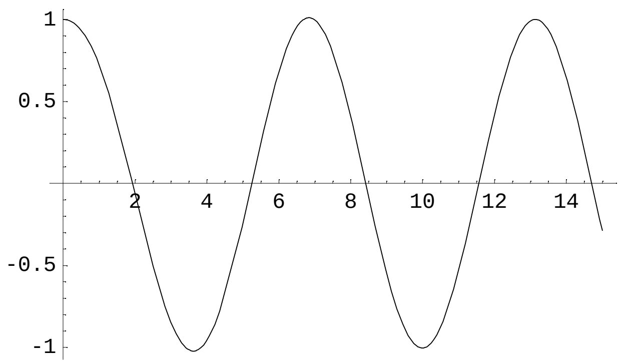
k1 = 1 k2 = 1 k3 = −2

==> $y[x] = \frac{1}{39} e^{-x\$2731/2} \left(\text{Cos}\left[\frac{\sqrt{3}\ x\$2731}{2}\right](39 + 9\,\text{Cos}[1] - 6\,\text{Sin}[1]) - 3\,e^{x\$2731/2}\,\text{Cos}[x\$2731]^2\,(3\,\text{Cos}[1] - 2\,\text{Sin}[1]) + 9\,e^{x\$2731/2}\,\text{Cos}[1]\,\text{Sin}[x\$2731]^2 - 6\,e^{x\$2731/2}\,\text{Sin}[1]\,\text{Sin}[x\$2731]^2 + 6\,e^{x\$2731/2}\,\text{Cos}[1]\,\text{Sin}[2\,x\$2731] + 9\,e^{x\$2731/2}\,\text{Sin}[1]\,\text{Sin}[2\,x\$2731] + 13\sqrt{3}\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2731}{2}\right] - 5\sqrt{3}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2731}{2}\right] - 14\sqrt{3}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2731}{2}\right]\right)$



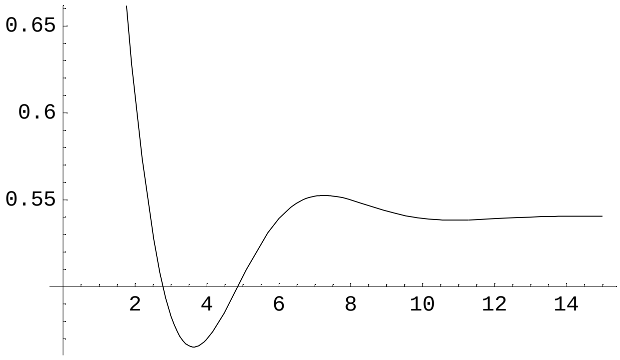
k1 = 1 k2 = 1 k3 = −1

==> $y[x] = \frac{1}{3} e^{-x\$2779/2} \left(-3\,\text{Cos}\left[\frac{\sqrt{3}\ x\$2779}{2}\right](-1 + \text{Sin}[1]) + 3\,e^{x\$2779/2}\,\text{Cos}[x\$2779]\,\text{Sin}[1] + 3\,e^{x\$2779/2}\,\text{Cos}[1]\,\text{Sin}[x\$2779] + \sqrt{3}\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2779}{2}\right] - 2\sqrt{3}\,\text{Cos}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2779}{2}\right] - \sqrt{3}\,\text{Sin}[1]\,\text{Sin}\left[\frac{\sqrt{3}\ x\$2779}{2}\right]\right)$



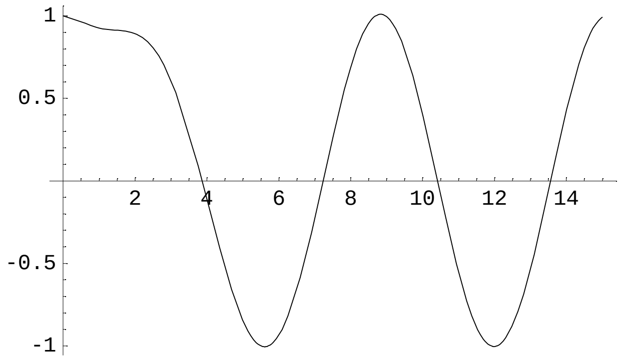
k1 = 1 k2 = 1 k3 = 0

$$==> \quad y[x] = \mathrm{Cos}[1] + 2\, e^{-x\$2823/2}\, \mathrm{Cos}\left[\frac{\sqrt{3}\ x\$2823}{2}\right] \mathrm{Sin}\left[\frac{1}{2}\right]^2 + \frac{2\, e^{-x\$2823/2}\, \mathrm{Sin}\left[\frac{1}{2}\right]^2 \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2823}{2}\right]}{\sqrt{3}}$$



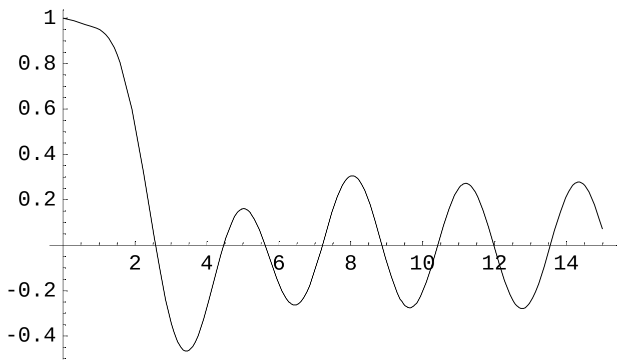
k1 = 1 k2 = 1 k3 = 1

$$==> \quad y[x] = \frac{1}{3} e^{-x\$2829/2} \left(-3\, e^{x\$2829/2}\, \mathrm{Cos}[x\$2829]\, \mathrm{Sin}[1] + 3\, \mathrm{Cos}\left[\frac{\sqrt{3}\ x\$2829}{2}\right] (1 + \mathrm{Sin}[1]) + 3\, e^{x\$2829/2}\, \mathrm{Cos}[1]\, \mathrm{Sin}[x\$2829] + \sqrt{3}\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2829}{2}\right] - 2\sqrt{3}\, \mathrm{Cos}[1]\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2829}{2}\right] + \sqrt{3}\, \mathrm{Sin}[1]\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2829}{2}\right]\right)$$



k1 = 1 k2 = 1 k3 = 2

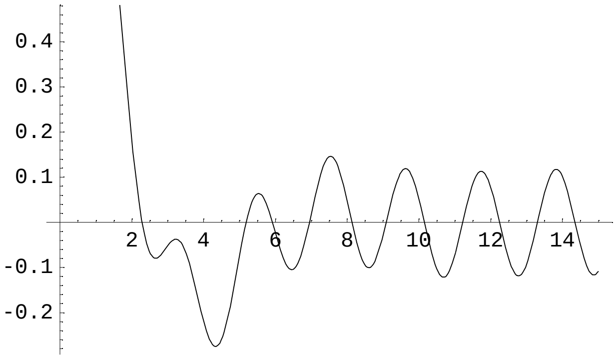
$$==> \quad y[x] = \frac{1}{39} e^{-x\$2877/2} \left(-3\, e^{x\$2877/2}\, \mathrm{Cos}[x\$2877]^2 (3\,\mathrm{Cos}[1] + 2\,\mathrm{Sin}[1]) + \mathrm{Cos}\left[\frac{\sqrt{3}\ x\$2877}{2}\right] (39 + 9\,\mathrm{Cos}[1] + 6\,\mathrm{Sin}[1]) + 9\, e^{x\$2877/2}\, \mathrm{Cos}[1]\, \mathrm{Sin}[x\$2877]^2 + 6\, e^{x\$2877/2}\, \mathrm{Sin}[1]\, \mathrm{Sin}[x\$2877]^2 + 6\, e^{x\$2877/2}\, \mathrm{Cos}[1]\, \mathrm{Sin}[2\, x\$2877] - 9\, e^{x\$2877/2}\, \mathrm{Sin}[1]\, \mathrm{Sin}[2\, x\$2877] + 13\sqrt{3}\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2877}{2}\right] - 5\sqrt{3}\, \mathrm{Cos}[1]\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2877}{2}\right] + 14\sqrt{3}\, \mathrm{Sin}[1]\, \mathrm{Sin}\left[\frac{\sqrt{3}\ x\$2877}{2}\right]\right)$$



k1 = 1 k2 = 1 k3 = 3

==> y[x] =

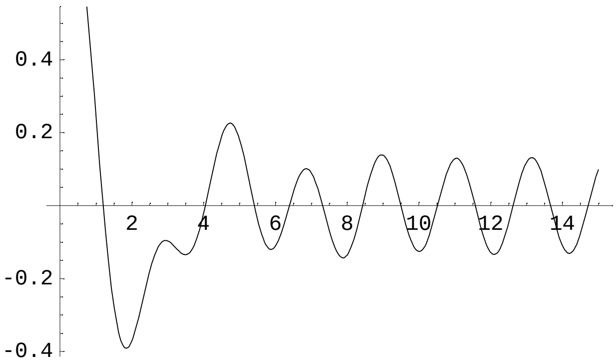
$$\frac{1}{438} e^{-x\$2925/2} \left(-48 e^{x\$2925/2} \text{Cos}[1-3\, x\$2925] + 51\sqrt{3}\, \text{Cos}\left[1-\frac{\sqrt{3}\, x\$2925}{2}\right] - 51\sqrt{3}\, \text{Cos}\left[1+\frac{\sqrt{3}\, x\$2925}{2}\right] + 6\, \text{Cos}\left[\frac{\sqrt{3}\, x\$2925}{2}\right] (73 + 8\, \text{Cos}[1] + 3\, \text{Sin}[1]) - 18 e^{x\$2925/2} \text{Sin}[1-3\, x\$2925] + 146\sqrt{3}\, \text{Sin}\left[\frac{\sqrt{3}\, x\$2925}{2}\right] + 10\sqrt{3}\, \text{Sin}\left[1-\frac{\sqrt{3}\, x\$2925}{2}\right] - 10\sqrt{3}\, \text{Sin}\left[1+\frac{\sqrt{3}\, x\$2925}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = -3

==> y[x] =

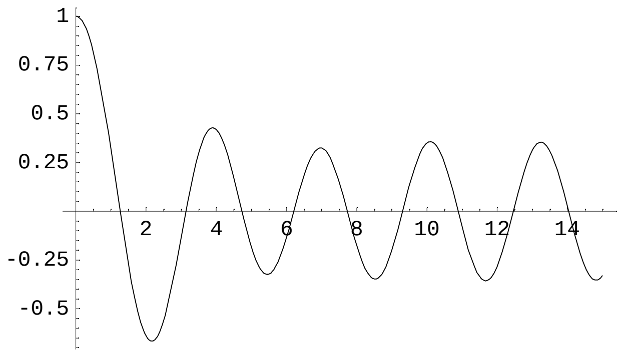
$$\frac{1}{812} e^{-x\$2973/2} \left(-98 e^{x\$2973/2} \text{Cos}[1+3\, x\$2973] - 45\sqrt{7}\, \text{Cos}\left[1-\frac{\sqrt{7}\, x\$2973}{2}\right] + 45\sqrt{7}\, \text{Cos}\left[1+\frac{\sqrt{7}\, x\$2973}{2}\right] + 14\, \text{Cos}\left[\frac{\sqrt{7}\, x\$2973}{2}\right] (58 + 7\, \text{Cos}[1] - 3\, \text{Sin}[1]) + 116\sqrt{7}\, \text{Sin}\left[\frac{\sqrt{7}\, x\$2973}{2}\right] + 42 e^{x\$2973/2} \text{Sin}[1+3\, x\$2973] + 11\sqrt{7}\, \text{Sin}\left[1-\frac{\sqrt{7}\, x\$2973}{2}\right] - 11\sqrt{7}\, \text{Sin}\left[1+\frac{\sqrt{7}\, x\$2973}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = -2

==> y[x] =

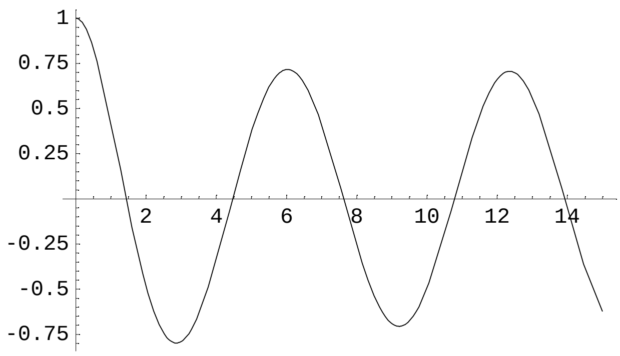
$$\frac{1}{28} e^{-x\$3030/2} \left(-7 e^{x\$3030/2} \text{Cos}[x\$3030]^2 (\text{Cos}[1] - \text{Sin}[1]) + 7\, \text{Cos}\left[\frac{\sqrt{7}\, x\$3030}{2}\right] (4 + \text{Cos}[1] - \text{Sin}[1]) + 7 e^{x\$3030/2} \text{Cos}[1]\, \text{Sin}[x\$3030]^2 - 7 e^{x\$3030/2} \text{Sin}[1]\, \text{Sin}[x\$3030]^2 + 7 e^{x\$3030/2} \text{Cos}[1]\, \text{Sin}[2\, x\$3030] + 7 e^{x\$3030/2} \text{Sin}[1]\, \text{Sin}[2\, x\$3030] + 4\sqrt{7}\, \text{Sin}\left[\frac{\sqrt{7}\, x\$3030}{2}\right] - 3\sqrt{7}\, \text{Cos}[1]\, \text{Sin}\left[\frac{\sqrt{7}\, x\$3030}{2}\right] - 5\sqrt{7}\, \text{Sin}[1]\, \text{Sin}\left[\frac{\sqrt{7}\, x\$3030}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = −1

==> y[x] =

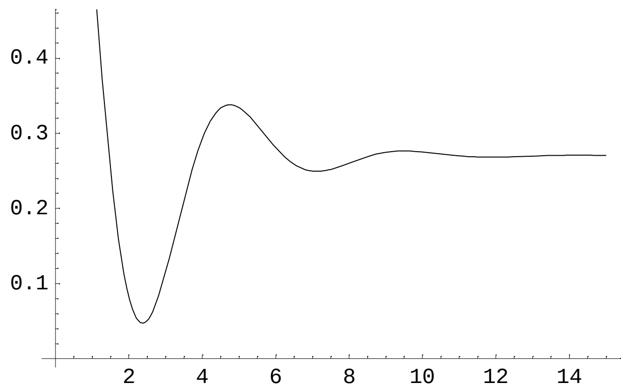
$$\frac{1}{14}\, e^{-x\$3082/2} \left(-7\,\mathrm{Cos}\left[\frac{\sqrt{7}\ x\$3082}{2}\right] (-2+\mathrm{Cos}[1]+\mathrm{Sin}[1]) + 7\, e^{x\$3082/2}\,\mathrm{Cos}[x\$3082]\,(\mathrm{Cos}[1]+\mathrm{Sin}[1]) + 7\, e^{x\$3082/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$3082] - 7\, e^{x\$3082/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$3082] + 2\sqrt{7}\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3082}{2}\right] - 3\sqrt{7}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3082}{2}\right] + \sqrt{7}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3082}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = 0

==> y[x] =

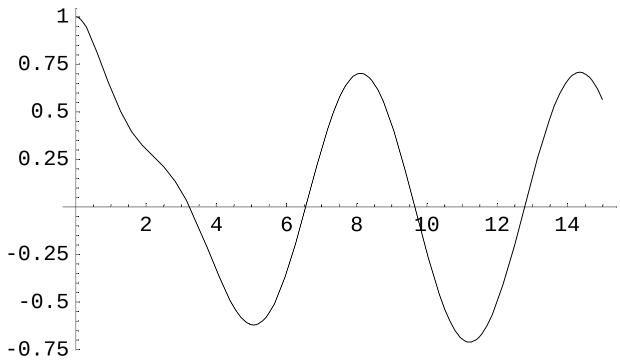
$$\frac{1}{14}\, e^{-x\$3126/2} \left(7\, e^{x\$3126/2}\,\mathrm{Cos}[1] - 7\,(-2+\mathrm{Cos}[1])\,\mathrm{Cos}\left[\frac{\sqrt{7}\ x\$3126}{2}\right] - \sqrt{7}\,(-2+\mathrm{Cos}[1])\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3126}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = 1

==> y[x] =

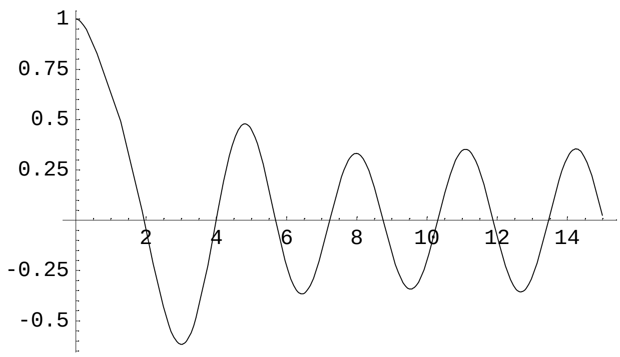
$$\frac{1}{14}\, e^{-x\$3133/2} \left(-7\,\mathrm{Cos}\left[\frac{\sqrt{7}\ x\$3133}{2}\right] (-2+\mathrm{Cos}[1]-\mathrm{Sin}[1]) + 7\, e^{x\$3133/2}\,\mathrm{Cos}[x\$3133]\,(\mathrm{Cos}[1]-\mathrm{Sin}[1]) + 7\, e^{x\$3133/2}\,\mathrm{Cos}[1]\,\mathrm{Sin}[x\$3133] + 7\, e^{x\$3133/2}\,\mathrm{Sin}[1]\,\mathrm{Sin}[x\$3133] + 2\sqrt{7}\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3133}{2}\right] - 3\sqrt{7}\,\mathrm{Cos}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3133}{2}\right] - \sqrt{7}\,\mathrm{Sin}[1]\,\mathrm{Sin}\left[\frac{\sqrt{7}\ x\$3133}{2}\right]\right)$$



k1 = 1 k2 = 2 k3 = 2

==> y[x] =

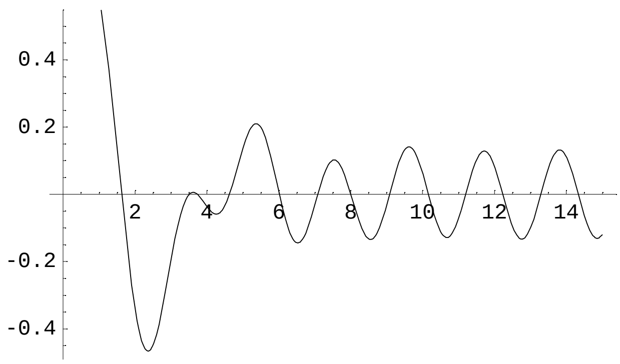
$$\frac{1}{28} e^{-x\$3181/2} \Big(-7 e^{x\$3181/2} \mathrm{Cos}[x\$3181]^2 (\mathrm{Cos}[1] + \mathrm{Sin}[1]) + 7 \mathrm{Cos}\Big[\frac{\sqrt{7}\ x\$3181}{2}\Big] (4 + \mathrm{Cos}[1] + \mathrm{Sin}[1]) + 7 e^{x\$3181/2} \mathrm{Cos}[1] \mathrm{Sin}[x\$3181]^2 + 7 e^{x\$3181/2} \mathrm{Sin}[1] \mathrm{Sin}[x\$3181]^2 + 7 e^{x\$3181/2} \mathrm{Cos}[1] \mathrm{Sin}[2\ x\$3181] - 7 e^{x\$3181/2} \mathrm{Sin}[1] \mathrm{Sin}[2\ x\$3181] + 4\sqrt{7}\ \mathrm{Sin}\Big[\frac{\sqrt{7}\ x\$3181}{2}\Big] - 3\sqrt{7}\ \mathrm{Cos}[1]\ \mathrm{Sin}\Big[\frac{\sqrt{7}\ x\$3181}{2}\Big] + 5\sqrt{7}\ \mathrm{Sin}[1]\ \mathrm{Sin}\Big[\frac{\sqrt{7}\ x\$3181}{2}\Big]\Big)$$



k1 = 1 k2 = 2 k3 = 3

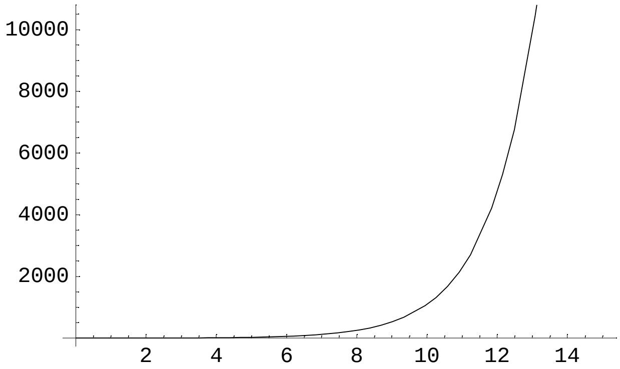
==> y[x] =

$$\frac{1}{812} e^{-x\$3229/2} \Big(-98 e^{x\$3229/2} \mathrm{Cos}[1 - 3\ x\$3229] + 45\sqrt{7}\ \mathrm{Cos}\Big[1 - \frac{\sqrt{7}\ x\$3229}{2}\Big] - 45\sqrt{7}\ \mathrm{Cos}\Big[1 + \frac{\sqrt{7}\ x\$3229}{2}\Big] + 14\ \mathrm{Cos}\Big[\frac{\sqrt{7}\ x\$3229}{2}\Big] (58 + 7\ \mathrm{Cos}[1] + 3\ \mathrm{Sin}[1]) - 42 e^{x\$3229/2} \mathrm{Sin}[1 - 3\ x\$3229] + 116\sqrt{7}\ \mathrm{Sin}\Big[\frac{\sqrt{7}\ x\$3229}{2}\Big] + 11\sqrt{7}\ \mathrm{Sin}\Big[1 - \frac{\sqrt{7}\ x\$3229}{2}\Big] - 11\sqrt{7}\ \mathrm{Sin}\Big[1 + \frac{\sqrt{7}\ x\$3229}{2}\Big]\Big)$$



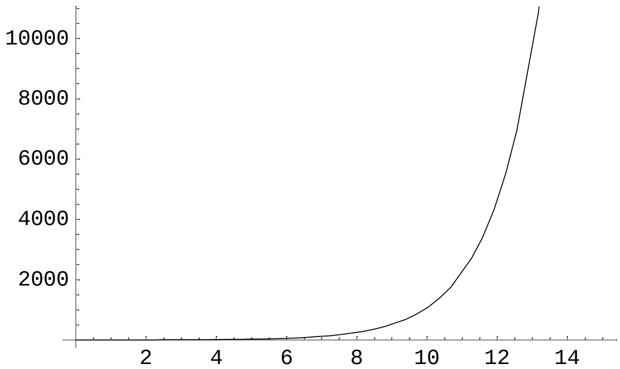
k1 = 2 k2 = -2 k3 = -3

$$==> \ y[x] = \frac{1}{942} e^{-(1+\sqrt{3})\ x\$3277} \left(471 - 157\sqrt{3} + 471 e^{2\sqrt{3}\ x\$3277} + 157\sqrt{3}\ e^{2\sqrt{3}\ x\$3277} + 33\,\mathrm{Cos}[1] + 7\sqrt{3}\ \mathrm{Cos}[1] + 33 e^{2\sqrt{3}\ x\$3277}\,\mathrm{Cos}[1] - 7\sqrt{3}\ e^{2\sqrt{3}\ x\$3277}\,\mathrm{Cos}[1] - 66 e^{x\$3277+\sqrt{3}\ x\$3277}\,\mathrm{Cos}[1+3\,x\$3277] - 18\,\mathrm{Sin}[1] + 39\sqrt{3}\ \mathrm{Sin}[1] - 18 e^{2\sqrt{3}\ x\$3277}\,\mathrm{Sin}[1] - 39\sqrt{3}\ e^{2\sqrt{3}\ x\$3277}\,\mathrm{Sin}[1] + 36 e^{x\$3277+\sqrt{3}\ x\$3277}\,\mathrm{Sin}[1+3\,x\$3277]\right)$$



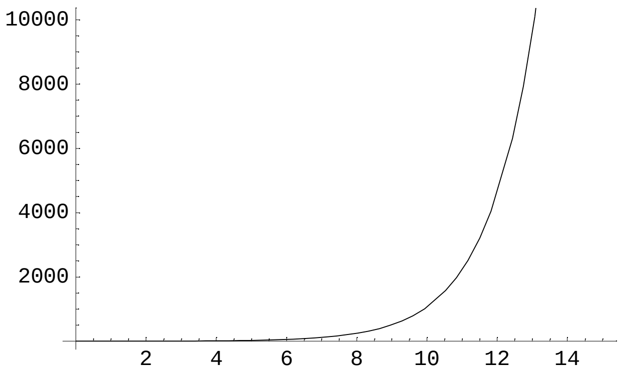
k1 = 2 k2 = -2 k3 = -2

$$==> \ y[x] = \frac{1}{156} e^{-(1+\sqrt{3})\ x\$3324} \left(78 - 26\sqrt{3} + 78 e^{2\sqrt{3}\ x\$3324} + 26\sqrt{3}\ e^{2\sqrt{3}\ x\$3324} + 9\,\mathrm{Cos}[1] + \sqrt{3}\ \mathrm{Cos}[1] + 9 e^{2\sqrt{3}\ x\$3324}\,\mathrm{Cos}[1] - \sqrt{3}\ e^{2\sqrt{3}\ x\$3324}\,\mathrm{Cos}[1] - 18 e^{x\$3324+\sqrt{3}\ x\$3324}\,\mathrm{Cos}[1+2\,x\$3324] - 6\,\mathrm{Sin}[1] + 8\sqrt{3}\ \mathrm{Sin}[1] - 6 e^{2\sqrt{3}\ x\$3324}\,\mathrm{Sin}[1] - 8\sqrt{3}\ e^{2\sqrt{3}\ x\$3324}\,\mathrm{Sin}[1] + 12 e^{x\$3324+\sqrt{3}\ x\$3324}\,\mathrm{Sin}[1+2\,x\$3324]\right)$$



k1 = 2 k2 = -2 k3 = -1

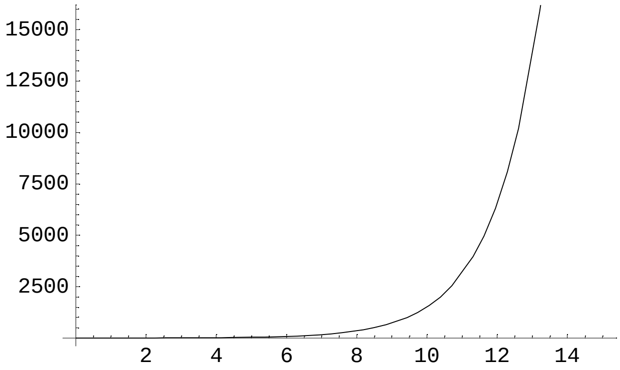
$$==> \ y[x] = \frac{1}{78} e^{-(1+\sqrt{3})\ x\$3362} \left(39 - 13\sqrt{3} + 39 e^{2\sqrt{3}\ x\$3362} + 13\sqrt{3}\ e^{2\sqrt{3}\ x\$3362} + 9\,\mathrm{Cos}[1] - \sqrt{3}\ \mathrm{Cos}[1] + 9 e^{2\sqrt{3}\ x\$3362}\,\mathrm{Cos}[1] + \sqrt{3}\ e^{2\sqrt{3}\ x\$3362}\,\mathrm{Cos}[1] - 18 e^{x\$3362+\sqrt{3}\ x\$3362}\,\mathrm{Cos}[1+x\$3362] - 6\,\mathrm{Sin}[1] + 5\sqrt{3}\ \mathrm{Sin}[1] - 6 e^{2\sqrt{3}\ x\$3362}\,\mathrm{Sin}[1] - 5\sqrt{3}\ e^{2\sqrt{3}\ x\$3362}\,\mathrm{Sin}[1] + 12 e^{x\$3362+\sqrt{3}\ x\$3362}\,\mathrm{Sin}[1+x\$3362]\right)$$



k1 = 2 k2 = -2 k3 = 0

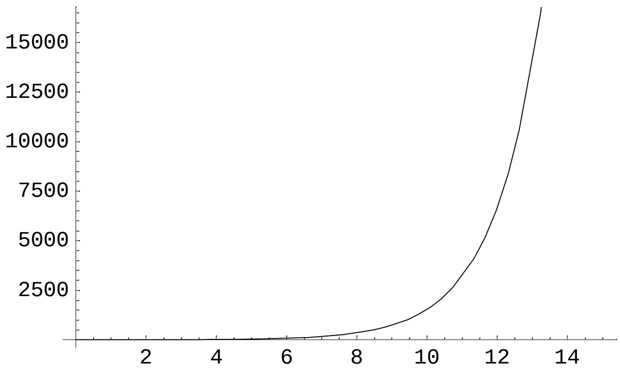
==> y[x] =

$$\frac{1}{12} e^{-\left(1+\sqrt{3}\right) x\$3398} \left(-6\, e^{\left(1+\sqrt{3}\right) x\$3398} \text{Cos}[1] - \left(-3+\sqrt{3}\right) (2+\text{Cos}[1]) + \left(3+\sqrt{3}\right) e^{2\sqrt{3}\, x\$3398} (2+\text{Cos}[1])\right)$$



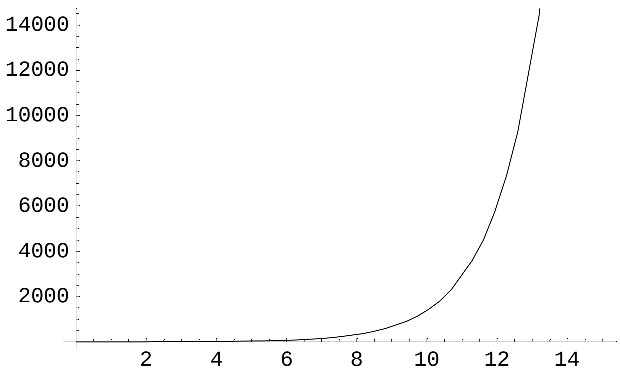
k1 = 2 k2 = -2 k3 = 1

$$\text{==>}\quad y[x] = \frac{1}{78} e^{-\left(1+\sqrt{3}\right) x\$3405} \Big(39 - 13\sqrt{3} + 39\, e^{2\sqrt{3}\, x\$3405} + 13\sqrt{3}\, e^{2\sqrt{3}\, x\$3405} + 9\,\text{Cos}[1] - \sqrt{3}\,\text{Cos}[1] + 9\, e^{2\sqrt{3}\, x\$3405}\,\text{Cos}[1] + \sqrt{3}\, e^{2\sqrt{3}\, x\$3405}\,\text{Cos}[1] - 18\, e^{x\$3405+\sqrt{3}\, x\$3405}\,\text{Cos}[1 - x\$3405] + 6\,\text{Sin}[1] - 5\sqrt{3}\,\text{Sin}[1] + 6\, e^{2\sqrt{3}\, x\$3405}\,\text{Sin}[1] + 5\sqrt{3}\, e^{2\sqrt{3}\, x\$3405}\,\text{Sin}[1] - 12\, e^{x\$3405+\sqrt{3}\, x\$3405}\,\text{Sin}[1 - x\$3405]\Big)$$



k1 = 2 k2 = -2 k3 = 2

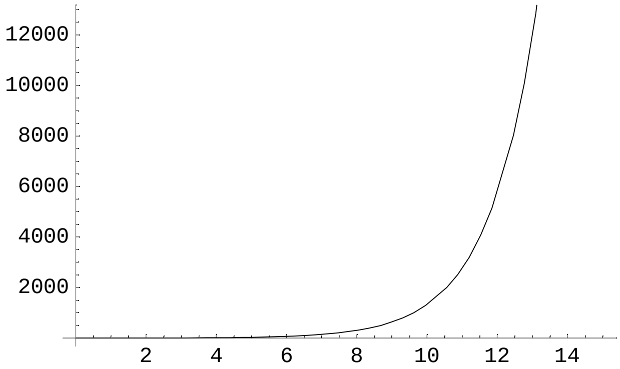
$$\text{==>}\quad y[x] = \frac{1}{156} e^{-\left(1+\sqrt{3}\right) x\$3441} \Big(78 - 26\sqrt{3} + 78\, e^{2\sqrt{3}\, x\$3441} + 26\sqrt{3}\, e^{2\sqrt{3}\, x\$3441} + 9\,\text{Cos}[1] + \sqrt{3}\,\text{Cos}[1] + 9\, e^{2\sqrt{3}\, x\$3441}\,\text{Cos}[1] - \sqrt{3}\, e^{2\sqrt{3}\, x\$3441}\,\text{Cos}[1] - 18\, e^{x\$3441+\sqrt{3}\, x\$3441}\,\text{Cos}[1 - 2\, x\$3441] + 6\,\text{Sin}[1] - 8\sqrt{3}\,\text{Sin}[1] + 6\, e^{2\sqrt{3}\, x\$3441}\,\text{Sin}[1] + 8\sqrt{3}\, e^{2\sqrt{3}\, x\$3441}\,\text{Sin}[1] - 12\, e^{x\$3441+\sqrt{3}\, x\$3441}\,\text{Sin}[1 - 2\, x\$3441]\Big)$$



k1 = 2 k2 = -2 k3 = 3

==> y[x] =

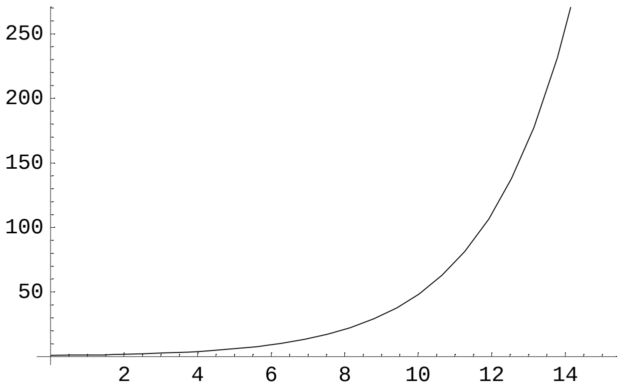
$$\frac{1}{942} e^{-\left(1+\sqrt{3}\right) x\$3477} \left(471 - 157 \sqrt{3} + 471 e^{2\sqrt{3}\, x\$3477} + 157 \sqrt{3}\, e^{2\sqrt{3}\, x\$3477} + 33 \operatorname{Cos}[1] + 7\sqrt{3} \operatorname{Cos}[1] + 33 e^{2\sqrt{3}\, x\$3477} \operatorname{Cos}[1] - 7\sqrt{3}\, e^{2\sqrt{3}\, x\$3477} \operatorname{Cos}[1] - 66 e^{x\$3477+\sqrt{3}\, x\$3477} \operatorname{Cos}[1 - 3\, x\$3477] + 18 \operatorname{Sin}[1] - 39\sqrt{3} \operatorname{Sin}[1] + 18 e^{2\sqrt{3}\, x\$3477} \operatorname{Sin}[1] + 39\sqrt{3}\, e^{2\sqrt{3}\, x\$3477} \operatorname{Sin}[1] - 36 e^{x\$3477+\sqrt{3}\, x\$3477} \operatorname{Sin}[1 - 3\, x\$3477]\right)$$



k1 = 2 k2 = −1 k3 = −3

==> y[x] =

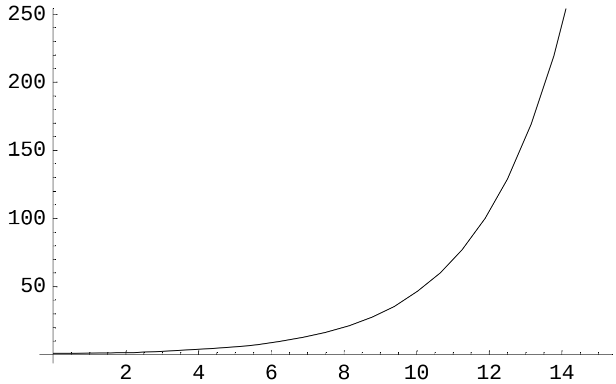
$$\frac{1}{136} e^{-\left(1+\sqrt{2}\right) x\$3513} \left(68 - 34\sqrt{2} + 68 e^{2\sqrt{2}\, x\$3513} + 34\sqrt{2}\, e^{2\sqrt{2}\, x\$3513} + 5 \operatorname{Cos}[1] + 2\sqrt{2} \operatorname{Cos}[1] + 5 e^{2\sqrt{2}\, x\$3513} \operatorname{Cos}[1] - 2\sqrt{2}\, e^{2\sqrt{2}\, x\$3513} \operatorname{Cos}[1] - 10 e^{x\$3513+\sqrt{2}\, x\$3513} \operatorname{Cos}[1 + 3\, x\$3513] - 3 \operatorname{Sin}[1] + 9\sqrt{2} \operatorname{Sin}[1] - 3 e^{2\sqrt{2}\, x\$3513} \operatorname{Sin}[1] - 9\sqrt{2}\, e^{2\sqrt{2}\, x\$3513} \operatorname{Sin}[1] + 6 e^{x\$3513+\sqrt{2}\, x\$3513} \operatorname{Sin}[1 + 3\, x\$3513]\right)$$



k1 = 2 k2 = −1 k3 = −2

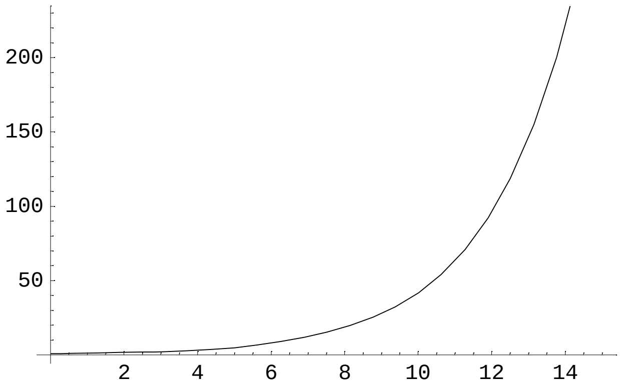
==> y[x] =

$$\frac{1}{164} e^{-\left(1+\sqrt{2}\right) x\$3560} \left(82 - 41\sqrt{2} + 82 e^{2\sqrt{2}\, x\$3560} + 41\sqrt{2}\, e^{2\sqrt{2}\, x\$3560} + 10 \operatorname{Cos}[1] + 3\sqrt{2} \operatorname{Cos}[1] + 10 e^{2\sqrt{2}\, x\$3560} \operatorname{Cos}[1] - 3\sqrt{2}\, e^{2\sqrt{2}\, x\$3560} \operatorname{Cos}[1] - 20 e^{x\$3560+\sqrt{2}\, x\$3560} \operatorname{Cos}[1 + 2\, x\$3560] - 8 \operatorname{Sin}[1] + 14\sqrt{2} \operatorname{Sin}[1] - 8 e^{2\sqrt{2}\, x\$3560} \operatorname{Sin}[1] - 14\sqrt{2}\, e^{2\sqrt{2}\, x\$3560} \operatorname{Sin}[1] + 16 e^{x\$3560+\sqrt{2}\, x\$3560} \operatorname{Sin}[1 + 2\, x\$3560]\right)$$



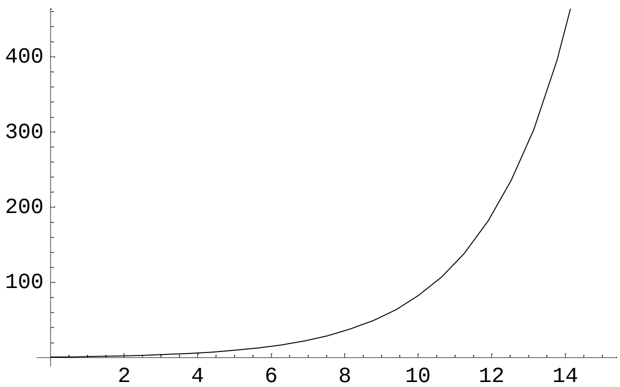
k1 = 2 k2 = -1 k3 = -1

==> $y[x] = \frac{1}{8} e^{-(1+\sqrt{2})\, x\$3598}$
$(4 - 2\sqrt{2} + 4 e^{2\sqrt{2}\, x\$3598} + 2\sqrt{2}\, e^{2\sqrt{2}\, x\$3598} + Cos[1] + e^{2\sqrt{2}\, x\$3598} Cos[1] - 2 e^{x\$3598+\sqrt{2}\, x\$3598} Cos[1 + x\$3598] - Sin[1] + \sqrt{2}\, Sin[1] - e^{2\sqrt{2}\, x\$3598} Sin[1] - \sqrt{2}\, e^{2\sqrt{2}\, x\$3598} Sin[1] + 2 e^{x\$3598+\sqrt{2}\, x\$3598} Sin[1 + x\$3598])$



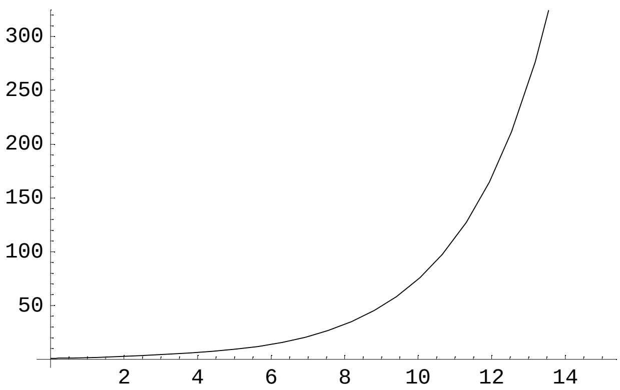
k1 = 2 k2 = -1 k3 = 0

==> $y[x] = \frac{1}{4} e^{-(1+\sqrt{2})\, x\$3634} (-4 e^{(1+\sqrt{2})\, x\$3634} Cos[1] - (-2 + \sqrt{2}) (1 + Cos[1]) + (2 + \sqrt{2}) e^{2\sqrt{2}\, x\$3634} (1 + Cos[1]))$



k1 = 2 k2 = -1 k3 = 1

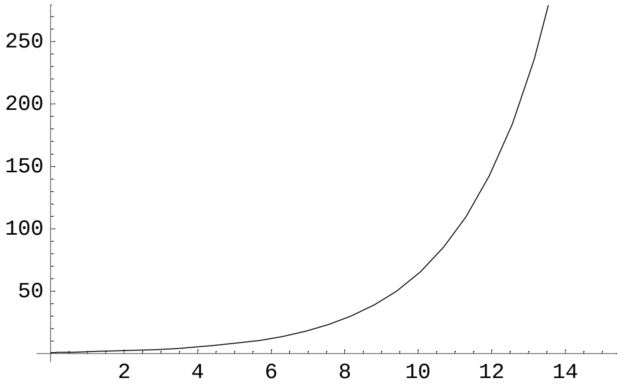
==> $y[x] = \frac{1}{8} e^{-(1+\sqrt{2})\, x\$3641}$
$(4 - 2\sqrt{2} + 4 e^{2\sqrt{2}\, x\$3641} + 2\sqrt{2}\, e^{2\sqrt{2}\, x\$3641} + Cos[1] + e^{2\sqrt{2}\, x\$3641} Cos[1] - 2 e^{x\$3641+\sqrt{2}\, x\$3641} Cos[1 - x\$3641] + Sin[1] - \sqrt{2}\, Sin[1] + e^{2\sqrt{2}\, x\$3641} Sin[1] + \sqrt{2}\, e^{2\sqrt{2}\, x\$3641} Sin[1] - 2 e^{x\$3641+\sqrt{2}\, x\$3641} Sin[1 - x\$3641])$



k1 = 2 k2 = -1 k3 = 2

==> $y[x] = \frac{1}{164} e^{-(1+\sqrt{2})\, x\$3677}$

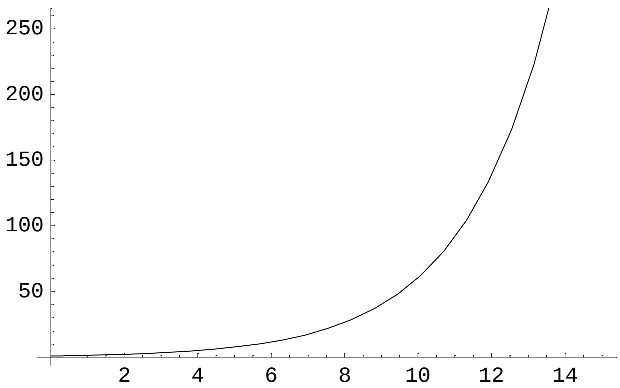
$\Big(82 - 41\sqrt{2} + 82\, e^{2\sqrt{2}\, x\$3677} + 41\sqrt{2}\, e^{2\sqrt{2}\, x\$3677} + 10\, Cos[1] + 3\sqrt{2}\, Cos[1] + 10\, e^{2\sqrt{2}\, x\$3677}\, Cos[1] - 3\sqrt{2}\, e^{2\sqrt{2}\, x\$3677}\, Cos[1] - 20\, e^{x\$3677+\sqrt{2}\, x\$3677}\, Cos[1 - 2\, x\$3677] + 8\, Sin[1] - 14\sqrt{2}\, Sin[1] + 8\, e^{2\sqrt{2}\, x\$3677}\, Sin[1] + 14\sqrt{2}\, e^{2\sqrt{2}\, x\$3677}\, Sin[1] - 16\, e^{x\$3677+\sqrt{2}\, x\$3677}\, Sin[1 - 2\, x\$3677]\Big)$



k1 = 2 k2 = -1 k3 = 3

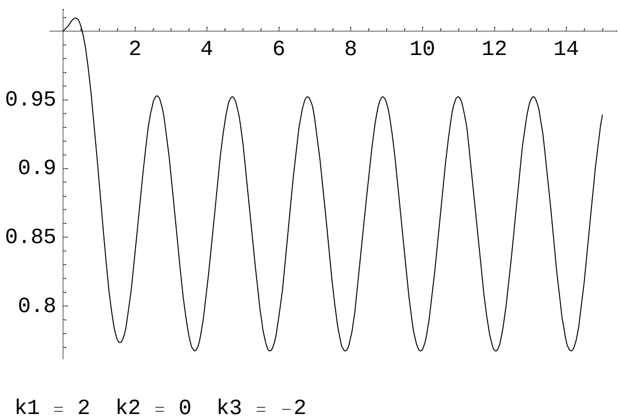
==> $y[x] = \frac{1}{136} e^{-(1+\sqrt{2})\, x\$3713}$

$\Big(68 - 34\sqrt{2} + 68\, e^{2\sqrt{2}\, x\$3713} + 34\sqrt{2}\, e^{2\sqrt{2}\, x\$3713} + 5\, Cos[1] + 2\sqrt{2}\, Cos[1] + 5\, e^{2\sqrt{2}\, x\$3713}\, Cos[1] - 2\sqrt{2}\, e^{2\sqrt{2}\, x\$3713}\, Cos[1] - 10\, e^{x\$3713+\sqrt{2}\, x\$3713}\, Cos[1 - 3\, x\$3713] + 3\, Sin[1] - 9\sqrt{2}\, Sin[1] + 3\, e^{2\sqrt{2}\, x\$3713}\, Sin[1] + 9\sqrt{2}\, e^{2\sqrt{2}\, x\$3713}\, Sin[1] - 6\, e^{x\$3713+\sqrt{2}\, x\$3713}\, Sin[1 - 3\, x\$3713]\Big)$



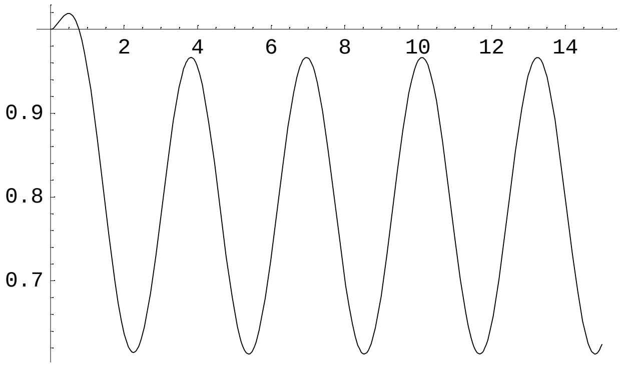
k1 = 2 k2 = 0 k3 = -3

==> $y[x] = \frac{1}{78} \left(78 + 6\, e^{-2\, x\$3749}\, Cos[1] - 6\, Cos[1 + 3\, x\$3749] - 13\, Sin[1] + 9\, e^{-2\, x\$3749}\, Sin[1] + 4\, Sin[1 + 3\, x\$3749]\right)$



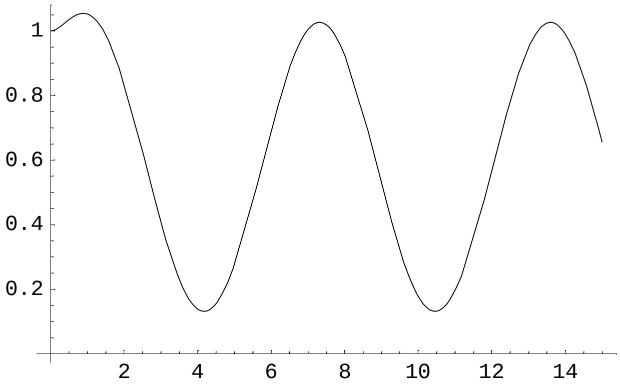
k1 = 2 k2 = 0 k3 = -2

==> $y[x] = \frac{1}{8} \left(8 + e^{-2\, x\$3763}\, Cos[1] - Cos[1 + 2\, x\$3763] - 2\, Sin[1] + e^{-2\, x\$3763}\, Sin[1] + Sin[1 + 2\, x\$3763]\right)$



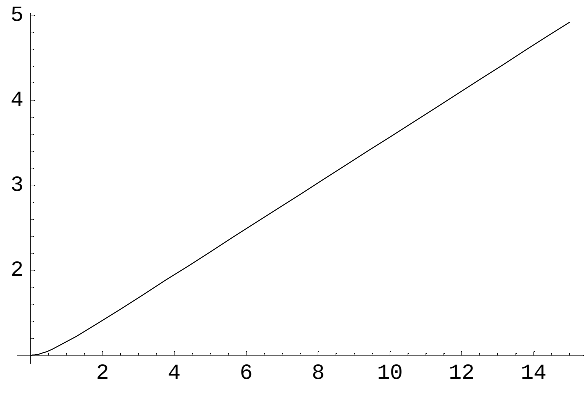
k1 = 2 k2 = 0 k3 = -1

==> y[x] =
$\frac{1}{10}$ (10 + 2 $e^{-2\,x\$3773}$ Cos[1] - 2 Cos[1 + x$3773] - 5 Sin[1] + $e^{-2\,x\$3773}$ Sin[1] + 4 Sin[1 + x$3773])



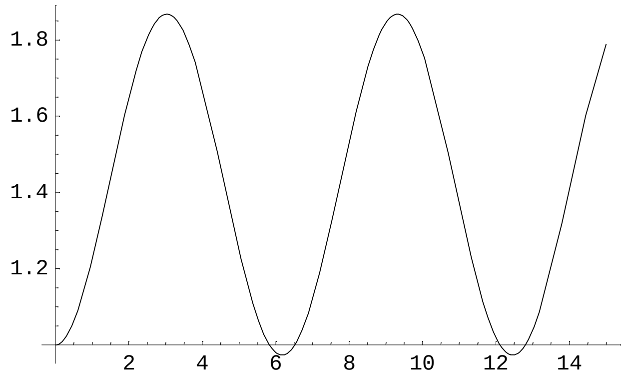
k1 = 2 k2 = 0 k3 = 0

==> y[x] = $\frac{1}{4}$ (4 - Cos[1] + $e^{-2\,x\$3782}$ Cos[1] + 2 x$3782 Cos[1])



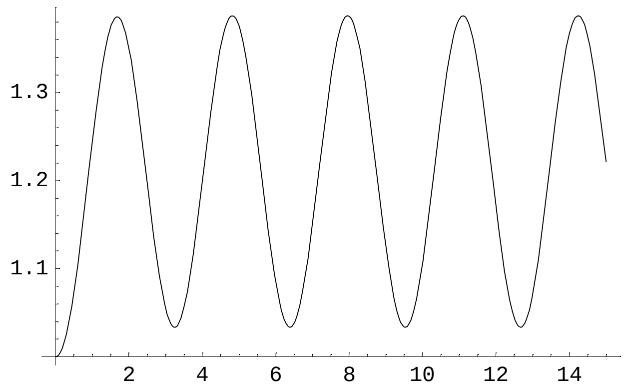
k1 = 2 k2 = 0 k3 = 1

==> y[x] =
$\frac{1}{10}$ (10 + 2 $e^{-2\,x\$3791}$ Cos[1] - 2 Cos[1 - x$3791] + 5 Sin[1] - $e^{-2\,x\$3791}$ Sin[1] - 4 Sin[1 - x$3791])



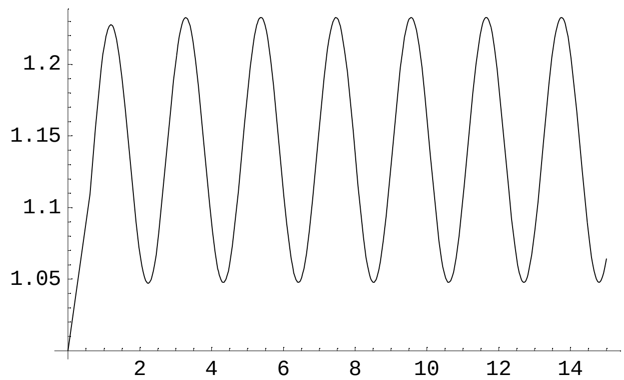
k1 = 2 k2 = 0 k3 = 2

$$\texttt{==>}\quad y[x] = \frac{1}{8}\left(8 + e^{-2\,x\$3802}\,\mathrm{Cos}[1] - \mathrm{Cos}[1 - 2\,x\$3802] + 2\,\mathrm{Sin}[1] - e^{-2\,x\$3802}\,\mathrm{Sin}[1] - \mathrm{Sin}[1 - 2\,x\$3802]\right)$$



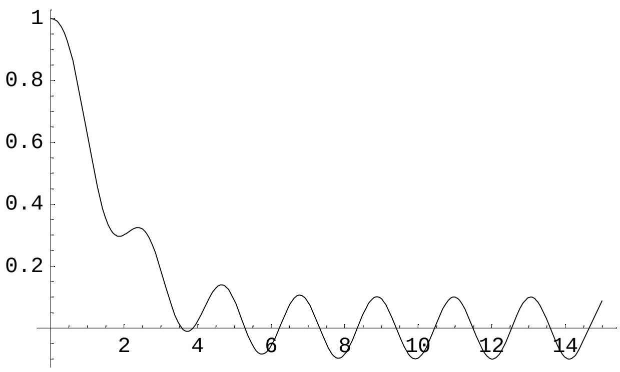
k1 = 2 k2 = 0 k3 = 3

$$\texttt{==>}\quad y[x] = \frac{1}{78}\left(78 + 6\,e^{-2\,x\$3811}\,\mathrm{Cos}[1] - 6\,\mathrm{Cos}[1 - 3\,x\$3811] + 13\,\mathrm{Sin}[1] - 9\,e^{-2\,x\$3811}\,\mathrm{Sin}[1] - 4\,\mathrm{Sin}[1 - 3\,x\$3811]\right)$$



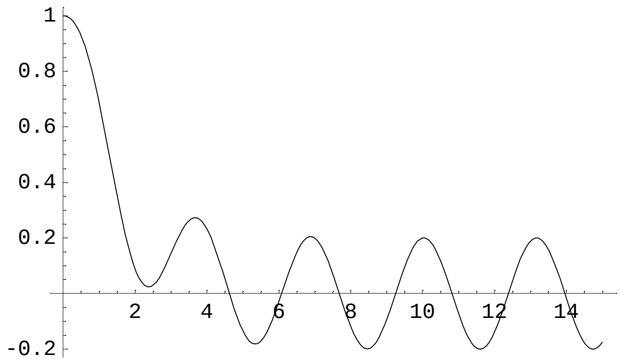
k1 = 2 k2 = 1 k3 = -3

$$\texttt{==>}\quad y[x] = \frac{1}{50}\,e^{-x\$3822}\left(50 + 50\,x\$3822 + 4\,\mathrm{Cos}[1] - 5\,x\$3822\,\mathrm{Cos}[1] - 4\,e^{x\$3822}\,\mathrm{Cos}[1 + 3\,x\$3822] - 3\,\mathrm{Sin}[1] - 15\,x\$3822\,\mathrm{Sin}[1] + 3\,e^{x\$3822}\,\mathrm{Sin}[1 + 3\,x\$3822]\right)$$



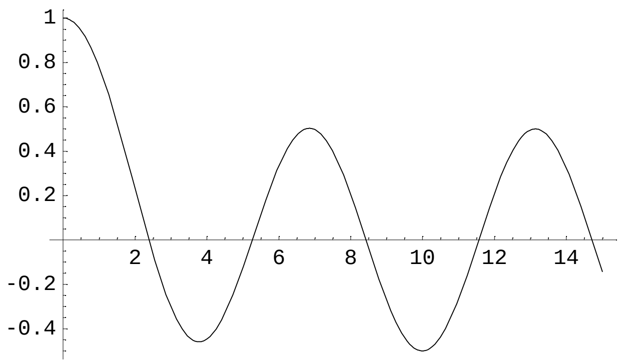
k1 = 2 k2 = 1 k3 = −2

==> $y[x] = \frac{1}{25} e^{-x\$3841} (25 + 25\, x\$3841 + 3\, Cos[1] - 5\, x\$3841\, Cos[1] - 3\, e^{x\$3841}\, Cos[1 + 2\, x\$3841] - 4\, Sin[1] - 10\, x\$3841\, Sin[1] + 4\, e^{x\$3841}\, Sin[1 + 2\, x\$3841])$



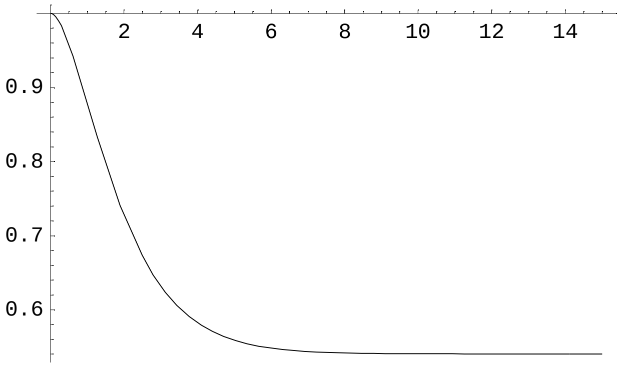
k1 = 2 k2 = 1 k3 = −1

==> $y[x] = \frac{1}{2} e^{-x\$3860} (2 - Sin[1] - x\$3860\, (-2 + Cos[1] + Sin[1]) + e^{x\$3860}\, Sin[1 + x\$3860])$



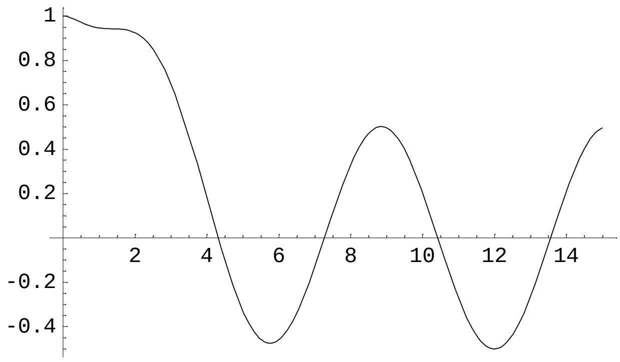
k1 = 2 k2 = 1 k3 = 0

==> $y[x] = e^{-x\$3876} (1 + x\$3876 - Cos[1] + e^{x\$3876}\, Cos[1] - x\$3876\, Cos[1])$



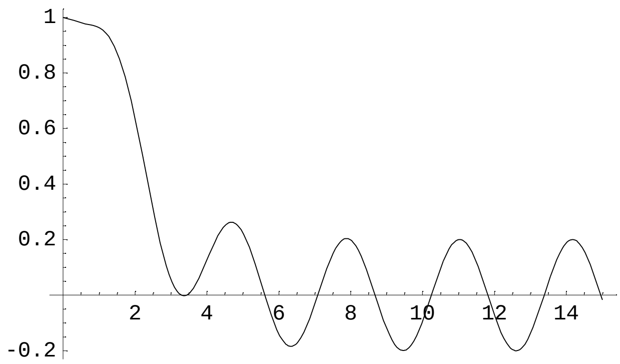
k1 = 2 k2 = 1 k3 = 1

==> y[x] = $\frac{1}{2}$ e^(-x$3882) (2 + Sin[1] + x$3882 (2 - Cos[1] + Sin[1]) - e^(x$3882) Sin[1 - x$3882])



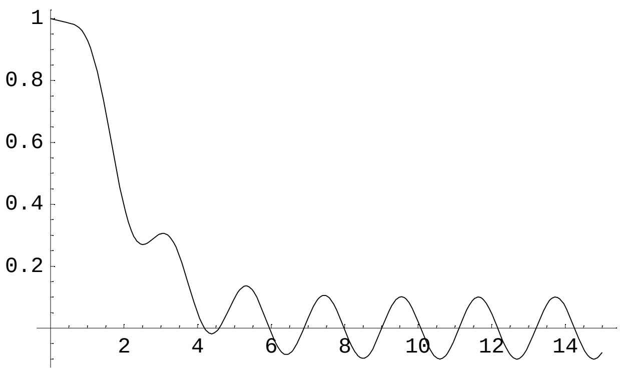
k1 = 2 k2 = 1 k3 = 2

==> y[x] = $\frac{1}{25}$ e^(-x$3898) (25 + 25 x$3898 + 3 Cos[1] - 5 x$3898 Cos[1] -
3 e^(x$3898) Cos[1 - 2 x$3898] + 4 Sin[1] + 10 x$3898 Sin[1] - 4 e^(x$3898) Sin[1 - 2 x$3898])



k1 = 2 k2 = 1 k3 = 3

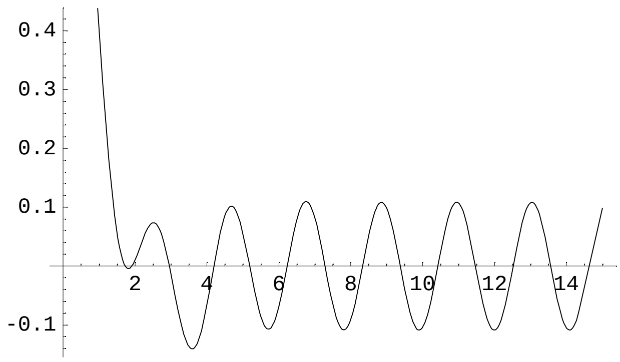
==> y[x] = $\frac{1}{50}$ e^(-x$3915) (50 + 50 x$3915 + 4 Cos[1] - 5 x$3915 Cos[1] -
4 e^(x$3915) Cos[1 - 3 x$3915] + 3 Sin[1] + 15 x$3915 Sin[1] - 3 e^(x$3915) Sin[1 - 3 x$3915])



k1 = 2 k2 = 2 k3 = -3

==> y[x] =

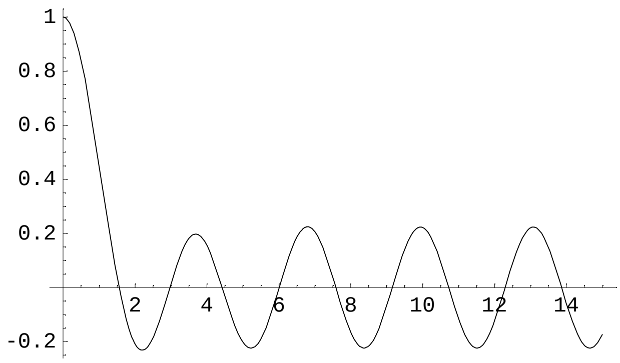
$\frac{1}{170}$ ⅇ^(-x$3932) (-20 Cos[1 - x$3932] + 170 Cos[x$3932] + 34 Cos[1 + x$3932] - 14 ⅇ^(x$3932) Cos[1 + 3 x$3932] + 5 Sin[1 - x$3932] + 170 Sin[x$3932] - 17 Sin[1 + x$3932] + 12 ⅇ^(x$3932) Sin[1 + 3 x$3932])



k1 = 2 k2 = 2 k3 = -2

==> y[x] =

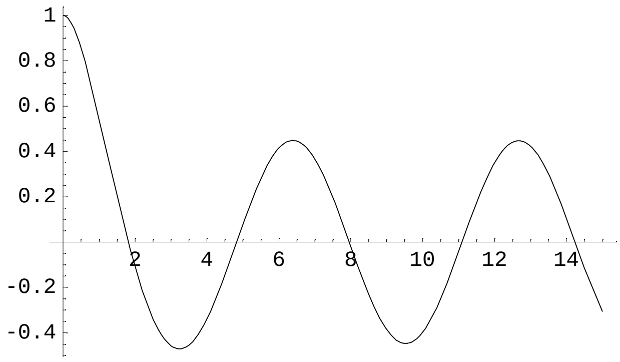
$\frac{1}{20}$ ⅇ^(-x$3963) (-3 Cos[1 - x$3963] + 20 Cos[x$3963] + 5 Cos[1 + x$3963] - 2 ⅇ^(x$3963) Cos[1 + 2 x$3963] + Sin[1 - x$3963] + 20 Sin[x$3963] - 5 Sin[1 + x$3963] + 4 ⅇ^(x$3963) Sin[1 + 2 x$3963])



k1 = 2 k2 = 2 k3 = -1

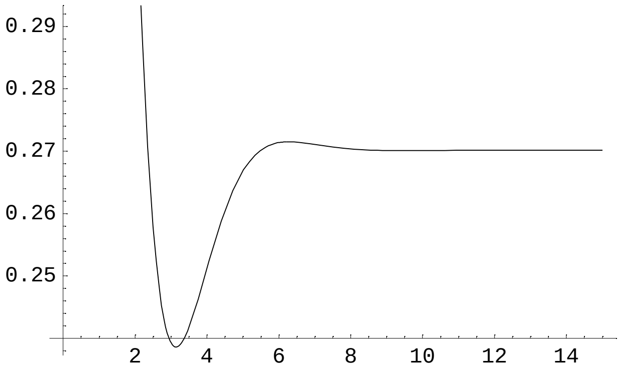
==> y[x] =

$\frac{1}{10}$ ⅇ^(-x$3993) (-2 Cos[1 - x$3993] + 10 Cos[x$3993] + 2 ⅇ^(x$3993) Cos[1 + x$3993] + Sin[1 - x$3993] + 10 Sin[x$3993] - 5 Sin[1 + x$3993] + 4 ⅇ^(x$3993) Sin[1 + x$3993])



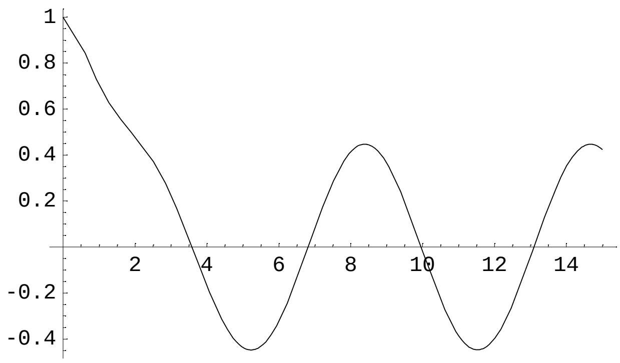
k1 = 2 k2 = 2 k3 = 0

==> y[x] = $\frac{1}{2}$ e^-x$4020 (e^x$4020 Cos[1] - (-2 + Cos[1]) Cos[x$4020] - (-2 + Cos[1]) Sin[x$4020])



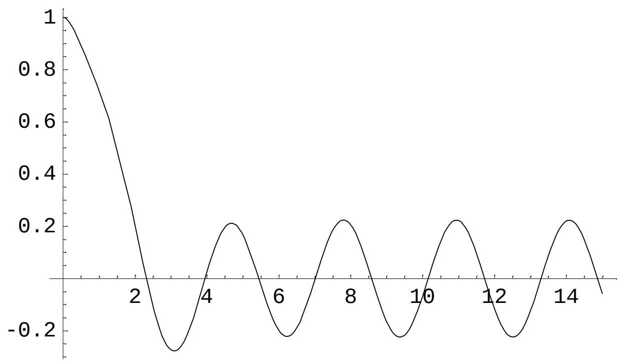
k1 = 2 k2 = 2 k3 = 1

==> y[x] =
$\frac{1}{10}$ e^-x$4027 (2 e^x$4027 Cos[1 - x$4027] + 10 Cos[x$4027] - 2 Cos[1 + x$4027] + 5 Sin[1 - x$4027] -
4 e^x$4027 Sin[1 - x$4027] + 10 Sin[x$4027] - Sin[1 + x$4027])



k1 = 2 k2 = 2 k3 = 2

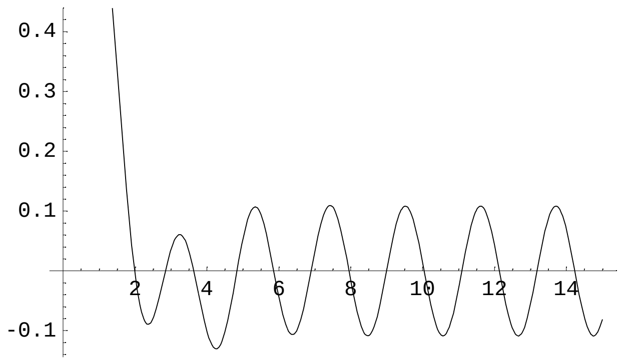
==> y[x] =
-$\frac{1}{20}$ e^-x$4052 (2 e^x$4052 Cos[1 - 2 x$4052] - 5 Cos[1 - x$4052] - 20 Cos[x$4052] + 3 Cos[1 + x$4052] +
4 e^x$4052 Sin[1 - 2 x$4052] - 5 Sin[1 - x$4052] - 20 Sin[x$4052] + Sin[1 + x$4052])



k1 = 2 k2 = 2 k3 = 3

==> y[x] =

$\frac{1}{170}$ $e^{-x\$4080}$ (−14 $e^{x\$4080}$ Cos[1 − 3 x$4080] + 34 Cos[1 − x$4080] + 170 Cos[x$4080] − 20 Cos[1 + x$4080] −
12 $e^{x\$4080}$ Sin[1 − 3 x$4080] + 17 Sin[1 − x$4080] + 170 Sin[x$4080] − 5 Sin[1 + x$4080])

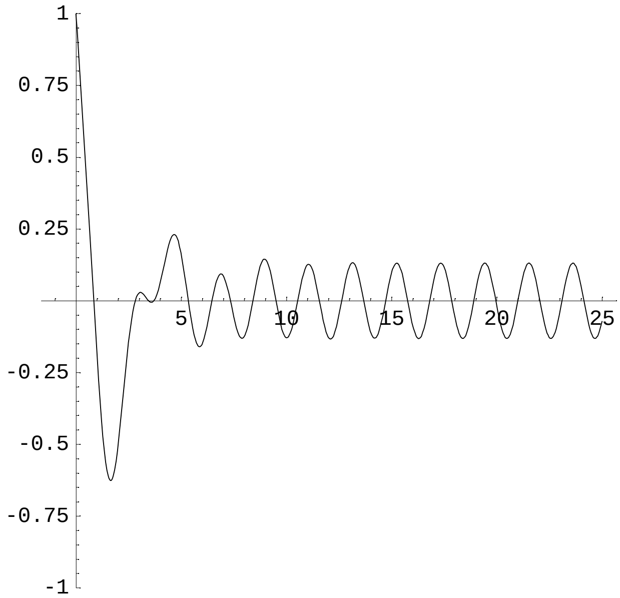


b Nähere Untersuchung der Lösung von y''[x]+ y'[x]+ 2 y[x]   Cos[-3 x-1], y[0]   1, y'[0]   -1

Exakte Lösung

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x]+ 2 y[x]==Cos[-3 x-1], y[0]==1, y'[0]==-1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
plot1 = Plot[y[x],{x,-1,25},PlotRange->{-1,1},AspectRatio->1];
```

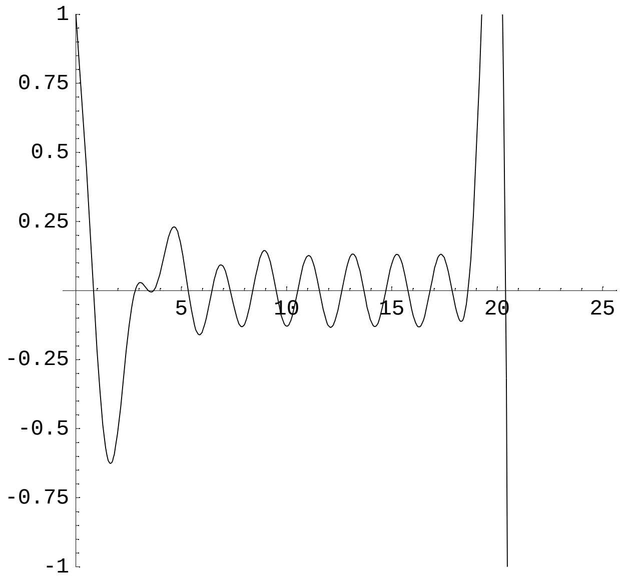
$$\text{==> } y[x] = \frac{1}{812} e^{-x/2} \Big(-98 e^{x/2} \text{Cos}[1+3x] - 45\sqrt{7}\,\text{Cos}\Big[1-\frac{\sqrt{7}\,x}{2}\Big] + 45\sqrt{7}\,\text{Cos}\Big[1+\frac{\sqrt{7}\,x}{2}\Big] + 14\,\text{Cos}\Big[\frac{\sqrt{7}\,x}{2}\Big](58+7\,\text{Cos}[1]-3\,\text{Sin}[1]) - 116\sqrt{7}\,\text{Sin}\Big[\frac{\sqrt{7}\,x}{2}\Big] + 42 e^{x/2}\,\text{Sin}[1+3x] + 11\sqrt{7}\,\text{Sin}\Big[1-\frac{\sqrt{7}\,x}{2}\Big] - 11\sqrt{7}\,\text{Sin}\Big[1+\frac{\sqrt{7}\,x}{2}\Big]\Big)$$



Numerische Lösung, WorkingPrecision 64

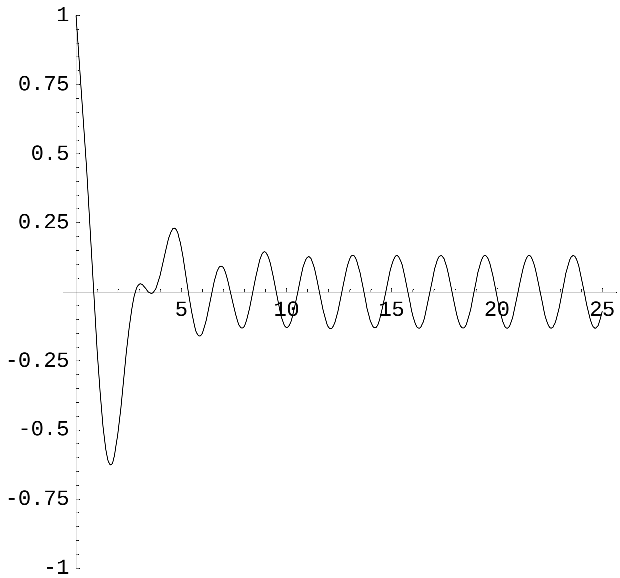
```
Remove[x,y];
solut = NDSolve[{y''[x]+ y'[x]+ 2 y[x]==Cos[-3 x-1], y[0]==1, y'[0]==
-1},y,{x,0,25},WorkingPrecision→64];
plot2 = Plot[y[x]/.solut,{x,0,25},PlotRange->{-1,1},AspectRatio->1];
```

```
NDSolve::mxst : Maximum number of 10000 steps reached at the point x ==
   17.4752862886652538431495114334308695321230306214661948101928697302448254921171 5`64.. Mehr…

InterpolatingFunction::dmval : Input value {18.077} lies outside the
   range of data in the interpolating function. Extrapolation will be used. Mehr…

InterpolatingFunction::dmval : Input value {17.5341} lies outside the
   range of data in the interpolating function. Extrapolation will be used. Mehr…

InterpolatingFunction::dmval : Input value {17.8188} lies outside the
   range of data in the interpolating function. Extrapolation will be used. Mehr…

General::stop :
 Further output of InterpolatingFunction::dmval will be suppressed during this calculation. Mehr…
```



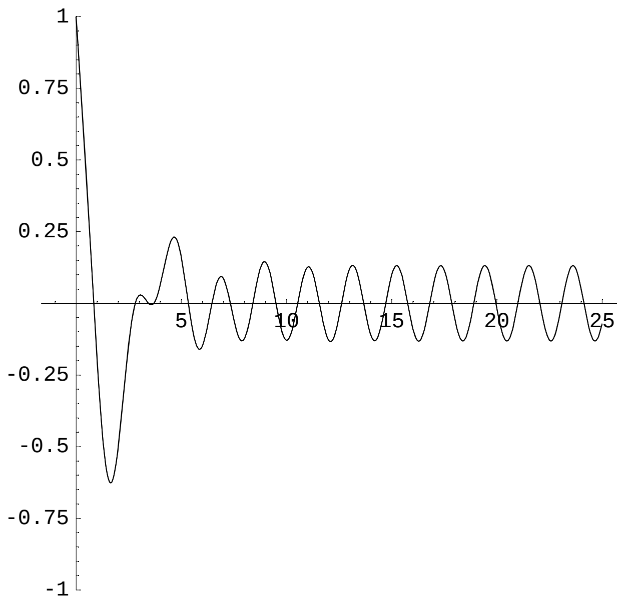
Numerische Lösung, WorkingPrecision 24

```
Remove[x,y];
solut = NDSolve[{y''[x]+ y'[x]+ 2 y[x]==Cos[-3 x-1], y[0]==1, y'[0]==
-1},y,{x,0,25},WorkingPrecision→24];
plot2 = Plot[y[x]/.solut,{x,0,25},PlotRange->{-1,1},AspectRatio->1];
```



Ueberlagerung der exakten und der numerischen Lösung (WorkingPrecision 24)

```
Show[plot1,plot2];
```



2 Randwertproblem

a Achtung! Die Prozedur DSolve in Version 5.2 findet nicht automatisch alle Lösungen eines Randwertproblems. Hier wird das Eigenwertproblem (Randwertproblem) y''[x] - y[x], y[0] 0, y[ ] 0 studiert

i

```
Remove["Global`*"];
solv=DSolve[{y''[x] == - λ y[x], y[0]==0, y[Pi]==0},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
```

```
==>  y[x] = 0

==>  y[x] = 0
```

Nur die Nullösung ist gefunden worden!

```
solv
```

```
{{Function[{x}, 0] → Function[{x}, 0]}}
```

ii Wir testen, ob andere Eigenfunktionen auch Lösungen sind, y[x]-> Sin[Sqrt[ ] x]:

```
Remove[λ,y,x]

(y''[x] == - λ y[x]/. {y[x]-> Sin[Sqrt[λ] x],y''[x]-> D[Sin[Sqrt[λ]
x],{x,2}]})//Simplify
```

```
True
```

```
Remove[λ,y,x]

{y''[x] == - λ y[x], y[0], y[Pi]}/. {y[x]-> Sin[Sqrt[λ] x],y''[x]-> D[Sin[Sqrt[λ]
x],{x,2}],y[0]-> Sin[Sqrt[λ] 0],y[Pi]-> Sin[Sqrt[λ] Pi]}//Simplify
```

$\{\text{True}, 0, \text{Sin}[\pi \sqrt{\lambda}]\}$

```
Assuming[λ∈Integers,{y''[x] == - λ^2 y[x], y[0], y[Pi]}/. {y[x]-> Sin[λ
x],y''[x]-> D[Sin[λ x],{x,2}],y[0]-> Sin[λ 0],y[Pi]-> Sin[λ Pi]}//Simplify]
```

```
{True, 0, 0}
```

iii

```
Remove["Global`*"];
solv=DSolve[{y''[x] == - y[x], y[0]==0, y[Pi]==0},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
```

```
==>  y[x] = C[2] Sin[x]

==>  y[x] = C[2] Sin[x]
```

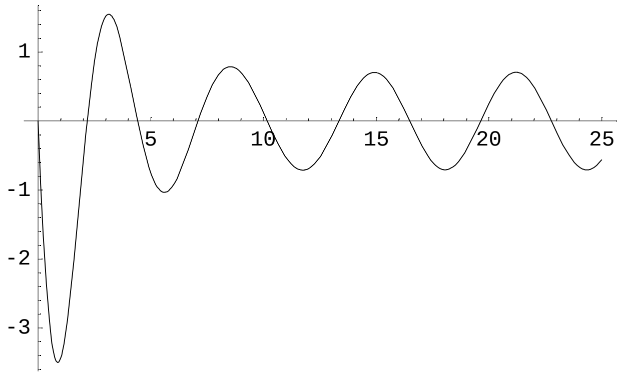
Hier ist die erste Eigenfunktion zum gegebenen Eigenwert 1 gefunden worden! Der Eigenwert war vorgegeben.

b Ein weiteres Beispiel ohne Untersuchung von Eigenwerten und Eingenfunktionen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x]+ 2 y[x]== Sin[x], y[0]==0, y'[Pi]==0},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[y[x],{x,0,25}];
```

==> y[x] =

$$\left(e^{-x/2}\left(-e^{x/2}\,\mathrm{Cos}[x]\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)+\mathrm{Cos}\left[\frac{\sqrt{7}\,x}{2}\right]\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)+\sqrt{7}\,e^{x/2}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}[x]-e^{x/2}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}[x]+2\,e^{\pi/2}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]+\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]+\sqrt{7}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]\right)\right)\Big/\left(2\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)\right)$$

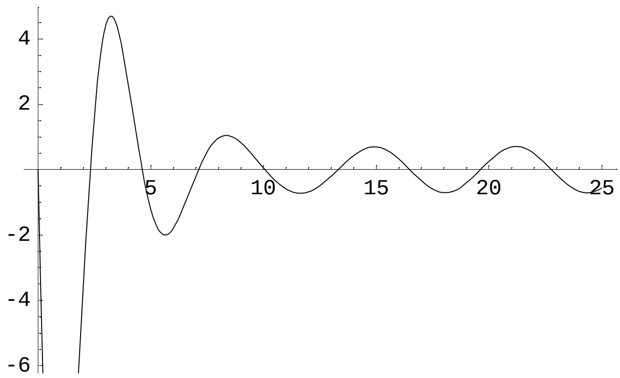


c Noch ein weiteres Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x]+ 2 y[x]==Sin[x], y[0]==0, y'[Pi]==1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[y[x],{x,0,25}];
```

==> y[x] =

$$\left(e^{-x/2}\left(-e^{x/2}\,\mathrm{Cos}[x]\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)+\mathrm{Cos}\left[\frac{\sqrt{7}\,x}{2}\right]\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)+\sqrt{7}\,e^{x/2}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}[x]-e^{x/2}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}[x]+6\,e^{\pi/2}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]+\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]+\sqrt{7}\,\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]\right)\right)\Big/\left(2\left(\sqrt{7}\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]-\mathrm{Sin}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)\right)$$

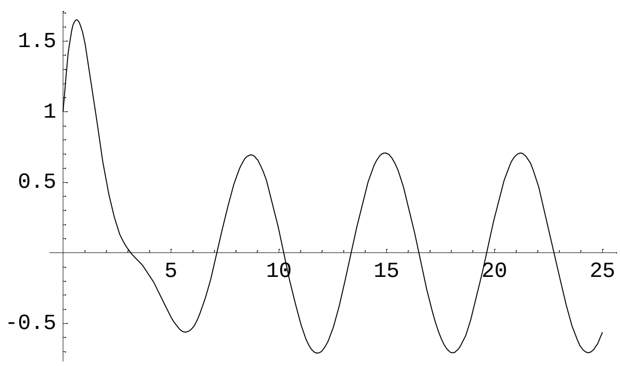


d Nochmals ein weiteres Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x]+ 2 y[x]==Sin[x], y[0]==1, y[Pi]==0},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[y[x],{x,0,25}];
```

==> y[x] =

$$-\frac{1}{2}e^{-x/2}\left(e^{x/2}\,\mathrm{Cos}[x]-3\,\mathrm{Cos}\left[\frac{\sqrt{7}\,x}{2}\right]-e^{x/2}\,\mathrm{Sin}[x]+3\,\mathrm{Cot}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]+e^{\pi/2}\,\mathrm{Csc}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]\right)$$

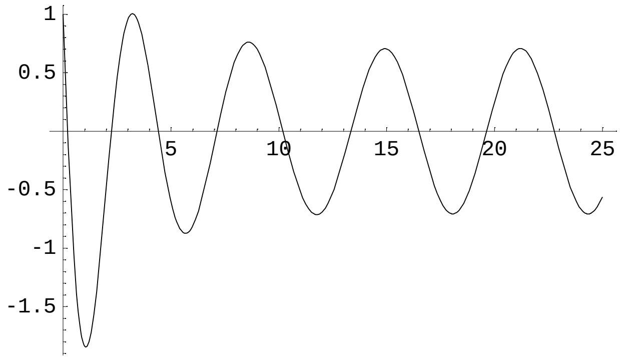


e Wieder ein weiteres Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x]+ 2 y[x]==Sin[x], y[0]==1, y[Pi]==1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[y[x],{x,0,25}];
```

==> y[x] =

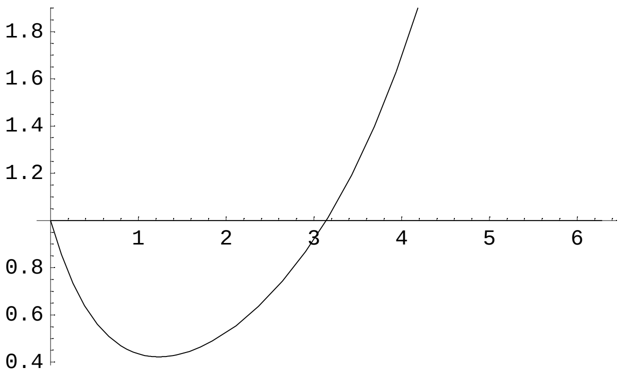
$$\frac{1}{2}\left(-\mathrm{Cos}[x]+e^{-x/2}\left(3\,\mathrm{Cos}\left[\frac{\sqrt{7}\,x}{2}\right]+e^{x/2}\,\mathrm{Sin}[x]+\left(e^{\pi/2}-3\,\mathrm{Cos}\left[\frac{\sqrt{7}\,\pi}{2}\right]\right)\mathrm{Csc}\left[\frac{\sqrt{7}\,\pi}{2}\right]\mathrm{Sin}\left[\frac{\sqrt{7}\,x}{2}\right]\right)\right)$$



f Und wieder ein weiteres Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x] == y[x], y[0]==1, y[Pi]==1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[{y[x],1},{x,0,2Pi}];
```

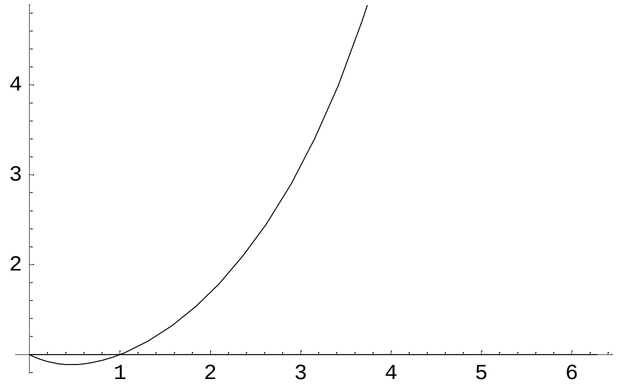
$$\text{==>}\quad y[x] = \frac{e^{-\frac{1}{2}\left(1+\sqrt{5}\right)x}\left(e^{\sqrt{5}\,\pi}-e^{\frac{1}{2}\left(1+\sqrt{5}\right)\pi}-e^{\sqrt{5}\,x}+e^{\frac{1}{2}\left(\pi+\sqrt{5}\,\pi+2\sqrt{5}\,x\right)}\right)}{-1+e^{\sqrt{5}\,\pi}}$$



g Abermals ein weiteres Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x]+ y'[x] == y[x], y[0]==1, y[1]==1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[{y[x],1},{x,0,2Pi}];
```

==> $y[x] = \frac{e^{-\frac{1}{2}(1+\sqrt{5})x}\left(e^{\sqrt{5}} - e^{\frac{1}{2}(1+\sqrt{5})} - e^{\sqrt{5}x} + e^{\frac{1}{2}(1+\sqrt{5}+2\sqrt{5}x)}\right)}{-1+e^{\sqrt{5}}}$



h Ein letztes Beispiel ohne homogene Randbedingungen

```
Remove["Global`*"];
solv=DSolve[{y''[x] == - y[x], y[0]==1, y[1]==1},y,x];
y = y/.solv[[1]];
Print["==>  y[x] = ",y[x]//Simplify];
Plot[{y[x],1},{x,0,2Pi}];
```

==> $y[x] = Cos[x] + Sin[x] \, Tan\left[\frac{1}{2}\right]$