> restart

> $F := \frac{s}{s^2+s+1}$

$$F := \frac{s}{s^2+s+1} \quad (1)$$

> with(inttrans) :

> $f := expand(invlaplace(F, s, t))$

$$f := e^{-\frac{1}{2}t}\cos\left(\frac{1}{2}\sqrt{3}\,t\right) - \frac{1}{3}e^{-\frac{1}{2}t}\sqrt{3}\sin\left(\frac{1}{2}\sqrt{3}\,t\right) \quad (2)$$

> $FF := laplace(f, t, s)$

$$FF := \frac{s}{s^2+s+1} \quad (3)$$

> restart

> $Ecua := y''+3y'+2y = 2\cdot\exp(4\cdot x) + x^3 + \sin(2\cdot x)$

$$Ecua := \frac{d^2}{dx^2}y(x) + 3\left(\frac{d}{dx}y(x)\right) + 2y(x) = 2e^{4x} + x^3 + \sin(2x) \quad (4)$$

> $CondIni := y(0) = 4, D(y)(0) = -6$

$$CondIni := y(0) = 4, D(y)(0) = -6 \quad (5)$$

> with(inttrans) :

> $EcuaTL := subs(\{CondIni\}, \{laplace(Ecua, x, s)\})$

$$EcuaTL := \left\{s^2\,laplace(y(x), x, s) - 6 - 4s + 3s\,laplace(y(x), x, s) + 2\,laplace(y(x), x, s) = \frac{2}{s-4} + \frac{6}{s^4} + \frac{2}{s^2+4}\right\} \quad (6)$$

> $SolTL := expand(isolate(EcuaTL[1], laplace(y(x), x, s)))$

$$SolTL := laplace(y(x), x, s) = \frac{2}{(s^2+3s+2)(s-4)} + \frac{6}{(s^2+3s+2)s^4} + \frac{2}{(s^2+3s+2)(s^2+4)} + \frac{4s}{s^2+3s+2} + \frac{6}{s^2+3s+2} \quad (7)$$

> $SolPart := invlaplace(SolTL, s, x)$

$$SolPart := y(x) = \frac{41}{24}e^{-2x} + 8e^{-x} + \frac{1}{15}e^{4x} - \frac{45}{8} - \frac{9}{4}x^2 + \frac{1}{2}x^3 + \frac{21}{4}x - \frac{3}{20}\cos(2x) - \frac{1}{20}\sin(2x) \quad (8)$$

> $Comprobar := eval(subs(y(x) = rhs(SolPart), lhs(Ecua) - rhs(Ecua) = 0))$

$$Comprobar := 0 = 0 \quad (9)$$

> $ComprobarDos := y(0) = simplify(subs(x = 0, rhs(SolPart)))$

$$ComprobarDos := y(0) = 4 \quad (10)$$

> $CondIni[1]$

$$y(0) = 4 \quad (11)$$

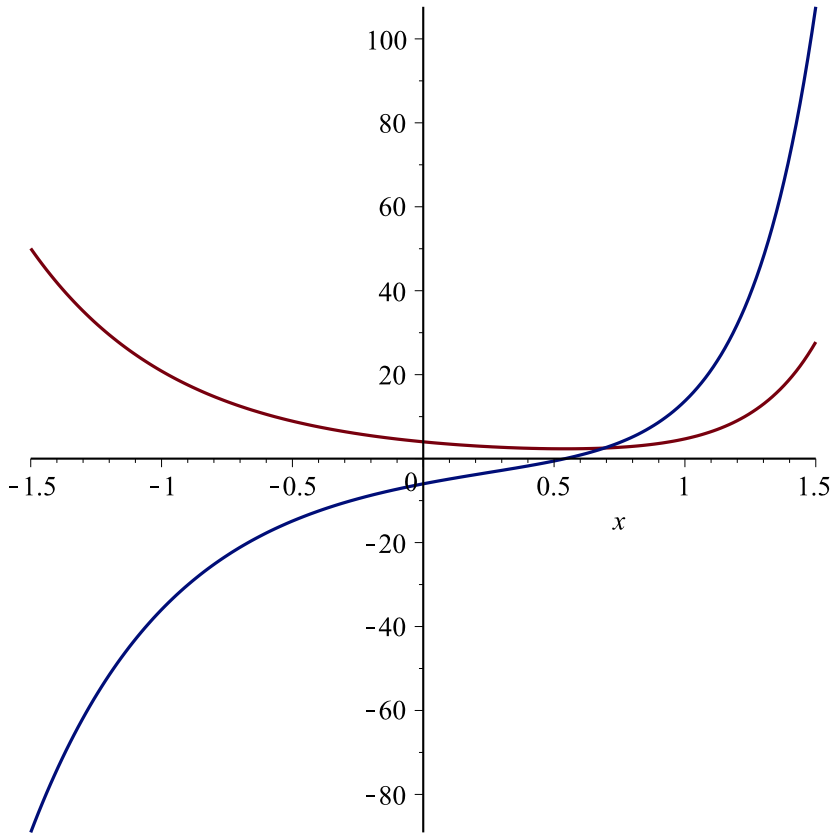
> $ComprobarTres := D(y)(0) = simplify(subs(x = 0, rhs(diff(SolPart, x))))$

$$ComprobarTres := D(y)(0) = -6 \quad (12)$$

> CondIni[2]

$$D(y)(0) = -6 \quad (13)$$

> plot([rhs(SolPart), rhs(diff(SolPart, x))], x = -1.5..1.5)



> restart

> Ecua := 3·diff(i(t), t) + 10·i(t) = Heaviside(t − 2)·120·cos(60·Pi·t)

$$Ecua := 3\left(\frac{d}{dt}\,i(t)\right) + 10\,i(t) = 120\,\text{Heaviside}(t-2)\cos(60\,\pi\,t) \quad (14)$$

> CondIni := i(0) = 0

$$CondIni := i(0) = 0 \quad (15)$$

> with(inttrans):

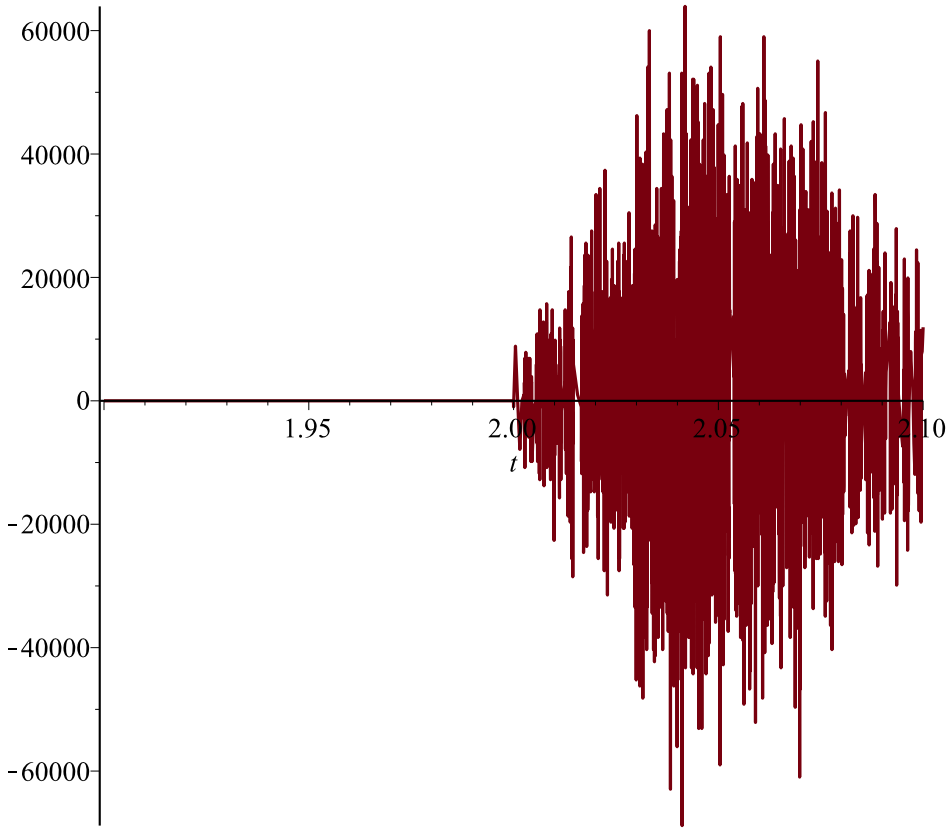
> EcuaTL := subs(CondIni, laplace(Ecua, t, s))

$$EcuaTL := 3\,s\,laplace(i(t), t, s) + 10\,laplace(i(t), t, s) = \frac{120\,e^{-2s}\,s}{3600\,\pi^2 + s^2} \quad (16)$$

> SolTL := isolate(EcuaTL, laplace(i(t), t, s))

$$SolTL := laplace(i(t), t, s) = \frac{120\,e^{-2s}\,s}{\left(3600\,\pi^2 + s^2\right)(3\,s + 10)} \quad (17)$$

```
> SolPart := simplify(invlaplace(SolTL, s, t)) :
> plot(rhs(SolPart), t = 1.9 ..2.1)
```




```
>
>
>
>
>
>
```