> *restart*

> $Sol := int(\cos(a\cdot\tau)\cdot\sin(a\cdot(t-\tau)), \tau=0..t)$

$$Sol := \frac{1}{2}\sin(a\,t)\,t \tag{1}$$

> *with(inttrans)* :

> $SolDos := invlaplace\left(\frac{a\cdot s}{(s^2+a^2)^2}, s, t\right)$

$$SolDos := \frac{1}{2}\sin(a\,t)\,t \tag{2}$$

> *restart*

> $Ecuacion := y''' + 2\,y'' - 3\,y' + 4\,y = 5\cdot\exp(2\,x) + x^2 - 6\cos(2\,x)$

$$Ecuacion := \frac{d^3}{dx^3}\,y(x) + 2\left(\frac{d^2}{dx^2}\,y(x)\right) - 3\left(\frac{d}{dx}\,y(x)\right) + 4\,y(x) = 5\,e^{2\,x} + x^2 - 6\cos(2\,x) \tag{3}$$

> $CondIni := y(0)=2, D(y)(0)=-3, D(D(y))(0)=4$

$$CondIni := y(0)=2, D(y)(0)=-3, D^{(2)}(y)(0)=4 \tag{4}$$

> *with(inttrans)* :

> $EcuaTL := subs(CondIni, laplace(Ecuacion, x, s))$

$$EcuaTL := s^3\,laplace(y(x), x, s) + 8 - s - 2\,s^2 + 2\,s^2\,laplace(y(x), x, s) - 3\,s\,laplace(y(x), x, s) + 4\,laplace(y(x), x, s) = \frac{5}{s-2} + \frac{2}{s^3} - \frac{6\,s}{s^2+4} \tag{5}$$

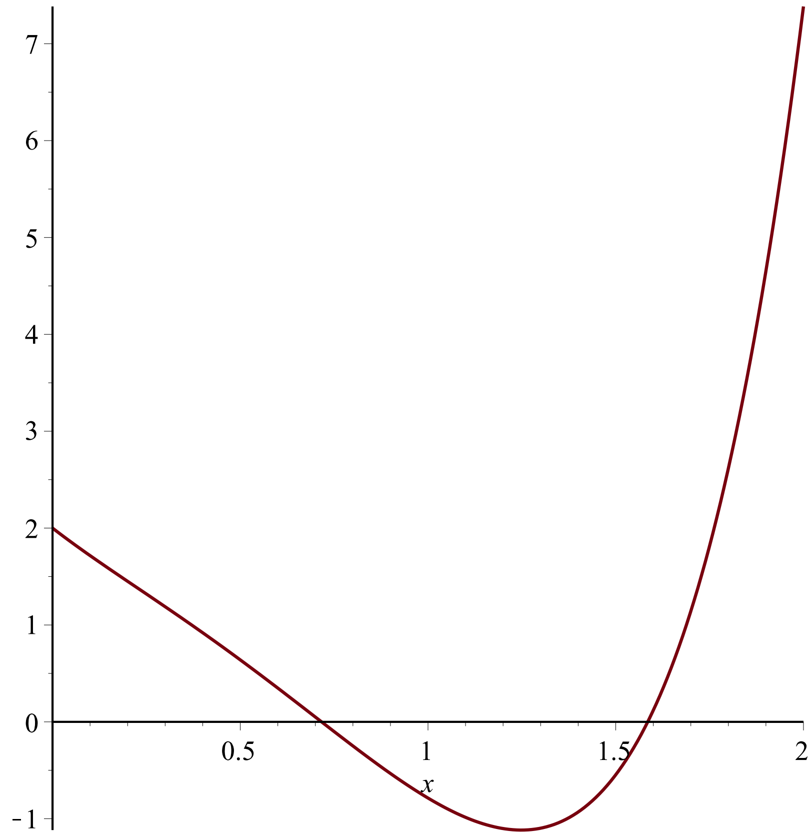
> $SolTL := simplify(isolate(EcuaTL, laplace(y(x), x, s)))$

$$SolTL := laplace(y(x), x, s) = \frac{2\,s^8 - 3\,s^7 - 2\,s^6 + 3\,s^5 - 28\,s^4 + 86\,s^3 - 4\,s^2 + 8\,s - 16}{(s-2)\,s^3\,(s^2+4)\,(s^3+2\,s^2-3\,s+4)} \tag{6}$$

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

$$SolPart := y(x) = \frac{1}{11872}\sum_{\_\alpha = RootOf(\_Z^3+2\,\_Z^2-3\,\_Z+4)} (6009\,\_\alpha^2 + 16406\,\_\alpha - 3163)\,e^{\_\alpha\,x} + \frac{5}{14}\,e^{2\,x} + \frac{1}{32} + \frac{3}{8}\,x + \frac{1}{4}\,x^2 + \frac{6}{53}\cos(2\,x) + \frac{21}{53}\sin(2\,x) \tag{7}$$

> $plot(rhs(SolPart), x=0..2)$




> Comprobacion := expand(eval(subs(y(x) = rhs(SolPart), lhs(Ecuacion) − rhs(Ecuacion) = 0)))

$$Comprobacion := \frac{1}{11872} \sum_{\_\alpha = RootOf(\_Z^3 + 2\_Z^2 - 3\_Z + 4)} \left(6009\,\_\alpha^5\, e^{\alpha x} + 16406\,\_\alpha^4\, e^{\alpha x} - 3163\,\_\alpha^3\, e^{\alpha x}\right) + \frac{1}{5936} \sum_{\_\alpha = RootOf(\_Z^3 + 2\_Z^2 - 3\_Z + 4)} \left(6009\,\_\alpha^4\, e^{\alpha x} + 16406\,\_\alpha^3\, e^{\alpha x} - 3163\,\_\alpha^2\, e^{\alpha x}\right) - \frac{3}{11872} \sum_{\_\alpha = RootOf(\_Z^3 + 2\_Z^2 - 3\_Z + 4)} \left(6009\,\_\alpha^3\, e^{\alpha x} + 16406\,\_\alpha^2\, e^{\alpha x} - 3163\,\_\alpha\, e^{\alpha x}\right) + \frac{1}{2968} \sum_{\_\alpha = RootOf(\_Z^3 + 2\_Z^2 - 3\_Z + 4)} \left(6009\,\_\alpha^2\, e^{\alpha x} + 16406\,\_\alpha\, e^{\alpha x} - 3163\, e^{\alpha x}\right) = 0 \tag{8}$$

> Ecuacion

$$\frac{d^3}{dx^3} y(x) + 2\left(\frac{d^2}{dx^2} y(x)\right) - 3\left(\frac{d}{dx} y(x)\right) + 4\,y(x) = 5\,e^{2x} + x^2 - 6\cos(2x) \tag{9}$$

> Q := rhs(Ecuacion)

$$Q := 5\,e^{2x} + x^2 - 6\cos(2x) \tag{10}$$

> $EcuaCarac := m^3 + 2\,m^2 - 3\,m + 4 = 0$

$$EcuaCarac := m^3 + 2\,m^2 - 3\,m + 4 = 0 \qquad \textbf{(11)}$$

> $Raiz := solve(EcuaCarac) : evalf(\%, 3)$

$$-3.28,\ 0.643 - 0.890\,\mathrm{I},\ 0.643 + 0.890\,\mathrm{I} \qquad \textbf{(12)}$$

> $\exp(Raiz[1]\cdot x) : yy[1] := evalf(\%, 3)$

$$yy_1 := \mathrm{e}^{-3.28\,x} \qquad \textbf{(13)}$$

> $\exp(\mathrm{Re}(Raiz[3])\cdot x)\cdot\cos(\mathrm{Im}(Raiz[3])\cdot x) : yy[2] := evalf(\%, 3)$

$$yy_2 := \mathrm{e}^{0.643\,x}\cos(-0.890\,x) \qquad \textbf{(14)}$$

> $\exp(\mathrm{Re}(Raiz[2])\cdot x)\cdot\sin(\mathrm{Im}(Raiz[2])\cdot x) : yy[3] := evalf(\%, 3)$

$$yy_3 := \mathrm{e}^{0.643\,x}\sin(-0.890\,x) \qquad \textbf{(15)}$$

>

>