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> restart
> Ecua := y'' - 4·y' + 4·y = exp(x)
      Ecua :=  $\frac{d^2}{dx^2} y(x) - 4 \frac{d}{dx} y(x) + 4 y(x) = e^x$  (1)
> CondIni := y(0) = 1, D(y)(0) = -2
      CondIni :=  $y(0) = 1, D(y)(0) = -2$  (2)
> with(inttrans)
[addtable, fourier, fouriercos, fouriersin, hankel, hilbert, invfourier, invhilbert, invlaplace,
 invmellin, laplace, mellin, savetable, setup] (3)
> EcuaTL := subs(CondIni, laplace(Ecua, x, s))
      EcuaTL :=  $s^2 \mathcal{L}(y(x), x, s) + 6 - s - 4 s \mathcal{L}(y(x), x, s) + 4 \mathcal{L}(y(x), x, s) = \frac{1}{s-1}$  (4)
> SolTL := simplify(isolate(EcuaTL, laplace(y(x), x, s)))
      SolTL :=  $\mathcal{L}(y(x), x, s) = \frac{s^2 - 7 s + 7}{(s-1)(s-2)^2}$  (5)
> SolPart := invlaplace(SolTL, s, x)
      SolPart :=  $y(x) = e^x - 3 x e^{2x}$  (6)
> ComprobarUno := simplify(eval(subs(y(x) = rhs(SolPart), Ecua)))
      ComprobarUno :=  $e^x = e^x$  (7)
> ComprobarDos := simplify(subs(x=0, SolPart))
      ComprobarDos :=  $y(0) = 1$  (8)
> ComprobarTres := D(y)(0) = simplify(subs(x=0, rhs(diff(SolPart, x))))
      ComprobarTres :=  $D(y)(0) = -2$  (9)
> CondIni
       $y(0) = 1, D(y)(0) = -2$  (10)
>
>
> restart
> yy[1] := cos(log(x)); yy[2] := sin(log(x))
      yy1 := cos(ln(x))
      yy2 := sin(ln(x)) (11)
> EcuaHom := x2·y'' + x·y' + y = 0
      EcuaHom :=  $x^2 \left( \frac{d^2}{dx^2} y(x) \right) + x \left( \frac{d}{dx} y(x) \right) + y(x) = 0$  (12)
> EcuaNoHom := lhs(EcuaHom) = sec(log(x))
      EcuaNoHom :=  $x^2 \left( \frac{d^2}{dx^2} y(x) \right) + x \left( \frac{d}{dx} y(x) \right) + y(x) = \sec(\ln(x))$  (13)
> EcuaDosHom := expand( $\frac{lhs(EcuaHom)}{x^2}$ ) = 0

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$$EcuaDosHom := \frac{d^2}{dx^2} y(x) + \frac{\frac{d}{dx} y(x)}{x} + \frac{y(x)}{x^2} = 0 \tag{14}$$

$$> EcuaDosNoHom := expand\left(\frac{lhs(EcuaNoHom)}{x^2}\right) = rhs\left(\frac{EcuaNoHom}{x^2}\right)$$

$$EcuaDosNoHom := \frac{d^2}{dx^2} y(x) + \frac{\frac{d}{dx} y(x)}{x} + \frac{y(x)}{x^2} = \frac{\sec(\ln(x))}{x^2} \tag{15}$$

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