

> restart

>  $Ecua := y'' - 5 \cdot y' + 6 \cdot y = 4 \cdot \exp(2x) - x^2$

$$Ecua := \frac{d^2}{dx^2} y(x) - 5 \frac{d}{dx} y(x) + 6 y(x) = 4 e^{2x} - x^2 \quad (1)$$


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>  $SolGral := y(x) = \_C1 \cdot \exp(3 \cdot x) + \_C2 \cdot \exp(2 \cdot x) - 4 \cdot x \cdot \exp(2 \cdot x) - \frac{38}{216} - \frac{10}{36} \cdot x - \frac{1}{6} \cdot x^2$

$$SolGral := y(x) = \_C1 e^{3x} + \_C2 e^{2x} - 4x e^{2x} - \frac{19}{108} - \frac{5x}{18} - \frac{x^2}{6} \quad (2)$$


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>  $Comprobar := simplify(eval(subs(y(x) = rhs(SolGral), Ecua)))$

$$Comprobar := 4 e^{2x} - x^2 = 4 e^{2x} - x^2 \quad (3)$$


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>  $Sistema := 6 \cdot E = -1, 6D - 10E = 0, 6B - 5D + 2E = 0 : Sistema[1]; Sistema[2]; Sistema[3]$

$$\begin{aligned} 6E &= -1 \\ 6D - 10E &= 0 \\ 6B - 5D + 2E &= 0 \end{aligned} \quad (4)$$


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>  $Para := solve(\{Sistema\}, \{B, D, E\})$

$$Para := \left\{ B = -\frac{19}{108}, D = -\frac{5}{18}, E = -\frac{1}{6} \right\} \quad (5)$$


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>  $A := -4$

$$A := -4 \quad (6)$$


---

>  $SolGral := y(x) = \_C1 \cdot \exp(3x) + \_C2 \cdot \exp(2x) + A \cdot x \cdot \exp(2x) + B + D \cdot x + E \cdot x^2$

$$SolGral := y(x) = \_C1 e^{3x} + \_C2 e^{2x} - 4x e^{2x} + B + Dx + Ex^2 \quad (7)$$


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>  $SolGralNoHom := subs(B = rhs(Para[1]), D = rhs(Para[2]), E = rhs(Para[3]), SolGral)$

$$SolGralNoHom := y(x) = \_C1 e^{3x} + \_C2 e^{2x} - 4x e^{2x} - \frac{19}{108} - \frac{5x}{18} - \frac{x^2}{6} \quad (8)$$


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> restart

>  $Ecua := y''' + y'' + y' = 5 \cdot \exp(3x) + \cos(2x) + 3 \cdot x$

$$Ecua := \frac{d^3}{dx^3} y(x) + \frac{d^2}{dx^2} y(x) + \frac{d}{dx} y(x) = 5 e^{3x} + \cos(2x) + 3x \quad (9)$$


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>  $EcuaHom := lhs(Ecua) = 0$

$$EcuaHom := \frac{d^3}{dx^3} y(x) + \frac{d^2}{dx^2} y(x) + \frac{d}{dx} y(x) = 0 \quad (10)$$


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>  $Q := rhs(Ecua)$

$$Q := 5 e^{3x} + \cos(2x) + 3x \quad (11)$$


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>  $SolHom := dsolve(EcuaHom)$

$$SolHom := y(x) = c_1 + c_2 e^{-\frac{x}{2}} \sin\left(\frac{\sqrt{3}x}{2}\right) + c_3 e^{-\frac{x}{2}} \cos\left(\frac{\sqrt{3}x}{2}\right) \quad (12)$$


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>  $SolNoHom := y(x) = rhs(SolHom) + A \cdot \exp(3 \cdot x) + B \cdot \cos(2 \cdot x) + D \cdot \sin(2 \cdot x) + E \cdot x + F \cdot x^2$

$$(13)$$

$$SolNoHom := y(x) = c_1 + c_2 e^{-\frac{x}{2}} \sin\left(\frac{\sqrt{3} x}{2}\right) + c_3 e^{-\frac{x}{2}} \cos\left(\frac{\sqrt{3} x}{2}\right) + A e^{3x} + B \cos(2x) + D \sin(2x) + E x + F x^2 \quad (13)$$

>

$$A := \frac{5}{39}$$

$$A := \frac{5}{39} \quad (14)$$

$$SistemaUno := -4 \cdot B - 6 \cdot D = 1, 6 \cdot B - 4 \cdot D = 0 : SistemaUno[1]; SistemaUno[2]$$

$$-4 B - 6 D = 1$$

$$6 B - 4 D = 0 \quad (15)$$

$$ParaUno := solve(\{SistemaUno\}, \{B, D\})$$

$$ParaUno := \left\{ B = -\frac{1}{13}, D = -\frac{3}{26} \right\} \quad (16)$$

$$SistemaDos := E + 2 \cdot F = 0, 2 \cdot F = 3 : SistemaDos[1]; SistemaDos[2]$$

$$E + 2 F = 0$$

$$2 F = 3 \quad (17)$$

$$ParaDos := solve(\{SistemaDos\}, \{E, F\})$$

$$ParaDos := \left\{ E = -3, F = \frac{3}{2} \right\} \quad (18)$$

$$SolFinal := subs(B = rhs(ParaUno[1]), D = rhs(ParaUno[2]), E = rhs(ParaDos[1]), F = rhs(ParaDos[2]), SolNoHom)$$

$$SolFinal := y(x) = c_1 + c_2 e^{-\frac{x}{2}} \sin\left(\frac{\sqrt{3} x}{2}\right) + c_3 e^{-\frac{x}{2}} \cos\left(\frac{\sqrt{3} x}{2}\right) + \frac{5 e^{3x}}{39} - \frac{\cos(2x)}{13} - \frac{3 \sin(2x)}{26} - 3x + \frac{3x^2}{2} \quad (19)$$

$$Ecua$$

$$\frac{d^3}{dx^3} y(x) + \frac{d^2}{dx^2} y(x) + \frac{d}{dx} y(x) = 5 e^{3x} + \cos(2x) + 3x \quad (20)$$

$$Comprobar := simplify(eval(subs(y(x) = rhs(SolFinal), Ecua)))$$

$$Comprobar := 5 e^{3x} + \cos(2x) + 3x = 5 e^{3x} + \cos(2x) + 3x \quad (21)$$

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