$$y'' - 6y' + 9y = 2e^{4x} + 3x^2$$

1 —

$$y'' - 6y' + 9y = 0$$

EDO (2) L cc NH.

$$(D^2 - 6D + 9)y = 0$$

MÉTODO

$$(D-3)^2 y = 0$$

"OPERADOR DIFERENCIAL"

$$y_{g/H} = C_1 e^{3x} + C_2 x e^{3x}$$

$$P(x) = 2e^{4x} + 3x^2$$

2 —

$$y'' - 6y' + 9y = 2e^{4x} + 3x^2$$

CASO II.

$$(D-3)^2 y = 2e^{4x} + 3x^2 \quad \text{EDO}(2)\text{ Lcc NH.}$$

$$\left((D-3)^2 (D-4) \underset{A}{D^3} \right) y = 0 \quad \text{EDO}(6)\text{ Lcc H.}$$

$$y_g = C_1 e^{3x} + C_2 x e^{3x} + C_3 e^{4x} + C_4 x^2 + C_5 x + C_6$$

$$\underset{\text{g/NH}}{y} = C_1 e^{3x} + C_2 x e^{3x} + \underbrace{A e^{4x} + B x^2 + D x + E}_{y_{P/Q}}$$

$$\underbrace{\phantom{C_1 e^{3x} + C_2 x e^{3x}}}_{y_{g/H_A}}$$

$$y_{P/Q} = A e^{4x} + B x^2 + D x + E$$

$$y' = 4A e^{4x} + 2Bx + D + (0)$$

$$y'' = 16 A e^{4x} + 2B + (0)$$

$$y'' \Rightarrow 16 A e^{4x} \qquad\qquad +2B$$

$$-6y' \Rightarrow -24 A e^{4x} \qquad -12Bx - 6D$$

$$+9y \Rightarrow 9 A e^{4x} + 9B x^2 + 9D x + 9E.$$

$$2e^{4x} \Rightarrow Ae^{4x}$$

$$+$$

$Q(x)$ $\quad 3x^2 \Rightarrow \qquad +9Bx^2$

$$+$$

$$(0)x \Rightarrow \qquad -12Bx + 9Dx$$

$$+$$

$$(0) \Rightarrow \qquad 2B - 6D + 9E.$$

$$A = 2 \quad \rightarrow \quad A = 2$$
$$9B = 3 \quad \rightarrow \quad B = \frac{1}{3}$$
$$-12B + 9D = 0 \qquad 9D = 4 \rightarrow D = \frac{4}{9}$$
$$2B - 6D + 9E = 0 \quad 9E = -\frac{2}{3} + \frac{24}{9} \quad E = \frac{2}{9}$$

$$y_{p/Q} = 2e^{4x} + \frac{1}{3}x^2 + \frac{4}{9}x + \frac{2}{9}$$

$$y_{g/NH} = C_1 e^{3x} + C_2 x e^{3x} + 2e^{4x} + \frac{1}{3}x^2 + \frac{4}{9}x + \frac{2}{9}$$

$$y'' + 8y' + 16y = 2e^{-4x}$$

$$\left(D^2 + 8D + 16 \right) y = 0$$
$$(D+4)^2 y = 0$$
$$y = C_1 e^{-4x} + C_2 x e^{-4x}$$

$$Q = 2e^{-4x}$$

$$(D+4)^2 y = 2e^{-4x} \qquad EDO(2) \, Lcc \, NH.$$
$$(D+4)^2 (D+4) y = 0$$
$$(D+4)^3 y = 0 \qquad EDO(3) \, Lcc \, H.$$
$$y = C_1 e^{-4x} + C_2 x e^{-4x} + C_3 x^2 e^{-4x}$$
$$y = C_1 e^{-4x} + C_2 x e^{-4x} + A x^2 e^{-4x}$$

$$y_{p/q} = Ax^2 e^{-4x}$$

$$y' = -4Ax^2 e^{-4x} + 2Axe^{-4x}$$

$$y'' = 16Ax^2 e^{-4x} - 8Axe^{-4x} - 8Axe^{-4x} + 2Ae^{-4x}$$

$$= 16Ax^2 e^{-4x} - 16Axe^{-4x} + 2Ae^{-4x}$$

$$\left(16Ax^2 e^{-4x} - 16Axe^{-4x} + 2Ae^{-4x}\right) +$$

$$+ \left(-32Ax^2 e^{-4x} + 16Axe^{-4x}\right) +$$

$$+ \left(16Ax^2 e^{-4x}\right) = 2e^{-4x}$$

$$\left((0)A\quad\right)x^2 e^{-4x} + \left((0)A\quad\right)xe^{-4x} +$$

$$+ \left(2A\quad\right)e^{-4x} = 2e^{-4x}$$

$$2A = 2 \quad A = 1$$

$$y_g = C_1 e^{-4x} + C_2 xe^{-4x} + x^2 e^{-4x}$$

$$y'' + 4y = 6\cos(2x)$$

$$(D^2 + 4)y = 0$$
$$(D + 2i)(D - 2i)y = 0$$
$$y_g = C_1 \cos(2x) + C_2 \sin(2x)$$

$$(D^2 + 4)y = 6\cos(2x)$$
$$(D^2 + 4)(D^2 + 4)_A y = 0$$

$$(D^2 + 4)^2 y = 0 \quad EDO(4) \, LCCH.$$

ojo

$$y_g = C_1 \cos(2x) + C_2 \sin(2x) + \underline{A} x \cos(2x) + \underline{B} x \sin(2x)$$

$$y_{p/a} = Ax \cos(2x) + Bx \sin(2x)$$

$$y' = -2Ax \sin(2x) + A\cos(2x) +$$

$$+ 2Bx \cos(2x) + B \sin(2x)$$
$$y'' = -4Ax \cos(2x) - 2A \sin(2x) - 2A \sin(2x) +$$
$$- 4Bx \sin(2x) + 2B \cos(2x) + 2B \cos(2x)$$
$$y'' = -4Ax \cos(2x) - 4A \sin(2x) +$$
$$- 4Bx \sin(2x) + 4B \cos(2x)$$

$$y'' \leftarrow -4Ax\cos(2x) - 4Bx\,sen(2x) - 4A\,sen(2x) + 4B\cos(2x)$$

$$+$$

$$4y = 4Ax\cos(2x) + 4Bx\,sen(2x) + (0)$$

$$=$$

$$6\cos(2x) \Rightarrow \qquad\qquad\qquad +4B\cos(2x)$$

$$+$$

$$(0)\,sen(2x) \qquad\qquad\qquad\qquad -4A\,sen(2x)$$

$$4B = 6 \qquad B = \frac{3}{2}$$

$$-4A = 0 \qquad A = 0$$

$$\boxed{y_g = C_1\cos(2x) + C_2\,sen(2x) + \frac{3}{2}x\,sen(2x)}$$

$$y_{maple} = C_2\,sen(2x) + C_1\cos(2x) + \frac{3}{4}\cos(2x)$$

$$+\frac{3}{2}x\,sen(2x)$$

$$y_g = \left(C_1 + \frac{3}{4}\right)\cos(2x) + C_2\,sen(2x) + \frac{3}{2}x\,sen(2x)$$

$$= C_{10}\cos(2x) + C_{20}\,sen(2x) + \frac{3}{2}x\,sen(2x)$$