

MOD

$$\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = 4e^{2x} \cos(2x)$$

EDOT(2) CC NH.

$$\frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 2y = 0$$

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

$$((D-1)^2 + 1^2)y = 0$$

$$(D^2 - 2D + 2) \left[e^x \cos(x) + e^x \sin(x) \right] = 0$$

$$\begin{aligned} & D^2(e^x \cos(x) + e^x \sin(x)) + \\ & - 2D(e^x \cos(x) + e^x \sin(x)) + \\ & 2(e^x \cos(x) + e^x \sin(x)) = 0 \end{aligned}$$

$$\begin{aligned} & 2e^x \cos(x) + 2e^x \sin(x) \\ & - 2(-e^x \sin(x) + e^x \cos(x)) + (e^x \cos(x) + e^x \sin(x)) \\ & + (-e^x \cos(x) - e^x \sin(x) - e^x \sin(x) + e^x \cos(x)) + \\ & (-e^x \sin(x) + e^x \cos(x) + e^x \cos(x) + e^x \sin(x)) \end{aligned}$$

$$(1+1+1-1-2-2+2)e^x \cos(x) +$$

$$(1-1-1-1-2+2+2)e^x \sin(x)$$

$$\boxed{y_{g/h} = C_1 e^x \cos(x) + C_2 e^x \sin(x)}$$

$$(D^2 - 2D + 2)y = 4e^{2x} \cos(2x)$$

$$(D^2 - 2D + 2)(D^2 - 4D + 8)y = 0$$

$$y_{\text{EXT}} = C_1 e^x \cos(x) + C_2 e^x \sin(x) + C_3 e^{2x} \cos(2x) + C_4 e^{2x} \sin(2x)$$

$$\Rightarrow y_{\text{NH}} = A e^{2x} \cos(2x) + B e^{2x} \sin(2x)$$

$$\frac{dy}{dx} = A(-2e^{2x} \sin(2x) + 2e^{2x} \cos(2x))$$

$$+ B(2e^{2x} \cos(2x) + 2e^{2x} \sin(2x))$$

$$\frac{dy}{dx} = (2A + 2B)e^{2x} \cos(2x) + (-2A + 2B)e^{2x} \sin(2x)$$

$$\frac{d^2y}{dx^2} = (2A + 2B)(-2e^{2x} \sin(2x) + 2e^{2x} \cos(2x)) +$$

$$+ (-2A + 2B)(2e^{2x} \cos(2x) + 2e^{2x} \sin(2x))$$

$$\frac{d^2y}{dx^2} = (8B)e^{2x} \cos(2x) + (-8A)e^{2x} \sin(2x)$$

$$\frac{d^2y}{dx^2} \Leftrightarrow 8B e^{2x} \cos(2x) - 8A e^{2x} \sin(2x)$$

$$-2 \frac{dy}{dx} \Leftrightarrow (-4A - 4B)e^{2x} \cos(2x) + (4A - 4B)e^{2x} \sin(2x)$$

$$+ 2y \Leftrightarrow 2A e^{2x} \cos(2x) + 2B e^{2x} \sin(2x)$$

$$\begin{aligned} &= \\ &4e^{2x} \cos(2x) + (-2A + 4B)e^{2x} \cos(2x) \\ &+ 0e^{2x} \sin(2x) + (-4A - 2B)e^{2x} \sin(2x) \end{aligned}$$

$$-2A + 4B = 4$$

$$-4A - 2B = 0$$

$$-4A = 2B$$

$$B = -2A$$

$$-2A + 4(-2A) = 4$$

$$-10A = 4$$

$$A = -\frac{2}{5}$$

$$B = \frac{4}{5}$$

$$y_g = C_1 e^x \cos(x) + C_2 e^x \sin(x) - \frac{2}{5} e^{2x} \cos(2x) + \frac{4}{5} e^{2x} \sin(2x)$$

Método Parámetro Variable

$$\frac{dy}{dx} + ay = F(x)$$

$$y_{g/NH} = C_1 e^{-ax} + e^{-ax} \int e^{ax} F(x) dx$$

$$= \left[\underbrace{C_1 + \int e^{ax} F(x) dx}_{A(x)} \right] e^{-ax}$$

$$y_{g/NH} = A(x) e^{-ax}$$

$$y_{g/H} = C_1 e^{-ax}$$

$$\frac{d^2 y}{dx^2} - 5 \frac{dy}{dx} + 6y = 4e^{2x} - x^2$$

$$(D^2 - 5D + 6)y = 0$$

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

$$y_{g/H} = c_1 e^{3x} + c_2 e^{2x}$$

$$y_{g/NH} = A(x)e^{3x} + B(x)e^{2x}$$

$$\frac{dy}{dx} = 3A(x)e^{3x} + 2B(x)e^{2x} + (A'(x)e^{3x} + B'(x)e^{2x})$$

$$\frac{dy}{dx} = 3A(x)e^{3x} + 2B(x)e^{2x} + (0) \quad = 0$$

$$\frac{d^2 y}{dx^2} = 9A(x)e^{3x} + 4B(x)e^{2x} + (3A'(x)e^{3x} + 2B'(x)e^{2x})$$

$$= F(x)$$

$$A'(x)e^{3x} + B'(x)e^{2x} = 0$$

$$3A'(x)e^{3x} + 2B'(x)e^{2x} = 4e^{2x} - x^2$$

$$\begin{pmatrix} e^{3x} & e^{2x} \\ 3e^{3x} & 2e^{2x} \end{pmatrix} \begin{pmatrix} A'(x) \\ B'(x) \end{pmatrix} = \begin{pmatrix} 0 \\ 4e^{2x} - x^2 \end{pmatrix}$$