TEMA II.- EDO(2)LCC NH.

MÉTODO DE PARÁMETROS VARIABLES.

$$\frac{dy}{dx} + a_1 y = Q(x)$$

$$y = c_1 e^{-a_1 x} + e^{-a_1 x} \int e^{a_1 x} Q(x)\, dx$$

$$y_{NH} = \left(\underbrace{\int e^{a_1 x} Q(x)\, dx + c_1}_{A(x)} \right) e^{-a_1 x}$$

$$\frac{dy}{dx} + a_1 y = 0$$

$$\boxed{\begin{array}{l} y_H = c_1 e^{-a_1 x} \\[2mm] y_{NH} = A(x)\, e^{-a_1 x} \end{array}}$$

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 4e^x + 3e^{4x}$$

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

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

$$y_H = c_1 e^{2x} + c_2 e^{3x}$$

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

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

$$= 0$$

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

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

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

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

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

$$\begin{bmatrix} e^{2x} & e^{3x} \\ 2e^{2x} & 3e^{3x} \end{bmatrix} \begin{bmatrix} A'(x) \\ B'(x) \end{bmatrix} = \begin{bmatrix} 0 \\ Q(x) \end{bmatrix}$$

$$\left.\begin{matrix} A'(x) \\ B'(x) \end{matrix}\right\} \text{ PARÁMETROS VARIABLES. DERIVADOS.}$$

$$y_{g/NH} = \left(\int A'(x)\,dx + c_1 \right) e^{2x} + \left(\int B'(x)\,dx + c_2 \right) e^{3x}$$

$$y''' + y'' + y' + y = 2e^x + 3xe^x$$

$$(D^3 + D^2 + D + 1)y = 2e^x + 3xe^x$$

$$(D+1)(D^2+1)y = 2e^x + 3xe^x$$

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

$$y_p = Ae^x + Bxe^x$$

$$y' = Ae^x + Be^x + Bxe^x$$

$$y' = (A+B)e^x + Bxe^x$$

$$y'' = (A+2B)e^x + Bxe^x$$

$$y''' = (A+3B)e^x + Bxe^x$$

$$2e^x = [A + (A+B) + (A+2B) + (A+3B)]e^x$$

$$3xe^x = (4A+6B)e^x + 4Bxe^x$$

$$4A + 6B = 2$$

$$4B = 3 \implies \frac{3}{4} = B \qquad 4A = 2 - 6\left(\frac{3}{4}\right)$$

$$A = \frac{2 - 6\left(\frac{3}{4}\right)}{}$$

$$y = C_1 e^{-x} + C_2 \cos(x) + C_3 sen(x) + \qquad A = \frac{2 - \frac{9}{2}}{4} \implies \frac{4-9}{8}$$

$$+ \left(-\frac{5}{8}e^x + \frac{3}{4}Bxe^x\right) \qquad A = \frac{-5}{8}$$