EDO(2)LCC NH

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

Método Parámetros variables.

EH$_A$ $\quad \frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 4y = 0 \qquad Q = 6e^{2x}$

$\therefore$

$$m^2 - 4m + 4 = 0$$

$$(m-2)^2 = 0 \quad M_1 = M_2 \quad \text{CASO II}$$

$$y_{g/H} = C_1 e^{2x} + C_2 x e^{2x}$$

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

$$\frac{dy}{dx} = 2A(x)e^{2x} + (2xe^{2x} + e^{2x})B(x) + \underbrace{A'(x)e^{2x} + B'(x)xe^{2x}}_{=0}$$

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

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

$$+ \underbrace{2A'(x)e^{2x} + (2xe^{2x} + e^{2x})B'(x)}_{Q(x)}$$

$$\frac{d^2y}{dx^2} = 4A(x)e^{2x} + (4xe^{2x} + 4e^{2x})B(x) + 6e^{2x}$$

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

$$A'(x)2e^{2x} + B'(x)(2xe^{2x} + e^{2x}) = 6e^{2x}$$

$$\begin{bmatrix} e^{2x} & xe^{2x} \\ 2e^{2x} & 2xe^{2x}+e^{2x} \end{bmatrix} \begin{bmatrix} A'(x) \\ B'(x) \end{bmatrix} = \begin{bmatrix} 0 \\ 6e^{2x} \end{bmatrix}$$

WW BB.

$$A'(x)e^{2x} = -B'(x)xe^{2x}$$

$$A'(x) = -B'(x)x$$

$$(-B'(x)x)2e^{2x} + B'(x)(2xe^{2x} + e^{2x}) = 6e^{2x}$$

$$-B'(x)\cancel{x(2e^{2x})} + B'(x)\cancel{(2xe^{2x})} + B'(x)e^{2x} = 6e^{2x}$$

$$B'(x)\cancel{e^{2x}} = 6\cancel{e^{2x}}$$

$$B'(x) = 6$$

$$A'(x) = -6x$$

$$B(x) = \int 6\,dx \Rightarrow 6x$$

$$A(x) = \int -6x\,dx \Rightarrow -6\int x\,dx = -6\left(\frac{x^2}{2}\right)$$

$$A(x) = -3x^2$$

$$y(x) = (-3x^2 + C_1)e^{2x} + (6x + C_2)xe^{2x}$$

$$\boxed{y(x) = C_1e^{2x} + C_2xe^{2x} + 3x^2e^{2x}}$$

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

$$m^3+m^2+m+1=0 \qquad m_1=-1 \quad m_2=i \quad m_3=-i$$

$$y_{g/h}=C_1e^{-x}+C_2\cos(x)+C_3\,\mathrm{sen}(x)$$

$$y_{g/nh}=A(x)e^{-x}+B(x)\cos(x)+C(x)\,\mathrm{sen}(x)$$

$$y'=-A(x)e^{-x}-B(x)\,\mathrm{sen}(x)+C(x)\cos(x)+\underbrace{+A'(x)e^{-x}+B'(x)\cos(y)+C'(x)\,\mathrm{sen}(x)}_{=0}$$

$$y''=A(x)e^{-x}-B(x)\cos(x)-C(x)\,\mathrm{sen}(x)+\underbrace{+\left(-A'(x)e^{-x}-B'(x)\,\mathrm{sen}(x)+C'(x)\cos(x)\right)}_{=0}$$

$$y'''=-A(x)e^{-x}+B(x)\,\mathrm{sen}(x)-C(x)\cos(x)+\underbrace{A'(x)e^{-x}-B'(x)\cos(x)-C'(x)\,\mathrm{sen}(x)}_{=Q}$$

$$\boxed{\begin{aligned} A'(x)e^{-x}+B'(x)\cos(x)+C'(x)\,\mathrm{sen}(x)&=0\\ -A'(x)e^{-x}-B'(x)\,\mathrm{sen}(x)+C'(x)\cos(x)&=0\\ A'(x)e^{-x}-B'(x)\cos(x)-C'(x)\,\mathrm{sen}(x)&=2x^2e^x \end{aligned}}$$

Método de los Coeficientes Indeterminados

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 4e^{2x} + 8xe^{3x}$$

EDO(2) Lcc NH.

$\dot{y} \Rightarrow y' \Rightarrow \frac{d}{dx} \Rightarrow D$

$$5\frac{dy}{dx} \Rightarrow 5Dy(x)$$

$$\frac{d^2y}{dx} \Rightarrow D(Dy(x)) \Rightarrow D^2y(x)$$

$$\frac{d}{dx}6x^2 \Rightarrow 6D(x^2) = 12x$$

$$(D^2-5D+6)y(x) = 4e^{2x}+8xe^{3x}$$

$$(D-3)(D-2)y(x) = 4e^{2x}+8xe^{3x}$$

$P(D)$	$y(x)$
D D^2 D^3 D^{n+1}	1 x x^2 x^n
$(D-a)$	e^{ax}
$(D-a)^2$ $(D-a)^{n+1}$	xe^{ax} $x^n e^{ax}$

$$(D-2)(D-3)y(x)=4e^{2x}+8xe^{3x}$$

$$(D-2)(D-3)\underset{A}{(D-2)}\cdot\underset{A}{(D-3)^2}y(x)=0$$

EDO(5) Lcc H

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

$$y_g=C_1e^{2x}+C_2xe^{2x}+C_3e^{3x}+C_4xe^{3x}+C_5x^2e^{3x}$$

$$y_{g/n-h}=C_1e^{2x}+Axe^{2x}+C_3e^{3x}+Bxe^{3x}+Dx^2e^{3x}$$

$$y_{p/a}=Axe^{2x}+Bxe^{3x}+Dx^2e^{3x}$$