TEMA II.- LA EDO(n) LINEAL

EDO(1) L CV NH.

$$\frac{dy}{dx} + p(x)y = q(x)$$

EDO(1)LCVH. $\longrightarrow$ (1) $\frac{dy}{dx} + p(x)y = 0 \Rightarrow \underset{\text{g/h}}{y(x)} = C_1 e^{-\int p(x)dx}$.

$$x\,Lx \cdot \frac{dy}{dx} - y = 0$$

$$\frac{dy}{dx} - \frac{y}{x\,Lx} = 0 \qquad p(x) = -\frac{1}{x\,Lx}$$

$$-\int p(x)dx = -\int\left(-\frac{dx}{x\,Lx}\right) \Rightarrow \int \frac{\frac{dx}{x}}{Lx} \qquad u = Lx \quad du = \frac{dx}{x}$$

$$\frac{\frac{a}{b}}{\frac{c}{d}} \Rightarrow \frac{ad}{bc} \Rightarrow \int \frac{du}{u} \Rightarrow Lu$$

$$-\int p(x)dx = L(Lx)$$

$$y(x) = C_1 e^{L(Lx)}$$

$$\boxed{y = C_1 Lx}$$ Solución general EDO(1)LCVH.

$$\frac{dy}{dx} - \frac{y}{x\,Lx} = 0$$

EDO(1)LCVH

$$\frac{dy}{dx} = C_1\left[\frac{1}{x}\right]$$

$$\frac{dy}{dx} - \frac{y}{x\,Lx} = 0$$

$$x\,Lx\,\frac{dy}{dx} - y = 0$$

$$x\,Lx\left(\frac{C_1}{x}\right) - C_1 Lx = 0$$

$$C_1 Lx - C_1 Lx = 0$$

$$0 \equiv 0.$$

$$\frac{C_1}{x} - \frac{C_1 \cancel{Lx}}{x\cancel{Lx}} = 0$$

$$\frac{C_1}{x} - \frac{C_1}{x} = 0$$

$$0 \equiv 0$$

$$x \cdot Lx \cdot \frac{dy}{dx} - y = x^3(3Lx - 1)$$

EDO(1)L cv NH

$$\frac{dy}{dx} - \left(\frac{1}{x\,Lx}\right) \cdot y = \frac{x^3(3Lx-1)}{x\,Lx}$$

$$\frac{dy}{dx} - \left(\frac{1}{x\,Lx}\right) y = 3x^2 - \frac{x^2}{Lx}$$ EDO(1)L cv NH.

$$p(x) = -\frac{1}{x\,Lx} \qquad q(x) = 3x^2 - \frac{x^2}{Lx}$$

$$\boxed{y_H = C\,Lx}$$

$$y_p = e^{-\int p(x)\,dx} \int e^{\int p(x)\,dx}\, q(x)\,dx$$

$$y_p = Lx \int \left(\frac{1}{Lx}\right)\left(3x^2 - \frac{x^2}{Lx}\right) dx$$

$$= Lx \int \frac{\left(3x^2 - \frac{x^2}{Lx}\right)}{Lx}\, dx$$

$$= x^3$$

$$y_g = c_1 Lx + x^3$$

$$\frac{dy}{dx} = \frac{1}{x\cos(y) + \operatorname{sen}(2y)}$$

EDO(1) L CV NH.

$$\frac{dx}{dy} = \cos(y)\,x + \operatorname{sen}(2y)$$

$$\frac{dx}{dy} - \cos(y)\,x = \operatorname{sen}(2y)$$

$$p(y) = -\cos(y)$$

$$q(y) = \operatorname{sen}(2y)$$

$$X(y)_{g/H} = c_1\, e^{-\int p(y)\,dy}$$

$$\int p(y)\,dy = \int (-\cos(y))\,dy$$

$$= -(-\operatorname{sen}(y))$$

$$\int p(y)\,dy = \operatorname{sen}(y)$$

$$X(y)_{g/H} = c_1 e^{-\operatorname{sen}(y)}$$

$$X(y)_{p/q} = e^{-\operatorname{sen}(y)} \int e^{\operatorname{sen}(y)} \operatorname{sen}(2y)\,dy$$

$$\frac{dy}{dx} + p(x)y = 0$$

$$\frac{dy}{dx} = -p(x)y$$

$$dy = -p(x)\,y\,dx$$

$$\frac{dy}{y} = -p(x)dx$$

$$\int \frac{dy}{y} = -\int p(x)dx$$

$$Ly + C_1 = \left[-\int p(x)dx\right] + C_2$$

$$Ly = \left[-\int p(x)dx\right] + (C_2 - C_1)$$

$$e^{Ly} = e^{\left(-\int p(x)dx + C_2 - C_1\right)}$$

$$y = e^{(C_2-C_1)} \cdot e^{-\int p(x)dx}$$

$$y_{g/H} = C \cdot e^{-\int p(x)dx} \qquad y\, e^{\int p(x)dx} = C$$

EDO(1)LCVH.

EDO(1)LCVNH $\frac{dy}{dx} + p(x)y = q(x)$

$$e^{\int p(x)dx}\left(\frac{dy}{dx} + p(x)y\right) = e^{\int p(x)dx} q(x)$$

$$\frac{d}{dx}\left(y e^{\int p(x)dx}\right) = e^{\int p(x)dx} q(x)$$

$$\int d\left(y e^{\int p(x)dx}\right) = \int e^{\int p(x)dx} q(x)\,dx$$

$$y e^{\int p(x)dx} + C_1 = \left[\int e^{\int p(x)dx} q(x)\,dx\right] + C_2$$

$$y e^{\int p(x)dx} = (C_2 - C_1) + \int e^{\int p(x)dx} q(x)\,dx$$

$$y = C e^{-\int p(x)dx} + \left[e^{-\int p(x)dx} \int e^{\int p(x)dx} q(x)\,dy\right]$$

$$\boxed{y_{g/NH} = y_{g/H_A} + y_{p/q}}$$

REGLA "ORO"
TEMA II.

PRIMER EXAMEN PARCIAL
(TEMAS I & II)

Jueves 21 MARZO A LAS 11:00

SALONES J205A & J204