

PRÁCTICA LUNES 2/09 H001.

$$x y' + x = y \quad y(1) = -1$$

$$\text{EDO(1) L}$$

$$y' + p(x)y = q(x)$$

$$y' + \frac{x}{x} = \frac{y}{x}$$

$$y' + 1 = \frac{y}{x}$$

$$y' - \frac{y}{x} = -1 \quad p(x) = -\frac{1}{x}$$

$$q(x) = -1$$

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

CAPÍTULO II : ECUACIÓN LINEAL ORDEN SUP.

$$a_0(x) \frac{d^2 y(x)}{dx^2} + a_1(x) \frac{d^{n-1} y(x)}{dx^{n-1}} + \dots + a_{n-1}(x) \frac{dy(x)}{dx} + a_n(x) y(x) = Q(x)$$

EDO(n) L.C.V. N.H.

$$a_0(x) \frac{dy}{dx} + a_1(x) y = Q(x)$$

$$\frac{dy}{dx} + \frac{a_1(x)}{a_0(x)} y = \frac{Q(x)}{a_0(x)}$$

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

EDO(1) L.C.V. N.H.

$$\frac{dy}{dx} + a_1 y = 0 \quad y = c_1 e^{-\int p(x) dx}$$

EDO(1) L.C.C.H.

$$y = c_1 e^{-a_1 \int dx} \Rightarrow \boxed{y = c_1 e^{-a_1 x}}$$

$$\frac{dy}{dx} = -a_1 y \quad \frac{dy}{y} = -a_1 dx$$

$$\int \frac{dy}{y} = -a_1 \int dx$$

$$\ln y = -a_1 x + C_1$$

$$y = e^{(-a_1 x + C_1)}$$

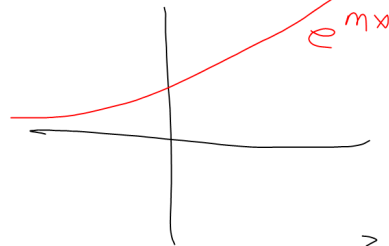
$$y = e^{C_1} e^{-a_1 x}$$

$$y = c_{10} e^{-a_1 x}$$

EDO(z) LCCH.

$$\frac{d^2 y}{dx^2} + a_1 \frac{dy}{dx} + a_2 y = 0$$

$$\left. \begin{array}{l} y = e^{mx} \\ \frac{dy}{dx} = m e^{mx} \\ \frac{d^2 y}{dx^2} = m^2 e^{mx} \end{array} \right\} \begin{array}{l} m^2 e^{mx} + a_1 m e^{mx} + a_2 e^{mx} = 0 \\ (m^2 + a_1 m + a_2) e^{mx} = 0 \end{array}$$



$$\begin{array}{l} y = 0 \\ y' = 0 \\ y'' = 0 \end{array} \quad \begin{array}{l} e^{mx} = 0 \quad m \rightarrow -\infty \\ \text{trivial.} \end{array}$$

$$\begin{array}{l} \rightarrow m^2 + a_1 m + a_2 = 0 \quad \text{Ecuación CARACTERÍSTICA.} \\ m_1 \neq m_2 \in \mathbb{R} \\ (m - m_1)(m - m_2) = 0 \end{array}$$

$$\begin{array}{l} \text{Solución} \\ \text{GENERAL } y = c_1 e^{m_1 x} + c_2 e^{m_2 x} \end{array} \quad \begin{array}{l} e^{m_1 x} \quad e^{m_2 x} \\ \text{SOLUCIONES} \\ \text{FUNDAMENTALES} \end{array}$$

$$W \Rightarrow \begin{vmatrix} e^{m_1 x} & e^{m_2 x} \\ m_1 e^{m_1 x} & m_2 e^{m_2 x} \end{vmatrix} \neq 0$$

$$\frac{d^2 y}{dx^2} - 5 \frac{dy}{dx} + 6y = 0$$

EDOL(z) $\subset \subset H$.

$$y = e^{mx}$$

$$m^2 - 5m + 6 = 0 \quad \in (A) \mathbb{C}.$$

$$(m-2)(m-3) = 0 \quad m_1 = 2$$

$$m_2 = 3$$

$$y_g = C_1 e^{2x} + C_2 e^{3x}$$

$$\begin{vmatrix} e^{2x} & e^{3x} \\ 2e^{2x} & 3e^{3x} \end{vmatrix} \neq 0$$

$$3e^{3x} e^{2x} - 2e^{3x} e^{2x} \neq 0$$

$$e^{3x} e^{2x} \neq 0$$