

TEMA 2. - EDO(n) LCC } H.  
N-A.

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

$$\phi(x) = a_1$$

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

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

$$y(x) = C_1 e^{-a_1 \int dx} + e^{-a_1 \int dx} \int e^{a_1 \int dx} Q(x) dx$$

$$y(x) = C_1 e^{-a_1 x} + e^{-a_1 x} \int e^{a_1 x} Q(x) dx.$$

$$\begin{array}{l}
 NH \\
 H
 \end{array}
 \left\{
 \begin{array}{l}
 \frac{dy}{dx} + 6y = 2e^{3x} \quad a_1 = 6 \\
 \frac{dy}{dx} + 6y = 0 \quad Q(x) = 2e^{3x}
 \end{array}
 \right.$$

$$y = C_1 e^{-6x}$$

$$y(x) = C_1 e^{-6x} + e^{-6x} \int e^{6x} (2e^{3x}) dx$$

$$y(x) = C_1 e^{-6x} + e^{-6x} \left[ 2 \int e^{9x} dx \right]$$

$$+ e^{-6x} \left[ \frac{2}{9} e^{9x} \right]$$

$$y = C_1 e^{-6x} + \frac{2}{9} e^{3x}$$

$$y = y_{g/NH} + y_{g/H} + y_{p/Q.}$$

$$\frac{d^2 y}{dx^2} + a_1 \frac{dy}{dx} + a_2 y = 0 \quad \text{EDO}(2) \text{ LCCA.}$$

$$y = e^{mx}$$

$$\frac{dy}{dx} = m e^{mx}$$

$$\frac{d^2 y}{dx^2} = m^2 e^{mx}$$

$$[m^2 e^{mx}] + a_1 [m e^{mx}] + a_2 [e^{mx}] = 0$$

$$(m^2 + a_1 m + a_2) e^{mx} = 0 \quad e^{mx} \neq 0$$

trivial.

$$m^2 + a_1 m + a_2 = 0$$

Ecuación algebraica característica

$$(m - m_1)(m - m_2) = 0 \quad \begin{matrix} m = m_1 \\ m = m_2 \end{matrix}$$

SOL  
GRAL

$$y(x) = C_1 e^{m_1 x} + C_2 e^{m_2 x}$$

$$\frac{d^2 y}{dx^2} - 7 \frac{dy}{dx} + 12y = 0 \quad \text{EDO}(z) \text{ LCC H.}$$

$$y = e^{mx}$$

$$m^2 - 7m + 12 = 0 \quad \in (A) \mathbb{C}.$$

$$(m-3)(m-4) = 0 \quad \begin{matrix} m_1 = 3 \\ m_2 = 4 \end{matrix}$$

$$y_1 = e^{3x}$$

$$y_2 = e^{4x}$$

$$y_g = c_1 e^{3x} + c_2 e^{4x}$$

$$\frac{d^2 y}{dx^2} = +9C_1 e^{3x} + 16C_2 e^{4x}$$

$$\oplus -7 \frac{dy}{dx} = -21C_1 e^{3x} - 28C_2 e^{4x}$$

$$\oplus 12 y = 12C_1 e^{3x} + 12C_2 e^{4x}$$

$$\ominus$$

$$0 = (0)C_1 e^{3x} + (0)C_2 e^{4x}$$

$$y'' + a_1 y' + a_2 y = 0 \quad \text{EDO}(z) \text{ LCC II.}$$

$$y = e^{mx}$$

$$m^2 + a_1 m + a_2 = 0 \quad \begin{matrix} m_1 \\ m_2 \end{matrix}$$

CASO I.-  $m_1, m_2 \in \mathbb{R} \quad m_1 \neq m_2$

$$y = c_1 e^{m_1 x} + c_2 e^{m_2 x}$$

CASO II.-  $m_1, m_2 \in \mathbb{R} \quad m_1 = m_2$

$$y = c_1 e^{m_1 x} + c_2 e^{m_1 x} \Rightarrow y = (c_1 + c_2) e^{m_1 x}$$

$$y = c_3 e^{m_1 x} + c_4 (?)$$

CASO ~~III~~  $m_1, m_2 \in \mathbb{C} \quad \begin{matrix} m_1 = a_1 + bi \\ m_2 = a_1 - bi \end{matrix} \quad m_1 \neq m_2$

$$y = c_1 e^{(a_1 + bi)x} + c_2 e^{(a_1 - bi)x}$$

$$\begin{matrix} x \in \mathbb{R} \\ y \in \mathbb{R} \end{matrix}$$

$$\text{EDO}(n) \text{ LCC } \textcircled{H}$$

$$y = C_1 e^{2x} + C_2 e^{3x} + C_3 e^{-4x}$$

$$(m-2)(m-3)(m+4)=0$$

$$(m^2 - 5m + 6)(m+4) = 0$$

$$m^3 - m^2 - 14m + 24 = 0$$

$$\frac{d^3 y}{dx^3} - \frac{d^2 y}{dx^2} - 14 \frac{dy}{dx} + 24y = 0$$