



TRÓPICO CANCER = 23 Junio.

$$\frac{d^2 y}{dx^2} + a_1 \frac{dy}{dx} + a_2 y = 0 \quad \exists \text{DOL}(e) \subset \mathbb{H}.$$

$$y_p = e^{mx} \quad \left. \begin{array}{l} m^2 + a_1 m + a_2 = 0 \end{array} \right\} \begin{array}{l} m_1 \\ m_2 \end{array}$$

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

$$y_g = C_1 e^{m_1 x} + C_2 e^{m_2 x}$$

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

$$y_g = C_1 e^{m_1 x} + C_2 x e^{m_1 x}$$

CASO III.- $m_1, m_2 \in \mathbb{C} \quad \begin{array}{l} m_1 = a + bi \\ m_2 = a - bi \end{array} \quad m_1 \neq m_2$

$$y_g = C_1 e^{ax} \cos(bx) + C_2 e^{ax} \sin(bx)$$

CASO III bis $m_1, m_2 \in \mathbb{C} \quad \begin{array}{l} m_1 = bi \\ m_2 = -bi \end{array} \quad a=0 \quad m_1 \neq m_2$

$$y_g = C_1 \cos(bx) + C_2 \sin(bx).$$

$$e^{ax} \quad x^n \quad n \in \mathbb{N} \quad \left\{ \begin{array}{l} \cos(bx) \\ \sin(bx) \end{array} \right\}$$

$$y_g = C_1 e^{2x} + C_2 e^{-2x} + C_3 e^{3x} + C_4 e^{-3x}$$

$$\text{EDO } (4) \text{ cc H} \quad \begin{array}{l} m_1 = 2 \\ m_2 = -2 \\ m_3 = 3 \\ m_4 = -3 \end{array} \quad \begin{array}{l} \text{CAS I.} \\ m_1 \neq m_2 \neq m_3 \neq m_4 \end{array}$$

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

$$(m^2-4)(m^2-9) = 0$$

$$m^4 - 13m^2 + 36 = 0$$

$$\frac{d^4 y}{dx^4} - 13 \frac{d^2 y}{dx^2} + 36y = 0$$

$$y_g = C_1 e^x + C_2 x e^x + C_3 x^2 e^x$$

$$\text{EDOL}(3) \text{ c.c. } \mathbb{H} \quad m_1 = m_2 = m_3 = 1$$

$$(m-1)^3 = 0$$

$$m^3 - 3m^2 + 3m - 1 = 0$$

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

$$y_g = \underbrace{C_1 e^{-2x}}_{\text{CASO I}} + \underbrace{C_2 e^{-2x} \cos(3x) + C_3 e^{-2x} \operatorname{sen}(3x)}_{\text{CASO III}}$$

EDOL(3) CC H

$$m_1 = -2 \quad m_2 = -2 + 3i$$

$$m_3 = -2 - 3i$$

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

$$(m+2)((m+2)^2 + 9) = 0$$

$$y_g = e^{-2x} (C_1 + C_2 \cos(3x) + C_3 \operatorname{sen}(3x))$$

$$(m+2)(m^2 + 4m + 13) = 0$$

$$m^3 + 6m^2 + 21m + 26 = 0$$

$$\frac{d^3 y}{dx^3} + 6 \frac{d^2 y}{dx^2} + 21 \frac{dy}{dx} + 26y = 0$$

$$y_g = C_1 \cos(5x) + C_2 \operatorname{sen}(5x) + C_3 x \cos(5x) + C_4 x \operatorname{sen}(5x)$$

$$\exists \text{DOL}(4) \underline{\underline{CC}} \#$$

$$m_1 = m_3 = 5i$$

$$m_2 = m_4 = -5i$$

$$(m - 5i)^2 (m + 5i)^2 = 0$$

$$(m^2 - 10im - 25)(m^2 + 10im - 25) = 0$$

$$m^4 + 50m^2 + 625 = 0$$

$$\frac{d^4 y}{dx^4} + 50 \frac{d^2 y}{dx^2} + 625 y = 0$$

EDOL - - - - H

$$y_g = C_1 e^x + C_2 x^2 e^x + C_3 x^3 e^x \quad (3) CV$$

$$C_4 x e^x$$

$$y_g = C_1 e^{3x} \cos(2x) + C_2 e^{-3x} \sin(2x) \quad (2) CV$$

$$y_g = C_1 x^3 e^{5x} + C_2 x^2 e^{5x} + C_3 x e^{5x} + C_4 e^{5x} \quad (4) CC$$

$$y_g = C_1 \cos(2x) + C_2 \sin(3x) \quad (2) CV$$

$$y_p = 4e^x + 2e^{-x} - 6e^x \cos(2x) + 8e^x \sin(2x)$$

$$y_g = c_1 e^x + c_2 e^{-x} + c_3 e^x \cos(2x) + c_4 e^x \sin(2x)$$

EDOL(4) cc H.

$$y_g = c_1 e^x + c_3 e^{-x} - 6e^x \cos(2x) + 8e^x \sin(2x)$$

EDOL(2) cc NH.

$$y_g = c_1 e^x + 2e^{-x} + c_2 e^x \cos(2x) + c_3 e^x \sin(2x)$$

EDOL(3) cc NH

$$y_g = c_1 e^x + 2e^{-x} + c_2 e^x \cos(2x) + 8e^x \sin(2x)$$

EDOL(2) cv NH