Clase 2021-10-05

Ecuaciones Diferenciales Ordinarias Lineales (n) No Hom.
C.C.

$$\frac{d^2y}{dx^2} + a_1 \frac{dy}{dx} + a_2 y = Q(x).$$

1º Resolver la EDOL(2) cc H asociada

2º Método de Parámetros Variables para resolver la EDOL(2)CCNH.

EDOL(1) cvNH. Tema I.

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

$$\frac{dy}{dx} + p(x)y = 0 \qquad H_A \quad y(x) = C_1 e^{-\int p(x)dx}$$

IXH.

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

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

$$NH \to y(x) = A(x)\, e^{-\int p(x)dx}$$

$$H_A \quad y(x) = C_1\, e^{-\int p(x)dx}$$

$$\frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = 5e^{3x}$$

HA $\quad \frac{d^2y}{dx^2} - 7\frac{dy}{dx} + 12y = 0 \rightarrow m^2 - 7m + 12 = 0$

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

$m_1 = 3 \quad m_2 = 4$

HA $\quad y_g = C_1 e^{3x} + C_2 e^{4x}$

NH $\quad y_g = A(x)e^{3x} + B(x)e^{4x}$ PARÁMETROS VARIABLES

MÉTODO:

$$\frac{dy}{dx} = 3A(x)e^{3x} + 4B(x)e^{4x} + \underbrace{\left[A'(x)e^{3x} + B'(x)e^{4x}\right]}_{=0}$$

$$\frac{dy}{dx} = 3A(x)e^{3x} + 4B(x)e^{4x} + (0)$$

$$\frac{d^2y}{dx^2} = 9A(x)e^{3x} + 16B(x)e^{4x} + \underbrace{\left[3A'(x)e^{3x} + 4B'(x)e^{4x}\right]}_{=Q(x)}$$

$$\frac{d^2y}{dx^2} = 9A(x)e^{3x} + 16B(x)e^{4x} + 5e^{3x}$$

$$A'(x)e^{3x} + B'(x)e^{4x} = 0$$
$$3A'(x)e^{3x} + 4B'(x)e^{4x} = 5e^{3x}$$

$$WW \rightarrow \underbrace{\begin{bmatrix} e^{3x} & e^{4x} \\ 3e^{3x} & 4e^{4x} \end{bmatrix}}_{\text{Wronskiano}(e^{3x},\, e^{4x}) \neq 0} \begin{bmatrix} A'(x) \\ B'(x) \end{bmatrix} = \begin{bmatrix} 0 \\ 5e^{3x} \end{bmatrix} \leftarrow BB$$

$Q(x)$

$$\begin{bmatrix} A'(x) \\ B'(x) \end{bmatrix} = \underbrace{\begin{bmatrix} 0 \\ 5e^{3x} \end{bmatrix}}_{BB} \cdot \begin{bmatrix} e^{3x} & e^{4x} \\ 3e^{3x} & 4e^{4x} \end{bmatrix}^{-1}$$

$\Leftarrow$ linsolve(WW, BB)

PRIMER EXAMEN PARCIAL (TEMAS I y II)

martes 12 octubre. 11:00 – 13:00 hs.