AVISO: PRIMER EXAMEN PARCIAL (TEMA I y II)

JUEVES 28 SEPTIEMBRE A LAS 11:00 HORAS.

TEMA. II.- EDO(n) L CC { A. NH.

$$\frac{d^2y}{dx^2} - 5\frac{dy}{dx} + 6y = 0 \quad \text{EDO(2) L CC H.}$$

$y = e^{mx}$ $\quad y_g = c_1 e^{m_1 x} + c_2 e^{m_2 x}$ $\quad m_1 \neq m_2 \in \mathbb{R}$

$m^2 - 5m + 6 = 0$ $\quad m_1 = 2$, $m_2 = 3$

CASO I $(m-2)(m-3) = 0$

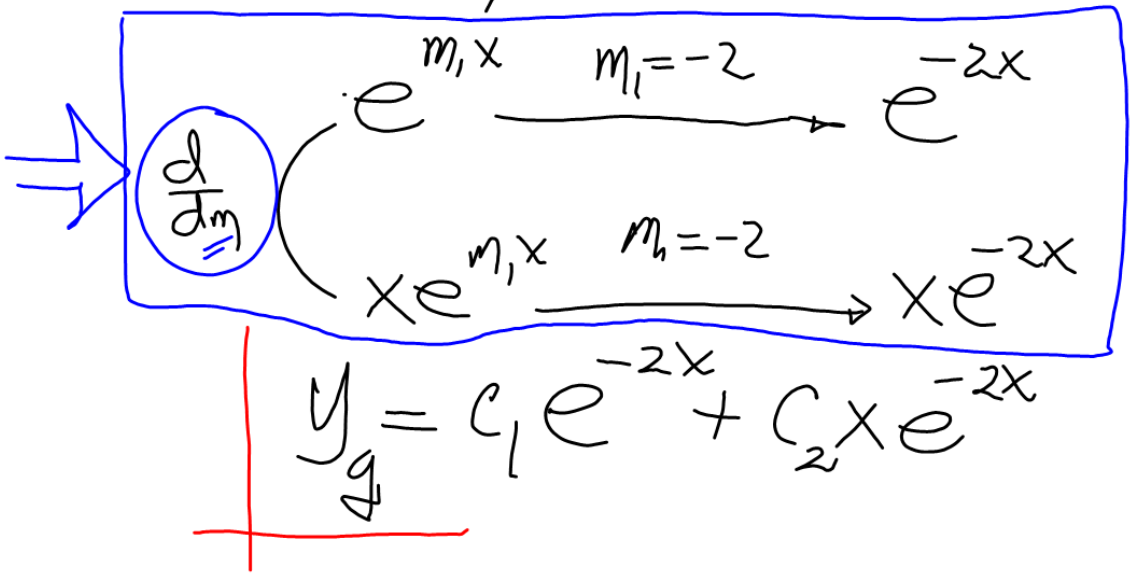
$$y_g = c_1 e^{2x} + c_2 e^{3x}$$

CASO II.-

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

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

$$(m+2)^2 = 0 \qquad m_1 = m_2 = -2$$



$$y_g = c_1 e^{-2x} + c_2 x e^{-2x}$$

$$\frac{d^3y}{dx^3} = 0$$

CASO III $\quad m^3 = 0 \qquad m_1 = m_2 = m_3 = 0$

$$\frac{d}{dm}\left(e^{mx} \xrightarrow{m=0} 1\right)$$

$$\frac{d}{dm}\left(xe^{mx} \xrightarrow{m=0} x\right)$$

$$\frac{d}{dm}\left(x^2e^{mx} \xrightarrow{m=0} x^2\right)$$

$$y_g = C_1 + C_2x + C_3x^2$$

$$\frac{dy}{dx} = (0) + C_2 + 2C_3x$$

$$\frac{d^2y}{dx^2} = (0) + 2C_3$$

$$\frac{d^3y}{dx^3} = 0 \quad \text{EDO(3)LCCH.}$$

CASO III

$$m_1 = a + bi \qquad a \in \mathbb{R}$$
$$m_2 = a - bi \qquad b \in \mathbb{R}^+$$

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

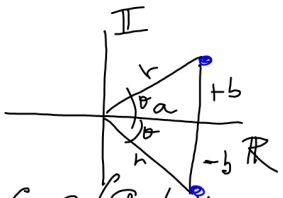
$$m^2 + a_1 m + a_2 = 0 \qquad m_1 \neq m_2$$

$x \in \mathbb{R}$
$y \in \mathbb{R}$

$$y_g = c_1 e^{(a+bi)x} + c_2 e^{(a-bi)x}$$

CASO III

$e^{\pi i} = -1$



$y_g = C_1 e^{(a+bi)x} + C_2 e^{(a-bi)x}$

$y_g = C_1 e^{ax} e^{bxi} + C_2 e^{ax} e^{(-bx)i}$

$y_g = e^{ax}\left(C_1 e^{(bx)i} + C_2 e^{(-bx)i}\right)$

$re^{\theta i} = r\cos(\theta) + r\,\mathrm{sen}(\theta)\,i$

$re^{-\theta i} = r\cos(\theta) - r\,\mathrm{sen}(\theta)\,i$

$e^{\theta i} = \cos(\theta) + \mathrm{sen}(\theta)\,i$

$e^{\pi i} = -1 + (0)$

$y_g = e^{ax}\left[C_1\left(\cos(bx) + \mathrm{sen}(bx)\,i\right) + C_2\left(\cos(bx) - \mathrm{sen}(bx)\,i\right)\right]$

$y_g = e^{ax}\left[(C_1 + C_2)\cos(bx) + (-C_1 i - C_2 i)\,\mathrm{sen}(bx)\right]$

$C_{10} = C_1 + C_2$, $C_{20} = -C_1 i - C_2 i$

$y_g = e^{ax}\left(C_{10}\cos(bx) + C_{20}\,\mathrm{sen}(bx)\right)$

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

$m_{1,2} = a \pm bi$

$$\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + 2y = 0 \quad \text{EDO(2) L cc H.}$$

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

$$m_{1,2} = \frac{2 \pm \sqrt{4 - 4(2)}}{2}$$

$$m_{1,2} = \frac{2}{2} \pm \frac{\sqrt{-4}}{2} \Rightarrow \underline{1 \pm i}$$

$a = 1$

$b = 1$

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

$$y_g = C_1 e^x \cos(2x) + C_2 e^x \operatorname{sen}(2x) + C_3 x e^x \cos(2x) + C_4 x e^x \operatorname{sen}(2x).$$

$$(m-1+2i)^2 (m-1-2i)^2 = 0$$

$$\left((m-1)^2 + (2i)^2\right)^2 = 0$$

$$\left(m^2 - 2m + 1 - 4\right)^2 = 0$$

$$\left(m^2 - 2m - 3\right)^2 = 0$$

$$m^4 - 2m^3 - 3m^2 + 6m^2$$

$$\frac{d^2y}{dx^2} + 8\frac{dy}{dx} - 5y = 6e^{2x} + x^2 + \cos(3x)$$

$$\frac{d^n y}{dx^n} + a_1 \frac{d^{n-1} y}{dx^{n-1}} + \cdots + a_{n-1}\frac{dy}{dx} + a_n y = g(x)$$

$$y(x) = \underset{g/h-h}{y(x)} + \underset{g/h}{y_p}$$

Método de Coeficientes Indeterminados

Método de Parámetros Variables