EDO(2)L cc H

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

trivial $\boxed{y=0}$

$y = e^{mx}$ solución (posible) particular fundamental

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

CASO I.- $m_1 \neq m_2 \in \mathbb{R}$ $\boxed{y_g = C_1 e^{m_1 x} + C_2 e^{m_2 x}}$

CASO II.- $m_1 = m_2 \in \mathbb{R}$ $\boxed{y_g = C_1 e^{m_1 x} + C_2 x e^{m_1 x}}$

CASO III.- $m_1, m_2 \in \mathbb{C}$ $\boxed{\begin{array}{l} m_1 = a + bi \\ m_2 = a - bi \end{array}}$ $a \in \mathbb{R}$, $b \in \mathbb{R}^+$

$m_1 \neq m_2$

$x \in \mathbb{R}$

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

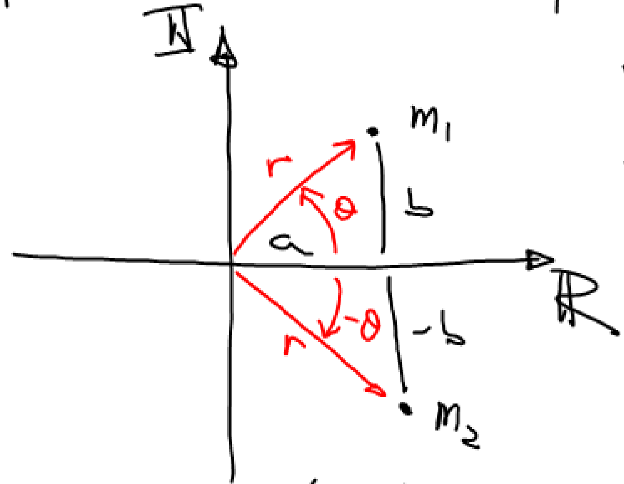
$C_1, C_2 \in \mathbb{C}$

$C_1, C_2 \in \mathbb{R}$ $y_g = C_1 e^{ax}\cos(bx) + C_2 e^{ax}\operatorname{sen}(bx)$

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

$$\begin{cases} e \doteq 2.72 \\ \pi \doteq 3.1416 \\ i = \sqrt{-1} \\ 1 \end{cases}$$

representación polar de los #'s complejos



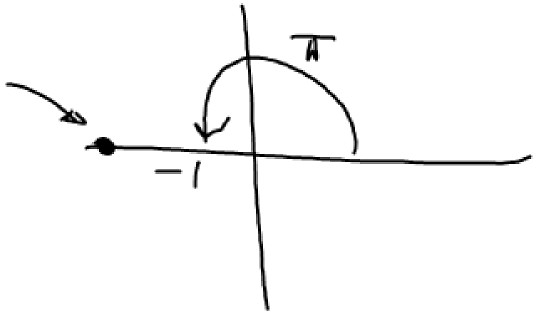
$$re^{\theta i} = r\cos(\theta) + r\,\mathrm{sen}(\theta)\,i$$

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

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

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

$$\theta = \pi \text{ rad} \quad (180^\circ)$$



$$e^{\pi i} = \cancelto{-1}{\cos(\pi)} + \left(\cancelto{0}{\mathrm{sen}(\pi)}\right) i$$

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

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

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

$$y_g = C_1 e^{ax} e^{bxi} + C_2 e^{ax} e^{-bxi}$$

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

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

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

$$y_g = C_{10} e^{ax}\cos(bx) + C_{20} e^{ax}\operatorname{sen}(bx)$$

$x \in \mathbb{R}$

$y \in \mathbb{R}$

$C_{10}, C_{20} \in \mathbb{R}$

$$\begin{cases} e^{ax} & a \in \mathbb{R} \\ x^n & n \in \mathbb{E}^+ \\ \begin{cases} \cos(bx) \\ \operatorname{sen}(bx) \end{cases} & b \in \mathbb{R}^+ \end{cases}$$

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

$$m_1 = m_2 = m_3 = m_4 = 3$$

$$y_g = C_1 e^{3x} + C_2 x e^{3x} + C_3 x^2 e^{3x} + C_4 x^3 e^{3x}$$ EDO(4) L cc H.

ojo $\Rightarrow$ $$y_g = C_1 e^{3x} + C_2 x^2 e^{3x} + C_3 x^3 e^{3x}$$ EDO(3) L cv H

$$y_g = C_1 e^{-5x}\cos(4x) + C_2 e^{-5x}\operatorname{sen}(4x)$$ EDO(2) L cc H

$$\left(m-(-5+4i)\right)\left(m-(-5-4i)\right) = 0$$

$$\left((m+5)^2 - (4i)^2\right) = 0 \qquad m^2 + 10m + 25 + 16 = 0$$

$$m^2 + 10m + 41 = 0$$

$$\boxed{\frac{d^2y}{dx^2} + 10\frac{dy}{dx} + 41y = 0}$$

$$y_g = C_1 e^{x}\cos(x) + C_2 e^{-x}\operatorname{sen}(x)$$ EDO(2) L cv H

$$y_g = C_1 e^{x}\cos(3x) + C_2 e^{x}\operatorname{sen}(2x)$$ EDO(2) L cv H

$\to y_g = C_1 \cos(4x) + C_2 \operatorname{sen}(4x)$

$a \pm bi$

$a = 0$

$b = 4$

EDO(2) L cc H

$(m+4i)(m-4i) = 0$

$m^2 + 16 = 0$

$$\boxed{\frac{d^2y}{dx^2} + 16y = 0}$$

$(m+a)(m-a) = m^2 - a^2$

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

$(4\sqrt{-1})^2$

$16 \cdot (-1)$

-16

$m^2 + 16.$

$$y = C_1 e^{-2x}\cos(3x) + C_2 e^{-2x}\operatorname{sen}(3x) + C_3 x e^{-2x}\cos(3x) + C_4 x e^{-2x}\operatorname{sen}(3x)$$

$$a = -2 \qquad b = 3$$

EDO(4)L $\underline{\underline{CC}}$ H

$$\left[\left(m - (-2+3i)\right)\cdot\left(m - (-2-3i)\right)\right]^2 = 0$$

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

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

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