$$y^2(1-y) = (x-C_1)^2.$$

$$y^2(1-y) - (x-C_1)^2 = 0$$

$$F(x,y) = 0$$

$$\frac{\partial F}{\partial x} + \frac{\partial F}{\partial y} \cdot \frac{dy}{dx} = 0$$

$$\left[(0) - 2(x-C_1)^1\right] + \left[2y - 3y^2\right]\frac{dy}{dx} = 0$$

$$-2x + 2C_1 + (2y-3y^2)\frac{dy}{dx} = 0$$

$$2C_1 = 2x - (2y-3y^2)\frac{dy}{dx}$$

$$C_1 = x - \frac{1}{2}(2y-3y^2)\frac{dy}{dx}$$

$$y^2(1-y) - \left(x - \left(x - \frac{1}{2}(2y-3y^2)\frac{dy}{dx}\right)\right)^2 = 0$$

EDO (1) NL

TEMA 2. EDO(n)LCC $\begin{cases} H. \\ NH. \end{cases}$

$$\frac{dy}{dx} + a_1 y = 0 \qquad \text{EDO(1)LCCH.}$$

$$\frac{dy}{dx} = -a_1 y \qquad \text{M.S.V.}$$

$$\frac{dy}{y} = -a_1 dx$$

$$\int \frac{dy}{y} = -a_1 \int dx$$

$$Ly + C_1 = -a_1 x + C_2$$

$$Ly = -a_1 x + (C_2 - C_1)$$

$$y = e^{(-a_1 x + (C_2 - C_1))}$$

$$= e^{(C_2 - C_1)} e^{-a_1 x}$$

$$y = ce^{-a_1 x}$$ SOGRAL.

$$y' + a_1 y = 0$$ EDO(1) L acH.

$$y' = -a_1 c e^{-a_1 x}$$

$$\left(-a_1 c e^{-a_1 x}\right) + a_1\left(ce^{-a_1 x}\right) = 0$$

$$(-a_1 + a_1) ce^{-a_1 x} = 0$$

$$(0) ce^{-a_1 x} = 0$$

$$0 = 0.$$

$$y' + p(x) y = 0 \qquad p(x) = a_1$$

$$y = ce^{-\int p(x)\,dx}$$

$$y = ce^{-\int a_1\,dx}$$

$$= ce^{-a_1 \int dx}$$

$$y = ce^{-a_1 x}$$

$$y' - \sqrt{2}\,y = 0$$

$$y = ce^{\sqrt{2}x}$$

EDOL(2) cc H.

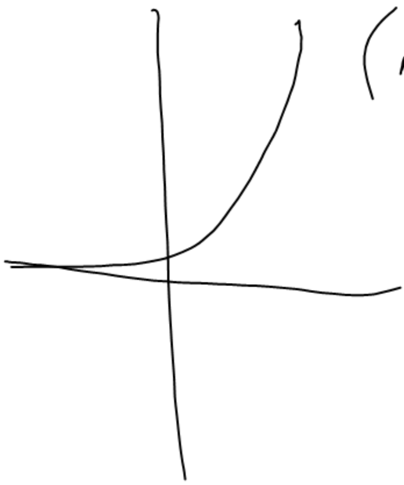
$$\frac{d^2y}{dx^2} + a_1\frac{dy}{dx} + a_2 y = 0 \qquad a_1, a_2 \in \mathbb{R}$$

H. $y = e^{mx}$ SPF.

$$\frac{dy}{dx} = me^{mx}$$

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

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



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

$$\left.\begin{array}{l} e^{mx}=0 \\ \lim\limits_{m\to-\infty} m \end{array}\right\} \text{solución inútil.}$$

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

Ecuación característica.

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

EA(2) $m^2+a_1 m+a_2=0$ $\quad \begin{array}{l} m_1 \\ m_2 \end{array}$ raíces.

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

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

CASO III.- $m_1, m_2\in\mathbb{C}$

$$y_g=c_1 y_1+c_2 y_2 \quad \left.\begin{array}{l} y_1 \\ y_2 \end{array}\right\} \text{SPF.}$$

$H\Rightarrow y=e^{mx}$ $\quad y_1=e^{m_1 x}$ $\quad y_2=e^{m_2 x}$

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

$$W\Rightarrow \begin{vmatrix} y_1 & y_2 \\ y_1' & y_2' \end{vmatrix}\neq 0$$

$$y_{SG} = C_1 y_1 + C_2 y_2 + C_3 y_3$$

$$\begin{vmatrix} y_1 & y_2 & y_3 \\ y_1' & y_2' & y_3' \\ y_1'' & y_2'' & y_3'' \end{vmatrix} \neq 0$$

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

$$W \begin{vmatrix} e^{m_1 x} & e^{m_2 x} \\ m_1 e^{m_1 x} & m_2 e^{m_2} \end{vmatrix} \neq 0$$

$$m_2 e^{m_1 x} e^{m_2 x} - m_1 e^{m_1 x} e^{m_2 x} \neq 0$$

$$(m_2 - m_1) e^{m_1 x} e^{m_2 x} \neq 0$$

$$e^{m_1 x} \neq 0 \quad e^{m_2 x} \neq 0$$

$$(m_2 - m_1) \neq 0$$

$$m_2 \neq m_1$$

$y'' - 5y' + 6y = 0$ EDOL(2)ccH

$m^2 - 5m + 6 = 0$ EAC.

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

$m_1 = 2 \quad m_2 = 3$

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

$y'' - 2y' + y = 0$

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

$(m-1)^2 = 0$

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

$\frac{d}{dm}$ $(m - m_1)(m - m_2) = 0$

$2m + a_1 = 0$

$\frac{d}{dm}$ $(m - m_1) + (m - m_2) = 0$

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

$$m_1 = m_2$$

$$(m - m_1)^2 = 0$$

$$\frac{d}{dm}$$

$$2m + a_1 = 0$$

$$\frac{d}{dm}$$

$$2(m - m_1) = 0$$

$$y'' + a_1 y' + a_2 y = 0$$

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

$$m_1 = m_2$$

$$y = e^{mx} \xrightarrow{m = m_1} e^{m_1 x} \quad \text{SPF.}$$

$$\frac{d}{dm}$$

$$x e^{mx} \xrightarrow{m = m_1} x e^{m_1 x}$$

$$y'' + a_1 y' + a_2 y = 0$$

$$y = x e^{m_1 x}$$

$$y' = m_1 x e^{m_1 x} + e^{m_1 x}$$

$$y'' = m_1^2 x e^{m_1 x} + m_1 e^{m_1 x} + m_1 e^{m_1 x}$$

$$= m_1^2 x e^{m_1 x} + 2 m_1 e^{m_1 x}$$

$$\left(m_1^2 x e^{m_1 x} + 2 m_1 e^{m_1 x}\right) + a_1\left(m_1 x e^{m_1 x} + e^{m_1 x}\right) +$$

$$+ a_2\left(x e^{m_1 x}\right) = 0$$

$$\left(m_1^2 + a_1 m_1 + a_2\right) x e^{m_1 x} + \left(2m_1 + a_1\right) e^{m_1 x} = 0$$

$$\begin{cases} m_1^2 + a_1 m_1 + a_2 = 0 \\ 2m_1 + a_1 = 0 \end{cases}$$

$$y'' + a_1 y' + a_2 y = 0$$

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