CAP II.- ECUACIÓN DIFERENCIAL ORDINARIA LINEAL

$$a_0(x)\frac{d^ny}{dx^n} + a_1(x)\frac{d^{n-1}y}{dx^{n-1}} + \ldots + a_{n-1}(x)\frac{dy}{dx} + a_n(x)y = Q(x)$$

EDO(n) L.C.V. NH

Regla de oro.- La ecuación, preferentemente, debe estar normalizada

Una ecuación está normalizada cuando el coeficiente de la derivada de mayor orden es igual a la unidad

EDO(1) L. cc. H

$$\frac{dy}{dx} + a_1 y = 0$$

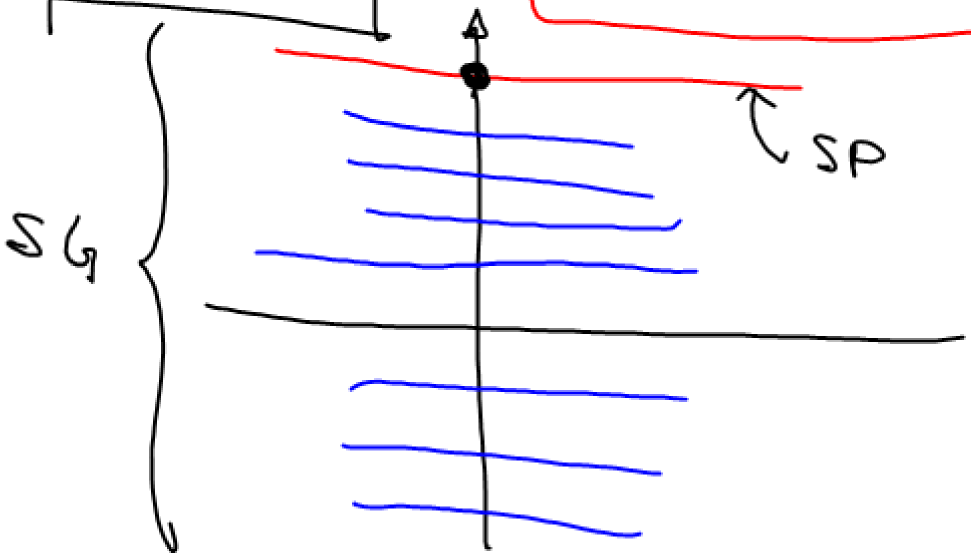
$$\boxed{\frac{dy}{dx} = 0}$$

$$\boxed{y(x) = C_1}$$ SG

$$y(0) = 5$$

$$\downarrow$$

$$\boxed{y(x) = 5}$$



$$\lim \sum_{n=0..\infty} \left(\frac{1}{n!}\right) = e$$

$$\frac{dy}{dx} + y = 0 \qquad a_1 = 1$$

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

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

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

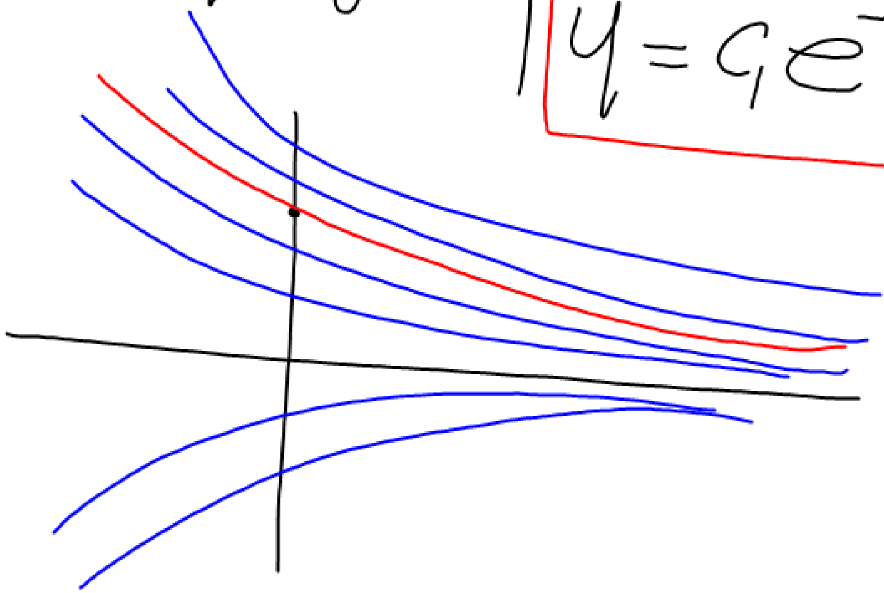
$$Ly + k_1 = -(x + k_2)$$

$$Ly = -x + (-k_2 - k_1)$$

$$y = e^{(-x + [k_2 - k_1])}$$

$$y = e^{-k_2 - k_1} e^{-x}$$

$$\boxed{y = C_1 e^{-x}} \quad SG$$



$$\boxed{y = 2.75 e^{-x}}$$

SP

$$\frac{dy}{dx} = 0 \qquad y(x) = C_1$$

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

$$\frac{dy}{dx} + a_1 y = 0 \qquad \boxed{y(x) = C_1 e^{-a_1 x}}$$

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

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

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

$$Ly + k_3 = -a_1 (x + k_4)$$

$$Ly = -a_1 x - a_1 k_4 - k_3$$

$$y = e^{(-a_1 x - a_1 k_4 - k_3)}$$

$$y = e^{(-a_1 k_4 - k_3)} e^{-a_1 x}$$

$$\frac{dy}{dx} + a_1 y = 0 \qquad y(x) = C_1 e^{-a_1 x}$$

$$\frac{dy}{dx} - \sqrt{2}\, y = 0 \qquad y(x) = C_1 e^{\sqrt{2} x}$$

$$\frac{dy}{dx} = 0 \qquad a_1 = 0 \qquad y(x) = C_1 e^{(0) x}$$

$$y(x) = C_1$$

EDO(2)Lcc H.

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

$$y(x) = c_1 y_1 + c_2 y_2 \qquad y_1 = e^{mx}$$

$$y = e^{mx}$$

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

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

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

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

$e^{mx} = 0 \quad y = 0$ trivial

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

$$(m - m_1)(m - m_2) = 0$$

$$y_1 = e^{m_1 x} \qquad y_2 = e^{m_2 x}$$

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

Euler

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