EDO(1)L CV NH.

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

$$y_g = C_1\, y_{g/H} + y_{p/q}$$

$y_{g/H}$.

$$\frac{dy}{dx} + p(x)\,y = 0$$

$$\frac{dy}{dx} = -p(x)\,y$$

$$dy = -p(x)\,dx \cdot y$$

Método de separación de variables.

$$\frac{dy}{y} = -p(x)\,dx$$

$$\int \frac{dy}{y} = -\int p(x)\,dx$$

$$L y + C_1 = -\int p(x)\,dx$$

$$L y - L C_1 = -\int p(x)\,dx$$

$$L\left(\frac{y}{C_1}\right) = -\int p(x)\,dx$$

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

$$\boxed{y_{g/H} = C_1 e^{-\int p(x)\,dx}}$$

$$\boxed{\frac{dy}{dx} + p(x)\,y = 0}$$

$$\frac{dy}{dx} + y\cos(x) = 0$$

$$p(x) = \cos(x)$$

$$y = c_1 e^{-\int \cos(x)\,dx}$$

$$\boxed{y = c_1 e^{-\operatorname{sen}(x)}}.$$

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

$$e^{\int p(x)\,dx}\left(\frac{dy}{dx} + p(x)y\right) = e^{\int p(x)\,dx} q(x)$$

$$\frac{d}{dx}\left(y e^{\int p(x)\,dx}\right) = e^{\int p(x)\,dx} q(x)$$

$$\int d\left(y e^{\int p(x)\,dx}\right) = \int e^{\int p(x)\,dx} q(x)\,dx$$

$$y e^{\int p(x)\,dx} = c_1 + \int e^{\int p(x)\,dx} q(x)\,dx$$

$$\boxed{y = \underset{y/\mathrm{H}.}{c_1 e^{-\int p(x)\,dx}}} + e^{-\int p(x)\,dx}\int e^{\int p(x)\,dx} q(x)\,dx.$$

$$x\,\text{sen}(x)\,y' + \left(\text{sen}(x) - x\cos(x)\right)y = \text{sen}(x)\cos(x) - x$$

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

$$y' + \underbrace{\frac{(\text{sen}(x) - x\cos(x))}{x\,\text{sen}(x)}}_{p(x)}\,y = \underbrace{\frac{(\text{sen}(x)\cos(x) - x)}{x\,\text{sen}(x)}}_{q(x)}$$

$$\frac{dy}{dx} + p(x)y = 0$$

$$\frac{dy}{dx} \cdot e^{+\int p(x)dx} + p(x)y e^{+\int p(x)dx} = 0$$

$$\frac{d}{dx}\left(y \cdot e^{+\int p(x)dx}\right) = 0$$

$$d\left(y e^{+\int p(x)dx}\right) = 0$$

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

$$y e^{\int p(x)dx} = C_1$$

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

Capítulo 2.: EDO(n)LCCNH. $n>1$

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

Homogenea asociada

$$\frac{d^n y}{dx^n} + a_1 \frac{d^{n-1}y}{dx^{n-1}} + \ldots + a_{n-1}\frac{dy}{dx} + a_n y = 0$$

$n=2$

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

$y_p = e^{ax}$ ✓

$$\frac{dy}{dx} + a y = 0 \qquad y = c_1 e^{-a\int dx}$$

$p = a \qquad y = c_1 e^{-ax}$

$$\frac{d^2y}{dx^2}+a_1\frac{dy}{dx}+a_2y=0$$

$$y_p=e^{mx}$$

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

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

$$m^2e^{mx}+a_1me^{mx}+a_2e^{mx}=0$$

$$(m^2+a_1m+a_2)e^{mx}=0$$

$$\boxed{y_p=0 \quad y'=0 \quad y''=0}$$

$$e^{mx}=0$$

SOLUCIÓN TRIVIAL

$$y''+a_1y'+a_2y=0$$

$$(0)+a_1(0)+a_2(0)=0$$

$$0\equiv 0$$

$$m^2+a_1m+a_2=0$$

ECUACIÓN CARACTERÍSTICA.

m_1 $\quad y_1=e^{m_1x}$

m_2 $\quad y_2=e^{m_2x}$

Si $m_1\neq m_2$

$$y_{g/H}=c_1e^{m_1x}+c_2e^{m_2x}$$