EDO(1) L CV H.

$$\frac{dy}{dx} + p(x)\,y = 0 \implies y_g = C_1 e^{-\int p(x)\,dx}$$

$$y e^{\int p\,dx} = C_1 \longrightarrow \underbrace{e^{\int p\,dx}\left(p(x)\,y + \frac{dy}{dx}\right)}_{d\left(y e^{\int p\,dx}\right)} = 0$$

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

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

EDO (1) L CU NH

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

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

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

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

$$du = e^{\int p(x)dx} q(x)\,dx$$

$$\int du = \int e^{\int p(x)\,dx} q(x)\,dx$$

$$u + k_1 = \left[\int e^{\int p\,dx} q\,dx\right] + k_2$$

$$u = (k_2 - k_1) + \left[\int e^{\int p\,dx} q\,dx\right]$$

$$y e^{\int p(x)\,dx} = C_1 + \left[\int e^{\int p(x)\,dx} q(x)\,dx\right]$$

$$y_g = C_1 e^{-\int p(x)\,dx} + e^{-\int p(x)\,dx}\left[\int e^{\int p(x)\,dx} q(x)\,dx\right]$$

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

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

$$\frac{dy}{dx} + p(x)y = q(x) \qquad y_g = C_1 e^{-\int p(x)dx} + e^{-\int p(x)dx} \int e^{\int p(x)dx} q(x)\,dx$$

$$\frac{dy}{dx} + p(x)y = q(x) \qquad y_{nh}^{g} = y_h^{g} + e^{-\int p(x)dx} \int e^{\int p(x)dx} q(x)\,dx$$

REGLA DE ORO DE LAS LINEALES

$$y_{n.h}^{g} = y_h^{g} + y_g^{p}$$

$$y_g = C_1 e^{2x} + 5e^{3x} + 4\cos(6x)$$

$$\text{EDO}(1) \left\{ \begin{matrix} CC \\ CV \end{matrix} \right\} \text{NH}$$

$$\frac{dy}{dx} + (\quad) y = Q(x)$$

$SolucionGeneral := y(x) = 5\,e^{3x} + 4\cos(6x) + e^{2x}\_C1$

$$\boxed{y_h = C_1 e^{2x}} \longrightarrow C_1 = \frac{y}{e^{2x}}$$

$$y_p = 5e^{3x} + 4\cos(6x)$$

$$\frac{dy}{dx} = 2C_1 e^{2x}$$

$$\frac{dy}{dx} = 2\left(\frac{y}{e^{2x}}\right)e^{2x} \Rightarrow \frac{dy}{dx} = 2y$$

$$\boxed{\frac{dy}{dx} - 2y = 0} \qquad Q(x) = \frac{dy_p}{dx} - 2y_p$$

$$y_p = 5e^{3x} + 4\cos(6x)$$

$$\frac{dy}{dx} = 15e^{3x} - 24\,\text{sen}(6x)$$

$$Q(x) = \left(15e^{3x} - 24\,\text{sen}(6x)\right) - 2\left(5e^{3x} + 4\cos(6x)\right)$$

$$Q(x) = 5e^{3x} - 24\,\text{sen}(6x) - 8\cos(6x).$$

$$\frac{dy}{dx} - 2y = 5e^{3x} - 24\,\text{sen}(6x) - 8\cos(6x).$$

$$x\frac{dy}{dx} + y = Lx$$

normalizada

$$\frac{dy}{dx} + \frac{y}{x} = \frac{Lx}{x}$$

$$\left\{ \begin{array}{l} p(x) = \frac{1}{x} \\ q(x) = \frac{Lx}{x} \end{array} \right.$$

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

$$\int p(x)dx = \int \frac{dx}{x} \Rightarrow Lx$$

$$e^{\int p(x)dx} = e^{Lx} \Rightarrow x$$

$$e^{-\int p(x)dx} = e^{-Lx} \Rightarrow e^{L\left(\frac{1}{x}\right)} \Rightarrow \frac{1}{x}$$

$$y_g = C_1\left(\frac{1}{x}\right) + \frac{1}{x}\int (x)\cdot\frac{Lx}{x}\cdot dx$$

$$y_g = \frac{C_1}{x} + \frac{1}{x}\int Lx\, dx$$

$$\boxed{\frac{dy}{dx} + \frac{1}{x}y = \frac{Lx}{x}}$$

$$y_g = \frac{C_1}{x} + \frac{1}{x}\left(x\,Lx - x\right) \Rightarrow \boxed{y_g = \frac{C_1}{x} + Lx - 1}$$