$$\frac{dy}{dx} + a_1 y = 0 \rightarrow y = C_1 e^{-a_1 x} \quad \text{EDO(1)L cc}\underline{\text{H}}.$$

$$\frac{dy}{dx} + a_1 y = q(x) \rightarrow y = C_1 e^{-a_1 x} + e^{-a_1 x} \int e^{a_1 x} q(x)\, dx.$$

EDO(1)L cc $\underline{\text{NH}}$.

Regla de Oro Ecs. <u>LINEALES</u>

$$\boxed{y_{g/NH} = y_{g/H_{A}} + y_{p/Q(x)}}$$

$$y = C_1 e^{2x} + 4\cos(3x) \quad SG$$

EDO(1) L $\bigcirc$ NH

CC
CV } ?

$$y_p = 4\cos(3x)$$

$$y = C_1 e^{2x} \quad \boxed{a_1 = -2}$$

$$\frac{dy}{dx} = -12\,\text{sen}(3x)$$

$$\frac{dy}{dx} - 2y = 0$$

$$Q(x) = [-12\,\text{sen}(3x)] - 2[4\cos(3x)]$$

$$Q(x) = -8\cos(3x) - 12\,\text{sen}(3x)$$

$$\boxed{\frac{dy}{dx} - 2y = -8\cos(3x) - 12\,\text{sen}(3x)}$$

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

NH

$$y = \underbrace{c_1 e^{4x} + c_2 e^{-4x} + c_3 e^{x}}_{\text{EDO (3) L ? NH}} + \underbrace{8e^{3x} + 4e^{5x}}_{y_p / Q(x)}$$

**176.** $y' + 2y = x^2 + 2x.$

$$\frac{dy}{dx} + a_1 y = q(x) \qquad a_1 = 2 \qquad q(x) = x^2 + 2x$$

$$y = c_1 e^{-a_1 x} + e^{-a_1 x}\int e^{a_1 x} q(x)\,dx$$

$$y_{g/h} = c_1 e^{-2x}$$

$$y_p = e^{-2x}\int e^{2x}(x^2+2x)\,dx$$

$$= e^{-2x}\int x^2 e^{2x}\,dx + e^{-2x}\int 2x e^{2x}\,dx$$

$$\int x^2 e^{2x}\,dx = \frac{x^2 e^{2x}}{2} - \int x e^{2x}\,dx$$

$u = x^2 \quad du = 2x\,dx$

$dv = e^{2x}dx \quad v = \frac{e^{2x}}{2}$

$$y_p = e^{-2x}\left(\frac{x^2 e^{2x}}{2} - \int x e^{2x}\,dx\right) + e^{-2x}\int 2x e^{2x}\,dx$$

$$y_p = e^{-2x}\left(\frac{x^2 e^{2x}}{2} + \int x e^{2x}\,dx\right)$$

$$\int x e^{2x}\,dx = \frac{x e^{2x}}{2} - \frac{1}{2}\int e^{2x}\,dx = \frac{x e^{2x}}{2} - \frac{1}{2}\,\frac{e^{2x}}{2}$$

$u = x \quad du = dx$

$dv = e^{2x}dx \quad v = \frac{e^{2x}}{2}$

$$= \frac{x e^{2x}}{2} - \frac{e^{2x}}{4}$$

$$y_p = e^{-2x}\left(\frac{x^2 e^{2x}}{2} + \frac{x e^{2x}}{2} - \frac{e^{2x}}{4}\right) \Rightarrow \frac{x^2}{2} + \frac{x}{2} - \frac{1}{4}$$

$$y_{g/NH} = c_1 e^{-2x} + \frac{x^2}{2} + \frac{x}{2} - \frac{1}{4}$$

$$\frac{dy}{dx} + \underset{a_1}{2}\, y = \underbrace{x^2 + 2x}_{q(x)}$$

EDO(1) L cc NH.

$$\frac{dy}{dx} + a_1 y = q(x)$$

$$y = c_1 e^{-a_1 x} + e^{-a_1 x} \int \overset{\text{FI}}{e^{a_1 x}}\, q(x)\, dx.$$

$$y = c_1 e^{-2x} + e^{-2x} \int e^{2x} (x^2 + 2x)\, dx$$

$$y_{NH}^{(g)} = y_{H}^{(g)} + y_{Q}^{(P)}$$

$$\frac{dy}{dx} + 2y = x^2 + 2x$$

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

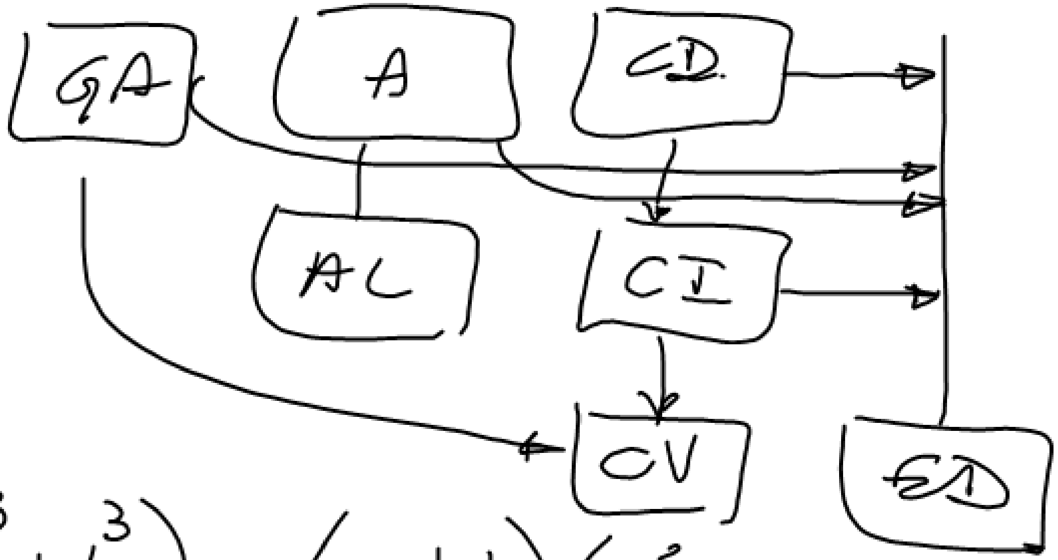
$$\frac{d}{dx}\left(y e^{2x}\right) = e^{2x}\left(x^2 + 2x\right)$$

$$d\left(y e^{2x}\right) = e^{2x}\left(x^2 + 2x\right)dx$$

$$\int d\left(y e^{2x}\right) = \int e^{2x}\left(x^2 + 2x\right)dx$$

$$y e^{2x} = c_1 + \int e^{2x}\left(x^2 + 2x\right)dx$$

$$y = c_1 e^{-2x} + e^{-2x}\int e^{2x}\left(x^2 + 2x\right)dx$$




$$\left(a^3 \pm b^3\right) = \left(a \pm b\right)\left(a^2 \mp ab + b^2\right)$$

$$\frac{x^2+2x+3}{(x+a)(x+b)(x+c)} = \frac{A}{x+a} + \frac{B}{x+b} + \frac{C}{x+c}$$