

MÉTODO FACTOR INTEGRANTE

$$\underbrace{(x+y^2)}_M - \underbrace{2xy}_N \frac{dy}{dx} = 0$$

$$\frac{\partial M}{\partial y} = 2y \quad \frac{\partial N}{\partial x} = -2y \quad \frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$$

ES EXACTA: $M \cdot M + \int N \cdot N \frac{dy}{dx} = 0$ No ES EXACTA

$$M \Rightarrow \text{FACTOR INTEGRANTE: } \frac{\partial}{\partial y}(M \cdot M) = \frac{\partial}{\partial x}(M \cdot N)$$

$$M \frac{\partial M}{\partial y} + M \frac{\partial M}{\partial y} = N \frac{\partial M}{\partial x} + M \frac{\partial N}{\partial x}$$

$$\text{H} \rightarrow M(x) \quad M \cdot (0) + M \frac{\partial M}{\partial y} = N \frac{dy}{dx} + M \frac{\partial N}{\partial x}$$

$$M \left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right) = N \frac{dy}{dx}$$

$$\frac{\left(\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x} \right) dx}{N} = \frac{dy}{M}$$

$$\frac{dy}{M} = \left(\frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N} \right) dx$$

$$\frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{N} = \left(\frac{2y - (-2y)}{-2xy} \right) dx$$

$$= \frac{-4y}{-2xy} dx$$

$$\frac{1}{M} dy = -\frac{2}{x} dx$$

$$\int \frac{1}{M} dy = -2 \int \frac{1}{x} dx$$

$$\int \frac{1}{M} dy = -2 \ln x$$

$$\int \frac{1}{M} dy = \ln x^{-2}$$

$$M = \frac{1}{x^2}$$

FACTOR INTEGRANTE

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

$$\frac{1}{x^2} (x+y^2) - \frac{2xy}{x^2} \frac{dy}{dx} = 0 \quad \text{EXACTA}$$

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

$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$$

$$(0) + \frac{2y}{x^2} = + \frac{2y}{x^2}$$

EXACTA $\int M dx \Rightarrow \int M dx$

$$\int \left(\frac{1}{x} + \frac{y^2}{x^2} \right) dx = \int \frac{dx}{x} + y^2 \int \frac{dx}{x^2}$$

$$= \ln x + y^2 \left(-\frac{1}{x} \right)$$

$$= \ln x - \frac{y^2}{x}$$

SOL GENERAL $\Rightarrow \int M dx + \int \left(N - \frac{\partial}{\partial y} \int M dx \right) dy = C_1$

$$\ln x - \frac{y^2}{x} + \int \left(-\frac{2y}{x} - (0) + \frac{2y}{x} \right) dy = C_1$$

SOL GENERAL $\boxed{\ln x - \frac{y^2}{x} = C_1}$

Martes Lineal Coef. Variables

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

EDO(1) L. c.v. N.H