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

EDO(1) NL.

EXACTA $\qquad \dfrac{\partial M}{\partial y} = \dfrac{\partial N}{\partial x}$

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

ES EXACTA.

$$SG_1 = \int M\,dx + \int\left[N - \frac{\partial}{\partial y}\int M\,dx\right]dy = C_1$$

$$SG_2 = \int N\,dy + \int\left[M - \frac{\partial}{\partial x}\int N\,dy\right]dx = C_1$$

Factor Integrante

No es:
Separable
Homogéneos
Exacta.

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

$$\mu(x,y)M(x,y) + \mu(x,y)N(x,y)\frac{dy}{dx} = 0$$

$\mu(x,y)$
FACTOR INTEGRANTE.

EXACTA.

$$\frac{\partial}{\partial y}\mu(x,y)M(x,y) = \frac{\partial}{\partial x}\mu(x,y)N(x,y)$$

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

$\mu(x)$

$$(0) + \mu(x)\frac{\partial M}{\partial y} = N\frac{d\mu(x)}{dx} + \mu(x)\frac{\partial N}{\partial x}$$

$$N\frac{d\mu(x)}{dx} = \mu(x)\frac{\partial M}{\partial y} - \mu(x)\frac{\partial N}{\partial x}$$

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

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

$$\frac{d\mu(x)}{\mu(x)} = f(x)\,dx$$

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

$M \qquad N$

$$\frac{\partial M}{\partial y}=(0)-x^2 \qquad \frac{\partial N}{\partial x}=2xy-3x^2$$

$$\frac{\partial M}{\partial y}\neq\frac{\partial N}{\partial x} \quad \text{NO ES EXACTA.}$$

$\mu(x)$

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

$$\frac{d\mu}{\mu}=\frac{(-x^2-2xy+3x^2)}{x^2y-x^3}\,dx$$

$$=\frac{2x^2-2xy}{-x^3+x^2y}\Rightarrow\frac{2\cancel{(x^2-xy)}}{-x\cancel{(x^2-xy)}}\Rightarrow-\frac{2}{x}$$

$$\frac{d\mu}{\mu}=-2\frac{dx}{x}$$

$$\int\frac{d\mu}{\mu}=-2\int\frac{dx}{x}$$

$$L\mu(x)=-2L(x)$$

$$L\mu(x)=L\left(\frac{1}{x^2}\right)$$

$$\boxed{\mu(x)=\frac{1}{x^2}}$$

$$(1-x^2y)+(x^2y-x^3)\frac{dy}{dx}=0$$

$$\frac{1}{x^2}(1-x^2y)+\frac{1}{x^2}(x^2y-x^3)\frac{dy}{dx}=0$$

EXACTA

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

$MM \qquad NN$

$$\frac{\partial MM}{\partial y}=-1 \qquad \frac{\partial NN}{\partial x}=-1$$

$$\frac{\partial MM}{\partial y}=\frac{\partial NN}{\partial x} \quad \text{EXACTA}$$

Jueves

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

EDO(1) L ev. NH.