FACTOR INTEGRANTE

$M(x,y) + N(x,y)\frac{dy}{dx} = 0$ NO EXACTA

$\frac{\partial M}{\partial y} \neq \frac{\partial N}{\partial x}$. siempre $\mu(x,y)$

$\underbrace{\mu(x,y)M(x,y)}_{MM} + \underbrace{\mu(x,y)N(x,y)}_{NN}\frac{dy}{dx} = 0$ EXACTA.

$$\frac{\partial MM}{\partial y} = \frac{\partial NN}{\partial x}$$

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

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

EDenDP(1) $L \longrightarrow \mu(x,y)$

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

Caso 1.- $\mu(x)$

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

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

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

$$\text{SG} \rightarrow \int \left(\underbrace{\frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{N}}_{f(x)}\right)dx + \int\frac{d\mu}{\mu} = C_1$$

$\mu(x)$
FACTOR INTEGRANTE

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

Caso 2: $\mu(y)$

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

$$\left(\mu\frac{\partial M}{\partial y}-\mu\frac{\partial N}{\partial x}\right)+M\frac{d\mu}{dy}=0$$

$$\mu\left(\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}\right)+M\frac{d\mu}{dy}=0$$

$$SG\Rightarrow\int\underbrace{\left(\frac{\frac{\partial M}{\partial y}-\frac{\partial N}{\partial x}}{M}\right)}_{f(y)}dy+\int\frac{d\mu}{\mu}=C_1\Rightarrow\mu(y)$$

242. $(2xy^2 - 3y^3)\,dx + (7 - 3xy^2)\,dy = 0, \quad \mu = \varphi(y).$

$M \qquad N \qquad$ NO-EXACTA

$$\frac{\partial M}{\partial y} = 4xy - 9y^2 \qquad \frac{\partial N}{\partial x} = (0) - 3y^2$$

$$f(x)\ \left(\frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{N}\right) \Rightarrow \left(\frac{-3y^2 - 4xy + 9y^2}{7 - 3xy^2}\right)$$

$$\Rightarrow \left(\frac{6y^2 - 4xy}{7 - 3xy^2}\right)$$

$$f(y)\ \left(\frac{\frac{\partial M}{\partial y} - \frac{\partial N}{\partial x}}{M}\right) \Rightarrow \left(\frac{4xy - 9y^2 + 3y^2}{2xy^2 - 3y^3}\right)$$

$$= \left(\frac{4xy - 6y^2}{2xy^2 - 3y^3}\right) \Rightarrow \left(\frac{2x\cancel{y} - 3y^2}{2x\cancel{y} - 3y^3}\right)\frac{2}{y}$$

$$\Rightarrow \frac{2}{y}$$

SG

$$\int \frac{2}{y}\,dy + \int \frac{d\mu}{\mu} = C_1$$

$$2\ln y + \ln \mu = C_1$$

$$\ln y^2 + \ln \mu = C_1$$

$$\ln(\mu y^2) = C_1$$

$$\mu y^2 = e^{C_1}$$

$$\mu = \frac{C_0}{y^2} \longrightarrow \mu(y) = \frac{1}{y^2}$$

$$\left(2xy^2-3y^3\right)+\left(7-3xy^2\right)\frac{dy}{dx}=0$$

$$\frac{1}{y^2}\left(2xy^2-3y^3\right)+\frac{1}{y^2}\left(7-3xy^2\right)\frac{dy}{dx}=0$$

$$\underbrace{(2x-3y)}_{MM}+\underbrace{\left(\frac{7}{y^2}-3x\right)}_{NN}\frac{dy}{dx}=0$$

$$\frac{\partial MM}{\partial y}=-3 \qquad \frac{\partial NN}{\partial x}=-3 \qquad \text{EXACTA.}$$

$$SG=\int(2x-3y)\,dx+\int\left(\frac{7}{y^2}-3x-\frac{\partial}{\partial y}\int(2x-3y)\,dx\right)dy=C_1$$

$$\left(x^2-3xy\right)+\int\left(\frac{7}{y^2}-\cancel{3x}+\cancel{3x}\right)dy=C_1$$

$$x^2-3xy+7\int\frac{dy}{y^2}=C_1$$

$$x^2-3xy+\left(-\frac{7}{y}\right)=C_1$$

$$\boxed{x^2-3xy-\frac{7}{y}=C_1} \quad SG$$

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