# MÉTODO ECUACIÓN DIFERENCIAL EXACTA.

$$x^2y^3 + 5xy^4 - 6x^3y + 8y^5 = C_1$$

SOLUCIÓN GENERAL EDO(1)NL

$F(x,y) = C_1$ $\qquad \frac{dy}{dx}$

$$\frac{dF}{dx} = 0 \qquad \frac{\partial F}{\partial x} + \frac{\partial F}{\partial y} \cdot \frac{dy}{dx} = 0$$

$$\underbrace{(2xy^3 + 5y^4 - 18x^2y)}_{M} + \underbrace{(3x^2y^2 + 20xy^3 - 6x^3 + 40y^4)}_{N}\frac{dy}{dx} = 0$$

EDO(1)NL

$$\boxed{M + N\frac{dy}{dx} = 0}$$

Teorema Schwartz

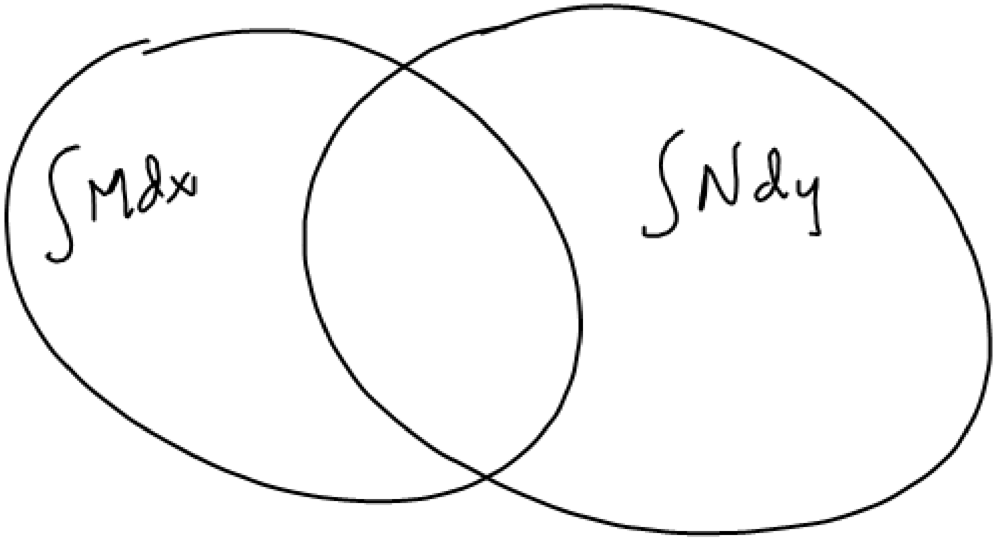
$$M \Leftrightarrow \frac{\partial F}{\partial x} \qquad N \Leftrightarrow \frac{\partial F}{\partial y} \qquad \frac{\partial^2 F}{\partial x \partial y} = \frac{\partial^2 F}{\partial y \partial x}$$

Si $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ entonces EXACTA.

$$\frac{\partial M}{\partial y} = 6xy^2 + 20y^3 - 18x^2 \qquad \frac{\partial N}{\partial x} = 6xy^2 + 20y^3 - 18x^2$$

$$M + N\frac{dy}{dx} = 0$$

EXACTA




$$SG \quad \left[\int M\,dx\right] \cup \left[\int N\,dy\right] = C_1$$

$$\left(2xy^3+5y^4-18x^2y\right)+\left(3x^2y^2+20xy^3-6x^3+40y^4\right)\frac{dy}{dx}=0$$

$$\int M\,dx = 2y^3\int x\,dx + 5y^4\int dx - 18y\int x^2\,dx$$

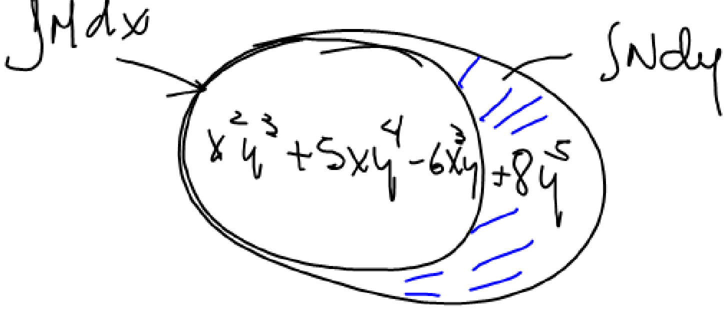
$$= x^2y^3+5xy^4-6x^3y$$

$$\int N\,dy = 3x^2\int y^2\,dy + 20x\int y^3\,dy - 6x^3\int dy + 40\int y^4\,dy$$

$$= x^2y^3+5xy^4-6x^3y+8y^5$$

$$\int M\,dx \cup \int N\,dy = C_1$$

$$x^2y^3+5xy^4-6x^3y+8y^5=C_1$$

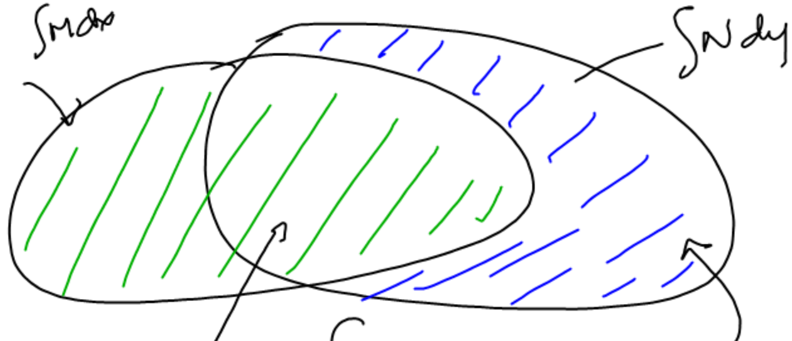


$$M + N\frac{dy}{dx} = 0 \qquad \text{EXACTA.}$$

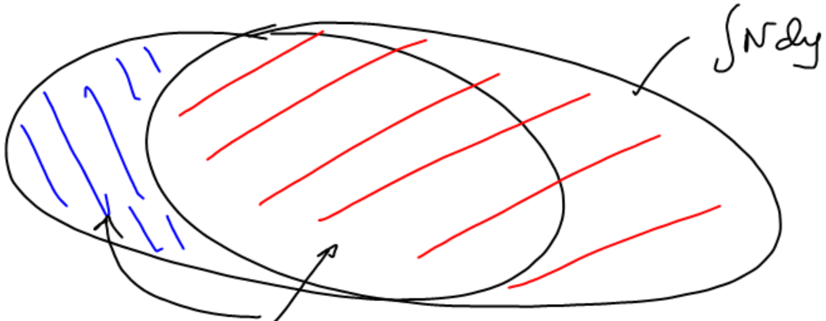
SG $$\int M\,dx + \int\left[N - \frac{\partial}{\partial y}\int M\,dx\right]dy = C_1$$

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

$$\int M(x,y)\,dx \qquad \int N(x,y)\,dy$$




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




$$SG = \int N\,dy + \int\left(M - \frac{\partial}{\partial x}\int N\,dy\right)dx = C_1$$