

$$(2xy^2 - 18x^2y + 4y^3) + (2x^2y - 6x^3 + 12xy^2) \frac{dy}{dx} = 0$$

$M(x, y)$ 
 $N(x, y)$

$$\frac{\partial M}{\partial y} \equiv \frac{\partial N}{\partial x} \Rightarrow \text{IS EXACT.}$$

$$\frac{\partial M}{\partial y} = 4xy - 18x^2 + 12y^2$$

$$\frac{\partial N}{\partial x} = 4xy - 18x^2 + 12y^2$$

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

$$\int M dx = 2y^2 \left( \frac{x^2}{2} \right) - 18y \left( \frac{x^3}{3} \right) + 4y^3 (x)$$

$$= \underline{x^2 y^2} - 6x^3 y + 4x y^3$$

$$\int N dy = 2x^2 \int y dy - 6x^3 \int dy + 12x \int y^2 dy$$

$$= 2x^2 \left( \frac{y^2}{2} \right) - 6x^3 (y) + 12x \left( \frac{y^3}{3} \right)$$

$$= \underline{x^2 y^2} - 6x^3 y + 4x y^3$$

Solución General  $\left[ \int M dx \right] \cup \left[ \int N dy \right] = C_1$



SOL  
GRAL

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

SG<sub>1</sub>  $\int M dx + \int \left[ N - \frac{\partial}{\partial y} \int M dx \right] dy = C_1$

SG<sub>2</sub>  $\int N dy + \int \left[ M - \frac{\partial}{\partial x} \int N dy \right] dx = C_1$

$$\frac{du}{dx} = - \frac{2u(4u^2+u-6)}{x(6u^2+u-3)}$$

$$x(6u^2+u-3) \frac{du}{dx} = -2u(4u^2+u-6)$$

$$2u(4u^2+u-6) + x(6u^2+u-3) \frac{du}{dx} = 0$$

$$M(x, u) + N(x, u) \frac{du}{dx} = 0$$

$$P(x) = 1$$

$$Q(u) = 2u(4u^2+u-6)$$

$$R(x) = x$$

$$S(u) = 6u^2+u-3$$

$$\int \frac{P}{R} dx + \int \frac{S}{Q} du = C,$$

$$\underbrace{(x^3 + xy^2)}_M + \underbrace{(x^2y + y^3)}_N \frac{dy}{dx} = 0$$

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

$$\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x} \therefore \text{ES EXACTA}$$

$$\begin{aligned} \int M dx &= \int x^3 dx + y^2 \int x dx \\ &= \frac{x^4}{4} + y^2 \frac{x^2}{2} \Rightarrow \frac{1}{4}x^4 + \frac{1}{2}x^2y^2 \end{aligned}$$

$$\begin{aligned} \int N dy &= x^2 \int y dy + \int y^3 dy \\ &= x^2 \left( \frac{y^2}{2} \right) + \left( \frac{y^4}{4} \right) \\ &= \frac{1}{2}x^2y^2 + \frac{1}{4}y^4 \end{aligned}$$

$$\frac{1}{4}x^4 + \frac{1}{2}x^2y^2 + \frac{1}{4}y^4$$

Sol. Gral

$$\frac{1}{4}x^4 + \frac{1}{2}x^2y^2 + \frac{1}{4}y^4 = C,$$

$$x^4 + 2x^2y^2 + y^4 = 4C,$$

$$(x^2 + y^2)^2 = 4C,$$

Sol. 2

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

$$\int M dx = \frac{x^4}{4} + \frac{1}{2}x^2y^2$$

$$\frac{\partial}{\partial y} \int M dx = x^2y$$

$$\frac{x^4}{4} + \frac{1}{2}x^2y^2 + \int \left[ (x^2y + y^3) - x^2y \right] dy = C,$$

$$\frac{x^4}{4} + \frac{1}{2}x^2y^2 + \int y^3 dy = C,$$

$$\frac{x^4}{4} + \frac{1}{2}x^2y^2 + \frac{y^4}{4} = C,$$

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

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

$$\frac{dy}{dx} = - \frac{M(x, y)}{N(x, y)}.$$