# EDO(1) NL — EXACTA.

S6

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

$$F(x,y) = C_1$$

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

$$\boxed{\left(4x^3y^2 - 9x^2y^3 + 16xy^4 + 5y^5\right) + \left(2x^4y - 9x^3y^2 + 32x^2y^3 + 25xy^4\right)\frac{dy}{dx} = 0}$$

$$\frac{\partial^2 F}{\partial x \partial y} = \frac{\partial^2 F}{\partial y \partial x}$$

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

$$\overbrace{\left(4x^3y^2 - 9x^2y^3 + 16xy^4 + 5y^5\right)}^{M} +$$

$$+\underbrace{\left(2x^4y - 9x^3y^2 + 32x^2y^3 + 25xy^4\right)}_{N}\frac{dy}{dx} = 0$$

$$\left.\begin{aligned}\frac{\partial M}{\partial y} &= 8x^3y - 27x^2y^2 + 64xy^3 + 25y^4\\ \frac{\partial N}{\partial x} &= 8x^3y - 27x^2y^2 + 64xy^3 + 25y^4\end{aligned}\right\}\ \underline{\text{EXACTA}}.$$

$$\overset{M}{(4x^3y^2 - 9x^2y^3 + 16xy^4 + 5y^5)} +$$

$$+ \overset{N}{(2x^4y - 9x^3y^2 + 32x^2y^3 + 25xy^4)}\frac{dy}{dx} = 0$$

$$y(4x^3y - 9x^2y^2 + 16xy^3 + 5y^4) +$$

$$y(2x^4 - 9x^3y + 32x^2y^2 + 25xy^3)\frac{dy}{dx} = 0$$

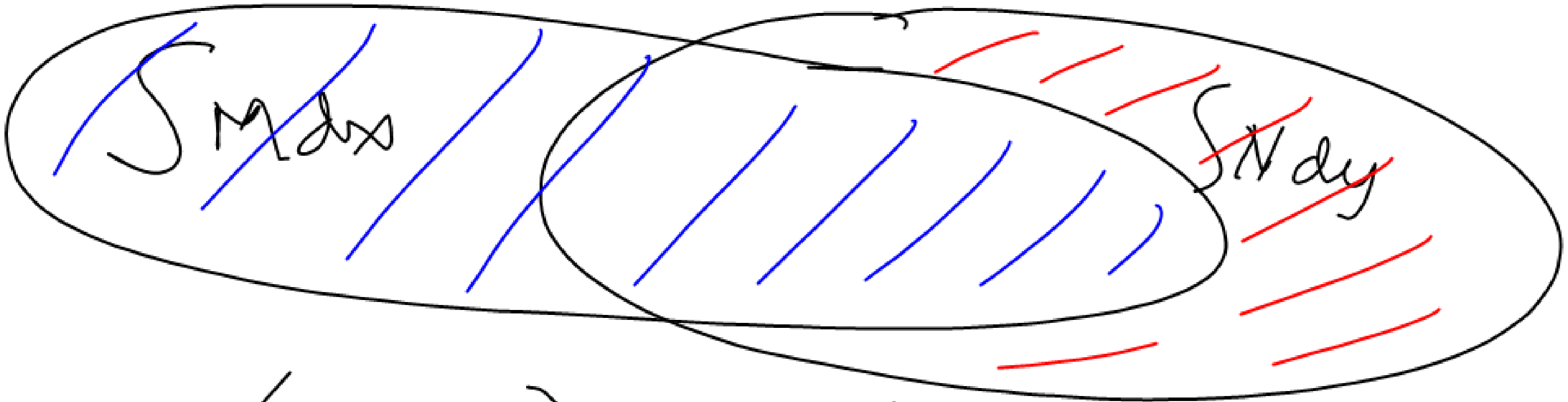
MM

$$(4x^3y - 9x^2y^2 + 16xy^3 + 5y^4) +$$

$$+ \underset{NN}{(2x^4 - 9x^3y + 32x^2y^2 + 25xy^3)} \cdot \frac{dy}{dx} = 0$$

$$\left.\begin{aligned} \frac{\partial MM}{\partial y} &= 4x^3 - 18x^2y + 48xy^2 + 20y^3 \\ \frac{\partial NN}{\partial x} &= 8x^3 - 27x^2y + 64xy^2 + 25y^3 \end{aligned}\right\} \frac{\partial MM}{\partial y} \neq \frac{\partial NN}{\partial x}$$

$$(4x^3y^2 - 9x^2y^3 + 16xy^4 + 5y^5) + (2x^4y - 9x^3y^2 + 32x^2y^3 + 25xy^4)\frac{dy}{dx} = 0$$




$$\left(\int M\,dx\right) \cup \left(\int N\,dy\right) = C_1$$

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

$$\overset{M}{\left(4x^3y^2-9x^2y^3+16xy^4+5y^5\right)}+$$

$$+\overset{N}{\left(2x^4y-9x^3y^2+32x^2y^3+25xy^4\right)}\frac{dy}{dx}=0$$

$$\int M\,dx = 4y^2\int x^3dx-9y^3\int x^2dx+16y^4\int x\,dx+5y^5\int dx$$

$$=4y^2\left(\frac{x^4}{4}\right)-9y^3\left(\frac{x^3}{3}\right)+16y^4\left(\frac{x^2}{2}\right)+5y^5(x)$$

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

$$\int N\,dy = 2x^4\int y\,dy-9x^3\int y^2dy+32x^2\int y^3dy+25x\int y^4dy$$

$$=2x^4\left(\frac{y^2}{2}\right)-9x^3\left(\frac{y^3}{3}\right)+32x^2\left(\frac{y^4}{4}\right)+25x\left(\frac{y^5}{5}\right)$$

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

$$SG = \int M\,dx = C_1 \quad \div \quad \int N\,dy = C_1$$

$$SG \Rightarrow \int M\,dx + \int\left(N - \frac{\partial}{\partial y}\int M\,dx\right)dy = c_1$$

$$\int N\,dy + \int\left(M - \frac{\partial}{\partial x}\int N\,dy\right)dx = c_1$$