VARIABLES SEPARABLES

$P(x)Q(y) + R(x)S(y)\frac{dy}{dx} = 0$ → $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ EXACTA.

EDO(1)NL → $M(x,y) + N(x,y)\frac{dy}{dx} = 0$

$M = n$ $M(\lambda x, \lambda y) = \lambda^n M(x,y)$

$N(\lambda x, \lambda y) = \lambda^n N(x,y)$

COEFICIENTES HOMOGÉNEOS

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

μ FACTOR INTEGRANTE

* $\mu(x)$
* $\mu(y)$.

→ MAPLE → MÉTODOS NUMÉRICOS → MATLAB.

154. $y^3\,dx + 2(x^2 - xy^2)\,dy = 0.$

$$M = y^3 \qquad \frac{\partial M}{\partial y} = 3y^2$$

$$N = 2x^2 - 2xy^2 \qquad \frac{\partial N}{\partial x} = 4x - 2y^2$$

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

$$= \frac{5y^2 - 4x}{x(2x - 2y^2)}$$

$$Q(y) = \left\{ \frac{\frac{\partial N}{\partial x} - \frac{\partial M}{\partial y}}{N} \right) = \frac{4x - 2y^2 - 3y^2}{y^3}$$

$$= \frac{4x - 5y^2}{y^3}$$

$$EcuacionDos := \frac{d}{dx} u(x) = -\frac{4\,(u(x)+1)\,\left(u(x)^2-u(x)+1\right)}{x\left(1-u(x)+4\,u(x)^2\right)}$$

$$\frac{du}{dx} = -\frac{1}{x}\left(\frac{(4u+4)(u^2-u+1)}{(1-u+4u^2)}\right)$$

$$\frac{du}{\left(\frac{(4u+4)(u^2-u+1)}{(1-u+4u^2)}\right)} + \frac{dx}{x} = 0$$

$$\int \frac{dx}{x} + \int \frac{(1-u+4u^2)\,du}{(4u+4)(u^2-u+1)} = C_1$$