CAPÍTULO: NO LINEAL PRIMER ORDEN.

$$\frac{dy}{dx} + p(x)\,y = q(x)$$

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

$$\frac{dy}{dx} = q(x) - p(x)\,y$$

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

$$\big(p(x)y - q(x)\big)dx + dy = 0$$

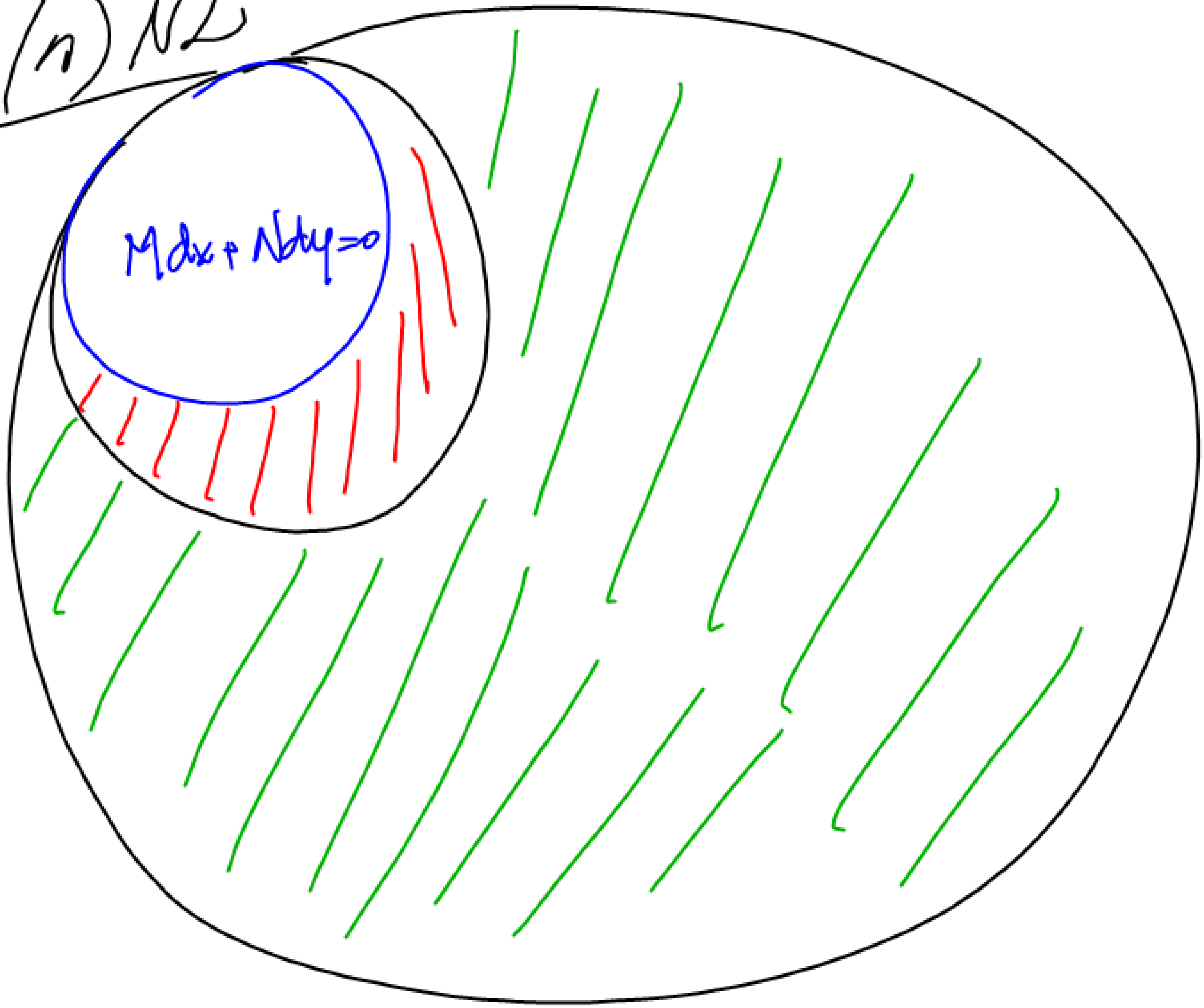
$$N(x,y)\,dy = -M(x,y)\,dx$$

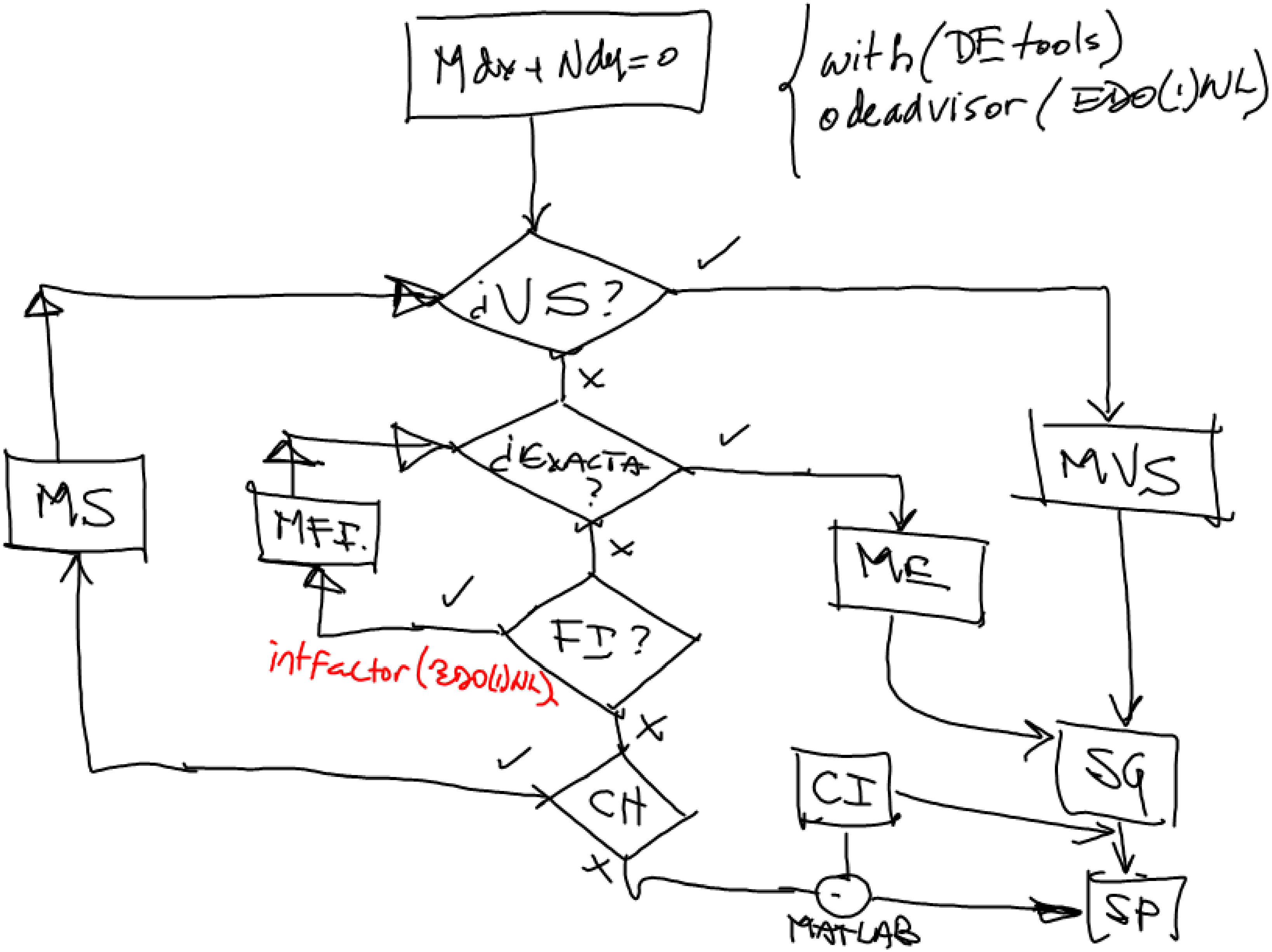
$$\boxed{M(x,y)\,dx + N(x,y)\,dy = 0.}$$

Representación general

EDO(1)NL

EDO(n) NL




M dx + N dy = 0
with(DEtools)
odeadvisor(EDO(1)NL)
¿VS?
¿EXACTA?
FI?
CH
MS
MFI.
MVS
ME
SG
CI
SP
MATLAB
intFactor(EDO(1)NL)

$\boxed{\text{MVS}}$

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

$$P(x)\cdot Q(y)\,dx + R(x)\cdot S(y)\,dy = 0$$

$$\left(\frac{1}{R(x)Q(y)}\right)\cdot\left[P(x)\cdot Q(y)\,dx + R(x)\,S(y)\,dy\right] = 0$$

$$\frac{P(x)}{R(x)}\,dx + \frac{S(y)}{Q(y)}\,dy = 0$$

SG

$$\boxed{\int \frac{P}{R}\,dx + \int \frac{S}{Q}\,dy = C_1}$$

82. $(1+y^2)\,dx + xy\,dy = 0.$

83. $(y^2+xy^2)\,y' + x^2 - yx^2 = 0.$

$$(1+y^2)\,dx + x\,y\,dy = 0$$

$P(x) = 1$ $\qquad$ $R(x) = x$

$Q(y) = 1+y^2$ $\qquad$ $S(y) = y$

$$\int \frac{P}{R}\,dx + \int \frac{S}{Q}\,dy = C_1$$

$$\int \frac{dx}{x} + \int \frac{y}{1+y^2}\,dy = C_1$$

$$Lx + \frac{1}{2}\int \frac{2y}{1+y^2}\,dy = C_1$$

$$Lx + \frac{1}{2}L(1+y^2) = C_1$$

$$Lx + L(1+y^2)^{1/2} = C_1$$

$$L\left(x(1+y^2)^{1/2}\right) = C_1$$

$$x(1+y^2)^{1/2} = e^{C_1}$$

$$\boxed{x(1+y^2)^{1/2} = C_{10}}$$

<u>EDO(1)NL.</u> $$M(x,y)+N(x,y)\frac{dy}{dx}=0$$

$$\Downarrow$$

$$\frac{dy}{dx}=-\frac{M}{N}$$

SOLUCIÓN GENERAL $$G(x,y)=C_1$$

$$\frac{dy}{dx}=-\frac{\frac{\partial G}{\partial x}}{\frac{\partial G}{\partial y}}$$

$$\frac{d}{dx}G(x,y)=0$$

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

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

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

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

<u>EXACTA</u>