$$\frac{d^4}{dt^4}y(t) - 5\left(\frac{d^2}{dt^2}y(t)\right) + 4\,y(t) = 5\,e^{-2t}\cos(3\,t)$$

$$y(0) = 5$$

$$D(y)(0) = -4$$

$$D^{(2)}(y)(0) = 3$$

$$D^{(3)}(y)(0) = -2$$

$$\bar{X}(0) = \begin{bmatrix} 5 \\ -4 \\ 3 \\ -2 \end{bmatrix}$$

$$y(t) \Rightarrow y_1(t)$$

$$\frac{dy}{dt} \Rightarrow \frac{d}{dt}y_1(t) = y_2(t)$$

$$\frac{d^2y}{dt^2} \Rightarrow \frac{dy_2(t)}{dt} = y_3(t)$$

$$\frac{d^3y}{dt^3} \Rightarrow \frac{dy_3(t)}{dt} = y_4(t)$$

$$\frac{d^4y}{dt^4} \Rightarrow \frac{dy_4(t)}{dt}$$

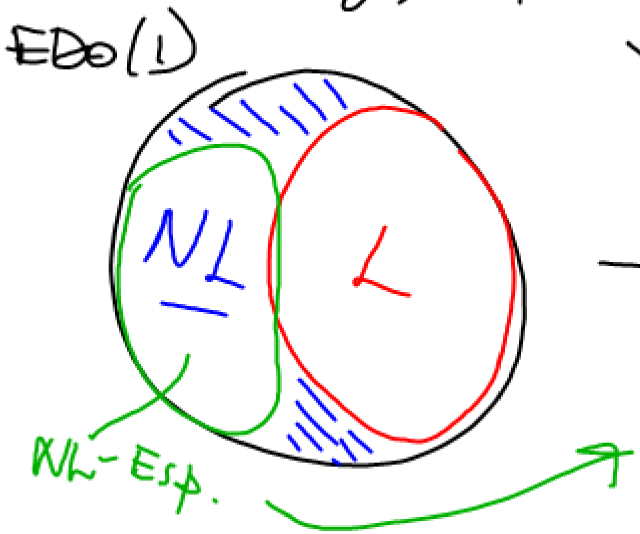
$$\frac{d}{dt}\begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \\ -4 & 0 & 5 & 0 \end{bmatrix}\begin{bmatrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 0 \\ 5e^{-2t}\cos(3t) \end{bmatrix}$$

Cap. 1.- Ecuación No Lineal 1er orden

$$F\left(x, y(x), \frac{dy(x)}{dx}\right) = 0$$

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

$$\frac{dy}{dx} + p(x) y = 0$$



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

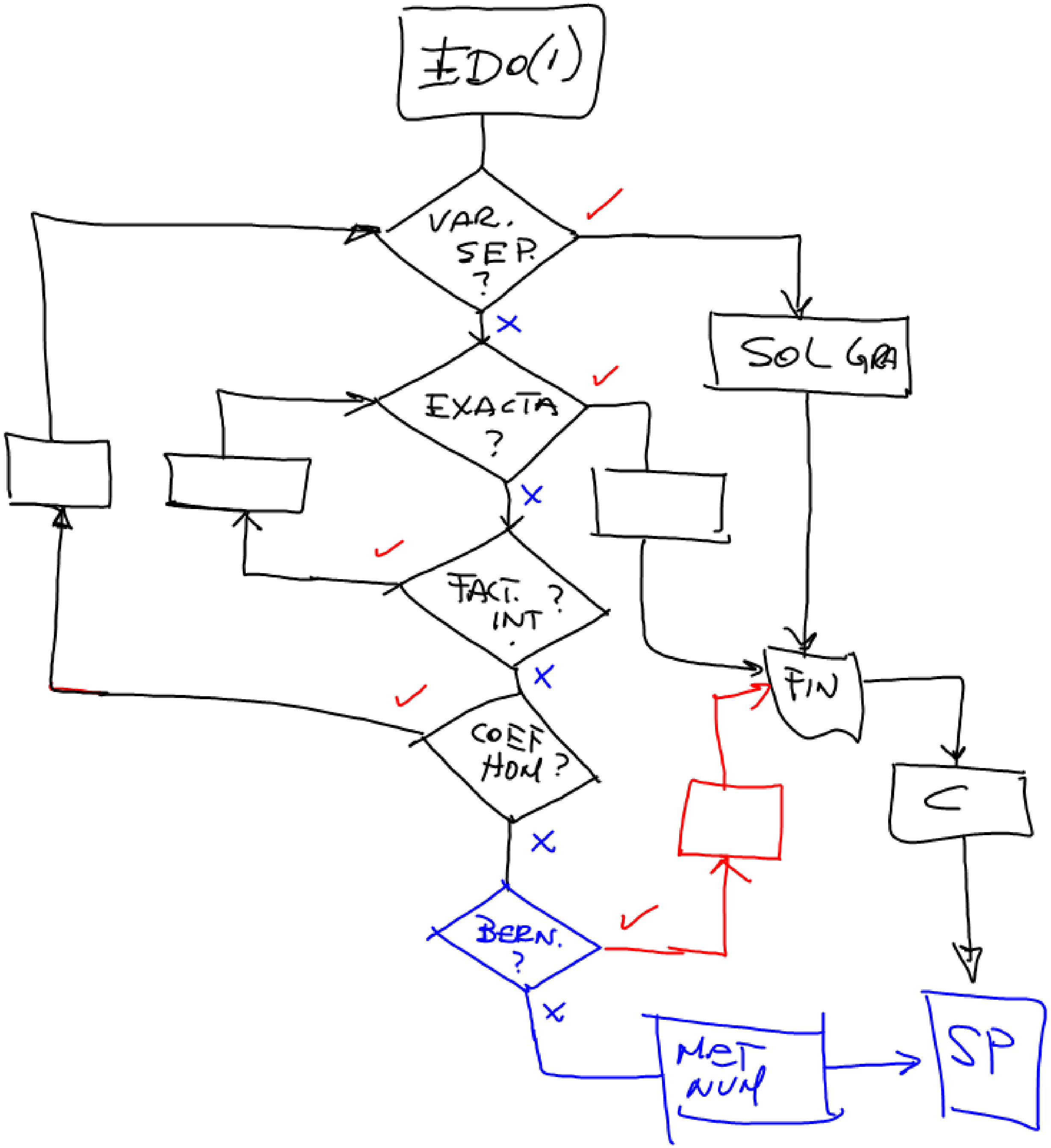
$$\frac{dy}{dx} = F(x, y)$$

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

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

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

4 Métodos de Solución


EDO(1)
VAR. SEP. ?
SOL GRA
EXACTA ?
FACT. INT. ?
COEF HOM ?
FIN
C
BERN. ?
MET NUM
SP

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

$$\underbrace{\left(xy^2 - y^2 + x - 1\right)}_{M(x,y)} + \underbrace{\left(x^2y - 2xy + x^2 + 2y - 2x + 2\right)}_{N(x,y).}\frac{dy}{dx} = 0$$

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

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

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

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

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

$$\left[\int \frac{S(y)}{Q(y)}\,dy\right] + k_1 = \left[-\int \frac{P(x)}{R(x)}\,dx\right] + k_2$$

SG $$\boxed{\left[+\int \frac{P(x)}{R(x)}\,dx\right] + \left[\int \frac{S(y)}{Q(y)}\,dy\right] = C_1}$$

$$\boxed{f(x,y) = C_1}$$ SG - EDO(1)NL

$y(0) = 5$