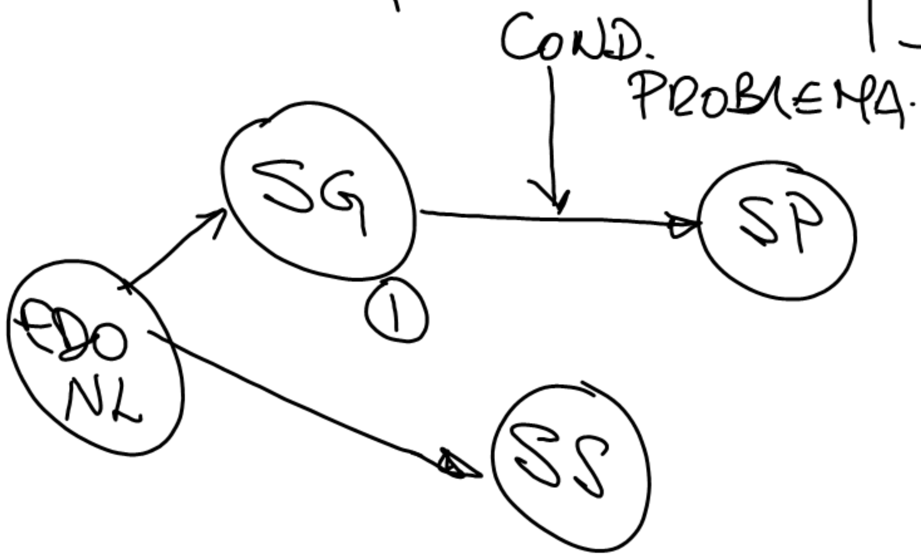
Definiciones

Solucion
- General (1)
- Particulares (∞)
- Singular (#)

EDO

EDO
- Lineales
  - SG (1)
  - SP (∞)
- No lineales
  - — SG (1), SP (∞)
  - — SG (1), SP (∞), SS (#)



$$2y(x)\left(\frac{dy}{dx}+2\right)-x\left(\frac{dy}{dx}\right)^2=0$$

$$2y\frac{dy}{dx}+4y-x\left(\frac{dy}{dx}\right)^2=0$$

$$2y+\frac{4y}{\cdot}-x\frac{dy}{dx}=0$$

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

EDO (1) NL

$$\boxed{cy-(c-x)^2=0} \qquad F(x,y)=0$$

$$cy=(c-x)^2$$

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

1

$$\frac{dy}{dx}=\frac{1}{c}\left(-2(c-x)\right)$$

$$\frac{dy}{dx}=\frac{-2(c-x)}{c}$$

$$2y\left(\frac{dy}{dx}+2\right)-x\left(\frac{dy}{dx}\right)^2=0$$

$$2\left(\frac{(c-x)^2}{c}\right)\left(\frac{-2(c-x)}{c}+2\right)-x\left(\frac{-2(c-x)}{c}\right)^2=0$$

$$\frac{-4(c-x)^3}{c^2}+4\left(\frac{(c-x)^2}{c}\right)-x\left(\frac{4(c-x)^2}{c^2}\right)=0$$

$$-\frac{4}{c^2}\left(c^3-3c^2x+3cx^2-x^3\right)+\frac{4}{c}\left((c^2-2xc+x^2)\right)-\frac{4x}{c^2}\left(c^2-2xc+x^2\right)=0$$

$$-\frac{4}{c^2}\left(c^3-3c^2x+3cx^2-x^3\right)+\frac{4}{c^2}\left(c^3-2xc^2+x^2c\right)-\frac{4}{c^2}\left(c^2x-2x^2c+x^3\right)=0$$

$$-\frac{4}{c^2}\left(\cancel{c^3}-\cancel{3c^2x}+\cancel{3cx^2}-\cancel{x^3}-\cancel{c^3}+\cancel{2xc^2}-\cancel{x^2c}+\cancel{c^2x}-\cancel{2x^2c}+\cancel{x^3}\right)=0$$

$$-\frac{4}{c^2}(0)=0$$

$$0\equiv 0$$

$$2y\left(\frac{dy}{dx}+2\right)-x\left(\frac{dy}{dx}\right)^2=0$$

$$y_g=\frac{(c-x)^2}{c}$$

$c=2$

$$y_p=\frac{(2-x)^2}{2}$$

$c=-3$

$$y_p=\frac{(-3-x)^2}{-3}$$

$$\boxed{y=0}$$ ✓

$$\boxed{y=-4x}$$ $\frac{dy}{dx}=-4$ ✓

$$2(-4x)(-4+2)-x(-4)^2=0$$

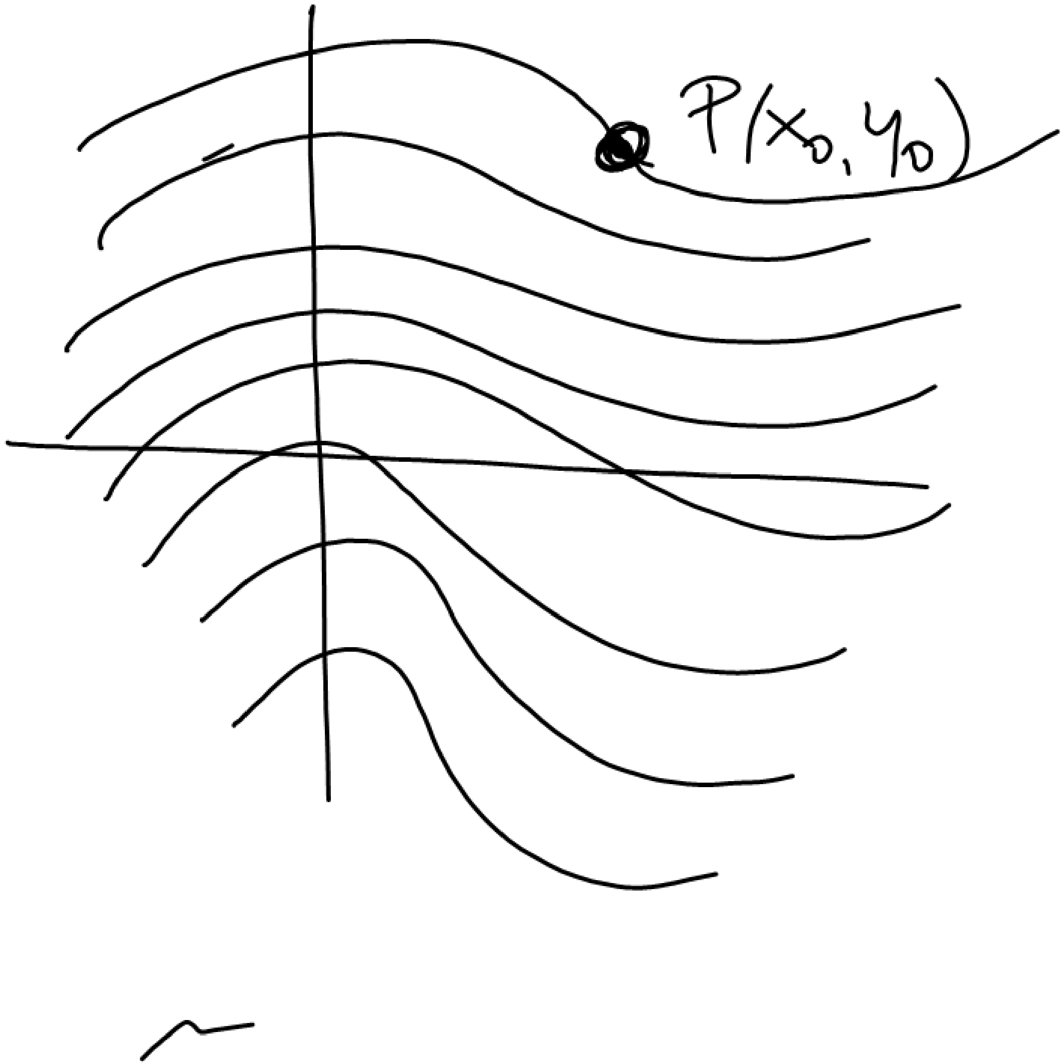
$$+16x-16x=0$$

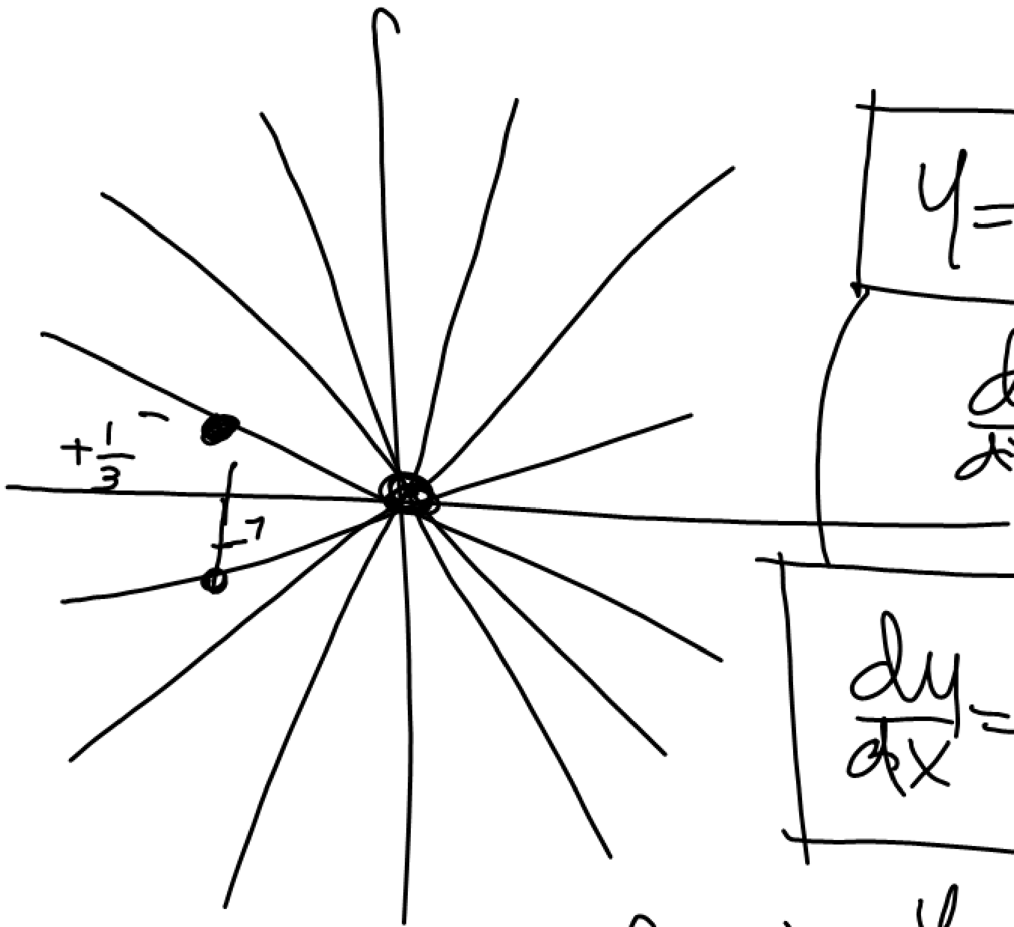
Teorema de Existencia y unicidad de Solución

L

NL 1^{er} $\boxed{\dfrac{dy}{dx} = f(x, y)}$ $\quad y(x_0) = y_0$

$$f(x,y)\Big|_{x_0} \qquad \frac{\partial f}{\partial y}\Big|_{x_0}$$


$P(x_0, y_0)$



$$\boxed{y = cx} \qquad c = \frac{y}{x}$$

$$\frac{dy}{dx} = c$$

$$y = -\frac{1}{3}x$$

$$\boxed{\frac{dy}{dx} = \frac{y}{x}}$$

$$f(x,y) = \frac{y}{x} \qquad P(0,0)$$

$$\frac{\partial f}{\partial y} = \frac{1}{x}$$

Ecuaciones de Primer Orden
No-Lineales

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