ECUACIÓN DIFERENCIAL ORDINARIA PRIMER ORDEN

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

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

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

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

EDO(1)NL

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

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

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

LINEAL

CV NH. $a_0(x)\frac{dy}{dx} + a_1(x)y = Q(x)$

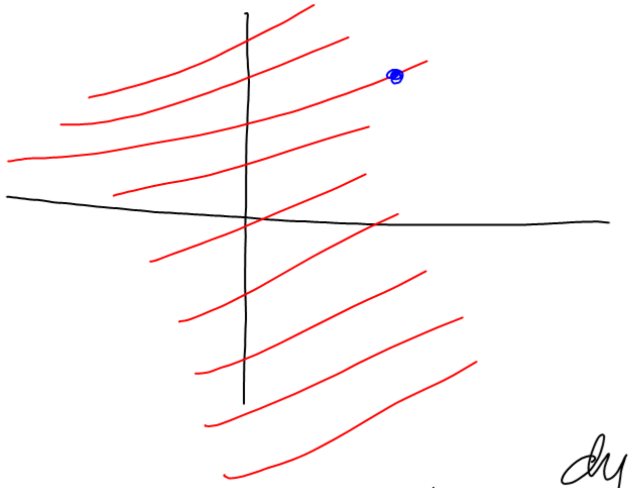
REGLA $\Rightarrow$ obliguen a que el coeficiente de la derivada de mayor orden sea siempre 1.

si $a_0(x) \neq 1$

$$\frac{dy}{dx} + \frac{a_1(x)}{a_0(x)}\overset{\vee}{y} = \frac{Q(x)}{a_0(x)}$$

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

Teorema de Existencia y Unicidad de la solución EDO(1).



$P(x_1, y_1)$ $\quad \dfrac{dy}{dx} = F(x, y)$

$L \rightarrow \dfrac{dy}{dx} = -p(x)y + q(x)$

$NL \rightarrow \dfrac{dy}{dx} = \dfrac{-M(x,y)}{N(x,y)}$

Si F existe para un punto dado y es continua

$\dfrac{\partial F}{\partial y}$ existe para un punto dado y es continua

entonces por es punto pasa una y sólo una solución particular

$$\frac{dy}{dx} - \frac{y}{x} = 0$$

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

$$\frac{dy}{y} = \frac{dx}{x} \qquad \frac{\partial F}{\partial y} = \frac{1}{x}$$

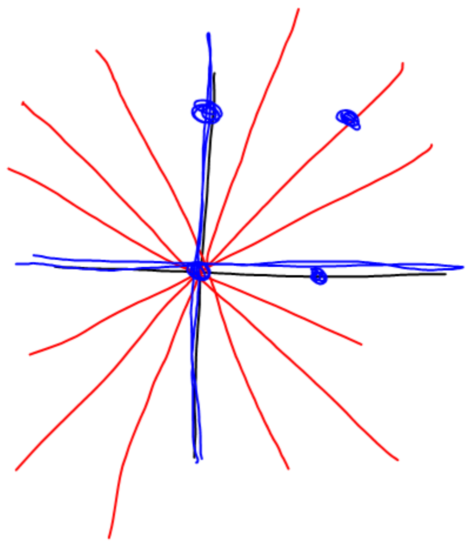
$$\int \frac{dy}{y} = \int \frac{dx}{x} \qquad P(0,0)$$

$P(5,5)$

$$\ln y = \ln x + \ln C$$

$$\ln y = \ln(Cx)$$

$$\boxed{y = Cx}$$



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

$$\frac{\partial M}{\partial y}=\frac{d}{dy}\left(x\left(x^2+y^2\right)^{-\frac{1}{2}}\right)+\frac{d}{dy}\left(y^{-1}\right)$$

$$=x\left(-\frac{1}{2}\left(x^2+y^2\right)^{-\frac{3}{2}}(2y)\right)+\left(-y^{-2}\right)$$

$$=x\left(-y\left(x^2+y^2\right)^{-3/2}\right)-\frac{1}{y^2}$$

$$\frac{\partial N}{\partial x}=y\frac{d}{dx}\left(\left(x^2+y^2\right)^{-\frac{1}{2}}\right)-\frac{1}{y^2}$$

$$=y\left(-\frac{1}{2}\left(x^2+y^2\right)^{-\frac{3}{2}}(2x)\right)-\frac{1}{y^2}$$

$$=y\left(-x\left(x^2+y^2\right)^{-\frac{3}{2}}\right)-\frac{1}{y^2}$$

$$\left(2xy^2 - 3y^3\right) + \left(7 - 3xy^2\right)\frac{dy}{dx} = 0$$

$$\underset{M}{} \qquad \underset{N}{}$$

NO EXACTA.

$$\frac{\partial M}{\partial y} = 4xy - 9y^2$$

$$\frac{\partial N}{\partial x} = -3y^2$$