la clasificación y los tipos de solución

- EDO
  - 1^er orden
    - LINEALES
    - NO-LINEALES
      - TIPO I
        - (LINEALES y TIPO I): SG (1), SP (∞)
      - TIPO II. –
        - SG (1)
        - SP (∞)
        - SS (#)
  - orden $n > 1$ superior
    - LINEALES
    - NO-LINEALES
      - TIPO I
        - (LINEALES y TIPO I): SG (1), SP (∞)
      - TIPO II. –
        - SG (1)
        - SP (∞)
        - SS (#)

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

EDO (1) N-L

$$\underbrace{C_1\,y(x)-(C_1-x)^2=0}_{F(x,\,y(x))=0}$$ SOLUCIÓN GENERAL

$$C_1\,y(x)=(C_1-x)^2$$

$$y(x)=\frac{(C_1-x)^2}{C_1}$$

$$2\cdot y\cdot\left(y'+2\right)-x\left(y'\right)^2=0$$

$$y=\frac{(c_1-x)^2}{c_1}$$

$$y'=\frac{2(c_1-x)(-1)}{c_1}=-2+\frac{2x}{c_1}$$

$$2\cdot\left(\frac{(c_1-x)^2}{c_1}\right)\cdot\left(\cancel{-2}+\frac{2x}{c_1}\cancel{+2}\right)-x\left(-2+\frac{2x}{c_1}\right)^2=0$$

$$\frac{4x}{c_1}\left(\frac{(c_1-x)^2}{c_1}\right)-x\left(4-\frac{8x}{c_1}+\frac{4x^2}{c_1^2}\right)=0$$

$$\frac{4x}{c_1}\left(\frac{c_1^2-2c_1x+x^2}{c_1}\right)-4x+\frac{8x^2}{c_1}-\frac{4x^3}{c_1^2}=0$$

$$\cancel{\frac{4xc_1^2}{c_1^2}}-\cancel{\frac{8c_1x^2}{c_1^2}}+\cancel{\frac{4x^3}{c_1^2}}-\cancel{4x}+\cancel{\frac{8x^2}{c_1}}-\cancel{\frac{4x^3}{c_1^2}}=0$$

$$\underline{0=0}$$

$$2y(y'+2)-x(y')^2=0 \qquad y_g=\frac{(C_1-x)^2}{C_1}$$

$\boxed{C_1=1}$

$$y_p=(1-x)^2$$

$$y'=2(1-x)(-1)$$

$$y'=-2+2x$$

$$2(1-x)^2(\cancel{-2}+2x+\cancel{2})-x(-2+2x)^2=0$$

$$4x(1-2x+x^2)-x(4-8x+4x^2)=0$$

$$\cancel{4x}-\cancel{8x^2}+\cancel{4x^3}-\cancel{4x}+\cancel{8x^2}-\cancel{4x^3}=0$$

$$\underline{0\equiv 0}$$

$C_1=-4$

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

$$y=-\frac{1}{4}(16+8x+x^2)$$

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

$$y'=-2-\frac{x}{2}$$

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

$$\left(-8-4x-\frac{x^2}{2}\right)\left(-\frac{x}{2}\right)-x\left(4+2x+\frac{x^2}{4}\right)=0$$

$$\cancel{4x}+\cancel{2x^2}+\cancel{\frac{x^3}{4}}-\cancel{4x}-\cancel{2x^2}-\cancel{\frac{x^3}{4}}=0$$

$$\underline{0\equiv 0}$$

$$2y(y'+2)-x(y')^2=0$$

SOLUCIÓN $y=-4x$ $\leftarrow$ $y=\dfrac{(C_1-x)^2}{C_1}$

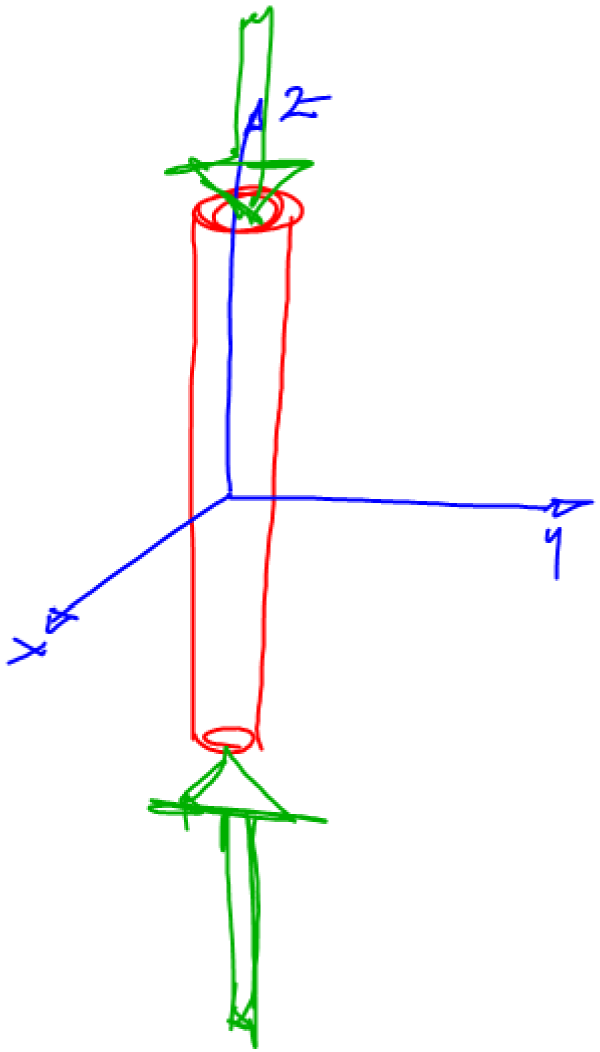
$$y'=-4$$

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

$$16x-16x=0$$

$$\underline{\underline{0=0}}$$

SINGULAR


z
y
x

EDO(n)
- LINEALES
  - Coeficientes constantes
    - Homogeneas
    - No-homog.
  - Coeficientes Variables
    - Homogeneas
    - No-homogeneas.
- NO-LINEALES — ×.

EDO(n) L CV NH → EDO(1) L CC H.

$$a_0(x)\frac{d^n y}{dx^n}+a_1(x)\frac{d^{n-1}y}{dx^{n-1}}+\cdots+a_{n-1}(x)\frac{dy}{dx}+a_n(x)y=Q(x)$$

$$\begin{cases} Q(x)=0 & H \\ Q(x)\neq 0 & NH \end{cases}$$

$$\forall\, a_i(x)=k_i \quad i=1,\dots,n$$

Interpretación geométrica

de la Solución General

"La familia de soluciones particulares"