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

ED
- ED Ordinaria — $\frac{dy}{dx} \longrightarrow y(x)$ — una sóla var. indep.
  - Temas I, II, III
- EDenDP — $\frac{\partial z}{\partial x} \; \frac{\partial z}{\partial y} \longrightarrow z(x,y)$ — v.i.
  - Tema IV

El orden (ED) corresponde a la derivada de mayor orden.

$$\frac{dy}{dx} = y \qquad \text{EDO}(1)$$

$$\frac{d^2y}{dx^2} + 5\frac{dy}{dx} + 6y = 2e^{2x} \qquad \text{EDO}(2)$$

$$\frac{\partial^2 z}{\partial x \partial y} = z \qquad \text{EDenDP}(2)$$

- ED
  - EDO
    - 1er orden TEMA I
    - orden superior a uno TEMA II y III
  - EDenDP
    - 1er orden TEMA IV a)
    - orden superior TEMA IV b)

EDO

$$F\left(x, y, \frac{dy}{dx}\right) = 0 \quad \begin{cases} \text{Lineales} \\ \\ \text{No Lineales} \end{cases}$$

$$G\left(x, y, \frac{dy}{dx}\right) = Q(x)$$

EDO( ) Homogenea   EDO( ) No Homogenea

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

$$x^2\frac{d^2y}{dx^2} - 6x\frac{dy}{dx} + 4x^3y - \operatorname{sen} 4x + 2e^{4x} + 8 = 0$$

$$F\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}\right) = 0$$

$$x^2\frac{d^2y}{dx^2} - 6x\frac{dy}{dx} + 4x^3y = \operatorname{sen}(4x) - 2e^{4x} - 8$$

$$G\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}\right) = Q(x)$$ LINEAL

NL $\left(\frac{dy}{dx}\right)^2 + 5y = 2e^x$

NL $\frac{d^2y}{dt^2} - \operatorname{sen}(y) = 0$ $\quad \operatorname{sen}(y) \doteq y$

$y \leq 4^0$

L $\frac{d^2y}{dt^2} - y = 0$

NL $\frac{dy}{dx} \cdot y = 5e^x$

$$\frac{dy}{dx} = \frac{5e^x}{y}$$

$$\frac{dy}{dx} - 5e^x \cdot \frac{1}{y} = 0$$

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

FORMA GENERAL EDO(n)L $\begin{cases} CC \\ CV \end{cases}$ $\begin{cases} H \\ NH. \end{cases}$

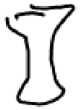
- EDO
  - EDO(1)
    - LIN. — T I b)
    - NO LIN. — T. I a)
  - EDO(n)
    - LIN — T II
    - NO LIN. — X

- EDO
  - LIN
    - H. $F(x,y,y')=0$
    - NH $F(x,y,y')=Q(x)$
  - NL
    - H.
    - NH.

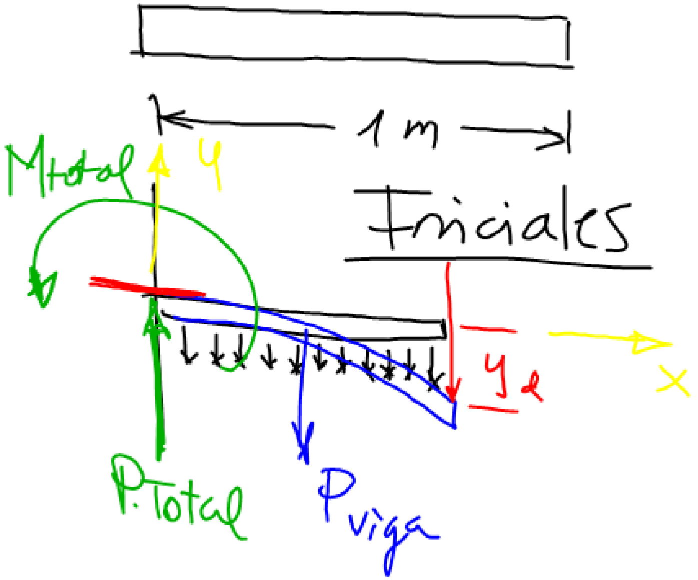
- ED
  - ordinaria
    - 1er ord
      - Li — CC. / CV.
        - H
        - NH.
      - NL
    - ord 'n'
      - L — CC / CV
        - H
        - NH
      - NL
  - en derivadas parciales
    - 1er orden
    - orden 'n'

Soluciones EDO
- general (1 y sólo 1)
- particulares (∞)
- singulares (NL) (#)

Condiciones
- iniciales
- frontera



$$\frac{d^4y}{dx^4} = F(x)$$



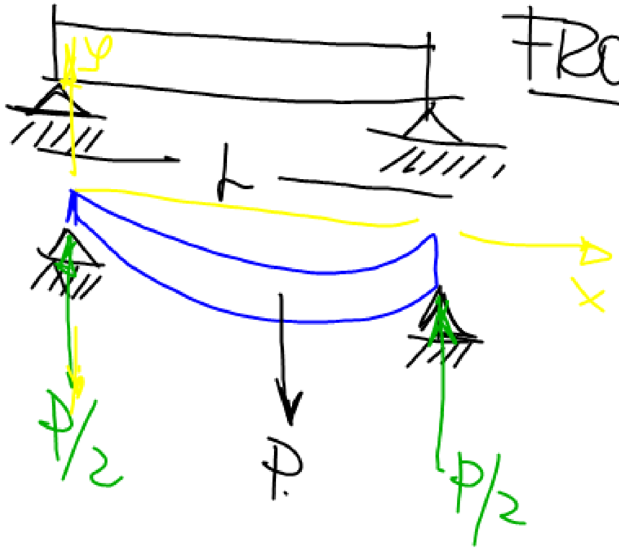
Iniciales

$y(0) = 0$

$y'(0) = 0$

$y''(0) = P_{total}$

$y'''(0) = M_{total}$



FRONTERA

$y(0) = 0 \qquad y(L) = 0$

$y''(0) = \frac{P_{total}}{2} \qquad y''(L) = \frac{P_{total}}{2}$

Singulares

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

EDO(1) NL

$$SG \Rightarrow cy-(c-x)^2=0$$

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

$$y_{P_1}=(1-x)^2$$

$$y_{P_2}=\frac{(-\pi-x)^2}{-\pi}$$

$$y_{P_3}=\frac{(\sqrt{2}-x)^2}{\sqrt{2}}$$

SINGULARES

$$y_{S_1}=-4x$$

$$y_{S_2}=0$$