EDO

- LINEALES
  - SG (1)
  - SP (∞)
- NO-LINEALES
  - A
    - SG (1)
    - SP (∞)
  - B
    - SG (1)
    - SP (∞)
    - SS (#)

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

$2y(y'+2) - xy'^2 = 0.$

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

$Cy - (C - x^2) = 0,$

$$C \cdot y(x) - (C - x)^2 = 0$$

$$\boxed{y(x) = \frac{(C - x)^2}{C}} \quad SG$$

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

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

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

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

$$\frac{4Cx}{C} - \frac{8x^2}{C} + \frac{4x^3}{C^2} - \frac{4x(C^2 - 2Cx + x^2)}{C^2} = 0$$

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

$$0 = 0$$

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

$C = -2$

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

$C = 1$

$$y = \frac{(1-x)^2}{1} \quad SP$$

$C = \sqrt{3}$

$$y = \frac{(\sqrt{3} - x)^2}{\sqrt{3}} \quad SP$$

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

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

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

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

$$0\equiv0$$

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

SOLUCIÓN SINGULAR

$$(c-x)^2=-4cx$$

$$(c^2-2cx+x^2=-4cx$$

$$c^2+2cx+x^2=0$$

$$(c+x)^2=0$$

ningún valor $c\in\mathbb{R}$

Problema EDO (4)

$$F\left(x, y, \frac{dy}{dx}, \frac{d^2y}{dx^2}, \frac{d^3y}{dx^3}, \frac{d^4y}{dx^4}\right) = 0$$

$$y_g = C_1 y_1 + C_2 y_2 + C_3 y_3 + C_4 y_4$$

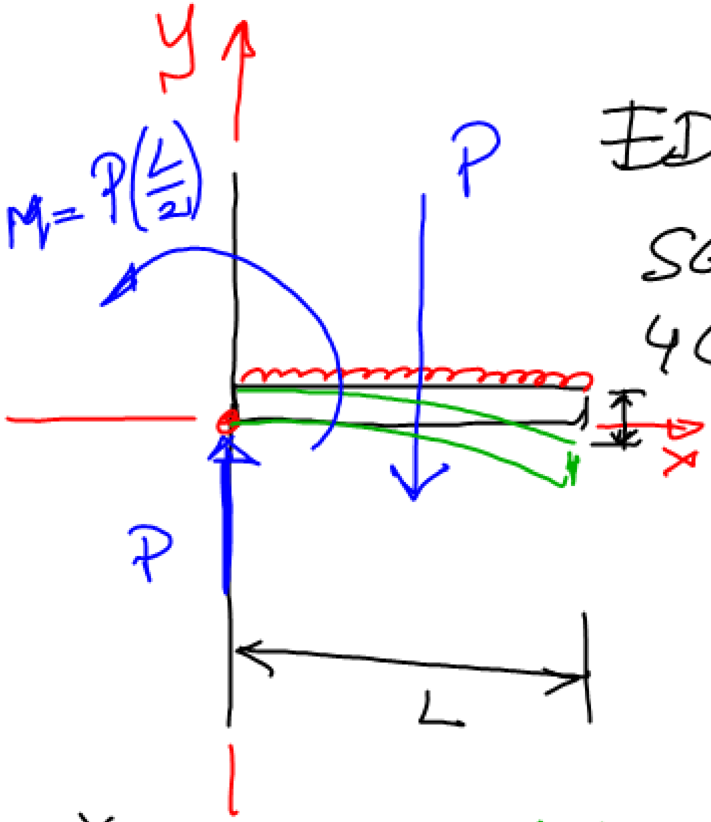
$$\left.\begin{matrix} y_1 \\ y_2 \\ y_3 \\ y_4 \end{matrix}\right\} \text{Solución Particular Fundamental}$$

tantas condiciones como orden

(como constantes arbitrarias en SG)

$$W = \begin{vmatrix} y_1 & y_2 & y_3 & y_4 \\ y_1' & y_2' & y_3' & y_4' \\ y_1'' & y_2'' & y_3'' & y_4'' \\ y_1''' & y_2''' & y_3''' & y_4''' \end{vmatrix} \neq 0$$

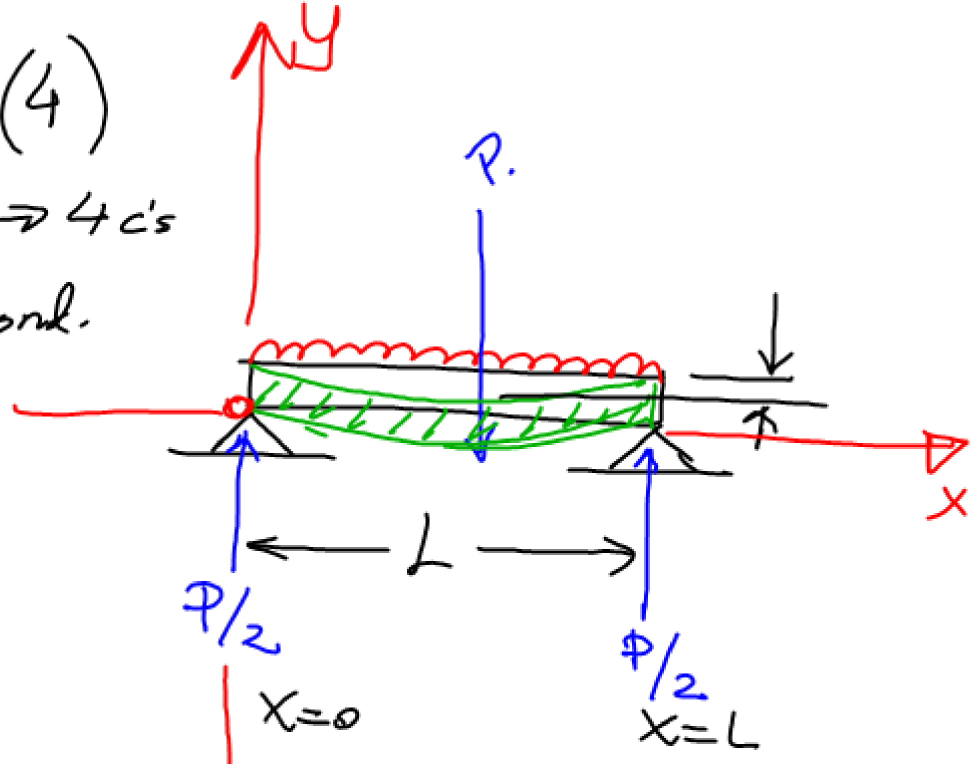
<u>wronskiano</u>



EDO(4)

$SG \to 4$ c's

4 Cond.



$x=0$

$y(0)=0$

$y'(0)=0$

$y''(0)=P$

$y'''(0)=M = \frac{PL}{2}$

INICIALES

$x=0$ $\qquad$ $x=L$

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

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

FRONTERA.