

Clase 2018-08-09

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

MODELO CAÍDA LIBRE

$$\left| \frac{d^2y}{dt^2} + g = 0 \quad \text{I} \right|$$

Expresión matemática
que bajo la forma de "ECUACIÓN"
contiene, al menos, una de las
derivadas de una función desconocida
denominada "INCÓGNITA"

$$y''(t) = -g \quad \text{para wolfram alpha (internet)}$$

MÉTODO: VARIABLES SEPARABLES

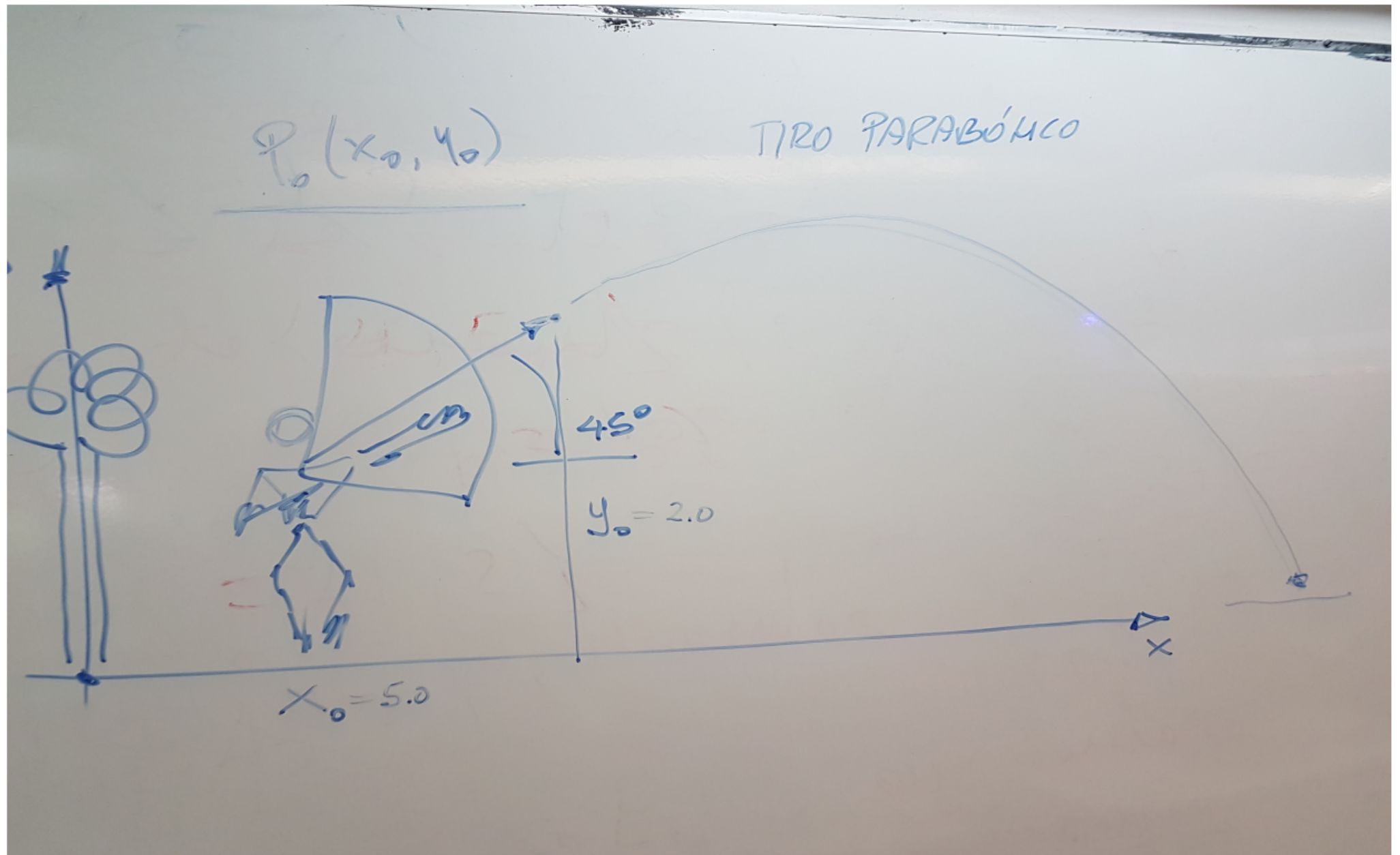
$$\textcircled{1} \quad \frac{d}{dt}\left(\frac{dy}{dt}\right) = -g \Rightarrow d\left(\frac{dy}{dt}\right) = -g dt \Rightarrow \int d\left(\frac{dy}{dt}\right) = -g \int dt \Rightarrow$$

$$\frac{dy}{dt} + c_1 = -g(t + c_2) \Rightarrow \frac{dy}{dt} = -gt + [-g \cdot c_2 - c_1] \Rightarrow \left| \frac{dy}{dt} = -gt + C_{10} \right|$$

$$\textcircled{2} \quad dy = (-gt + C_{10}) dt \Rightarrow \int dy = -g \int t dt + C_{10} \int dt \Rightarrow$$

$$y + c_3 = -g\left(\frac{t^2}{2} + c_4\right) + C_{10}(t + c_5) + c_6 \Rightarrow y = -g\frac{t^2}{2} + C_{10}t + (-gc_4 + C_{10}c_5 + c_6 - c_3)$$

$$\left| y = -g\frac{t^2}{2} + C_{10}t + C_{20} \right| \quad \text{SOLUCIÓN}$$



MODELO

MASA RESORTE.

$$\frac{0.030 \frac{\text{kg}}{\text{m}}}{9.8067 \frac{\text{m}}{\text{s}^2}} \cdot \frac{\text{m}}{\text{s}^2} = - \left(\frac{k_s}{m} \right) \cdot m$$

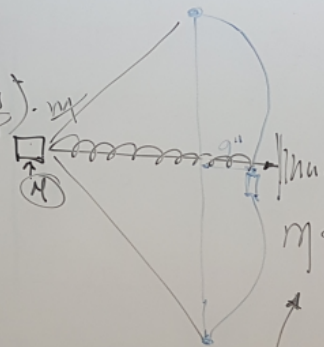
$$k_s = k_g$$

$$l_{\text{argo}} = 0.665 \text{ m}$$

$$-0.229 \text{ m}$$

$$s(0) = 0.436 \text{ m}$$

$$v(0) = 0$$



$$F = ma$$

Newton

$$m \frac{d^2 s(t)}{dt^2} = -k s(t)$$

Hooke.

$$0.030 \text{ kg} \quad K = \frac{14.61 \text{ kg}}{0.40 \text{ m}}$$

masa
flecha