

—nsol _____

—Solve Block Examples _____

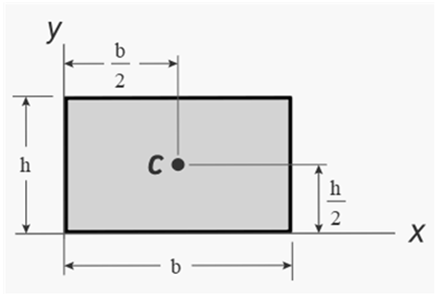
Square plate inertia moment

$I_x := 125 \text{ cm}^4$

$I_y := 45 \text{ cm}^4$

$$\left[\begin{array}{ll} \frac{h \cdot b^3}{3} = I_x & \frac{h^3 \cdot b}{3} = I_y \\ h \approx 1 \text{ cm} & b \approx 1 \text{ cm} \end{array} \right.$$

S:=nsol(0)



$h := S_1 = 5 \text{ cm}$

$b := S_2 = 3 \text{ cm}$

Momentum conservation

$m_1 := 10 \text{ kg}$

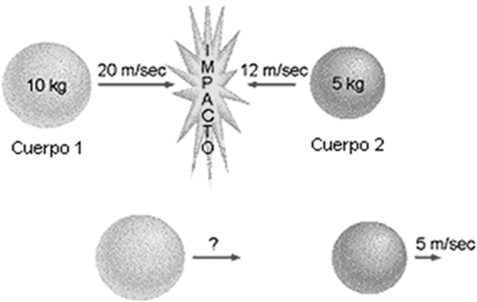
$m_2 := 5 \text{ kg}$

$v_{i1} := 20 \frac{\text{m}}{\text{s}}$

$v_{i2} := -12 \frac{\text{m}}{\text{s}}$

$v_{f1} = ?$

$v_{f2} := 5 \frac{\text{m}}{\text{s}}$



$$\left[\begin{array}{l} m_1 \cdot v_{i1} + m_2 \cdot v_{i2} = m_1 \cdot v_{f1} + m_2 \cdot v_{f2} \\ v_{f1} \approx 1 \frac{\text{m}}{\text{s}} \end{array} \right.$$

$v_{f1} = 11.5 \frac{\text{m}}{\text{s}}$

Conic and line intersection Parametrized solution

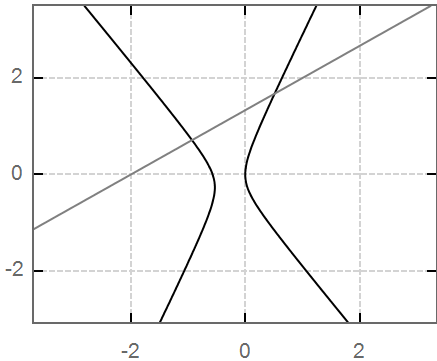
$$\begin{cases} C := 7 \cdot x^2 + 2 \cdot x \cdot y - 2 \cdot y^2 + 4 \cdot x \\ r := 2 \cdot x - 3 \cdot y + 4 \end{cases}$$

$$\left[\begin{array}{ll} C = 0 & r = 0 \\ x \approx x_0 & y \approx 0 \end{array} \right]$$

$$S(x_0) := \text{nsol}(0)$$

$$A := S(-1) = \begin{bmatrix} -0.9309 & 0.7127 \end{bmatrix}$$

$$B := S(1) = \begin{bmatrix} 0.513 & 1.6754 \end{bmatrix}$$



Boyle's Law

$$d := 1 \text{ mm}$$

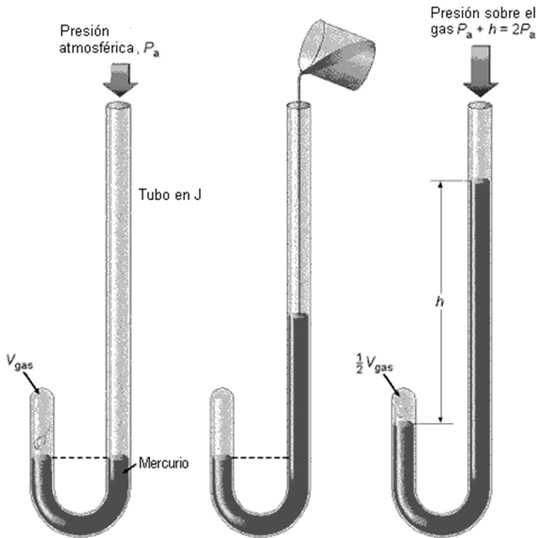
$$h := 4 \text{ m}$$

$$p_2 := 1 \text{ atm}$$

$$\rho := 998.3 \frac{\text{g}}{\text{L}}$$

$$\left[\begin{array}{l} p_1 = p_2 + \rho \cdot g_e \cdot h \\ V_1 = \frac{4}{3} \cdot \pi \cdot \left(\frac{d}{2} \right)^3 \\ p_1 \cdot V_1 = p_2 \cdot V_2 \\ p_1 \approx 1 \text{ atm} \\ V_1 \approx 1 \text{ mm}^3 \quad V_2 \approx 1 \text{ mm}^3 \end{array} \right]$$

$$S := \text{nsol}(0)$$



$$p_1 := S_1 = 1.3865 \text{ atm}$$

$$V_1 := S_2 = 0.5236 \text{ mm}^3$$

$$V_2 := S_3 = 0.726 \text{ mm}^3$$

$$\rho := 1120 \frac{\text{g}}{\text{L}}$$

$$p_1 := 4 \text{ atm}$$

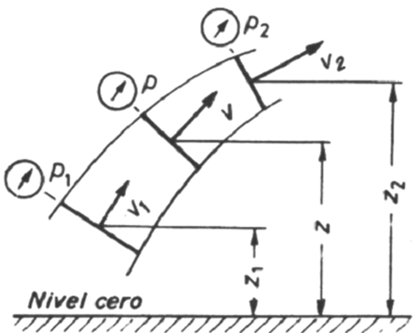
$$p_2 := 3 \text{ atm}$$

$$v_1 := 6 \frac{\text{m}}{\text{s}}$$

$$v_2 := 8 \frac{\text{m}}{\text{s}}$$

$$z_1 := 0.1 \text{ m}$$

$$z_2 = ?$$



$$\left[\begin{array}{l} \frac{p_1}{\rho} + g_e \cdot z_1 + \frac{v_1^2}{2} = \frac{p_2}{\rho} + g_e \cdot z_2 + \frac{v_2^2}{2} \\ z_2 \approx 1 \text{ m} \end{array} \right]$$
$$z_2 := \text{nsol}(0)$$

$$z_2 = 7.8976 \text{ m}$$

$$\text{Clear}(p_1) = 1$$