Examen Parcial

Métodos Numéricos

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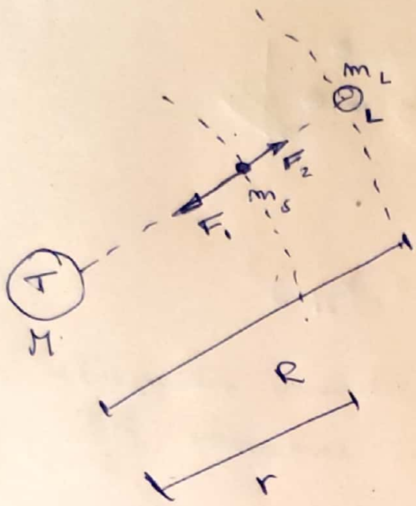
2)



$$\to F_1 - F_2 = m_s\, a_c$$

$$F_1 - F_2 = m_s \cdot \omega^2 r$$

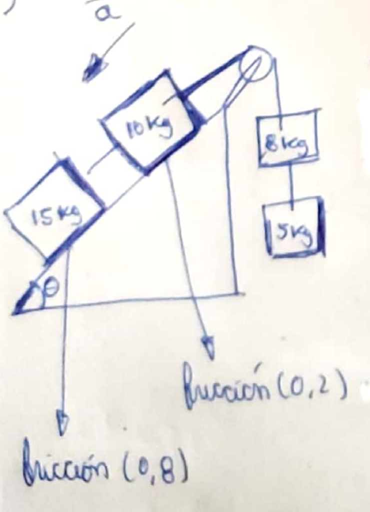
$$F_1 = \frac{G\, m_s M}{r^2}$$

$$F_2 = \frac{G\, m_s m}{(R-r)^2}$$

$$\to F_1 - F_2 = G\, m_s \left(\frac{M}{r^2} - \frac{m}{(R-r)^2} \right) = m_s\, r\, \omega^2$$

$$\to G \left(\frac{M}{r^2} - \frac{m}{(R-r)^2} \right) = r\, \omega^2 \ //$$

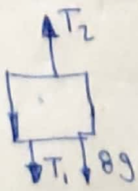
3)



→ para el bloque de 5 kg

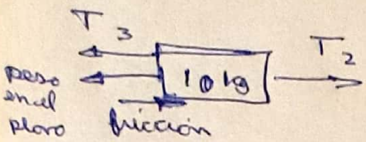
$$\to T_1 - 5g = 5a$$

para el bloque de 8 kg



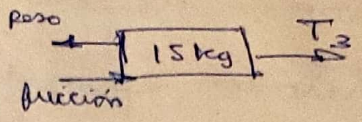
$$\to T_2 - T_1 - 8g = 8a$$

Para el bloque de 10 kg



$\Rightarrow T_3 + 10g\cos\theta - T_2 - 10g\,\text{sen}\,\theta(0{,}2) = 10a$

Para el bloque de 15 kg



$\Rightarrow 15g\cos\theta - 15g\,\text{sen}\,\theta(0{,}8) - T_3 = 15a$

$\Rightarrow$ acomodamos nuestro sistema

$$T_1 - 5a = 5g$$
$$T_2 - T_1 - 8a = 8g$$
$$T_3 - T_2 - 10a = 10g\,\text{sen}\,\theta(0{,}2) - 10g\cos\theta$$
$$-T_3 - 15a = 15g\,\text{sen}\,\theta(0{,}8) - 15g\cos\theta$$

4) $\Rightarrow$ Si $y = a_0 + a_1 x_1 + a_2 x_2$

$$\Rightarrow S = \sum_{i=1}^{n} (y_i - a_0 - a_1 x_{1i} - a_2 x_{2i})^2$$

$\Rightarrow$ como depende de 3 variables debemos minimizarlas para todas ellas, entonces, debemos encontrar $\frac{\partial S}{\partial a_0}$, $\frac{\partial S}{a_1}$ y $\frac{\partial S}{a_2}$

$$\Rightarrow \frac{\partial S}{\partial a_0} = -2\sum (y_i - a_0 - a_1 x_{1i} - a_2 x_{2i})$$

$$\frac{\partial S}{\partial a_1} = -2\sum x_{1i}(y_i - a_0 - a_1 x_{1i} - a_2 x_{2i})$$

$$\frac{\partial S}{\partial a_2} = -2\sum x_{2i}(y_i - a_0 - a_1 x_{1i} - a_2 x_{2i})$$

$\Rightarrow$ Si igualamos $\frac{\partial S}{\partial a_0} = 0$, $\frac{\partial S}{\partial a_1} = 0$, $\frac{\partial S}{\partial a_2} = 0$

tenemos que:

$$\sum y_i = (n)a_0 + \left(\sum x_{1i}\right)a_1 + \left(\sum x_{2i}\right)a_2$$

$$\sum x_{1i} y_i = \left(\sum x_{1i}\right)a_0 + \left(\sum x_{1i}^2\right)a_1 + \left(\sum x_{1i} x_{2i}\right)a_2$$

$$\sum x_{2i} y_i = \left(\sum x_{2i}\right)a_0 + \left(\sum x_{2i} x_{1i}\right)a_1 + \left(\sum x_{2i}^2\right)a_2$$