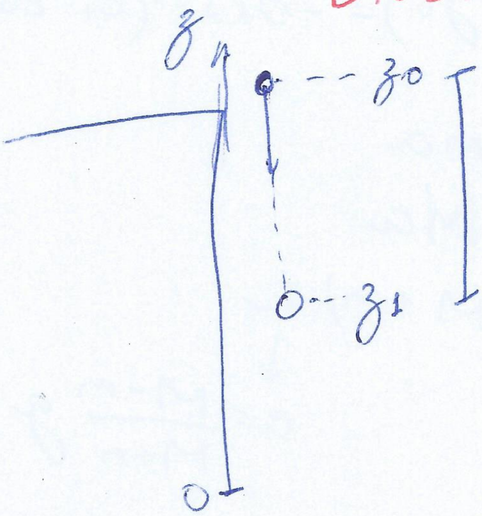
Energia e Trabalho



$$\boxed{v_1^2 = v_0^2 + 2g(z_0 - z_1)}$$

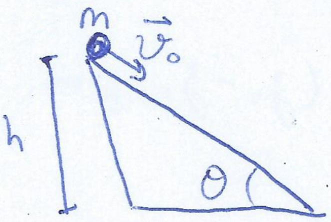
Se $v_0 = 0$

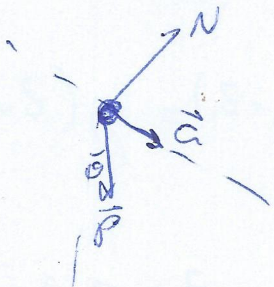
$$v_1 = \sqrt{2gh}$$

Agora se lançarmos para cima com v_1, a altura máxima é $h = \frac{v_1^2}{2g}$.

Existe uma relação entre altura e velocidade em diferentes instantes.

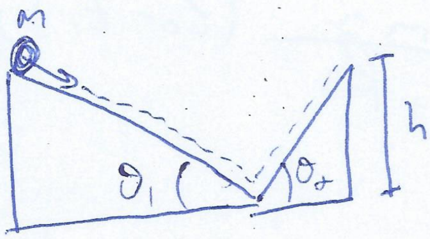
2° caso:





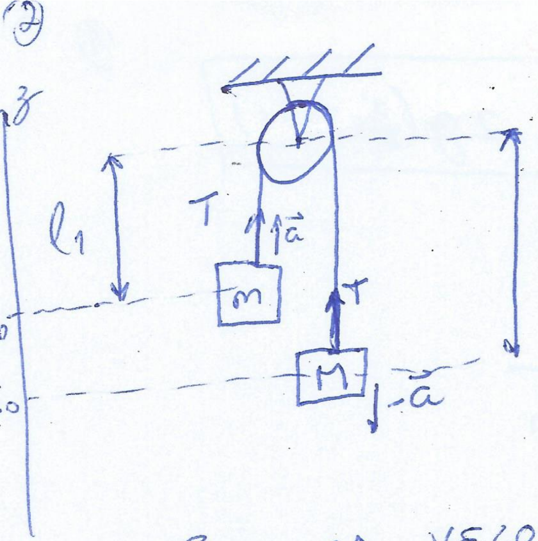
$$a = \frac{P\,\text{sen}\,\theta}{m}$$

$$\therefore\ v_1^2 = v_0^2 + 2g\underbrace{l\,\text{sen}\,\theta}_{h}$$



$$\boxed{\frac{1}{2}v_1^2 + gz_1 = \frac{1}{2}v_2^2 + gz_2}$$

2



$$\Delta l_1 = (z_1 - z_0) = -\Delta l_2 = -(Z_1 - Z_0)$$

$$\therefore \begin{cases} T - mg = ma \\ T - Mg = -Ma \end{cases}$$

$$(M - m)g = (M + m)a$$

$$a = \frac{M-m}{M+m} g$$

PARA AS VELOCIDADES, TEMOS:

$$v_1^2 = v_0^2 + 2a\,(z_1 - z_0)$$

$$V_1^2 = V_0^2 + 2(-a)(Z_1 - Z_0)$$

$$\frac{1}{2} v_1^2 - \frac{1}{2} v_0^2 = g\left(\frac{m-M}{m+M}\right)(z_0 - z_1) = g(z_0 - z_1) - \frac{2M}{m+M} g(z_0 - z_1)$$

$$\frac{1}{2} V_1^2 - \frac{1}{2} V_0^2 = g\left(\frac{M-m}{M+m}\right)(Z_0 - Z_1) = g(Z_0 - Z_1) - \frac{2m}{m+M} g(Z_0 - Z_1)$$

OU

$$\begin{cases} \frac{1}{2} v_1^2 + g z_1 = \frac{1}{2} v_0^2 + g z_0 - \frac{2Mg}{m+M}(z_0 - z_1) \ast m \\ \\ \frac{1}{2} V_1^2 + g Z_1 = \frac{1}{2} V_0^2 + g Z_0 - \frac{2mg}{m+M}(Z_0 - Z_1) \ast M \end{cases}$$

$$\left(\frac{1}{2} m v_1^2 + mgz_1\right) + \left(\frac{1}{2} M V_1^2 + MgZ_1\right) = \left(\frac{1}{2} m v_0^2 + mgz_0\right) + \left(\frac{1}{2} M V_0^2 + MgZ_0\right)$$

$$\therefore \boxed{E = \sum\left(\frac{1}{2} m v^2 + mgz\right)} \rightarrow$$ ENERGIA TOTAL DO SISTEMA.

SE CONSERVA DE FORMA GERAL.