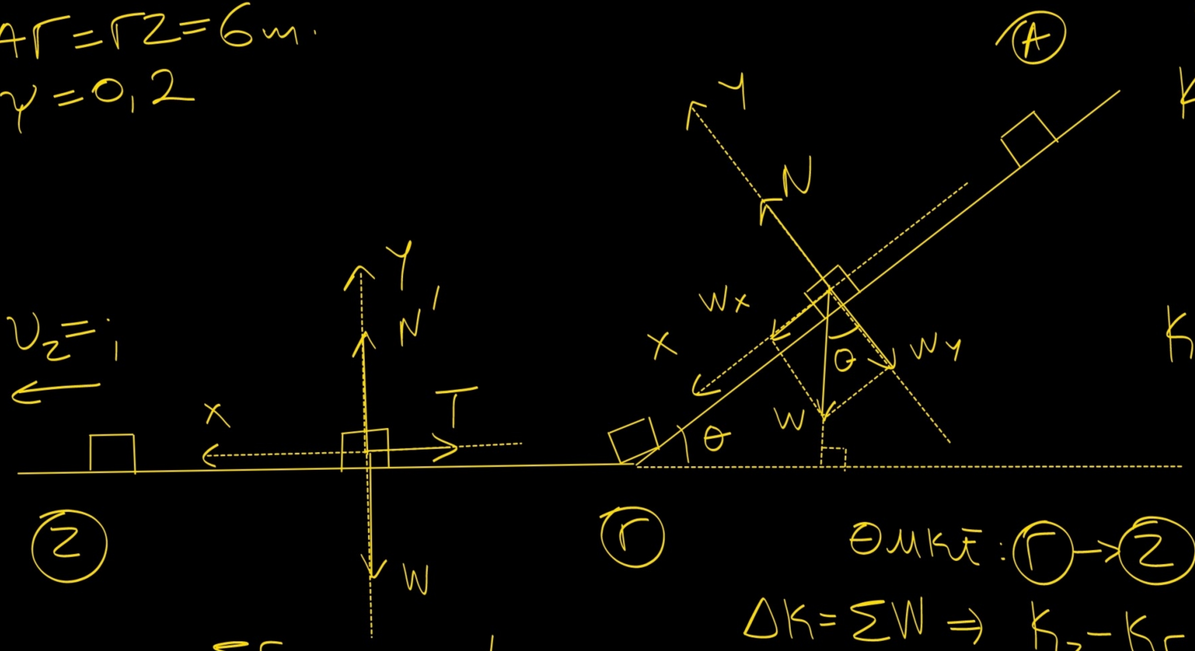
Ασκ. 6 σελ. 193.

$A\Gamma = \Gamma Z = 6m$.
$\gamma = 0,2$



Θμκέ: Α → Γ:

$\Delta K = \Sigma W \Rightarrow$

$K_\Gamma - K_A = W_{w_x} + W_{w_y} + W_N \Rightarrow$

$(\vec{w}_y, \vec{N} \perp \Delta\vec{x})$

$K_\Gamma = W_{w_x} \Rightarrow K_\Gamma = w_x \cdot A\Gamma \Rightarrow$

$K_\Gamma = m \cdot g \cdot \sigma\upsilon\nu\theta \cdot A\Gamma$

Θμκέ: Γ → Ζ:

$\Delta K = \Sigma W \Rightarrow K_Z - K_\Gamma = W_w + W_{N'} + W_T \Rightarrow$

$(\vec{w}, \vec{N'} \perp \Delta\vec{x})$

$K_Z - m \cdot g \cdot A\Gamma \cdot \sigma\upsilon\nu\theta = W_T \Rightarrow K_Z - m \cdot g \cdot A\Gamma \cdot \sigma\upsilon\nu\theta = -T \cdot \Gamma Z$

$\Sigma F_y = 0 \Rightarrow N' = w$

$T = \gamma N' = \gamma w = \gamma \cdot m \cdot g$.

$$K_2 - m \cdot g \cdot A\Gamma \cdot \eta\mu\theta = -T \cdot \Gamma Z \Rightarrow$$

$$K_2 = m \cdot g \cdot A\Gamma \cdot \eta\mu\theta - \gamma \cdot m \cdot g \cdot \Gamma Z \Rightarrow$$

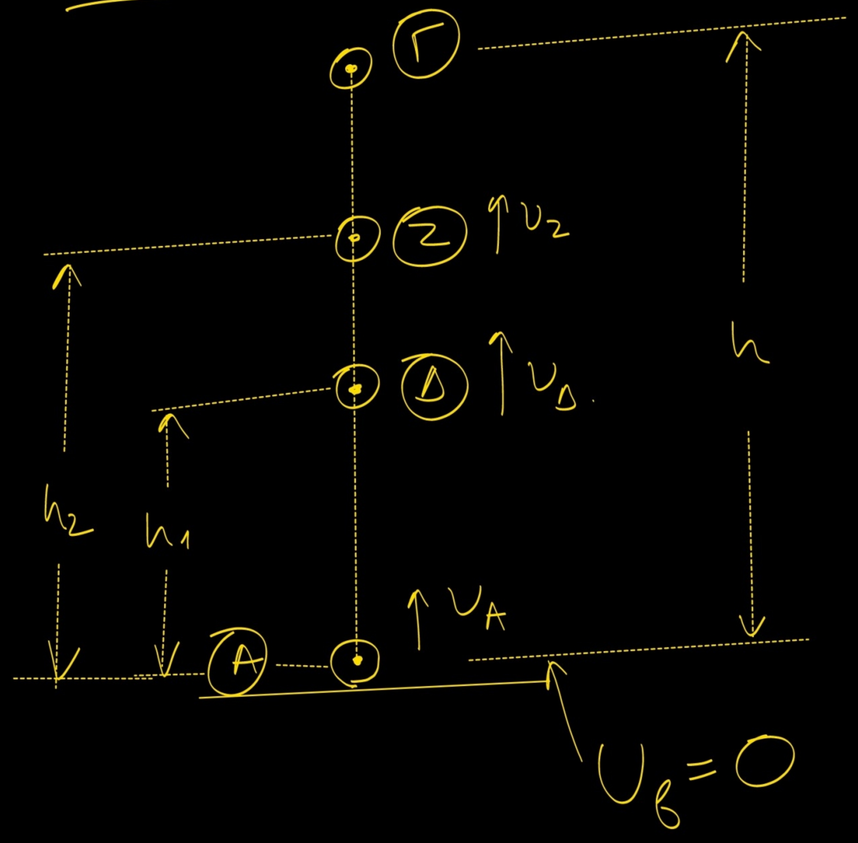
$$\frac{1}{2} m \cdot v_2^2 = m \cdot g \cdot A\Gamma \cdot \eta\mu\theta - \gamma \cdot m \cdot g \cdot \Gamma Z \Rightarrow$$

$$\frac{v_2^2}{2} = g \cdot A\Gamma \cdot \eta\mu\theta - \gamma \cdot g \cdot \Gamma Z \Rightarrow$$

$$\frac{v_2^2}{2} = +10 \cdot 6 \cdot \frac{1}{2} - 0,2 \cdot 10 \cdot 6 \Rightarrow$$

$$\frac{v_2^2}{2} = +30 - 12 \Rightarrow \frac{v_2^2}{2} = 18 \Rightarrow v_2^2 = 36 \Rightarrow \boxed{v_2 = 6 \, m/s}$$

Ασκ. 13 (Εξ. 194.)



Α. $h_1 = ;\quad K_\Delta = \frac{K_A}{2}$

ΑΔΜΕ: (Α) → (Γ): $K_A + U_A = K_\Gamma + U_\Gamma \Rightarrow$

$K_A = m \cdot g \cdot h$

ΑΔΜΕ: (Α) → (Δ): $K_A + U_A = K_\Delta + U_\Delta \Rightarrow$

$m \cdot g \cdot h + 0 = \frac{K_A}{2} + m \cdot g \cdot h_1 \Rightarrow$

$m \cdot g \cdot h = \frac{m \cdot g \cdot h}{2} + m \cdot g \cdot h_1 \Rightarrow$

$h = \frac{h}{2} + h_1 \Rightarrow 40 = 20 + h_1 \Rightarrow$

$h_1 = 20\,m.$

Β) Ορμή: $p = m \cdot v$

$$p_2 = \frac{p_A}{2} \Rightarrow m \cdot v_2 = \frac{m \cdot v_A}{2} \Rightarrow v_2 = \frac{v_A}{2}$$

$$K_2 = \frac{1}{2} \cdot m \cdot v_2^2 = \frac{1}{2} \cdot m \cdot \left(\frac{v_A}{2}\right)^2 = \frac{1}{4} \cdot \frac{1}{2} m \cdot v_A^2 \Rightarrow$$

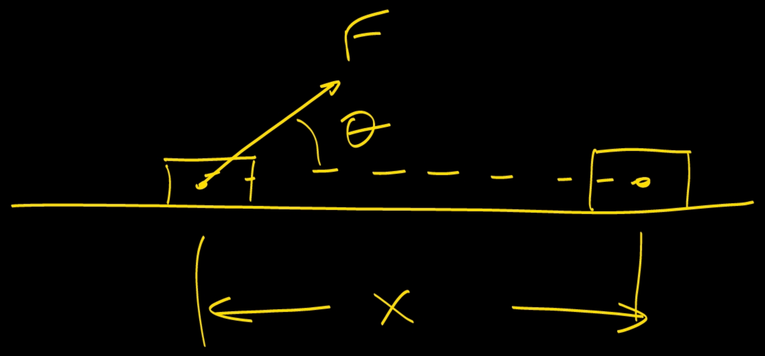
$$K_2 = \frac{1}{4} K_A$$

ΑΔΜΕ: (Α) → (2): $K_A + \cancel{U_A}^{0} = K_2 + U_2 \Rightarrow$

$$K_A = \frac{K_A}{4} + m \cdot g \cdot h_2 \Rightarrow \cancel{m} \cdot g \cdot h = \frac{\cancel{m} \cdot g \cdot h}{4} + \cancel{m} \cdot g \cdot h_2 \Rightarrow h = \frac{h}{4} + h_2 \Rightarrow 40 = \frac{40}{4} + h_2 \Rightarrow$$

$$40 = 10 + h_2 \Rightarrow h_2 = 30\,m$$

Έργο δύναμης:

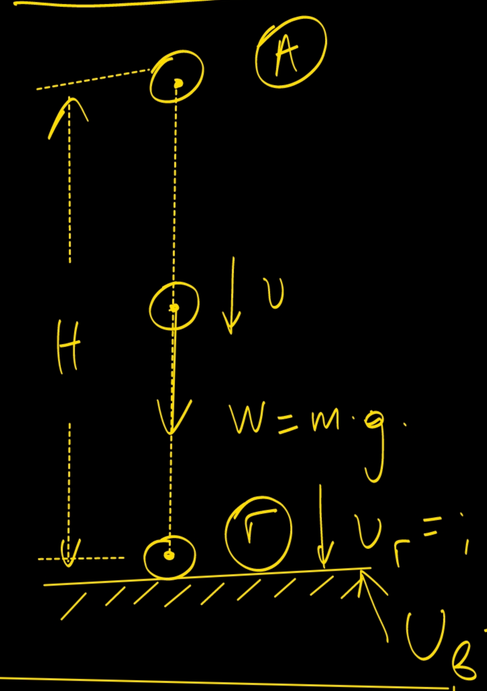


$$W_F = F \cdot x \cdot \sigma\upsilon\nu\theta$$

Ισχύς δύναμης:

$$P_F = \frac{\Delta W_F}{\Delta t} = F \cdot \upsilon \cdot \sigma\upsilon\nu\theta$$

Άσκ. 17 σελ. 194)



Α. ΘΜΚΕ: Α → Γ: $\Delta K = \Sigma W \Rightarrow K_\Gamma - K_A = W_W \Rightarrow$

$$\frac{1}{2} m \cdot \upsilon_\Gamma^2 - 0 = m \cdot g \cdot H \Rightarrow$$

$$\upsilon_\Gamma^2 = 2 \cdot g \cdot H \Rightarrow \upsilon_\Gamma^2 = 2 \cdot 10 \cdot 20 \Rightarrow \upsilon_\Gamma^2 = 400 \Rightarrow$$

$$\upsilon_\Gamma = 20 \, m/s$$

Β. Ρυθμός μεταβολής δυναμικής ενέργειας βάρους:

$$\frac{\Delta U}{\Delta t} = -\frac{\Delta W_W}{\Delta t} = -W \cdot \upsilon \cdot \sigma\upsilon\nu 0^\circ =$$

$$= -m \cdot g \cdot \upsilon = -m \cdot g \cdot g \cdot t \Rightarrow$$

$$\frac{\Delta U}{\Delta t} = -m \cdot g^2 \cdot t \Rightarrow \frac{\Delta U}{\Delta t} = -100t \, (SI)$$

$W_{\omega\theta}$

Χρόνος πτώσης

$$H = \frac{1}{2} g t_1^2 \Rightarrow$$

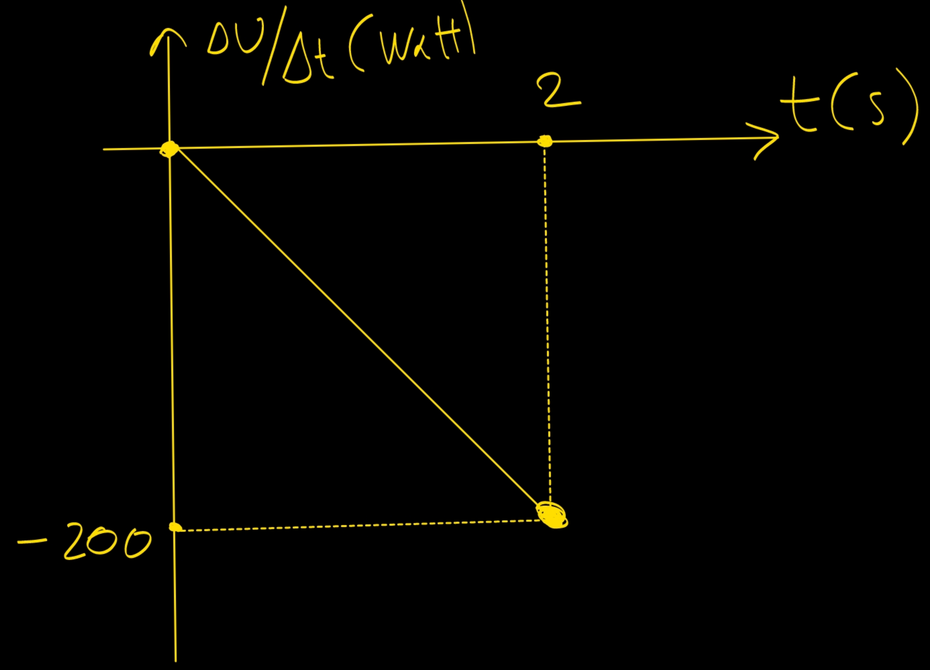
$$20 = \frac{1}{2} \cdot 10 \cdot t_1^2 \Rightarrow$$

$$5 t_1^2 = 20 \Rightarrow$$

$$t_1^2 = 4 \Rightarrow t_1 = 2 \text{ sec}$$

$$\frac{\Delta U}{\Delta t} = -100t \ (SI)$$

$$0 \le t \le 2 \text{ sec}$$



Για $t = 2$ sec είναι:

$$\frac{\Delta U}{\Delta t} = -100 \cdot 2 =$$

$$= -200 \text{ Watt}$$

Ασκ. 16 σελ. 194.