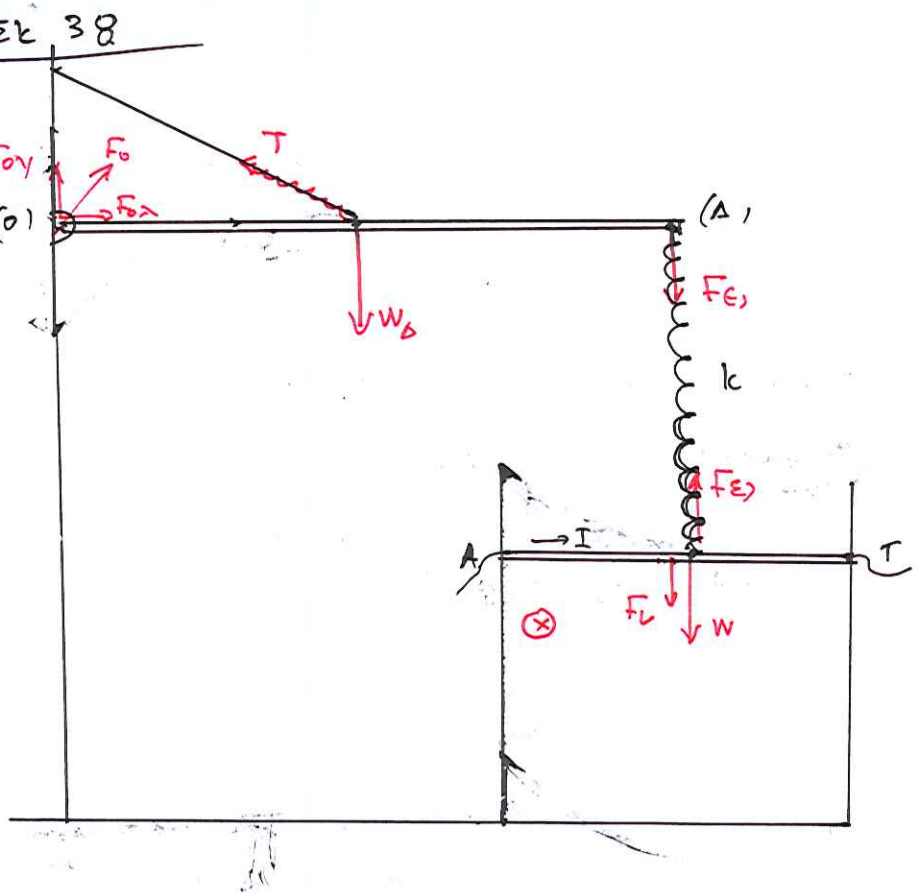
ΑΣΚ 38



$L = 0,1\ m$

$m_2 = 0,8\ kg$

$k = 100\ N/m$

$B = 2\ T$

$I = 10\ A$

$d = 2\ m$

$m_Δ = 4\ kg$

$μ_κ = 0,6$

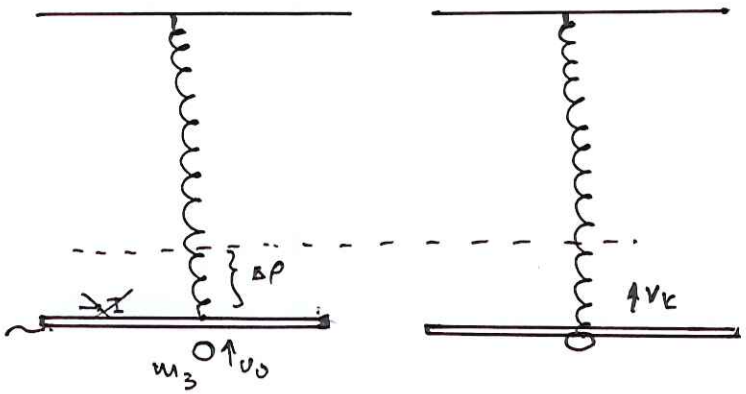
$g = 9,8$

Τη χρ. στιγμή (ΑΓ) $\Rightarrow \Sigma F = 0 \rightarrow F_{ε1} = \ldots$

$\boxed{Δl = 0,1\ m}$

Τη χρ. στιγμή (ΟΔ) $\Rightarrow$ $\Sigma F_x = 0$, $\Sigma F_y = 0$, $\Sigma \tau_{(Ο)} = 0$ $\rightarrow$ $T = \ldots$, $F_{ox} = \ldots$, $F_{oy} = \ldots$

$F_ο = \ldots$



• Α.Δ.Ο $\rightarrow$ ---- $v_k = 2\ m/s$

Ν.Ο.Ι $\Rightarrow \Sigma F = 0 \Rightarrow$ $\boxed{Δl = 0,1\ m}$

Αρχ. $v_k = v_{max} = ω \cdot A$

$y = A\,ημ(ωt)$

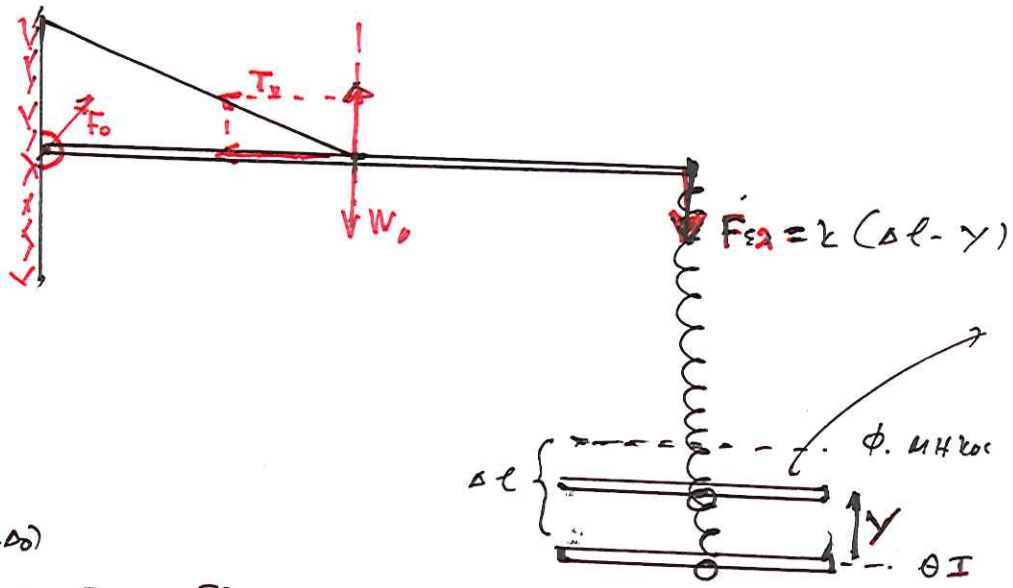
• $U_{ολ} = 3\ k \Rightarrow 4\ k = E_{ολ} \Rightarrow 4 \cdot \frac{1}{2} m v^2 = \frac{1}{2} m v_k^2$

$v = \pm 1\ m/s$

(Δεν βάζουμε την αρνητική λύση)

$V_{AΓ} = E_{επ} = B\,v\,l$

ΑΣΚ 38
ΘΩΡΑΚΕΙΑ



(ΡΑΒΔΟΣ)

$\Sigma \tau = 0 \Rightarrow$

$$T = 100 - \frac{1000}{3} y$$

Οριακά το νήμα δεν χαλαρώνει

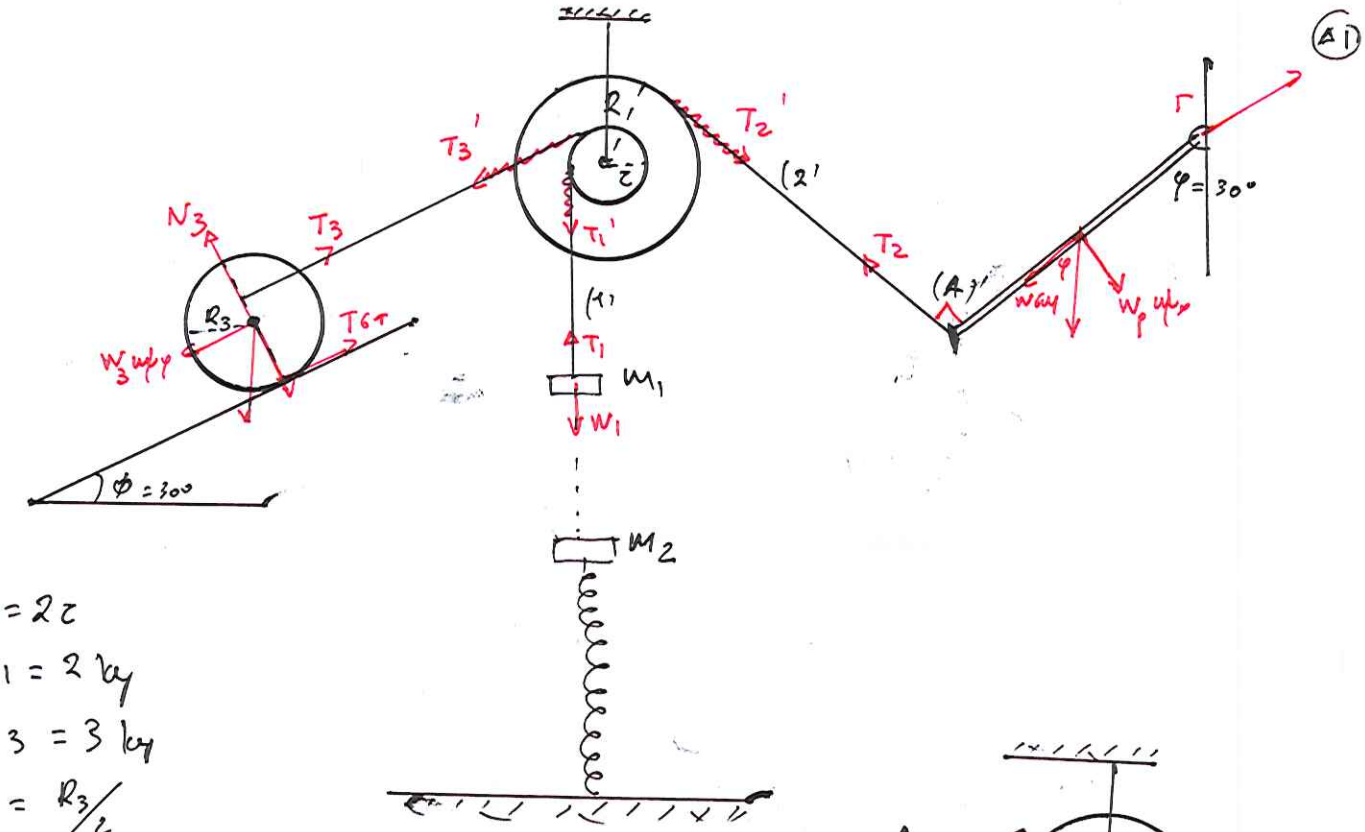
όταν $T = 0 \Rightarrow y = 0,3\,m = A_{max}$

$$V_{κ} = \omega \cdot A_{max}$$

και $m_3 V_0 = (m_3 + M) V_{κ}$

$\equiv$

Ασκ 39



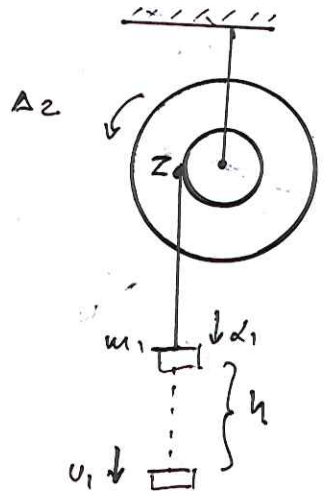
$R = 2r$

$m_1 = 2\ kg$

$m_3 = 3\ kg$

$d = R_3/2$

$\phi = 30^\circ$



(Δ1)

- Συνθήκη ισορροπίας για τον Δίσκο

$\Sigma\tau = 0$

$\Sigma F_x = 0$ $\Rightarrow$ $T_3 = \dots$, $T_{GT} = \dots$

- Συνθήκη ισορροπίας μ

$\Sigma F = 0 \Rightarrow T_1 = \dots$

- Συνθήκη ισορροπίας για τη τροχαλία $\Sigma\tau = 0 \Rightarrow$

$T_2' = \dots$

- Συνθήκη ισορροπίας για το ράβδο

$\Sigma\tau = 0 \rightarrow w_\rho = \dots$

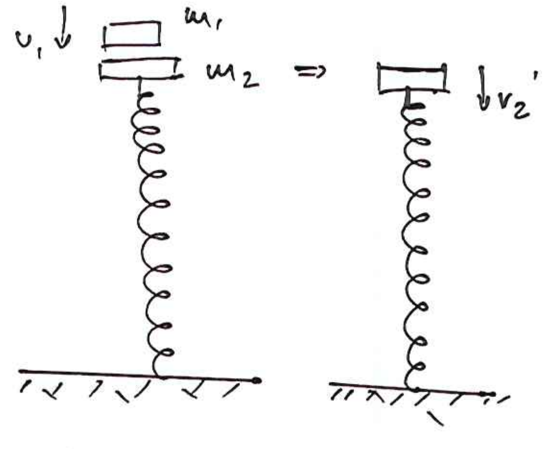
$\alpha_1 = \alpha_{επιτ_1}^{(2')} = \alpha_\gamma \cdot r = \dots$

$h = \frac{1}{2}\alpha_1 \cdot t_1^2 \rightarrow t_1 = \dots$

$\upsilon_1 = \alpha_1 \cdot t_1 = \dots$

ΑΣΚ 39

συνέχεια



Το m_2 κάνει ταλάντωση με το μέγιστο δυνατό πλάτος
→ Άρα λαβαίνει με την κρούση την μεγαλύτερη δυνατή ταχύτητα.

$V_2' = V_1$

↓

$m_2 = m_1$

$y = A\eta\mu\,\omega t \quad \left(A = \frac{V_2'}{\omega}\right) \quad \left(\omega = \sqrt{\frac{k}{m_2}}\right)$

• Στην Θ.Ι (m_2) $\Sigma F = 0 \Rightarrow k \cdot y_0 = m_2 g$

$\Rightarrow y_0 = 0{,}1\,m$.

Άρα θέλουμε τον ρυθμό μεταβολής της κιν. ενέργειας στην $y = -0{,}1\,m$ (θετική η φορά προς τα κάτω)

$\frac{\Delta K}{\Delta t} = \Sigma F \cdot U = -k \cdot y \cdot U$.

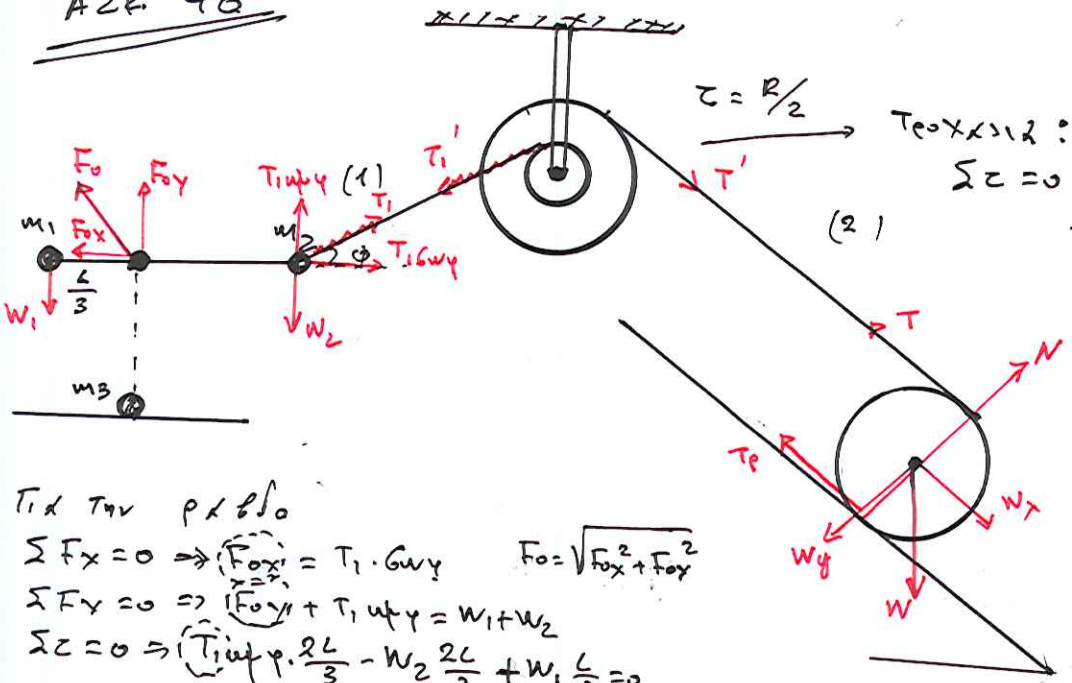
↓

$U^2 = \omega^2 (A^2 - y^2)$

και $U < 0$

Πρώτη φορά από την θέση που αντιστοιχεί στο φυσ. μήκος στην ανέβασή

ΑΣΚ. 48



$\tau = R/2$

Τροχαρχείο:

$\Sigma\tau = 0 \Rightarrow T_1' \cdot \tau - T' \cdot R = 0$ (2)

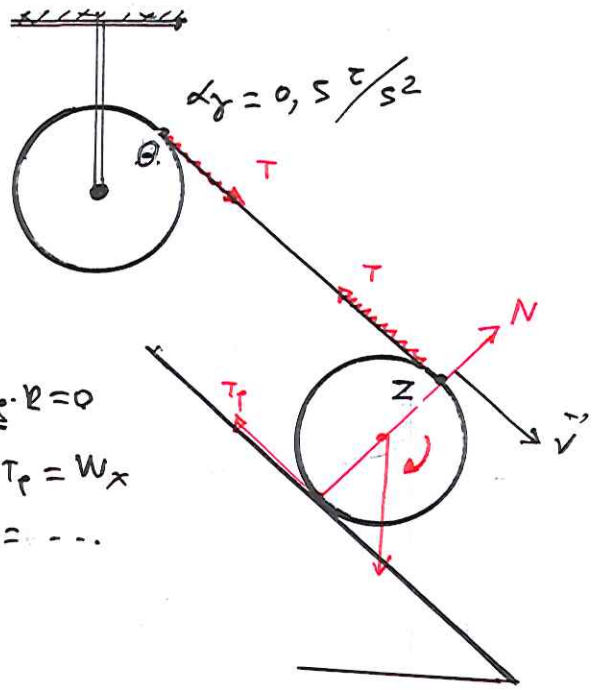
$T' = \dots$

Βιέκος:

$\Sigma\tau = 0 \Rightarrow T \cdot R - T_\varepsilon \cdot R = 0$

$\Sigma F_x = 0 \Rightarrow T + T_\varepsilon = W_x$

$M_\Delta = \dots$

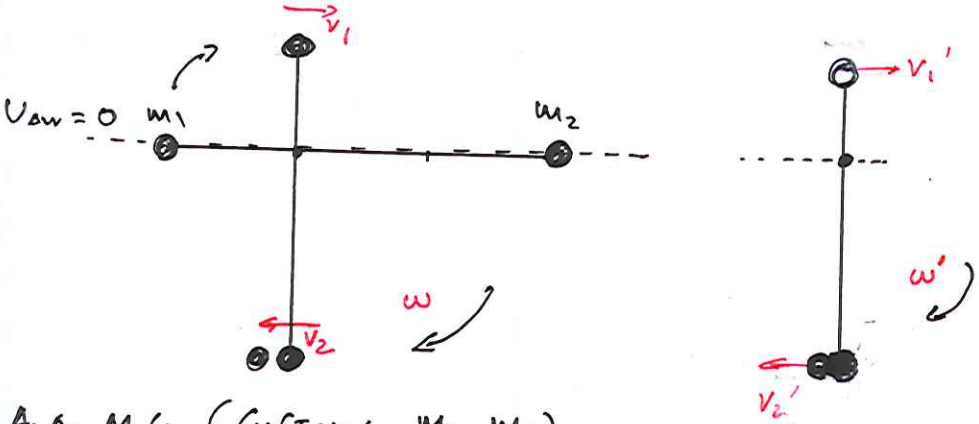


Για την ράβδο

$\Sigma F_x = 0 \Rightarrow F_{ox} = T_1 \cdot \sigma\upsilon\nu\varphi$ $\quad F_o = \sqrt{F_{ox}^2 + F_{oy}^2}$

$\Sigma F_y = 0 \Rightarrow F_{oy} + T_1 \eta\mu\varphi = W_1 + W_2$

$\Sigma\tau = 0 \Rightarrow T_1 \eta\mu\varphi \cdot \frac{2L}{3} - W_2 \frac{2L}{3} + W_1 \frac{L}{3} = 0$



Α. Δ. Μ. Ε. (Σύστημα m_1, m_2)

$E_M^{APX} = E_M^{TEL}$

$0 = m_1 g \frac{L}{3} + \frac{1}{2} m_1 v_1^2 - m_2 g \frac{2L}{3} + \frac{1}{2} m_2 v_2^2$

$v_1 = \omega \cdot L/3$, $v_2 = \omega \frac{2L}{3}$ $\quad \omega = \dots$ $\quad v_2 = \dots$

Για την κρούση

Α. Δ. Στροφ.

$L_{APX} = L_{TEL}$

$m_2 v_2 \frac{2L}{3} + m_1 v_1 \frac{L}{3} = m_1 v_1' \frac{L}{3} + m_2 v_2' \frac{2L}{3}$

$v_1' = \omega' \frac{L}{3}$, $v_2' = \omega' \frac{2L}{3}$

$K_{APX} = K_{TEL} + Q$

$\alpha_\Theta = \alpha_Z$

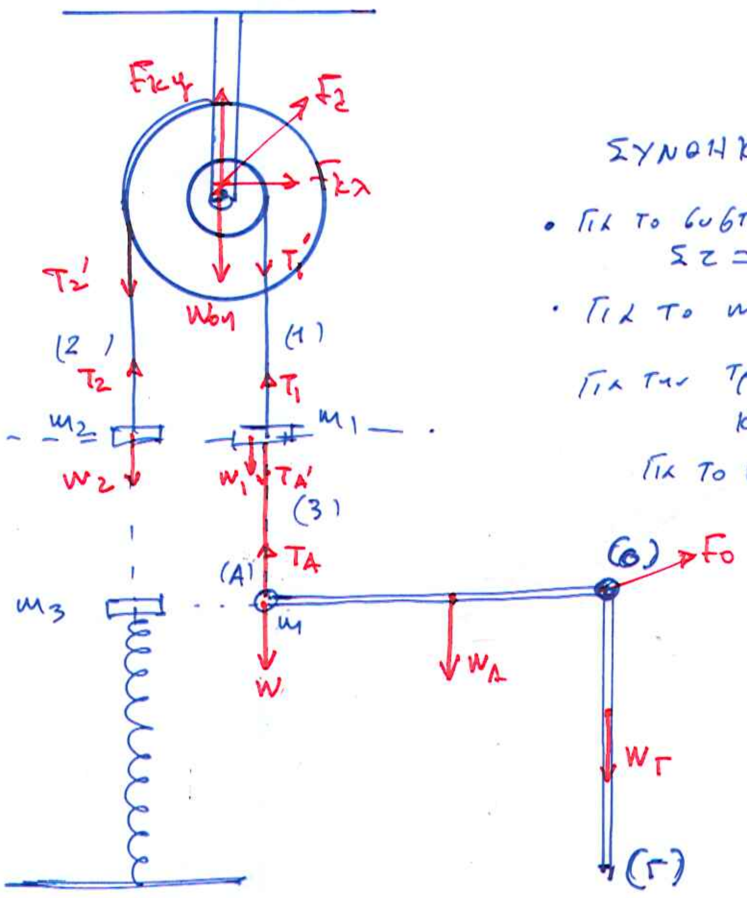
$\alpha_\gamma \cdot R = 2 \cdot \alpha_{cm} = 2 \cdot \alpha_{\gamma\,\Delta\iota\sigma\kappa}^{\Delta} \cdot R$

$\Rightarrow \alpha_{\gamma\,\Delta\iota\sigma\kappa}^{\Delta} = \frac{\alpha_\gamma^{\text{Τροχ}}}{2}$

$0,6\,m = R \cdot \Delta\theta = R \cdot \frac{1}{2} \alpha_\gamma^{TR} \cdot t^2$

$\Delta s_{\text{τυλ.}} = R \cdot \Delta\theta_\Delta = R \cdot \frac{1}{2} \alpha_\gamma^{\Delta} \cdot t^2$

ΑΣκ 52



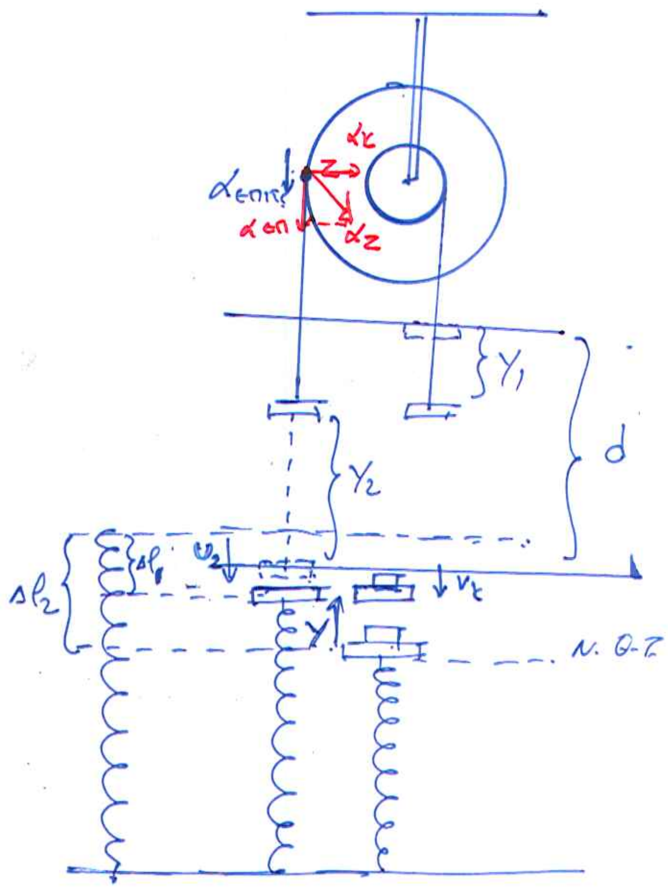
ΣΥΝΘΗΚΕΣ ΙΣΟΡΡΟΠΙΑΣ

- Για το σύστημα των δύο ράβδων $\Sigma\tau = 0 \rightarrow T_A = ..$
- Για το $m_1 \rightarrow T_1 = .$

Για την τροχαλία $\rightarrow T_2' = .$

και $F_k = .$

Για το $m_2 \rightarrow \ldots m_2 = ..$



$M_{o\lambda} = 2\,kg$

$\varphi = 90^\circ$

$m_{(A)} = 1\,kg$

$m_1 = 2\,kg$

$M_1 = 4\,kg$

$R_1 = 1\,m$

$M_2 = 4\,kg$

$R_2 = 2\,m$

$m_3 = 2\,kg$

$k = 200\,N/m$

α) $m_2 = 2\,kg$ (πρώτα)

$F_k = ;$

β) $\alpha_{\gamma\omega} = 1\,rad/s^2$

$d = 6\,m.$ $(\Sigma_1 - \Sigma_2)$

γ) $u_2^{t_1} = ;$

δ) $\alpha_{\varepsilon\pi\iota\tau(2)}^{t_1} = ;$

ε) $A = ;$

στ) $\frac{\Delta U}{\Delta t}_{2,3} = ;$ όταν $U_G = 1\,J.$

Για το πιάτο

Α.Α.Ο. $\rightarrow \ldots V_k = .$

$Y = \Delta \ell_2 - \Delta \ell_1$

ΝΘΙ   Θ.Ι (m_3)

$V_k^2 = \omega^2 (A^2 - Y^2)$

$U_G = 1\,J \Rightarrow \frac{1}{2} k \Delta\ell^2 = 1\,J$

$\Rightarrow \Delta\ell = 0{,}1\,m.$

- Στην Θ.Ι $\Delta\ell_2 = 0{,}2\,m$

ΑΡΑ $Y = 0{,}1\,m.$

$\frac{\Delta U}{\Delta t} = -\omega^2 \cdot Y = .$

$Y_1 + Y_2 = d$ $\alpha_1 = \alpha_\gamma \cdot R_1$

$\frac{1}{2}\alpha_1 t_1^2 + \frac{1}{2}\alpha_2 t_1^2 = d$ $\alpha_2 = \alpha_\gamma R_2$

$t_1 = ..$

$U_2^{(t_1)} = \alpha_2 \cdot t_1$

$\vec{\alpha}_{o\lambda(t_1)}^{(Z)} = \vec{\alpha}_{\varepsilon\pi\iota\tau}^{(Z)} + \vec{\alpha}_{\kappa\varepsilon\nu\tau}^{Z}$

$\alpha_{o\lambda}^{Z} = \sqrt{\alpha_{\varepsilon\pi\iota\tau}^2 + \alpha_k^2}$

$\alpha_{\varepsilon\pi\iota\tau_1}^{(Z)} = \alpha_2 = \alpha_\gamma \cdot R_2$

$\alpha_{\kappa\varepsilon\nu} = \omega^2 \cdot R_2 = (\alpha_\gamma \cdot t_1)^2 \cdot R_2$