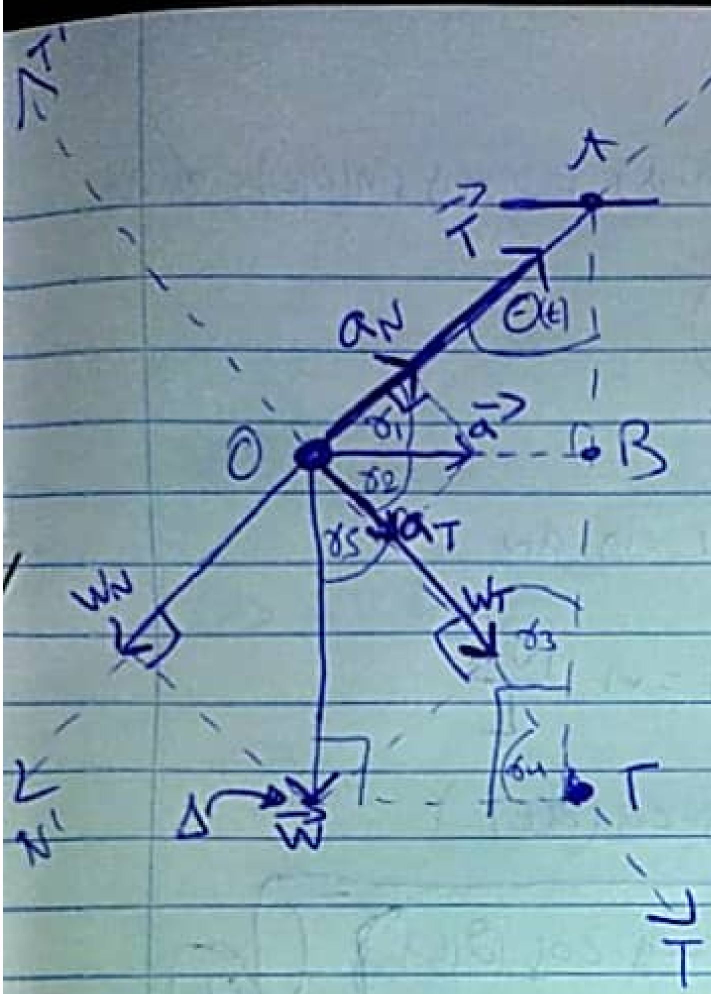


Calculating Angles

$O\hat{B}A: \gamma_1 + 90^\circ + \theta(t) = 180^\circ$

$\Rightarrow \boxed{\gamma_1 = 90^\circ - \theta(t)}$

$\gamma_1 + \gamma_2 = 90^\circ \Rightarrow \gamma_2 = 90^\circ - 90^\circ + \theta(t)$

$\boxed{\gamma_2 = \theta(t)}$

$\Gamma\hat{O}A: \gamma_3 + 90^\circ + \theta(t) = 180^\circ$

$\Rightarrow \boxed{\gamma_3 = 90^\circ - \theta(t)}$

$\gamma_3 + \gamma_4 = 90^\circ \Rightarrow \gamma_4 = 90^\circ - 90^\circ + \theta(t)$

$\Rightarrow \boxed{\gamma_4 = \theta(t)}$

$T\hat{\Delta}O: \gamma_4 + 90^\circ + \gamma_5 = 180^\circ \Rightarrow \gamma_5 = 90^\circ - \gamma_4$

$\Rightarrow \boxed{\gamma_5 = 90^\circ - \theta(t)}$

Analysing vectors to T and N axis

$\cos(\gamma_5) = \frac{W_T}{|\vec{W}|} \Leftrightarrow W_T = m \cdot g \cdot \cos[90^\circ - \theta(t)] \Rightarrow \boxed{W_T = m \cdot g \cdot \sin[\theta(t)]}$ (1)

$\sin(\gamma_5) = \frac{W_N}{|\vec{W}|} \Rightarrow W_N = m \cdot g \cdot \sin[90^\circ - \theta(t)] = -m \cdot g \cdot \sin(\theta(t) - 90^\circ)$

$\Rightarrow \boxed{W_N = -m \cdot g \cdot \cos(\theta(t))}$ (2)

$\cos(\gamma_2) = \frac{a_T}{|\vec{a}|} \Rightarrow \boxed{a_T = |\vec{a}| \cdot \cos(\theta(t))}$

$\sin(\gamma_2) = \frac{a_N}{|\vec{a}|} \Rightarrow \boxed{a_N = |\vec{a}| \cdot \sin(\theta(t))}$

Είναι σωστά γίνανε???
Κάτι μου φαίνεται λάθος εδώ γιατί $\boxed{a_T = \frac{v^2}{r}}$ κανονικά

$$\sum \vec{F}_T = m\cdot a_T \Leftrightarrow W_T = m\cdot a_T \Leftrightarrow \cancel{m}\cdot g\cdot \sin(\theta(t)) = \cancel{m}\cdot a_T$$

$$\boxed{a_T = g\cdot \sin(\theta(t))} \quad (3)$$

$$\sum \vec{F}_N = m\cdot a_N \Leftrightarrow T + W_N = m\cdot a_N$$

$$\Leftrightarrow T - m\cdot g\cdot \cos(\theta(t)) = m\cdot \frac{|\vec{v}|^2}{L}$$

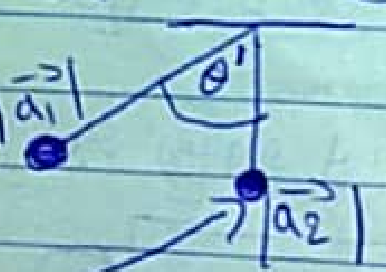
$$\Rightarrow T = m\cdot \frac{|\vec{v}|^2}{L} + m\cdot g\cdot \cos(\theta(t))$$

$$\Rightarrow \boxed{T = m\left[\frac{|\vec{v}|^2}{L} + g\cdot \cos(\theta(t))\right]} \quad (4)$$

$\vec{T}$ εξαρτάται και από την ταχύτητα $\vec{v}(t)$ άρα και από τον χρόνο, δεν είναι συντηρητική άρα ΔΕΝ μπορώ να κάνω Α.Δ.Μ.Ε

$$|\vec{a}| = \sqrt{a_T^2 + a_N^2} = \sqrt{g^2 \sin^2(\theta(t)) + \left[\frac{|\vec{v}|^2}{L}\right]^2}$$

$|\vec{v}(t)| = 0$, $\vec{\omega}(t) = 0$ $\rightarrow |\vec{a}_1|$



$\theta' = \theta(t)_{max}$

$|\vec{a}_1| = |\vec{a}_2| \rightarrow$ δεδομένο

$|\vec{v}(t)| = v_{max}$

$\omega(t) = \omega_{max}$

Scanned with CamScanner

$$|\vec{a_1}| \text{ @ } V=0: \quad |\vec{a_1}| = \sqrt{g^2 \cdot \sin^2(\theta(t)) + 0} = g \cdot \sin(\theta(t))$$

$$|\vec{a_2}| \text{ @ } V=V_{max}: \quad |\vec{a_2}| = \sqrt{g^2 \cdot \sin^2(\theta(t)) + \frac{V_{max}^4}{L^2}}$$

$$|\vec{a_1}| = |\vec{a_2}| \Leftrightarrow g \cdot \sin[\theta(t)]^2 = \sqrt{g^2 \cdot \sin^2(\theta(t)) + \frac{V_{max}^4}{L^2}}$$

$$\Leftrightarrow g^2 \cdot \sin^2[\theta(t)] = g^2 \cdot \sin^2(\theta(t)) + \frac{V_{max}^4}{L^2}$$

$$\frac{V_{max}^4}{L^2} = 0 \Rightarrow \boxed{V_{max} = 0}$$

περίεργο... Δεν στέκει καθενά!!

Ας δοκιμάσω κάτι άλλο:

$$a_T = \frac{\partial |\vec{v}|}{\partial t} \Leftrightarrow \partial |\vec{v}| = a_T \, \partial t = g \cdot \sin(\theta(t))$$

$$\int_{V(0)}^{V(t)} \partial |\vec{v}(t)| = \int_0^t g \cdot \sin(\theta(t)) \, \partial t$$

$$\frac{\partial \theta(t)}{\partial t} = \omega(t) \Leftrightarrow \boxed{\partial t = \frac{\partial \theta(t)}{\omega(t)}}$$

$$\Rightarrow V(t) - V(0) = g \int_{\theta(0)}^{\theta(t)} \sin(\theta(t)) \cdot \frac{\partial \theta(t)}{\omega(t)}$$

$$= \frac{g}{\omega(t)} \cdot \int_{\theta(0)}^{\theta(t)} \sin(\theta(t)) \, \partial \theta(t) = \frac{g}{\omega(t)} \Big[-\cos(\theta(t)) \Big]_{\theta(0)}^{\theta(t)}$$

$$= \frac{-g}{\omega(t)} \Big[\cos(\theta(t)) - \cos(\theta(0)) \Big] \Rightarrow$$

$$\boxed{V(t) = \frac{g}{\omega(t)} \cdot \cos(\theta(0)) - \frac{g}{\omega(t)} \cdot \cos(\theta(t))} \quad (5)$$

$$(5) \Rightarrow \frac{g}{\omega(t)} \cdot \cos(\theta(t)) = \frac{g}{\omega(t)} \cdot \cos(\theta(0)) - v(t)$$

$$\cos(\theta(t)) = \cos(\theta(0)) - \frac{g \cdot v(t)}{\omega(t)}$$

$$\boxed{\theta(t) = \cos^{-1}\left[\cos(\theta(0)) - \frac{g \cdot v(t)}{\omega(t)}\right]} \quad (6)$$

γνωρίζω ότι $\theta' = \max[\theta(t)]$, $v(t) = 0$
αλλά και $\omega(t) = 0$, άρα $\frac{g \cdot 0}{0}$ πρόβλημα!!!

αν όμως βρω $\frac{\partial \theta(t)}{\partial t} = \omega(t)$ κάνω κάτι???

περίεργο μου φαίνεται η εξίσωση, μπλέκει μέσα και v και ω και δεν είναι εξολοκλήρου με t μεταβλητές.

Επίσης κάτι ακόμα:

λογικά $|\vec{v}(t)| = \omega(t) \cdot L$ άρα

$$\theta(t) = \cos^{-1}\left[\cos(\theta(0)) - \frac{g \cdot \cancel{\omega(t)} \cdot L}{\cancel{\omega(t)}}\right]$$

$$\theta(t) = \cos^{-1}\left[\cos(\theta(0)) - g \cdot L\right] \left\{ \begin{array}{l} \text{σταθερά} \\ \text{όλα???} \end{array} \right.$$

ΛΑΘΟΣ γιατί $\frac{\partial \theta(t)}{\partial t} = 0$???