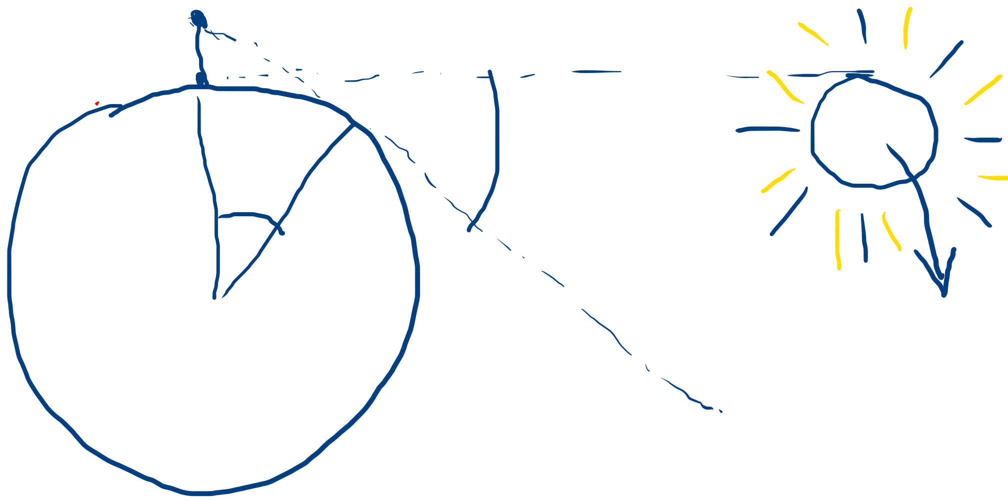
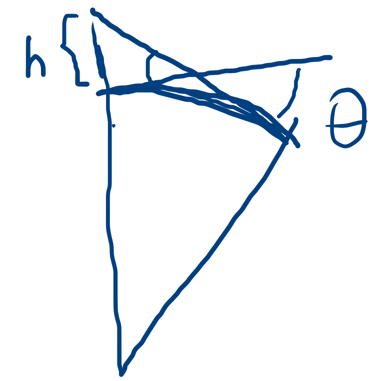


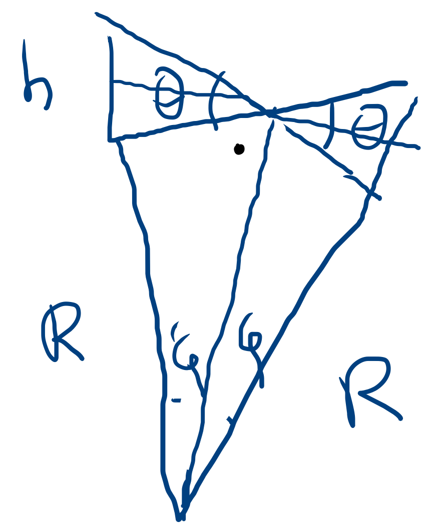


$$\frac{R}{h+R} = \frac{R}{R\left(1+\frac{h}{R}\right)}$$

$$\cos 2\varphi = \frac{R}{h+R}$$

$$\boxed{\frac{\theta}{2\pi} = \frac{11{,}15}{86400}}$$

$$\theta = 2\varphi$$

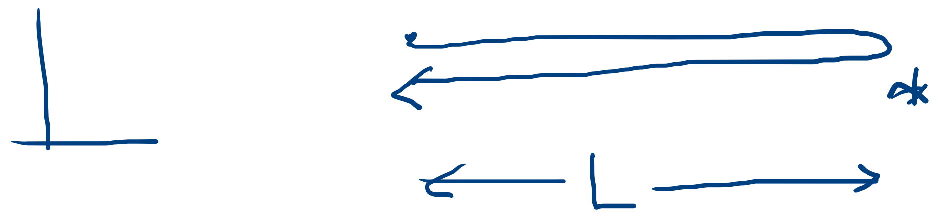


$$\cos\theta = \frac{R}{h+R} \simeq 1 - \frac{\theta^2}{2}$$

$$\frac{R}{h+R} = 1 - \frac{h}{R}$$

$$\frac{h}{R} \simeq \frac{\theta^2}{2}$$

$R = \ldots\ldots$



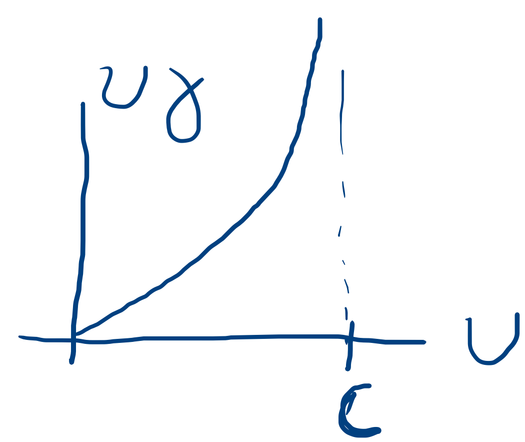
$$t'_{\rightarrow} = \frac{L/\upsilon}{\gamma} \qquad t_{\rightarrow} = \frac{L}{\upsilon} \qquad t_{\leftarrow} = \frac{L}{\upsilon}$$

$$t_{\rightleftarrows} = \frac{2L}{\upsilon}$$

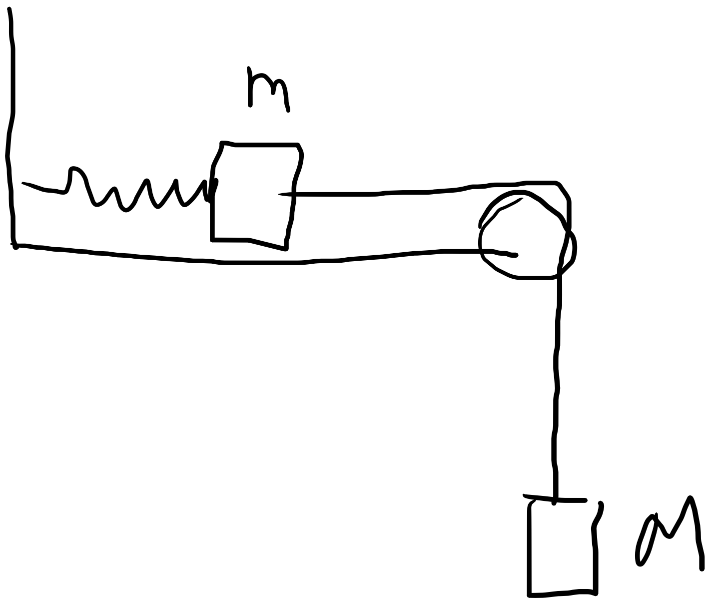
$$t = \gamma t'$$ (t' στο ίδιο σημείο στον Σ')

$\upsilon_1 > \upsilon_2$

$$\frac{L}{\upsilon_1 \gamma_1} < \frac{L}{\upsilon_2 \gamma_2}$$



$$n_1 = n_{\varepsilon\kappa} + \frac{L}{\upsilon_1\gamma_1} + \frac{2L}{\upsilon_2} - \frac{2L}{\upsilon_1} \qquad n_2 = n_{\varepsilon\kappa} + \frac{L}{\upsilon_2\gamma_2}$$



$$\frac{d^2\xi}{dt^2} + \omega^2 \xi = 0$$

$$\xi(t) = \xi_0 \cos\omega t + \frac{\upsilon_{\xi 0}}{\omega} \sin\omega t$$

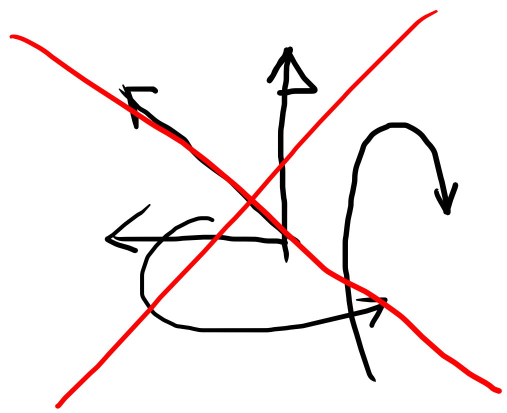
$\cos\omega t$, $\sin\omega t$ 2 ανεξ αρτ. λύσεις

γραμμικ. εξ $\longrightarrow$ $\xi_{\gamma\lambda}(t) = \alpha_1 \cos\omega t + \alpha_2 \sin\omega t$

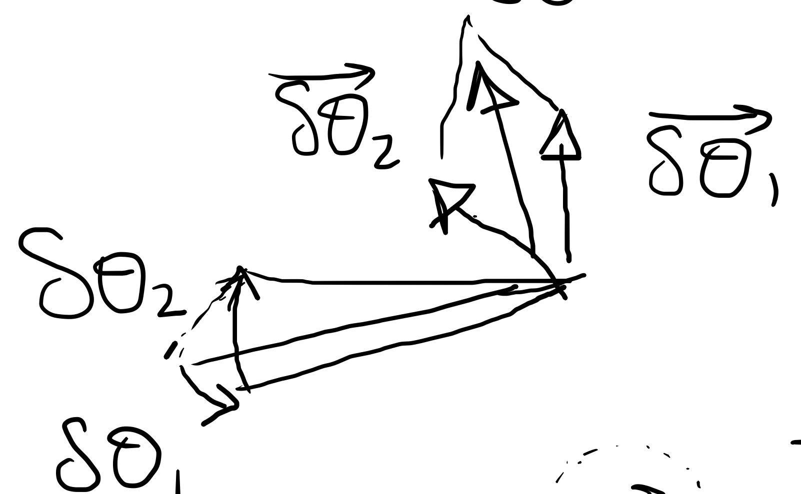
$\xi_{\gamma\lambda}(0) = \xi_0$ $\frac{d\xi_{\gamma\lambda}}{dt}(t=0) = \upsilon_{\xi 0}$

$\alpha_1 = \xi_0$ $\alpha_2 \omega = \upsilon_{\xi 0}$

$\overrightarrow{d\theta}$ $\cancel{d\vec{\theta}}$ $\left(\overrightarrow{dx} = d\vec{x} \right)$



$$\overrightarrow{\delta\theta} = \overrightarrow{\delta\theta}_1 + \overrightarrow{\delta\theta}_2$$

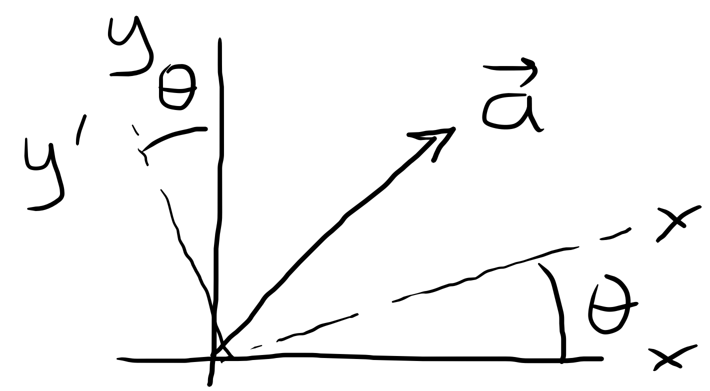


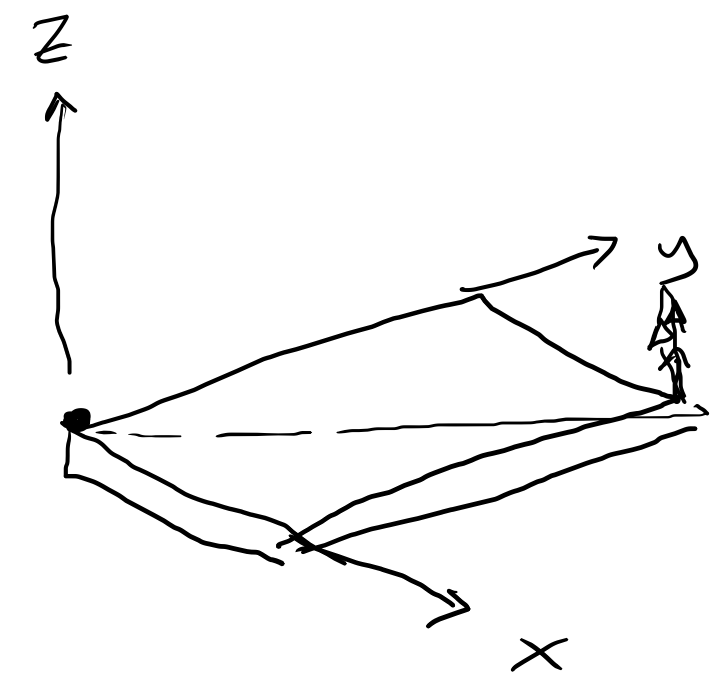
$$\vec{\omega} = \frac{\overrightarrow{d\theta}}{dt}$$

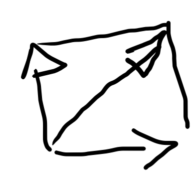
$$\begin{pmatrix} 1 & \theta & 0 \\ -\theta & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

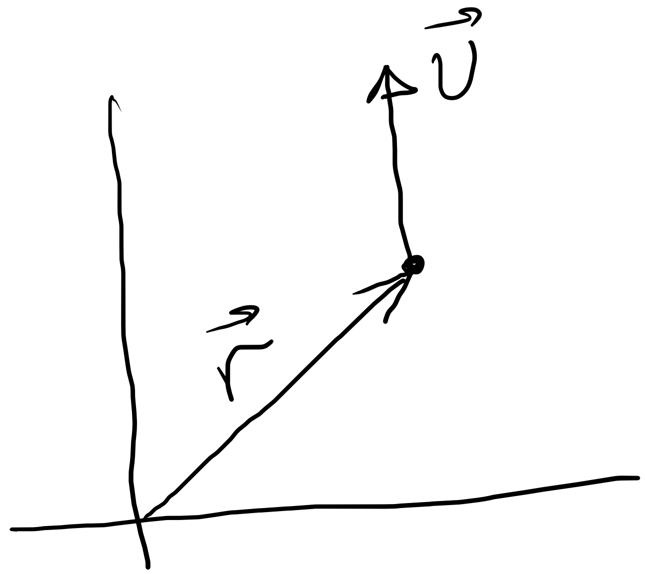
$$\sim$$

$$\begin{pmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} a_x \\ a_y \\ a_z \end{pmatrix} = \begin{pmatrix} \\ \\ \\ \end{pmatrix}$$



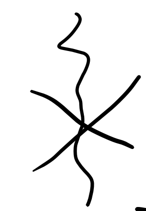




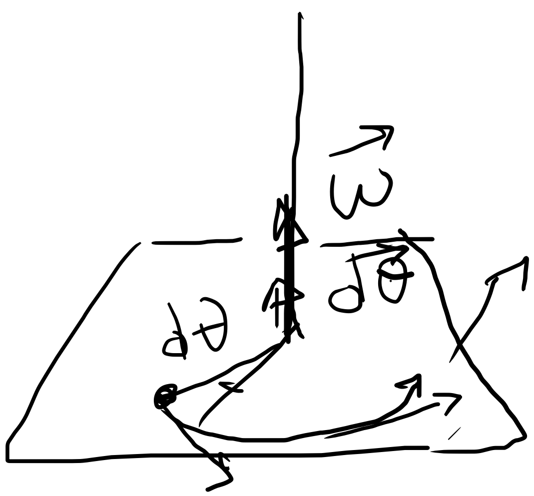


$$\vec{r} = r\,\hat{e}_r$$

$$\vec{v} = \frac{dr}{dt}\,\hat{e}_r + r\,\underbrace{\frac{d}{dt}\hat{e}_r}_{\frac{d\theta}{dt}\hat{e}_\theta}$$



$\vec{d\theta}$



$$\vec{\omega} = \frac{d\theta}{dt}$$

$$\boxed{\vec{v} = \vec{\omega} \times \vec{r}} \qquad \vec{v} \perp \vec{r}$$

$\boxed{\text{ζεστ.}}$ $\boxed{\text{ψυχρ.}}$

$$m_{0ζ} > m_{0ψ}$$

$$(E_1 + E_2 + \cdots + E_n)^2 - (\underbrace{\vec{p}_1 + \vec{p}_2 + \cdots + \vec{p}_n}_{\vec{0}})^2$$

$$m_{0\tau}^2 = (\mathcal{E}_1 + \mathcal{E}_2 + \cdots + \mathcal{E}_N)^2 \geq m_1^2c^4 + p_1^2c^2 + m_2^2c^4 + p_2^2c^2 + \cdots + m_n^2c^4$$

$$\mathcal{E}_{1ζ} > \mathcal{E}_{1ψ}$$

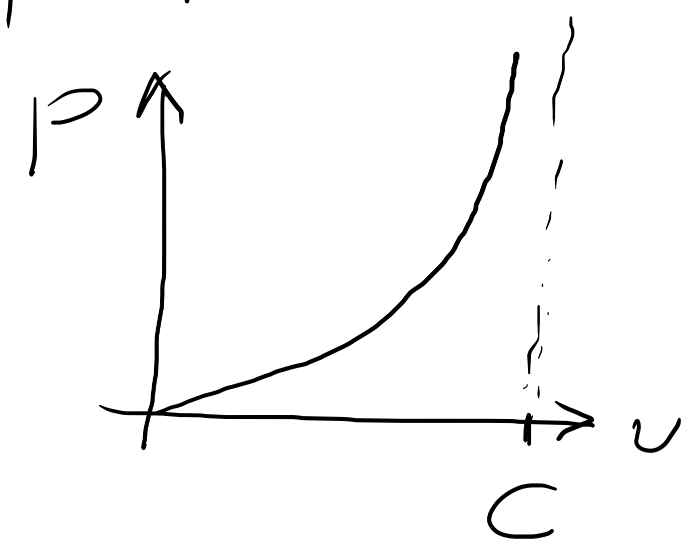
$p = m\gamma v \qquad -c < v < c \qquad \cancel{\exists}\ p(v=c)$

$$\boxed{?\qquad\qquad\qquad v = c}$$

$$\lim_{v \to c} p = +\infty$$

$$\frac{dp}{d\tau} = F = \text{σταθ}$$

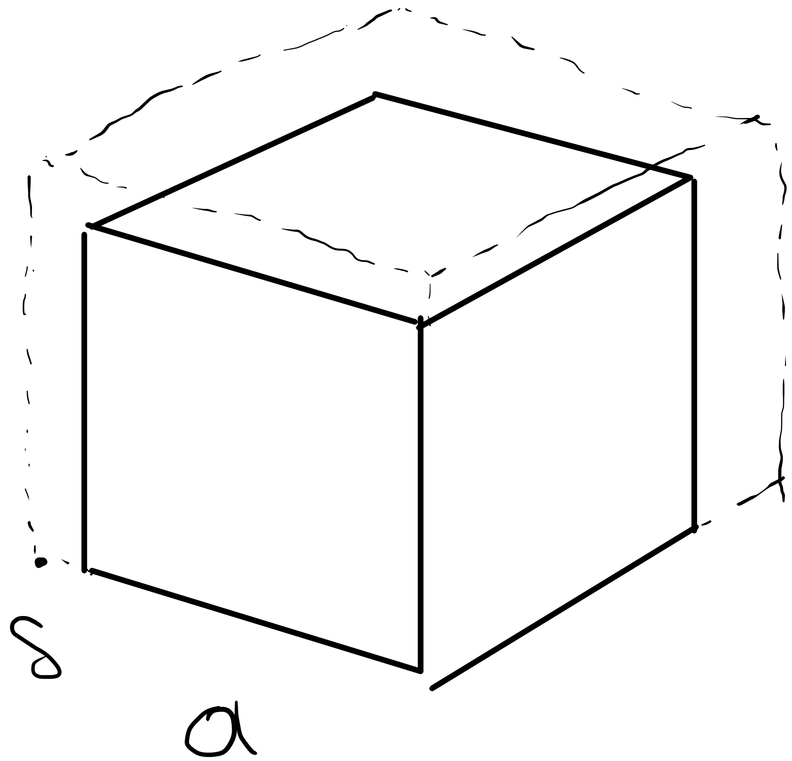
$p \uparrow\ \uparrow \qquad v < c$



$p_{m=0} = hf \ , \ v = c$

$E_{m=0} = p_{m=0}\, c$

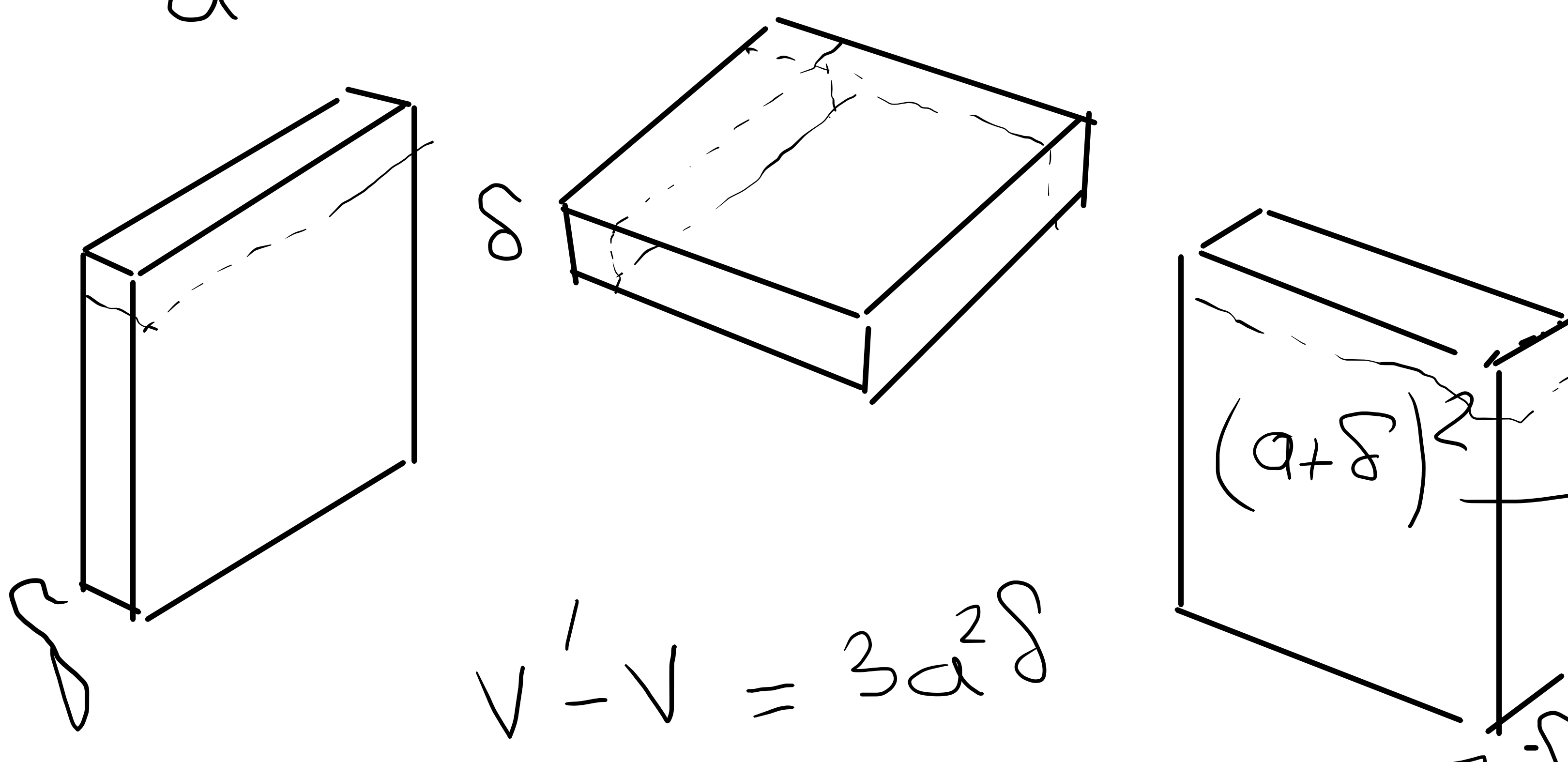
$E^2 = p^2 c^2 + m^2 c^4$



$V = a^3$

$V' = (a+\delta)^3 = a^3 + 3a^2\delta$

$+ \cancel{3a\delta^2 + \delta^3}$

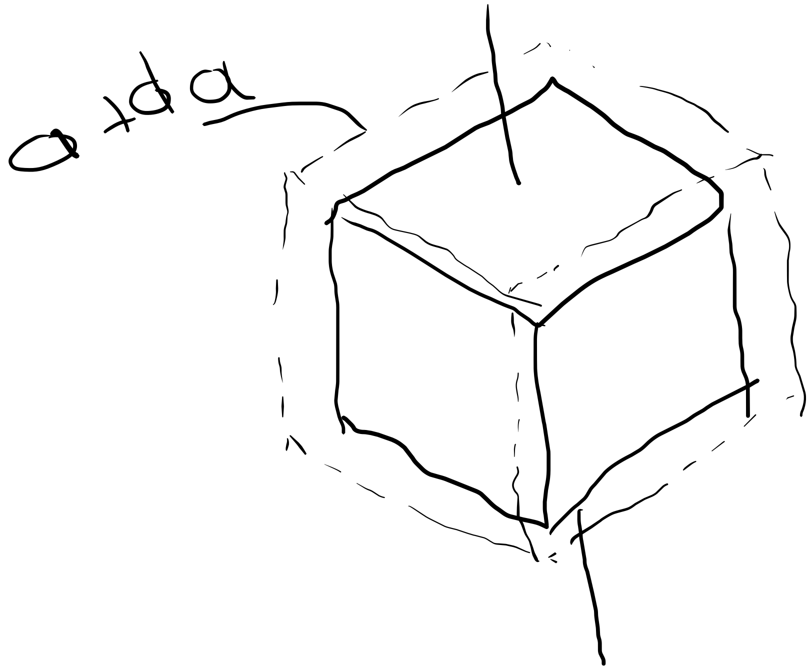


$\sim a^2$

$V' - V = 3a^2\delta$

$\frac{V'-V}{\delta} = 3a^2 \quad \boxed{6a^2}$

$\left(\frac{V'-V}{\delta} = 6a^2 \right.$



$$I = \frac{Ma^2}{6}$$

$M + dm$

$a + da$

$$\frac{M+dM}{(a+da)^3} = \rho = \frac{M}{a^3}$$

$$I' - I = dI_{k\phi} = \# \, dM \, a^2$$

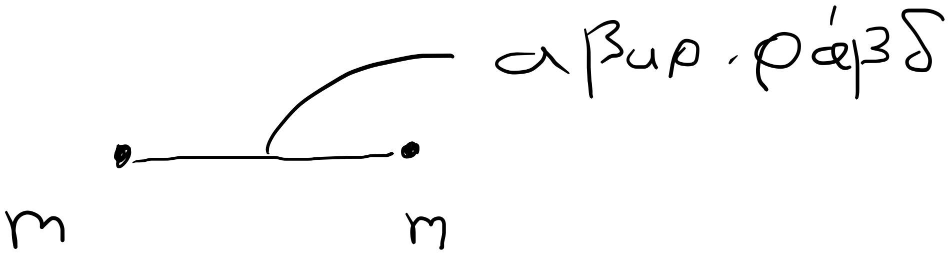
$$M = \rho a^3$$

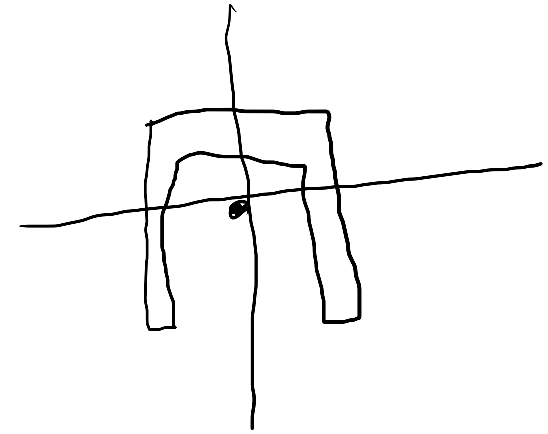
$$dM = 3\rho a^2 da$$

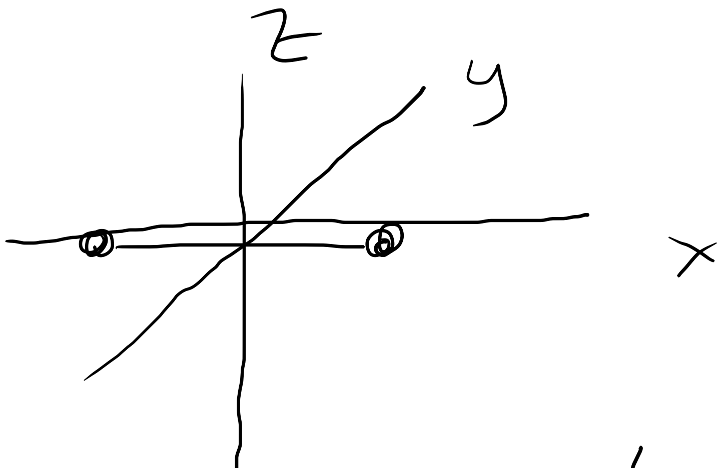
$$\frac{1}{6}(M+dm)(a+da)^2 - \frac{1}{6}Ma^2 = \frac{dMa^2}{6} + \frac{da\,M}{3}$$

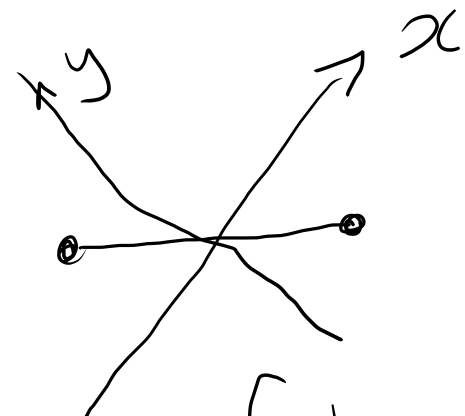
$$\frac{dM}{6} a^2 \left(1 + \frac{2da}{dM} \frac{M}{a}\right) = \dots$$

$$\frac{dM}{da} = 3\rho a^2 = \boxed{\frac{3M}{a}}$$









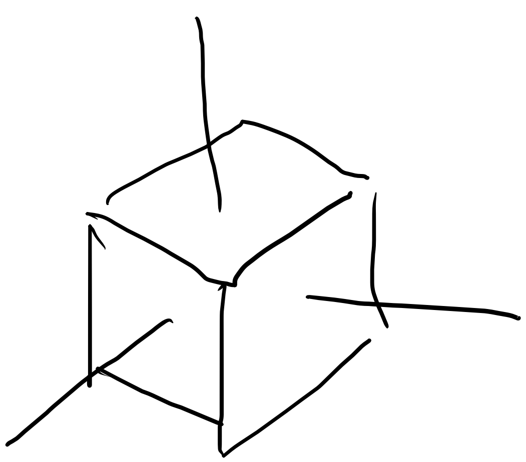
$$\int dm\, xy < 0$$

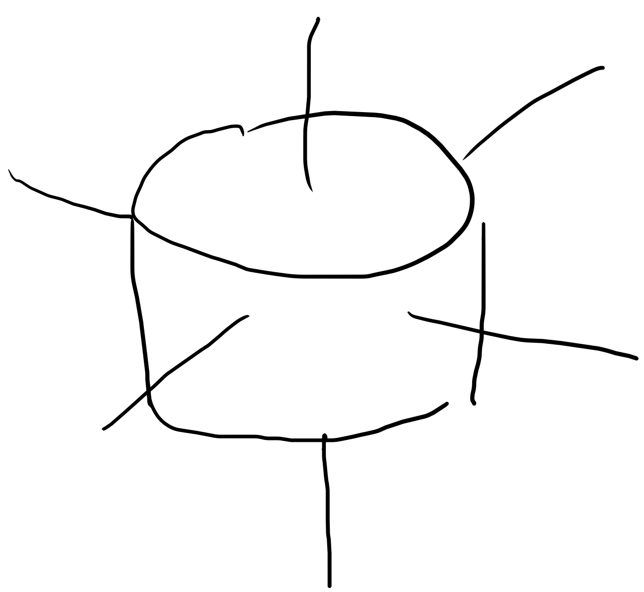
$$m x_1 y_1 + m x_2 y_2 < 0$$

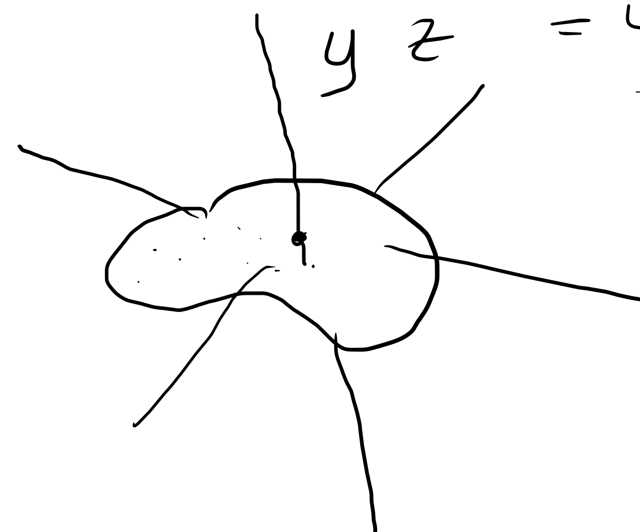
$$\int dm\, xz$$

$$xy$$

$$yz = 0$$





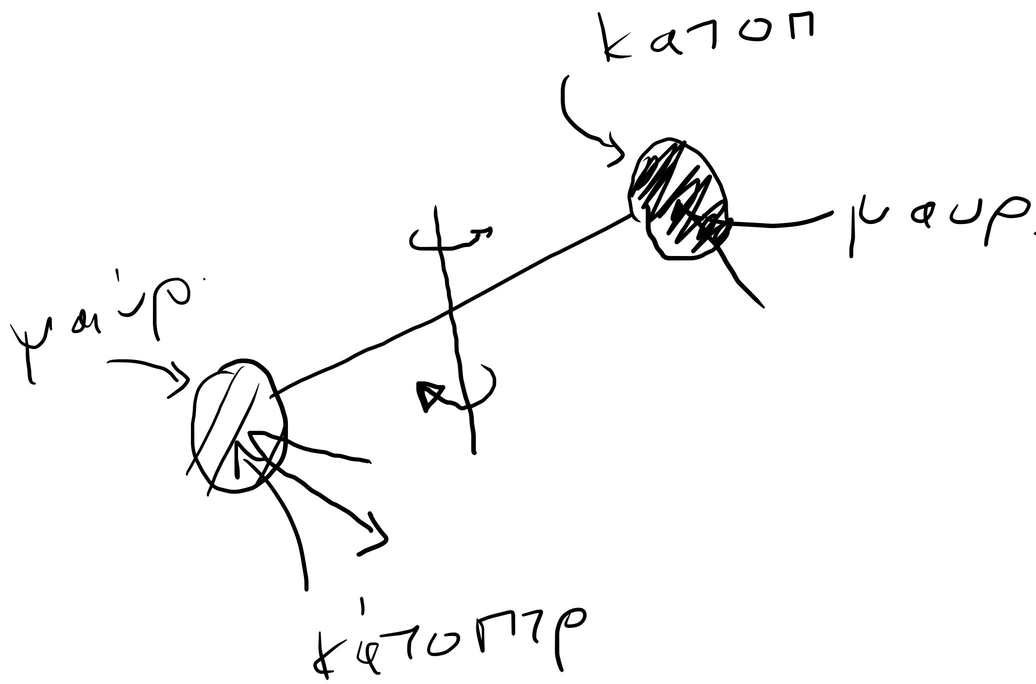


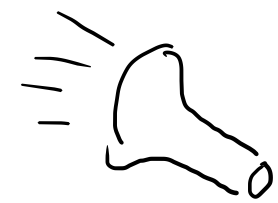
$\forall$ πατάτα

$\exists$ 3 ορθογ. άξονες που

διέρχονται από το ΚΜ της πατάτ.

$x, y, z \Rightarrow \int dm\, xy = \int dm\, xz = \int dm\, yz = 0$

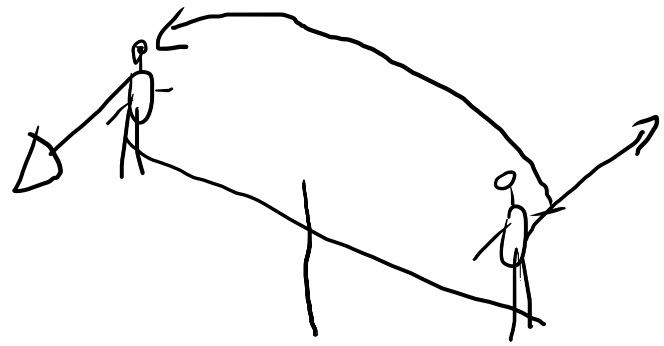


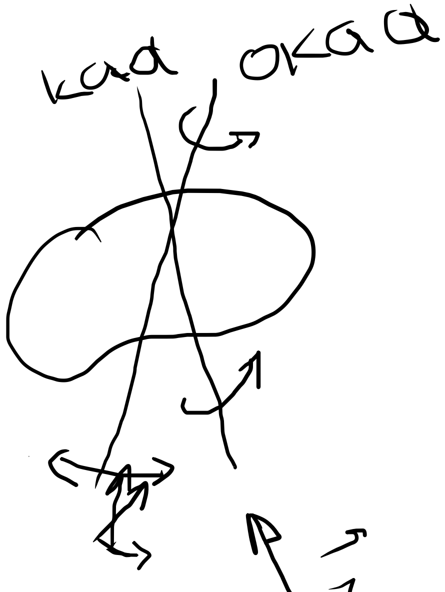


$$p_{m=0} \neq 0$$

m $\quad v$ $\qquad m\gamma v = p$

φωτον. f $\qquad h\frac{f}{c} = p$

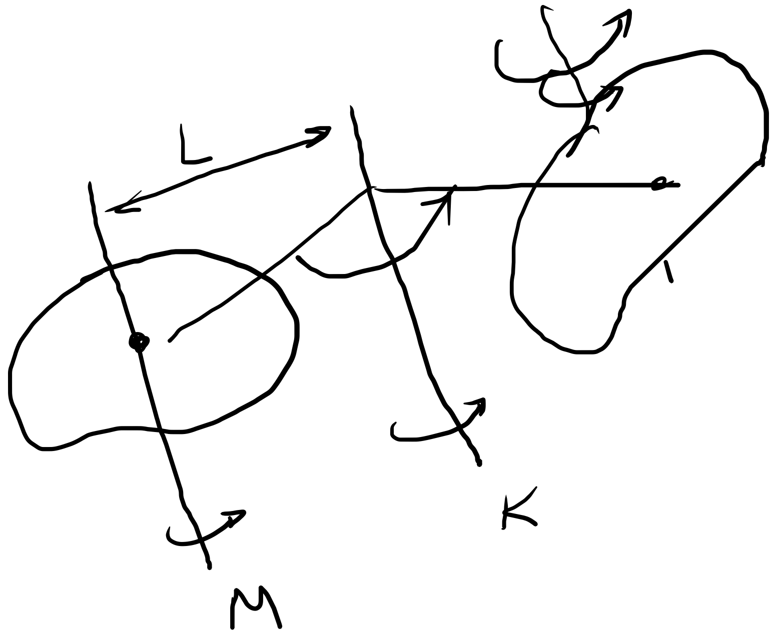




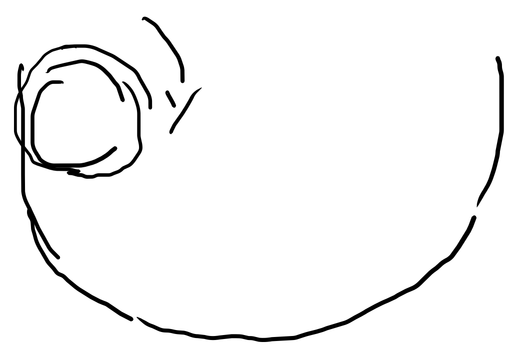
$$\vec{\tau} = I\vec{\alpha}$$

$$= \begin{pmatrix} I \end{pmatrix} \begin{pmatrix} \alpha_x \\ \alpha_y \\ \alpha_z \end{pmatrix}$$

$$\vec{\tau} \nparallel \vec{\alpha}$$

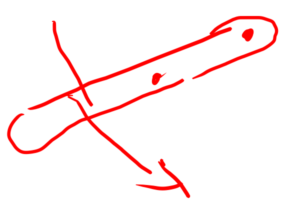


$$L_K = ML^2\omega + I_{KM}\,\omega$$



περ + μεταφ

~~περ + περ~~



$$L = M\left(\frac{L}{2}\right)^2\omega + \frac{ML^2}{12}\omega$$

$$dx = x_2 - x_1 \longrightarrow 0 \qquad (x_2 \neq x_1)$$

$$dx\ dx = (x_2 - x_1)^2 \lll (x_2 - x_1) = dx$$

$$0{,}01^2 \lll 0{,}01$$

$$dx + \cancel{(dx)^2} = 1 + dx \longrightarrow 1$$

$$dx$$

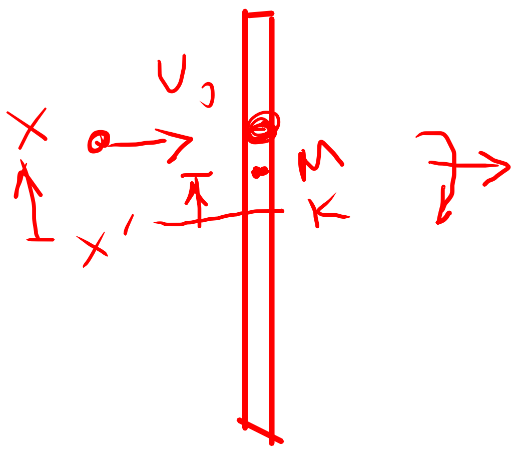
$$\alpha \equiv \frac{d^{2}\theta}{dt^{2}} = \frac{d}{dt}\frac{d}{dt}\theta = \frac{d}{dt}\underbrace{\lim_{\varepsilon\to 0}\frac{\theta(t+\varepsilon)-\theta(t)}{\varepsilon}}$$

$$\lim_{\varepsilon\to 0}\frac{\omega(t+\varepsilon)-\omega(t)}{\varepsilon} = \frac{d}{dt}\omega(t)$$

$$\lim_{\varepsilon_1\to 0}\left\{\left[\lim_{\varepsilon_2\to 0}\frac{\theta(t+\varepsilon_1+\varepsilon_2)-\theta(t+\varepsilon_1)}{\varepsilon_2} - \lim_{\varepsilon_2\to 0}\frac{\theta(t+\varepsilon_2)-\theta(t)}{\varepsilon_2}\right]\Big/\varepsilon_1\right\}$$

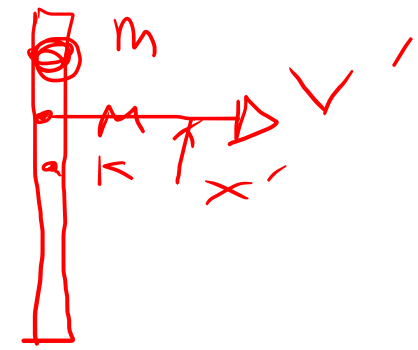
$\omega(t+\varepsilon_1)$

$\omega(t)$



$$L_{M}^{\alpha\rho\chi} = m v_0 (x - x')$$

$$L_{M}^{\tau\varepsilon\lambda} = I_{O\lambda}^{M+m}\, \omega$$



$$m v_0 = (M+m) v' \quad \checkmark$$

$$(K) \quad m v_0 x = I_M \omega + (M+m) v' x'$$

$$I_{O\lambda}^{M+m}$$