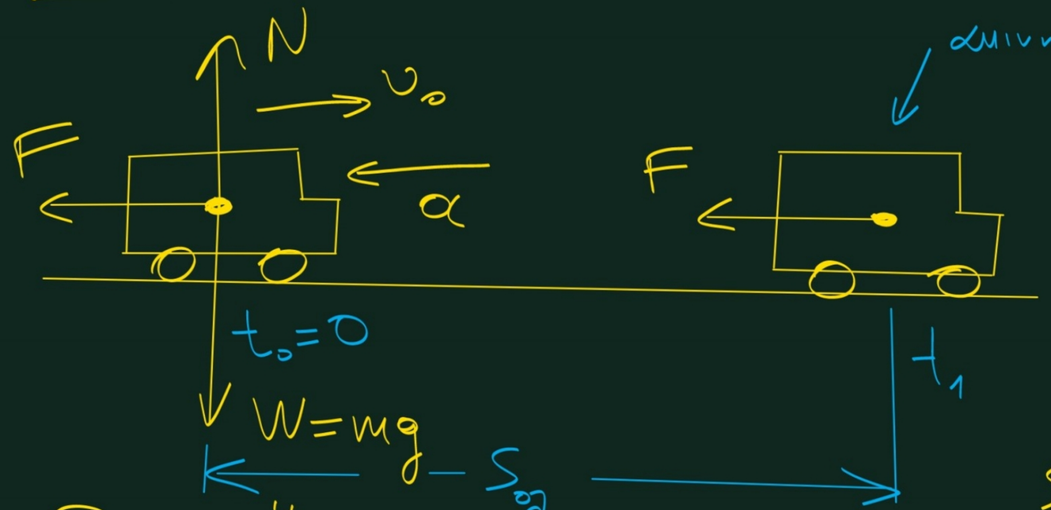
## Ασκ. 17. 662.108-




$F=2\cdot10^4\,N$

$m=4.000\,kg$

Αρα: $\Sigma F=m\alpha \Rightarrow F=m\cdot\alpha \Rightarrow$

$2\cdot10^4=4.000\cdot\alpha \Rightarrow 20.000=4.000\,\alpha \Rightarrow$

$\alpha=5\,m/s^2$

Α. Η κίνηση είναι επιβραδυνόμενη.

$\upsilon=\upsilon_0-\alpha t \Rightarrow 0=\upsilon_0-\alpha t_1 \Rightarrow \alpha t_1=\upsilon_0 \Rightarrow$

$$\boxed{t_1=\frac{\upsilon_0}{\alpha}}$$ (χρόνος κίνησης)

Διάστημα φρεναρίσματος.

$S=\upsilon_0 t-\frac{1}{2}\alpha t^2 \Rightarrow S_{ολ}=\upsilon_0 t_1-\frac{1}{2}\alpha\cdot t_1^2 \Rightarrow$

$S_{ολ}=\upsilon_0\cdot\frac{\upsilon_0}{\alpha}-\frac{1}{2}\alpha\cdot\left(\frac{\upsilon_0}{\alpha}\right)^2=\frac{\upsilon_0^2}{\alpha}-\frac{1}{2}\frac{\alpha\cdot\upsilon_0^2}{\alpha^2} \Rightarrow$

$S_{ολ}=\frac{\upsilon_0^2}{\alpha}-\frac{\upsilon_0^2}{2\alpha} \Rightarrow S_{ολ}=\frac{2\upsilon_0^2}{2\alpha}-\frac{\upsilon_0^2}{2\alpha} \Rightarrow$

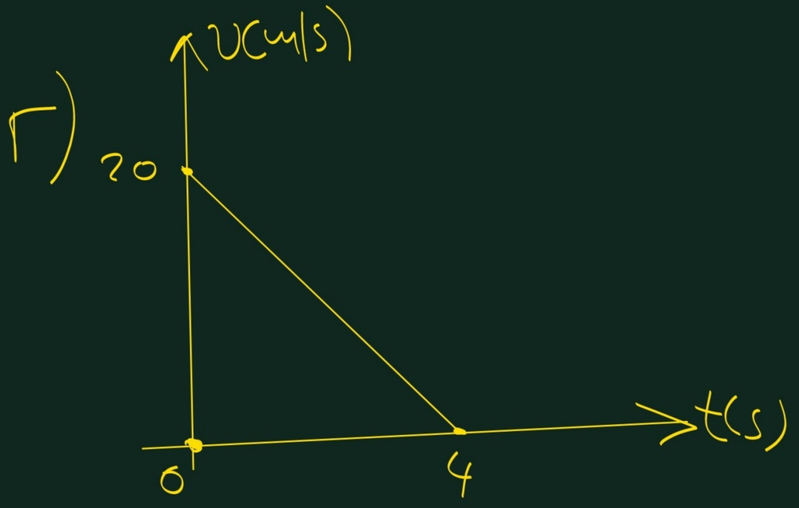
$$\boxed{S_{ολ}=\frac{\upsilon_0^2}{2\alpha}}$$

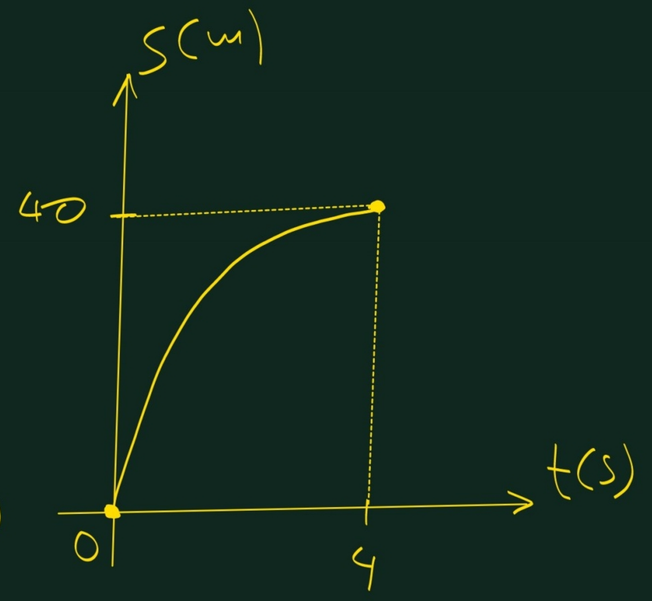
$$S_{o\lambda} = \frac{v_o^2}{2a} \Rightarrow 40 = \frac{v_o^2}{2 \cdot 5} \Rightarrow$$

$$v_o^2 = 400 \Rightarrow v_o = 20 \text{ m/s}$$

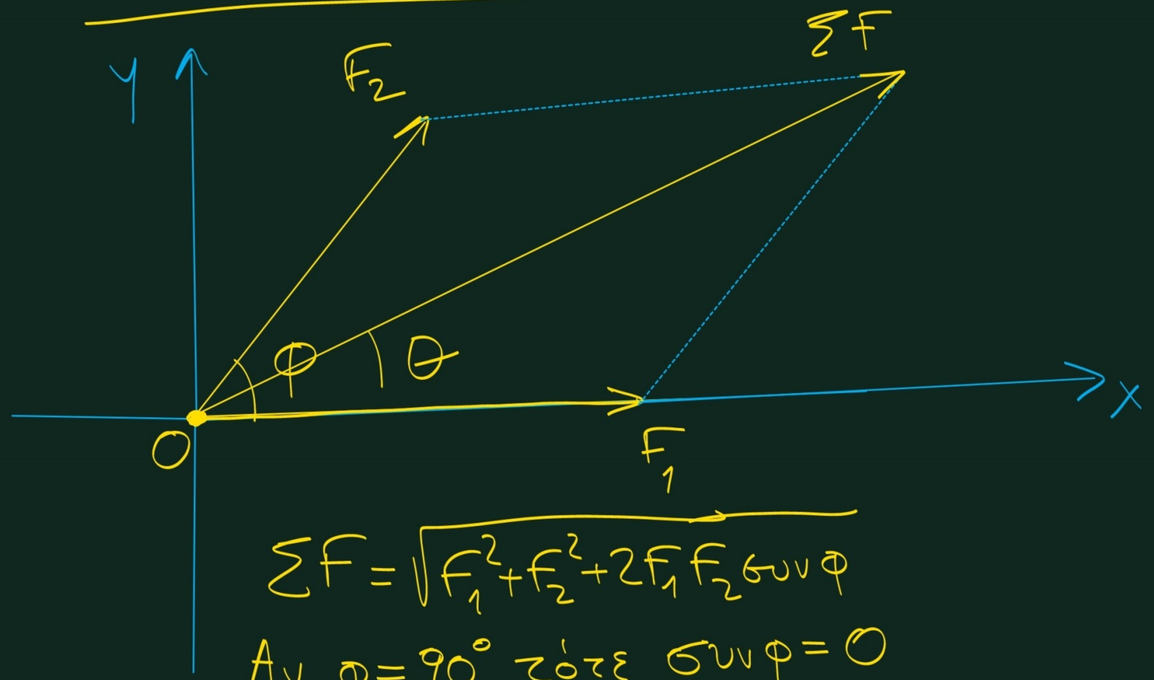
B) $$t_1 = \frac{v_o}{a} = \frac{20}{5} = 4 \text{ sec}$$

Γ)



# Σύνθεση δυνάμεων

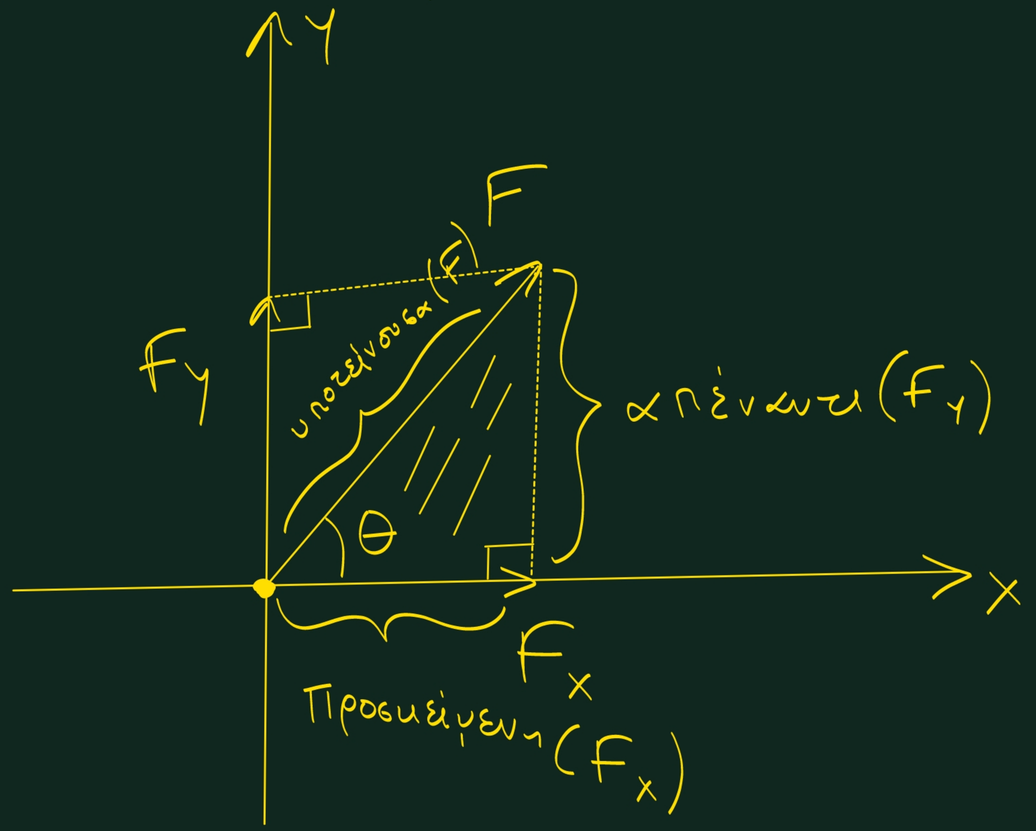



$$\Sigma F = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\sigma\upsilon\nu\varphi}$$

Αν $\varphi = 90^\circ$ τότε $\sigma\upsilon\nu\varphi = 0$

οπότε: $\Sigma F = \sqrt{F_1^2 + F_2^2}$

# Ανάλυση δύναμης σε συνιστώσες.

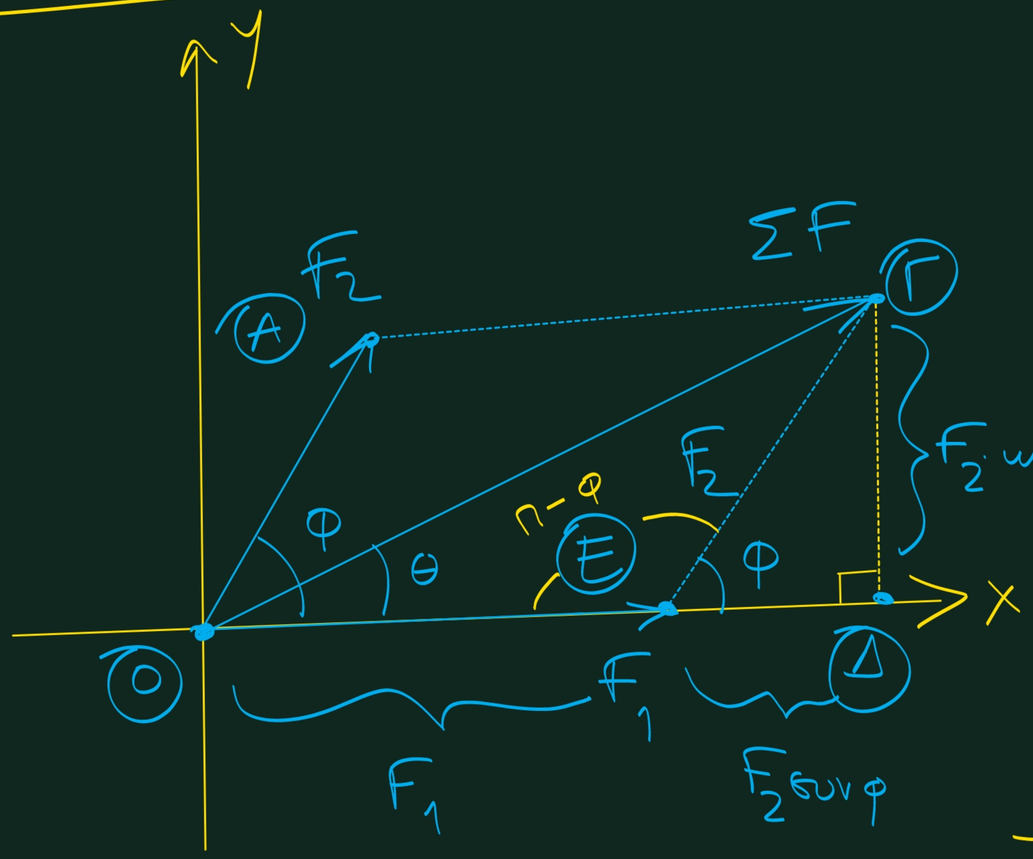



$$\eta\mu\theta = \frac{F_y}{F} \Rightarrow F_y = F \cdot \eta\mu\theta$$

$$\sigma\upsilon\nu\theta = \frac{F_x}{F} \Rightarrow F_x = F \cdot \sigma\upsilon\nu\theta$$

$$\varepsilon\varphi\theta = \frac{F_y}{F_x}$$

# Κανόνας παραλληλογράμμου.




$$\Sigma F = \sqrt{F_1^2 + F_2^2 + 2F_1F_2 \cdot \sigma\upsilon\nu\varphi}$$

από το νόμο συνημιτόνων στο $\overset{\Delta}{O\Gamma E}$.

Από το τρίγωνο $\overset{\Delta}{O\Gamma\Delta}$ έχουμε:

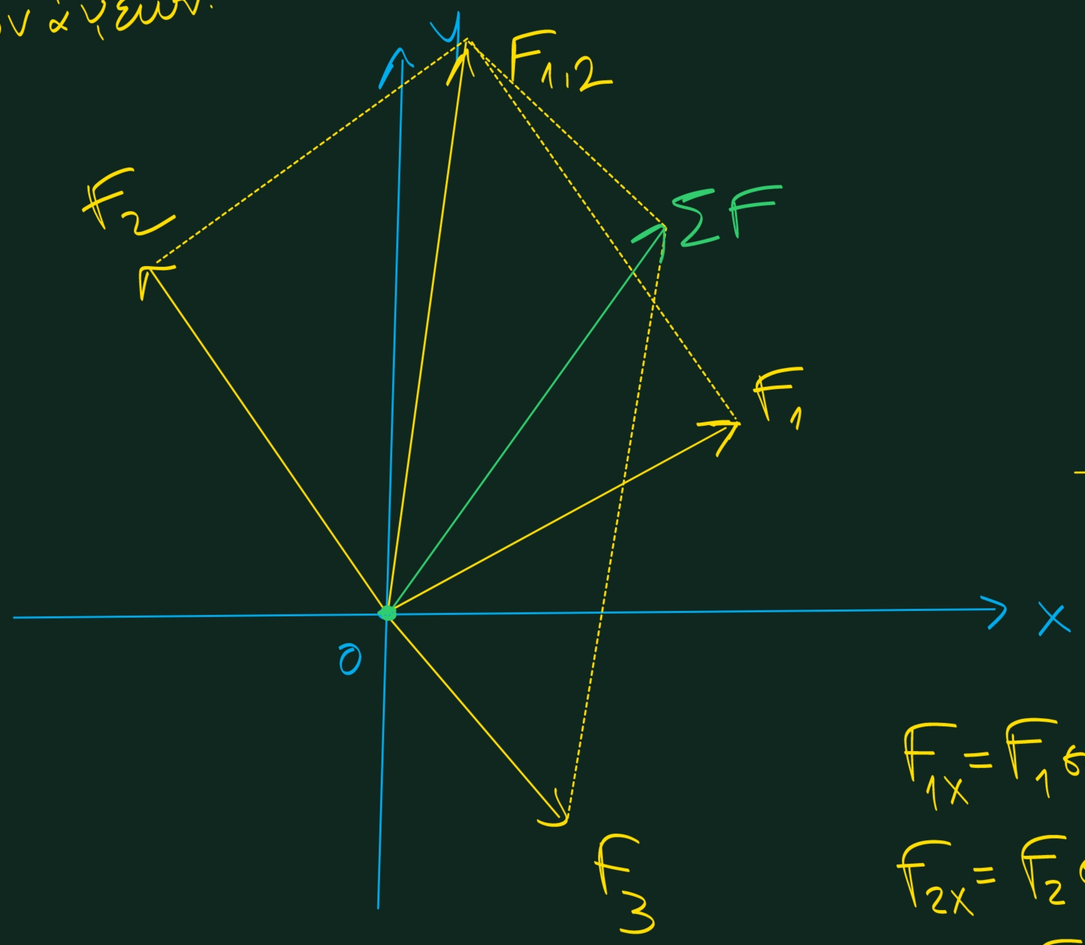
$$\varepsilon\varphi\theta = \frac{\Gamma\Delta}{O\Delta} = \frac{\Gamma\Delta}{OE+E\Delta} \Rightarrow$$

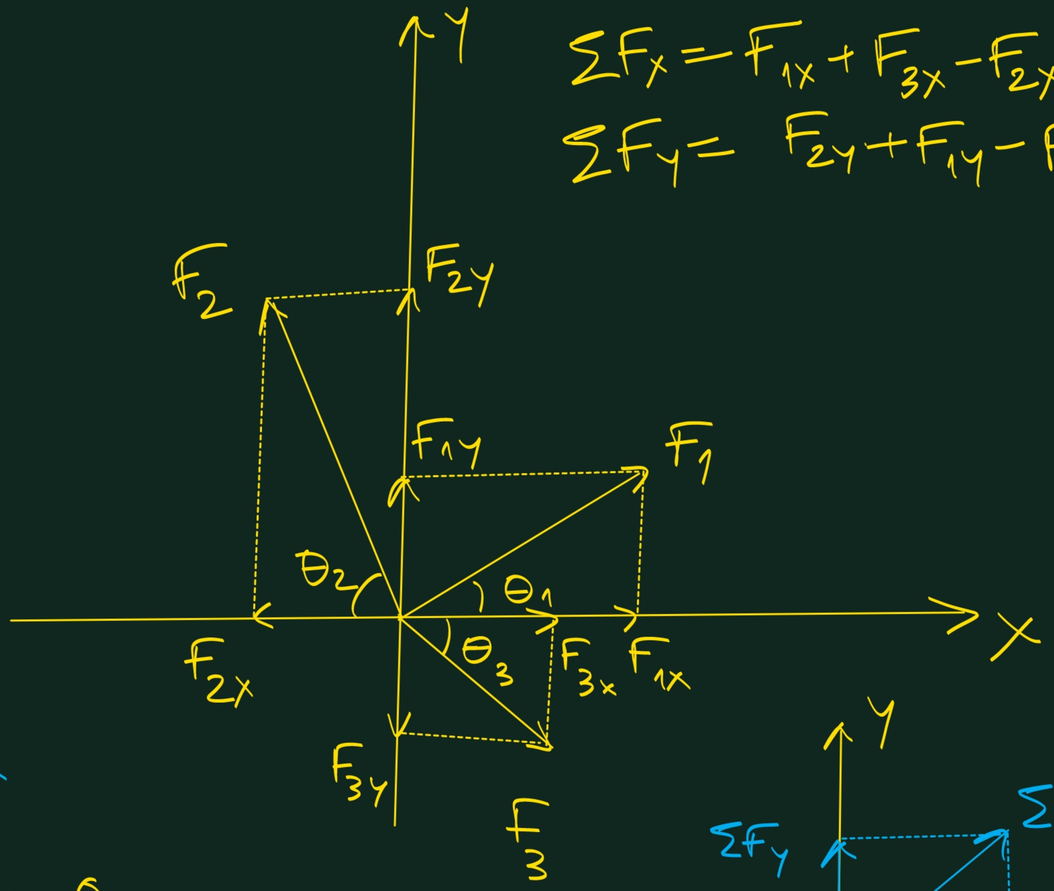
$$\varepsilon\varphi\theta = \frac{F_2 \cdot \eta\mu\varphi}{F_1 + F_2 \cdot \sigma\upsilon\nu\varphi}.$$

Από το νόμο των ημιτόνων στο $\overset{\Delta}{O\Gamma E}$ έχουμε:

$$\frac{O\Gamma}{\eta\mu(\pi-\varphi)} = \frac{\Gamma E}{\eta\mu\theta} \Rightarrow \frac{\Sigma F}{\eta\mu\varphi} = \frac{F_2}{\eta\mu\theta} \Rightarrow \eta\mu\theta = \frac{F_2}{\Sigma F} \cdot \eta\mu\varphi$$

# Σύνθεση πολλών ομοεπίπεδων δυνάμεων.




$$\Sigma F_x = F_{1x} + F_{3x} - F_{2x}$$

$$\Sigma F_y = F_{2y} + F_{1y} - F_{3y}$$

$$F_{1x} = F_1 \cdot \sigma\upsilon\nu\theta_1 \qquad F_{1y} = F_1 \cdot \eta\mu\theta_1$$

$$F_{2x} = F_2 \cdot \sigma\upsilon\nu\theta_2 \qquad F_{2y} = F_2 \cdot \eta\mu\theta_2$$

$$F_{3x} = F_3 \cdot \sigma\upsilon\nu\theta_3 \qquad F_{3y} = F_3 \cdot \eta\mu\theta_3$$