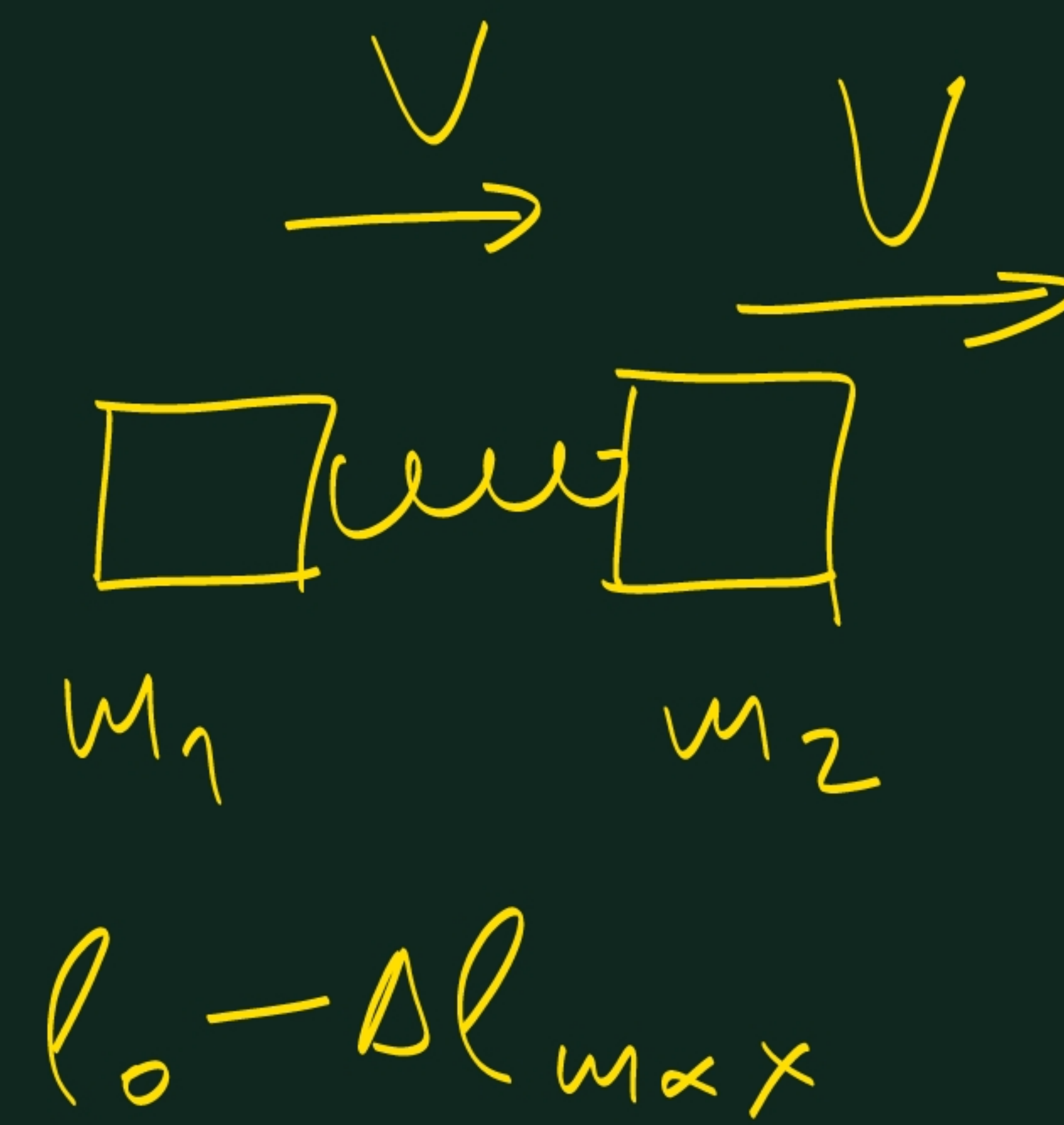
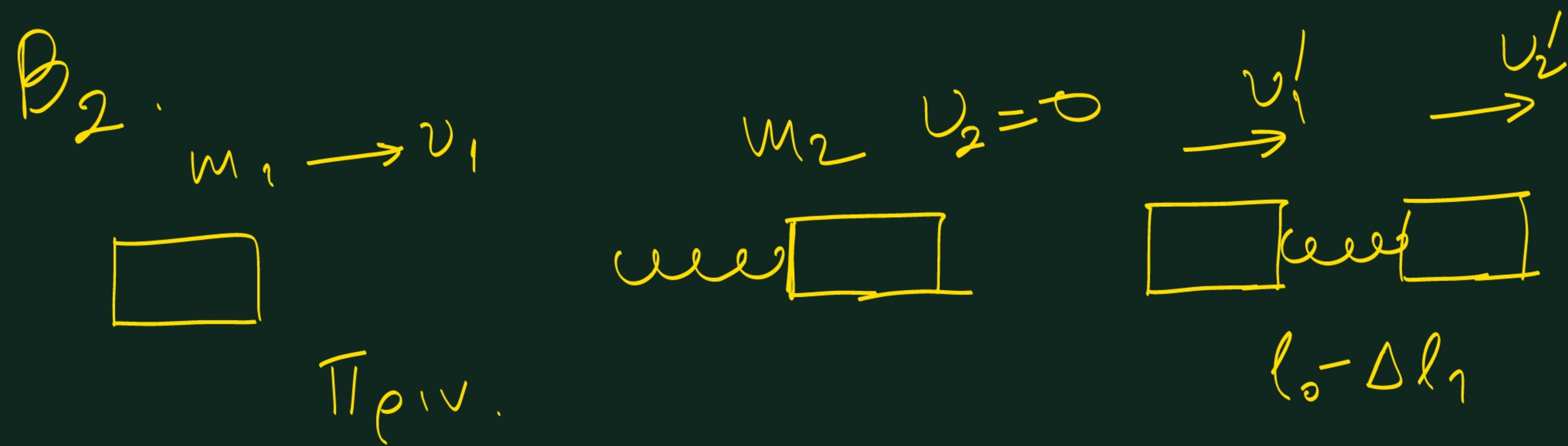




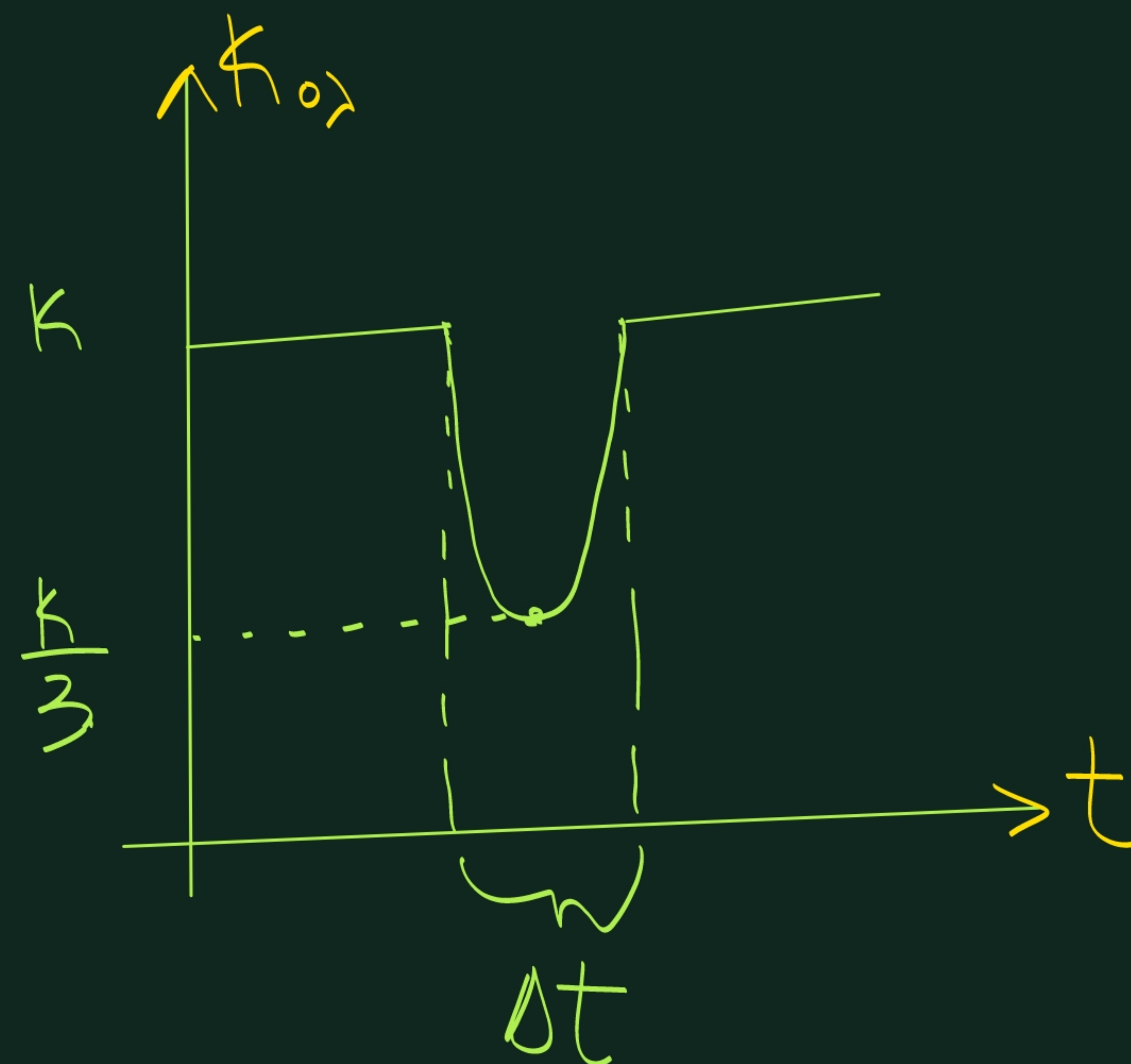
Στην ανελαστική υπόθεση:

$$\frac{1}{2} m_1 v_1^2 = \frac{1}{2} m_1 v_1'^2 + \frac{1}{2} m_2 v_2'^2 + \frac{1}{2} k \Delta l_1^2$$

ανελαστική υπόθεση

Στην ηηδαστική υπόθεση:

$$\frac{1}{2} m_1 v_1^2 = \frac{1}{2} (m_1 + m_2) V^2 + \frac{1}{2} k \Delta l_{max}^2$$



$$\frac{K}{3} = \frac{1}{2} (m_1 + m_2) V^2 \quad (\text{μινιμουμη συνιερεια συσσωματωματου})$$

$$K = \frac{1}{2} m_1 v_1^2$$

$$\text{και: } m_1 v_1 = (m_1 + m_2) V \quad (\text{διατηρηση ορμης})$$

$$\text{Αρα: } \frac{1}{3} \cdot \frac{1}{2} m_1 v_1^2 = \frac{1}{2} (m_1 + m_2) V^2 \Rightarrow \frac{1}{3} \frac{(m_1 v_1)^2}{m_1} = \frac{((m_1 + m_2) V)^2}{m_1 + m_2} \Rightarrow$$

$$3m_1 = m_1 + m_2 \Rightarrow 2m_1 = m_2 \Rightarrow$$

$$\boxed{\frac{m_1}{m_2} = \frac{1}{2}}$$

Σωστό το (δ)





A<sub>1</sub>. a

A<sub>2</sub>. b

A<sub>3</sub>. γ

A<sub>4</sub>. α

A<sub>5</sub>. a) Σ

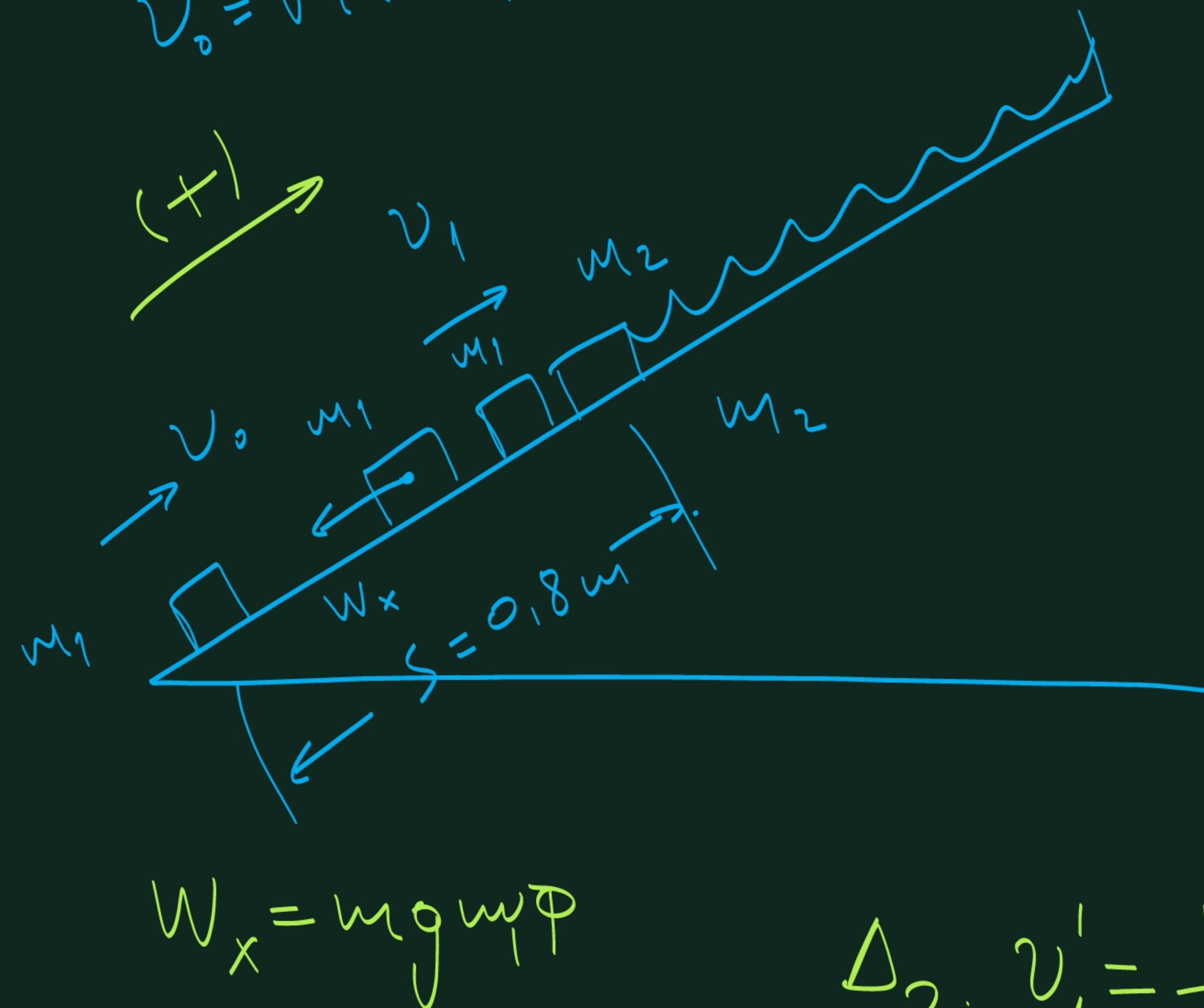
b) Σ

γ) Σ

δ) Λ

ε) Λ

ΘΕΜΑ Δ  
 $v_0 = \sqrt{17} \text{ m/s.}$



$$W_x = m g \mu \phi$$

Δ<sub>1</sub>. ΘΜΚΕ γιὰ τὸ  $m_1$ .

$$\frac{1}{2} m_1 v_1^2 - \frac{1}{2} m_1 v_0^2 = -m_1 g \mu \phi \cdot s \Rightarrow$$

$$v_1^2 - v_0^2 = -2 g s \mu \phi \Rightarrow$$

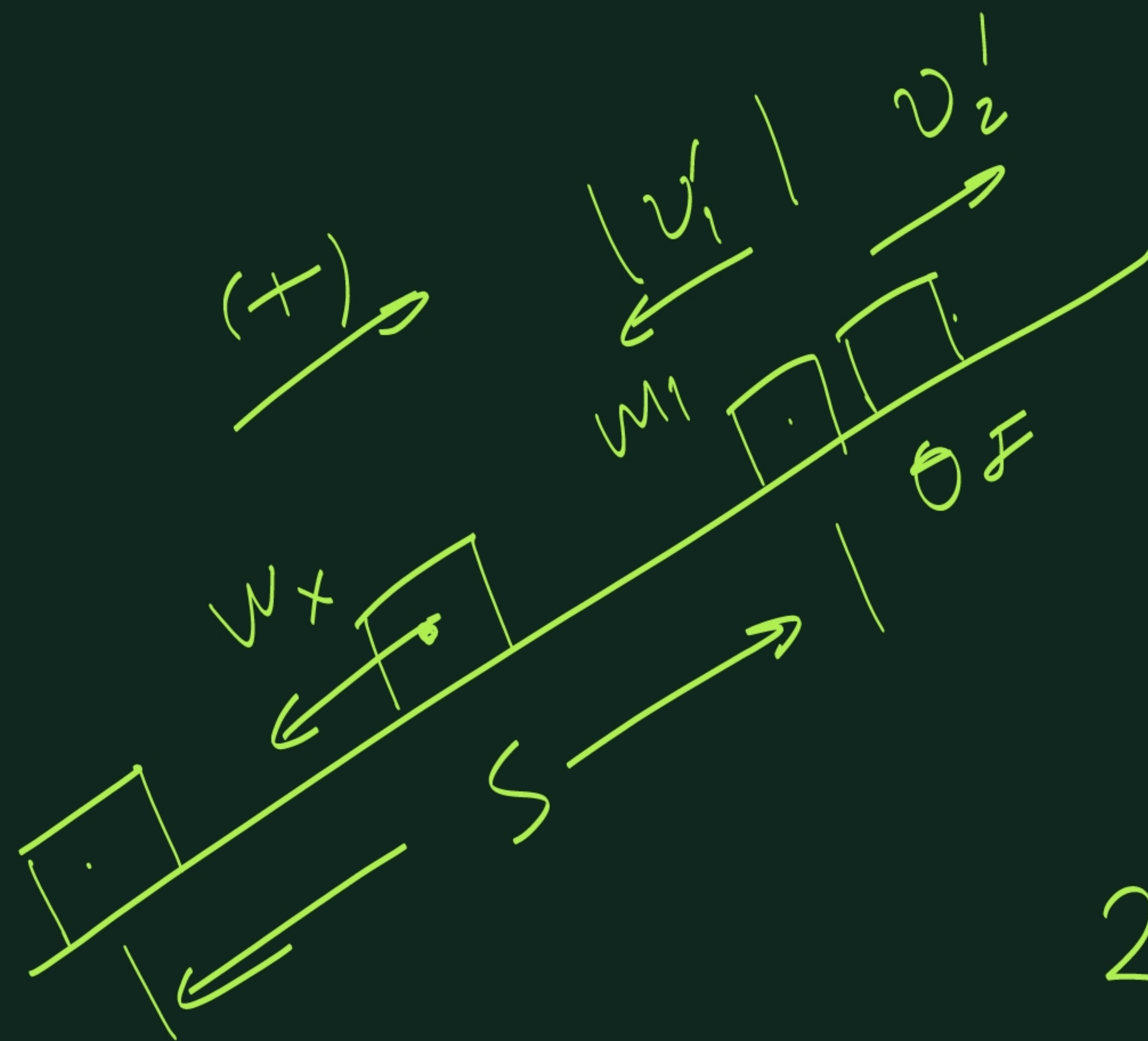
$$v_1^2 - 17 = -2 \cdot 10 \cdot 0.8 \cdot \frac{1}{2} \Rightarrow$$

$$v_1^2 - 17 = -8 \Rightarrow v_1^2 = 9 \Rightarrow v_1 = 3 \text{ m/s.}$$

$$v_2' = \frac{2m_1}{m_1 + m_2} v_1 = \frac{2 \cdot 1}{1 + 2} \cdot 3 \Rightarrow$$

$$v_2' = 2 \text{ m/s}$$

$$\Delta_2. v_1' = \frac{m_1 - m_2}{m_1 + m_2} v_1 = \frac{1 - 2}{1 + 2} \cdot 3 = -1 \text{ m/s}$$



$$ma = mg \sin \phi \Rightarrow$$

$$a = g \sin \phi$$

Δ3. Για  $t=0$  έχουμε:

$$x(0) = 0$$

$$v(0) = +v_{\max} \Rightarrow \phi_0 = 0$$

$$\text{Άρα: } x = A \sin(\omega t + \phi_0) \Rightarrow$$

$$x = \frac{0,32}{n} \sin\left(\frac{25n}{4} t\right) \text{ (SI)}$$

$$S = |v'_1| t + \frac{1}{2} a t^2 \Rightarrow$$

$$0,8 = t + \frac{1}{2} \cdot 10 \cdot \frac{1}{2} t^2 \Rightarrow$$

$$2,5 t^2 + t - 0,8 = 0$$

$$\Delta = 1 - 4 \cdot 2,5 \cdot (-0,8) = 1 + 8 = 9$$

$$t = \frac{-1 \pm 3}{5} \Rightarrow t = \frac{2}{5} \text{ sec}$$

$$\text{Άρα: } t = \frac{5T}{4} \Rightarrow$$

$$\frac{2}{5} = \frac{5T}{4} \Rightarrow T = \frac{8}{25} \text{ sec}$$

$$\omega = \frac{2\pi}{T} = \frac{2\pi}{\frac{8}{25}} = \frac{50\pi}{8} \Rightarrow$$

$$\omega = \frac{25\pi}{4} \text{ rad/sec}$$

Έχουμε θI άρα:

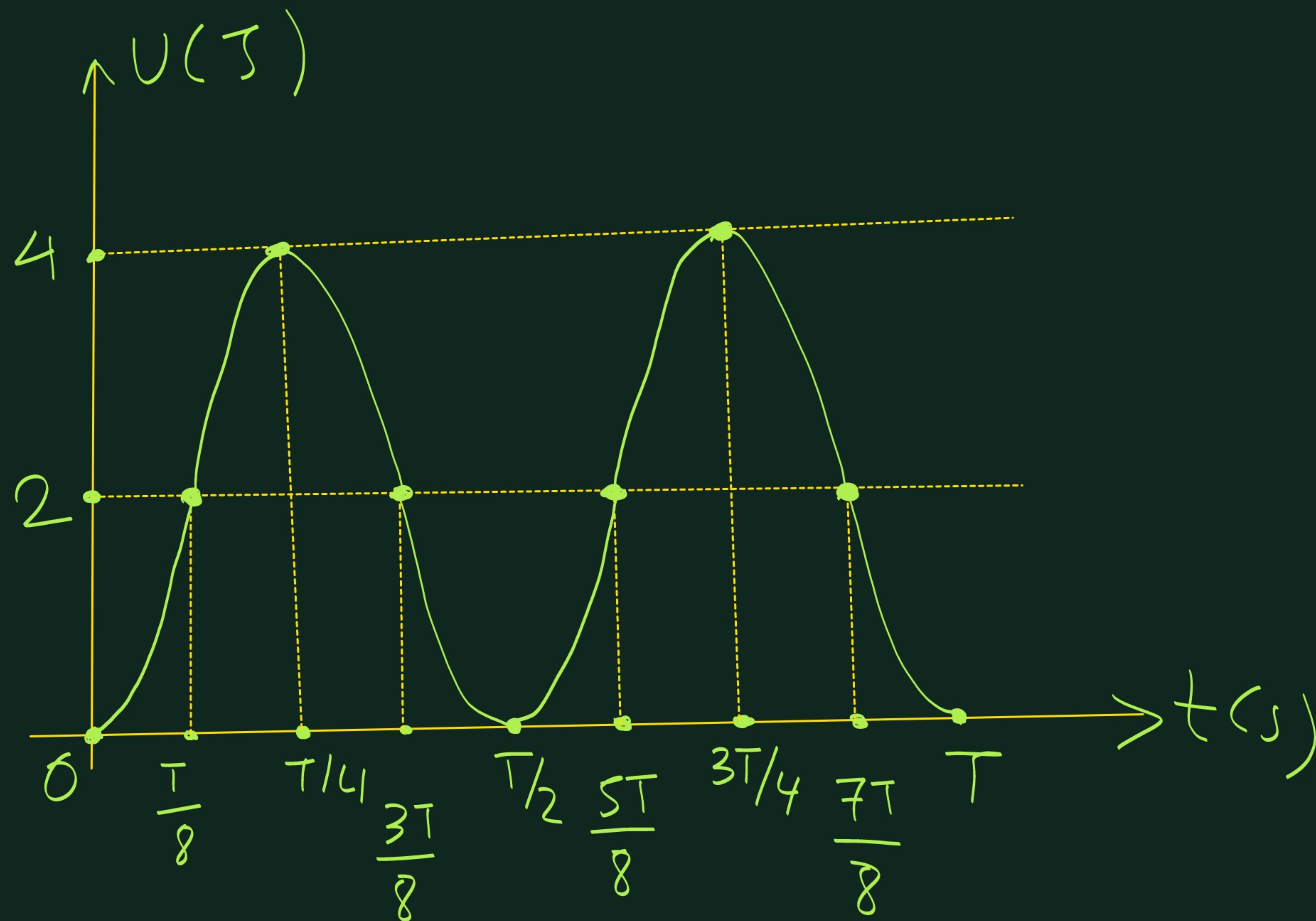
$$v'_2 = v_{\max} = \omega A \Rightarrow 2 = \frac{25\pi}{4} A \Rightarrow$$

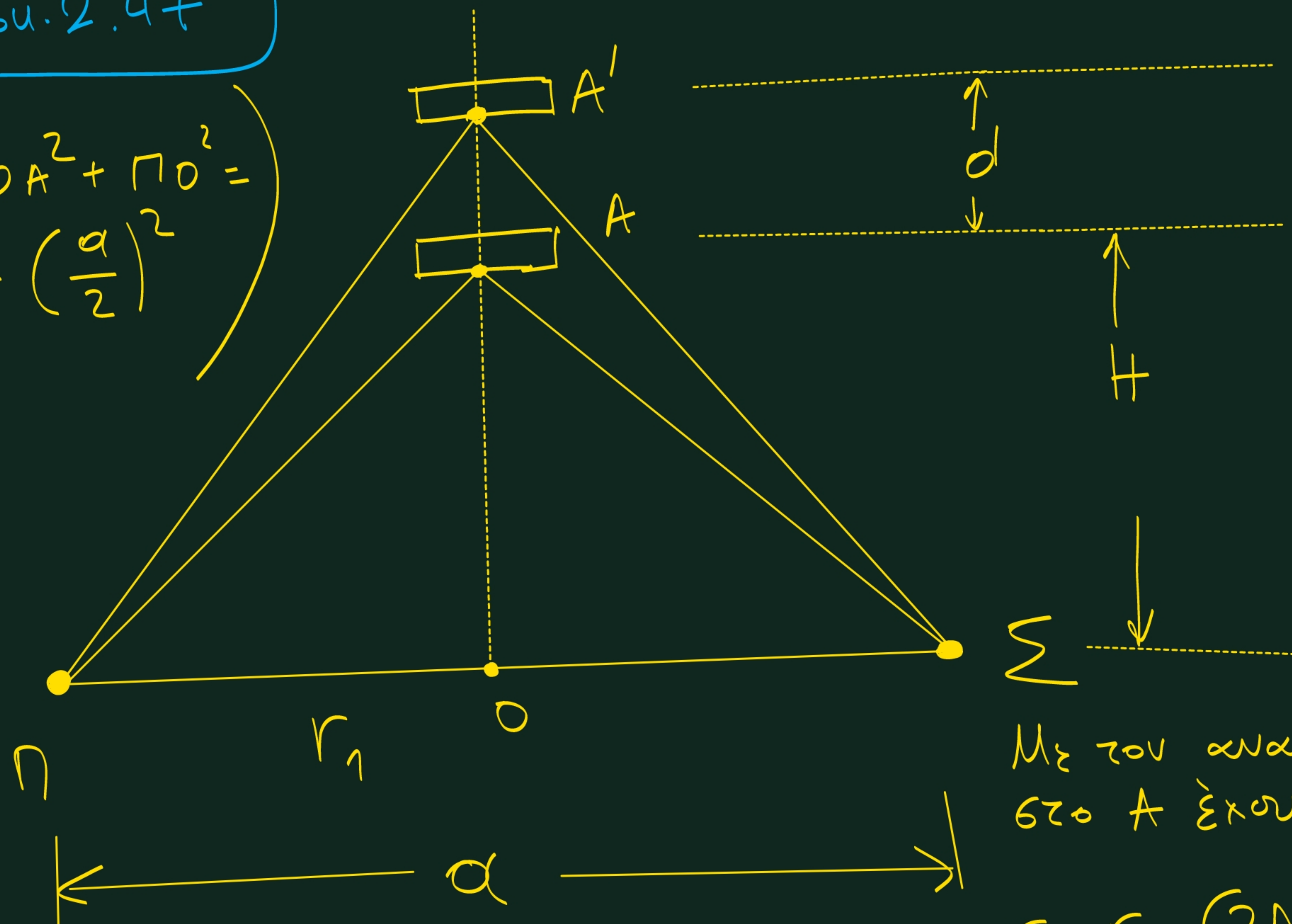
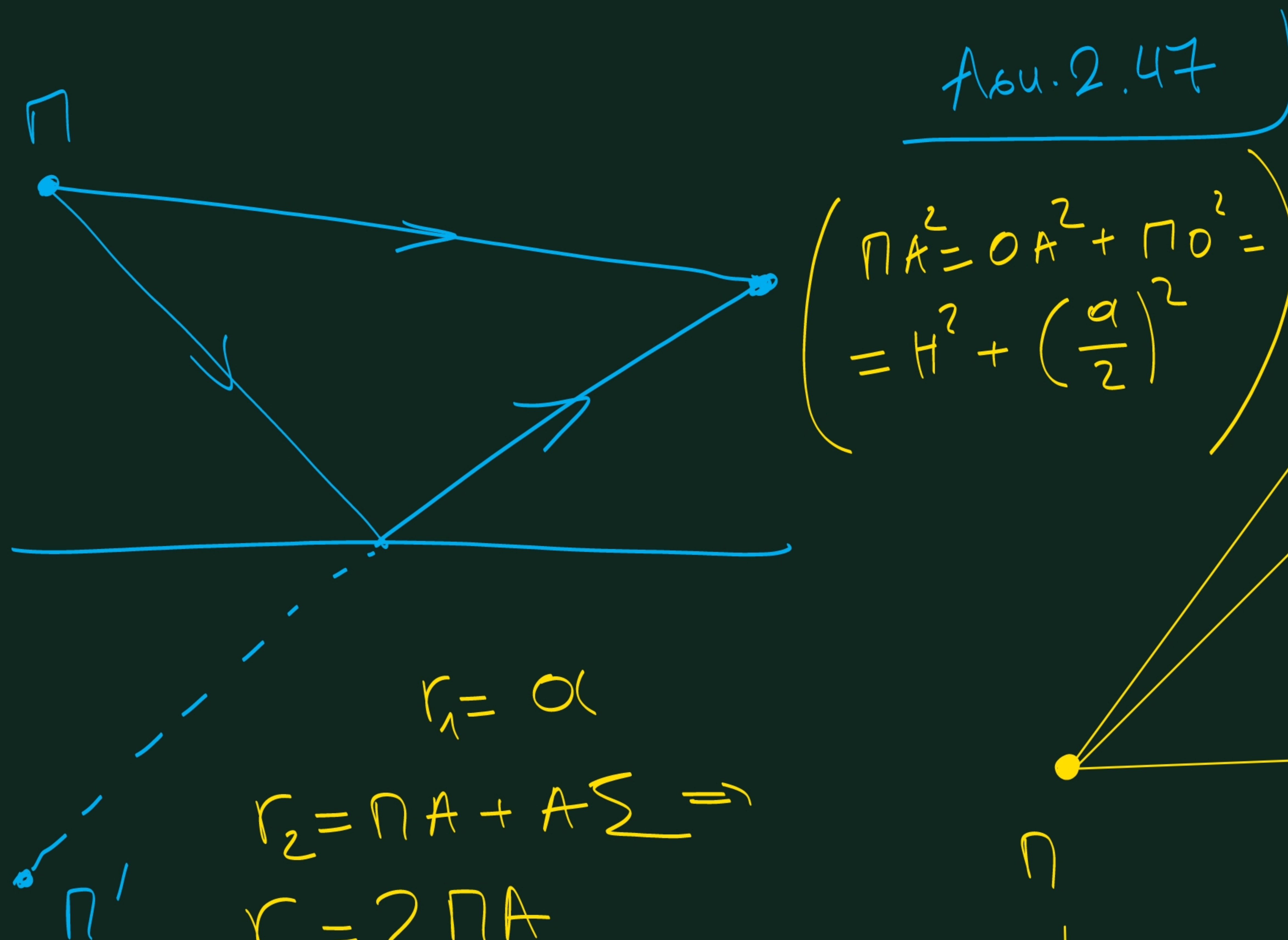
$$A = \frac{8}{25\pi} = \frac{32}{100\pi} = \frac{0,32}{\pi} \text{ m}$$

$$\Delta_4: U = \frac{1}{2} K x^2 = \frac{1}{2} K A^2 \omega_1^2 \omega t = \frac{1}{2} M_2 U_{\max}^2 \omega_1^2 \omega t =$$

$$= \frac{1}{2} \cdot 2 \cdot 2^2 \cdot \omega_1^2 \left( \frac{25\pi}{4} t \right) =$$

$$\boxed{U(t) = 4 \omega_1^2 \left( \frac{25\pi}{4} t \right)} \text{ (SI)}$$





Με τον αναλλασσόμενο στο  $A$  έχουμε απόθεση

$$r_2 - r_1 = (2N+1) \frac{\lambda}{2}$$

$$\Pi A = \sqrt{H^2 + \left(\frac{\alpha}{2}\right)^2} \quad \Pi A' = \sqrt{(H+d)^2 + \left(\frac{\alpha}{2}\right)^2}$$

Με τον ανωλ δεσφρα στο Α' έχουμε  
την επόμεν επόμεν ενίσχυση.

$$r_2' - r_1 = (2N + 2) \frac{\lambda}{2}$$

$$\text{Αρα: } (r_2' - r_1) - (r_2 - r_1) = (2N + 2) \frac{\lambda}{2} - (2N + 1) \frac{\lambda}{2} \Rightarrow$$

$$r_2' - r_2 = \lambda - \frac{\lambda}{2} \Rightarrow r_2' - r_2 = \frac{\lambda}{2} \Rightarrow 2nA' - 2nA = \frac{\lambda}{2} \Rightarrow$$

$$2 \sqrt{(H + d)^2 + \left(\frac{a}{2}\right)^2} - 2 \sqrt{H^2 + \left(\frac{a}{2}\right)^2} = \frac{\lambda}{2} \Rightarrow$$

$$\sqrt{4(H + d)^2 + a^2} - \sqrt{4H^2 + a^2} = \frac{\lambda}{2} \Rightarrow \lambda = 2 \left( \sqrt{4(H + d)^2 + a^2} - \sqrt{4H^2 + a^2} \right)$$