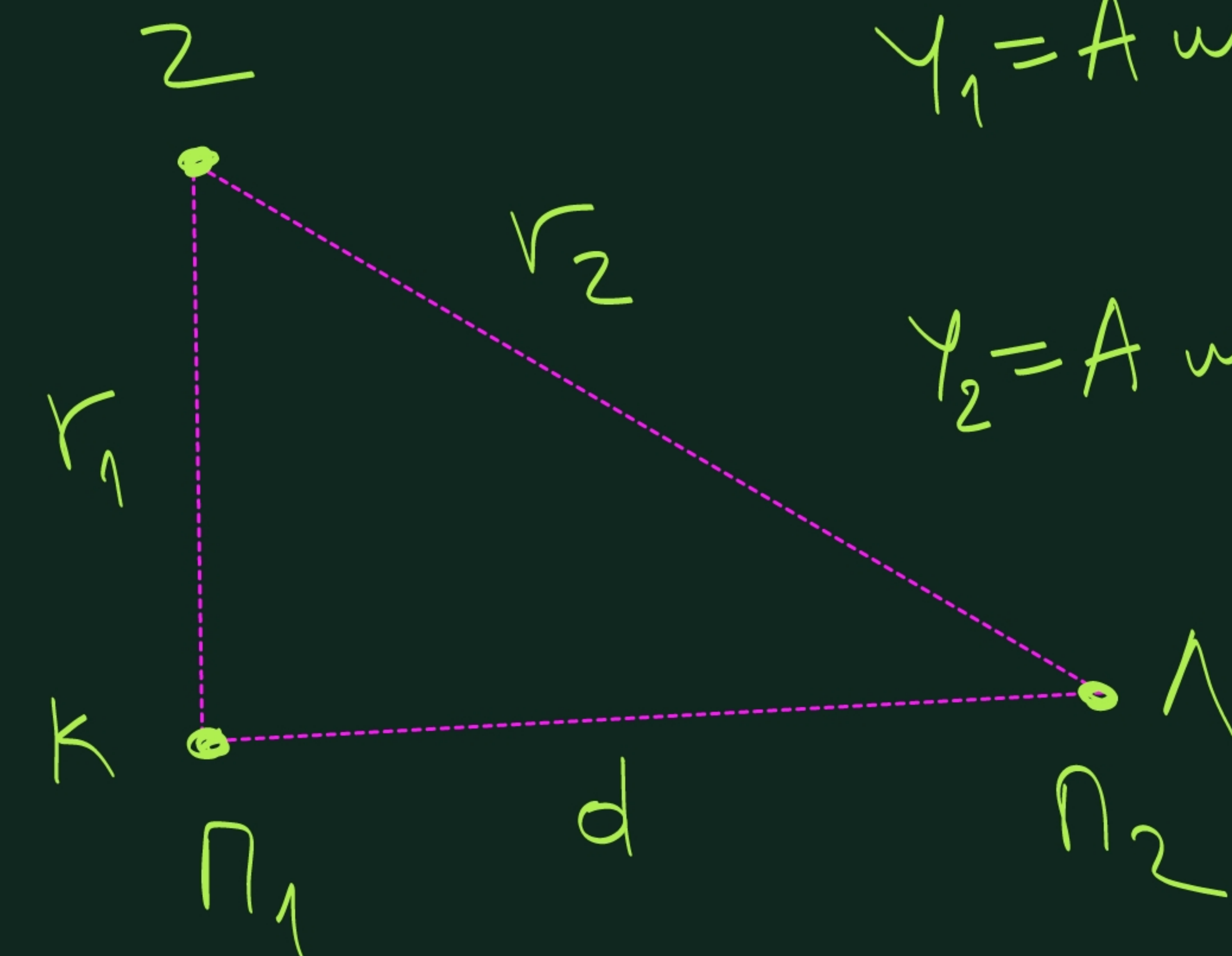


Ασκ. 10.83

$$r_1 = 1,2 \text{ m}$$

$$t_1 = 1,5 \text{ sec}$$

$$4\pi \text{ rad.}$$



α) Η ταχύτητα διάδοσης είναι:

$$v = \frac{r_1}{t_1} = \frac{1,2}{1,5} = \frac{2,4}{3} = 0,8 \text{ m/s.}$$

Οι ταλαντώσεις των σημείων περιγράφονται από τις:

$$y_1 = A \sin\left(\omega t - \frac{2\pi r_1}{\lambda}\right)$$

$$y_2 = A \sin\left(\omega t - \frac{2\pi r_2}{\lambda}\right)$$

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

$$\text{β) } A, \quad 0 \leq t \leq t_1$$

$$A, \quad t_1 < t \leq t_2$$

$$\omega t - \frac{2\pi r_1}{\lambda} - \left(\omega t - \frac{2\pi r_2}{\lambda}\right) = 4\pi \Rightarrow$$

$$\frac{2\pi(r_2 - r_1)}{\lambda} = 4\pi \Rightarrow r_2 - r_1 = 2\lambda.$$

$$\omega = 2\pi f = 4\pi \Rightarrow f = 2 \text{ Hz}$$

$$v = \lambda f \Rightarrow 0,8 = \lambda \cdot 2 \Rightarrow \lambda = 0,4 \text{ m.}$$

$$\text{Άρα: } r_2 - 1,2 = 0,8 \Rightarrow \boxed{r_2 = 2 \text{ m}}$$

$$t_2 = \frac{r_2}{v} = \frac{2}{0,8} \Rightarrow \boxed{t_2 = 2,5 \text{ sec}}$$

$$a_2 = 0$$

Στο Z έχει φτάσει μόνο το κύμα από την Π₁.

$$Y_2 = A \cos\left(\omega t - \frac{2\pi r_1}{\lambda}\right) \Rightarrow$$

$$v_2 = \omega A \cos\left(\omega t - \frac{2\pi r_1}{\lambda}\right) \Rightarrow$$

$$a_2 = -\omega^2 A \cos\left(\omega t - \frac{2\pi r_1}{\lambda}\right) \Rightarrow$$

$$a_2 = -(4\pi)^2 \cdot 0,4 \cos\left(4\pi t - \frac{2\pi \cdot 1,2}{0,4}\right) \Rightarrow$$

$$a_2 = -16\pi^2 \cdot 0,4 \cos(4\pi t - 6\pi) \Rightarrow$$

$$a_2 = -64 \cos(4\pi t - 6\pi)$$

$$A \vee t \geq t_2 = 2,3 \text{ sec } \text{poz:}$$

$$Y_2 = 2A \cos \frac{\pi |r_1 - r_2|}{\lambda} \cos\left(\omega t - \frac{\pi(r_1 + r_2)}{\lambda}\right) \Rightarrow$$

$$Y_2 = 0,8 \cos \frac{\pi(1,2 - 2)}{0,4} \cos\left(4\pi t - \pi \cdot \frac{1,2 + 2}{0,4}\right) \Rightarrow$$

$$Y_2 = 0,8 \cos 2\pi \cdot \cos(4\pi t - 8\pi) \Rightarrow$$

$$Y_2 = 0,8 \cos(4\pi t - 8\pi) \Rightarrow$$

$$v_2 = 0,8 \cdot 4\pi \cdot \sin(4\pi t - 8\pi) \Rightarrow$$

$$a_2 = -0,8 \cdot (4\pi)^2 \cdot \cos(4\pi t - 8\pi) \Rightarrow$$

$$a_2 = -0,8 \cdot 16\pi^2 \cdot \cos(4\pi t - 8\pi) \Rightarrow$$

$$a_2 = -128 \cos(4\pi t - 8\pi) \quad (\text{SI})$$

