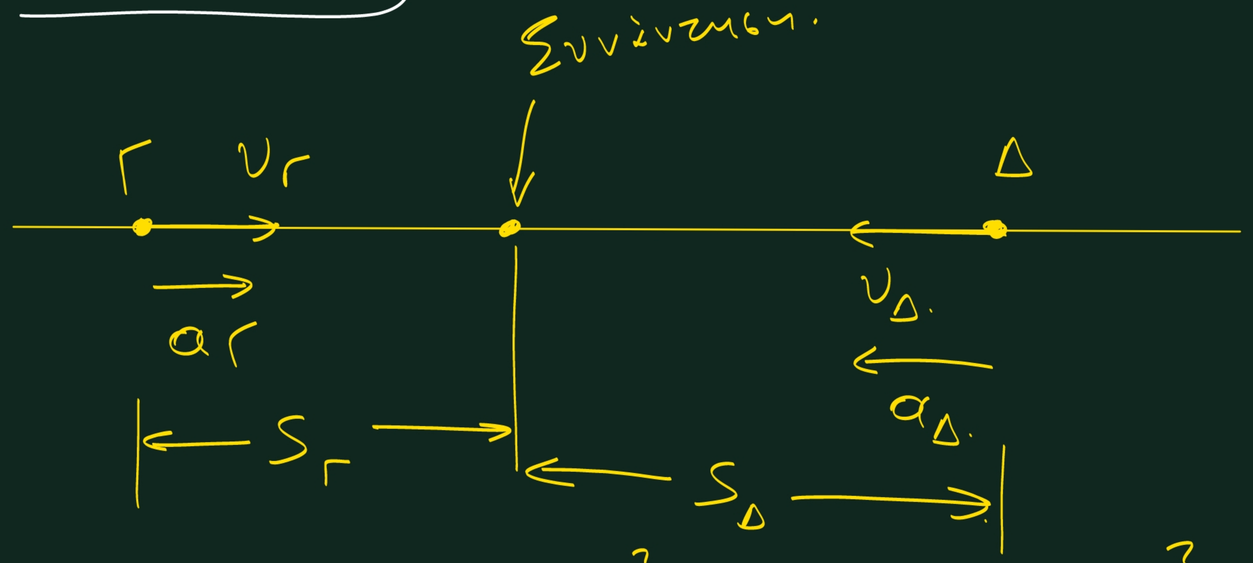
Ασκ. 6.53



$$S_Γ = v_{0Γ} \cdot t + \frac{1}{2} a_Γ t^2 = 5 \cdot 10 + \frac{1}{2} \cdot 4 \cdot 10^2 = 50 + 200 = 250\,m$$

$$S_Δ = v_{0Δ} \cdot t + \frac{1}{2} a_Δ \cdot t^2 = 8 \cdot 10 + \frac{1}{2} \cdot 2 \cdot 10^2 = 80 + 100 = 180\,m$$

Άρα: $ΓΔ = S_Γ + S_Δ = 430\,m$

Ασκ. 6.45.

$x_0 = x(0) = 0\ m$

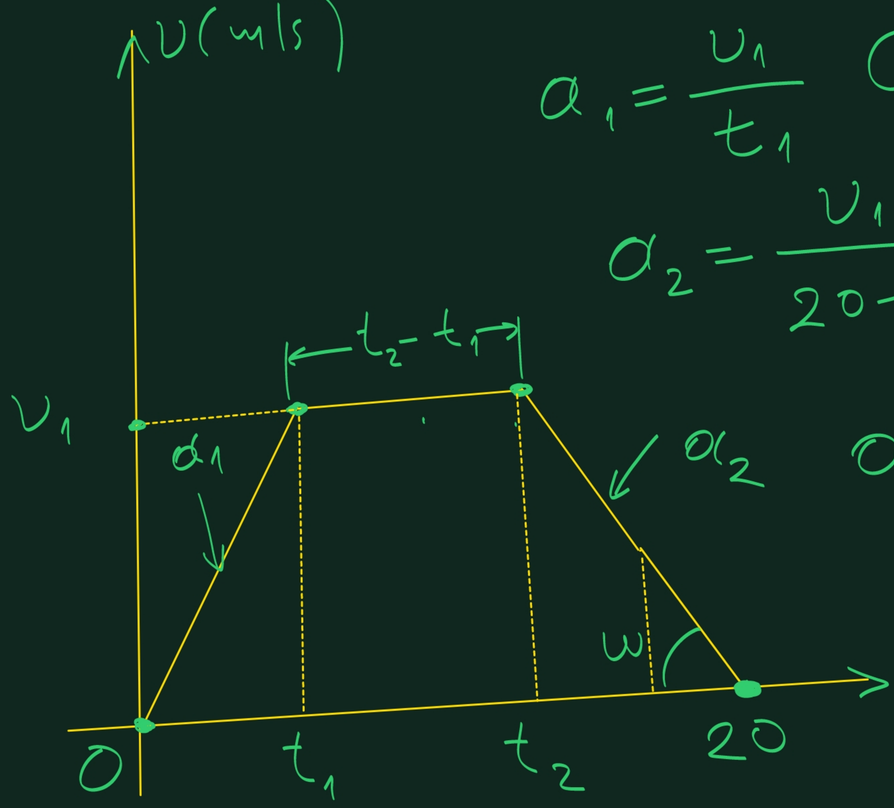
$v_0 = v(0) = 0\ m/s$

$a_1 = \frac{3}{4}\ m/s^2$ (επιβράδυνση)

$a_3 = \frac{3}{4}\ m/s^2$ (επιβράδυνση)

$t = 20\ sec$ (ολικός χρόνος)

$x = 75\ m = x(20)$ (τελική θέση)



$a_1 = \frac{v_1}{t_1}$ (επιταχύνει)

$a_2 = \frac{v_1}{20 - t_2} = \varepsilon\varphi\omega$ (επιβραδύνει)

$a_1 = a_2$ Άρα:

$\frac{v_1}{t_1} = \frac{v_1}{20 - t_2} \Rightarrow$

$20 - t_2 = t_1 \Rightarrow$

$t_1 + t_2 = 20\ sec$

$\Delta x_{ολ} = x(20) = \frac{t_2 - t_1 + 20}{2} \cdot v_1 \Rightarrow$

$75 = \frac{t_2 - t_1 + 20}{2} \cdot a_1 t_1 \Rightarrow 75 = \frac{20 - t_1 - t_1 + 20}{2} \cdot \frac{3}{4} \cdot t_1 \Rightarrow 150 = \frac{3}{4}(40 - 2t_1) \cdot t_1$

$\Rightarrow 200 = 40t_1 - 2t_1^2$

$$200 = 40t_1 - 2t_1^2 \Rightarrow$$

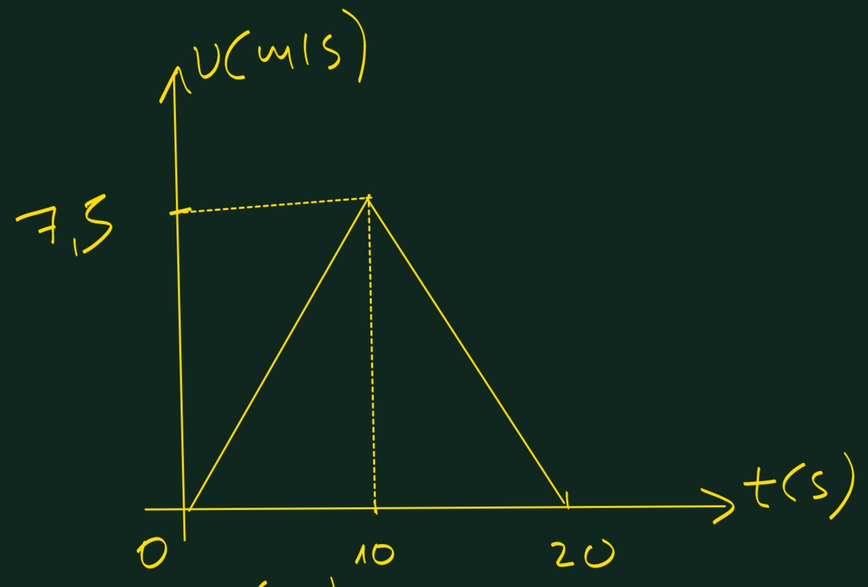
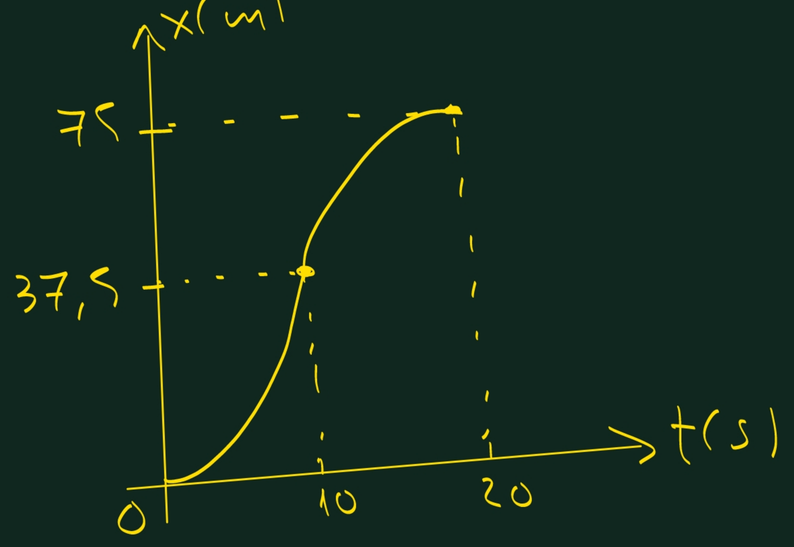
$$t_1^2 - 20t_1 + 100 = 0$$

$$\Delta = 400 - 400 = 0 \Rightarrow$$

$$(t_1 - 10)^2 = 0 \Rightarrow t_1 = 10\,sec$$

Άρα: $t_1 = t_2 = 10\,sec$

και $t_2 - t_1 = 0\,sec$

(το ζητούμενο διάστημα)

$$U_1 = a_1 t_1 = \frac{3}{4} \cdot 10 = 7,5\,m/s^2$$