Ασκ. 2.54) (Στάσιμο κύμα).

$y = 8\,\text{συν}\frac{\pi x}{2} \cdot \eta\mu 10\pi t \quad (y, x \text{ σε } cm)$

$y_1 = A\,\eta\mu\left(\omega t - \frac{2\pi x}{\lambda}\right)$

$y_2 = A\,\eta\mu\left(\omega t + \frac{2\pi x}{\lambda}\right)$

$\eta\mu\alpha + \eta\mu\beta = 2\eta\mu\frac{\alpha+\beta}{2} \cdot \text{συν}\frac{\alpha-\beta}{2}$

$y_1 + y_2 = 2A\eta\mu\frac{2\omega t}{2} \cdot \text{συν}\frac{-\frac{2\pi x}{\lambda} - \frac{2\pi x}{\lambda}}{2} = 2A\eta\mu\omega t \cdot \text{συν}\left(-\frac{2\pi x}{\lambda}\right) = 2A\,\text{συν}\frac{2\pi x}{\lambda} \cdot \eta\mu\omega t$

$\text{συν}x = \text{συν}(-x) = \text{συν}|x|$

Α. $\frac{2\pi x}{\lambda} = \frac{\pi x}{2} \Rightarrow \lambda = 4cm = 0{,}04\,m.$

$\omega = 10\pi\ rad/s \Rightarrow 2\pi f = 10\pi \Rightarrow f = 5\,Hz$

$\upsilon = \lambda \cdot f = 0{,}04 \cdot 5 = 0{,}2\,m/s.$

Β. $y_M = 8 \cdot 10^{-2} \cdot \text{συν}\left(\frac{\pi \cdot 10^2 x_M}{2}\right) \eta\mu 10\pi t \quad (y, x \text{ σε } m)$

$y_M = 8 \cdot 10^{-2}\,\text{συν}(50\pi x_M)\,\eta\mu(10\pi t)$