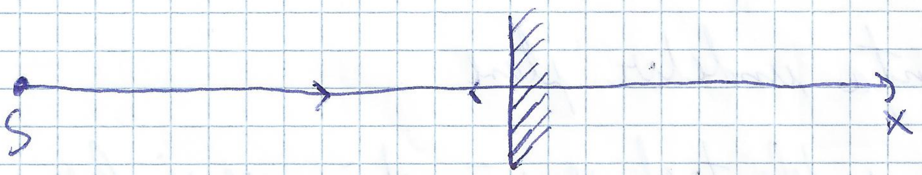
15. Prezentați subiectul: Unde staționare

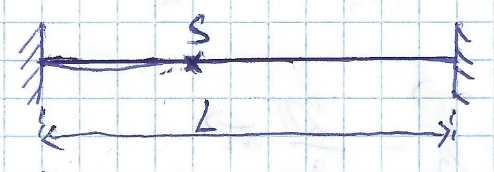


$$\xi_+(x,t) = A\cos(\omega t - kx)$$

$$\xi_-(x,t) = A\cos(\omega t + kx)$$

$$\xi_\theta(x,t) = \xi_+(x,t) + \xi_-(x,t) = 2A\cos\left(\omega t + \frac{\alpha}{2}\right)\cos\left(kx + \frac{\alpha}{2}\right)$$

a)



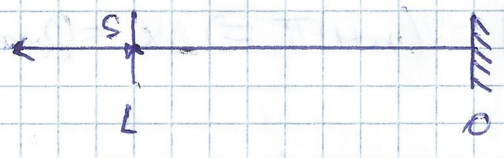
$$\begin{cases} \xi(0,t) = 0 \\ \xi(L,t) = 0 \end{cases} \Rightarrow$$

$$\Rightarrow \begin{cases} \frac{\alpha}{2} = (2m+1)\frac{\pi}{2} \\ k \cdot L + \frac{\alpha}{2} = (2m+1)\frac{\pi}{2} \end{cases}$$

$$k \cdot L = 2p\frac{\pi}{2} = p\pi \qquad p \in \mathbb{N}$$

$$\frac{2\pi}{\lambda} \cdot L = p\pi \Rightarrow L = p\frac{\lambda}{2}$$

b)



$$\xi(0,t) = 0 \qquad \xi(L,t) = max$$

$$\begin{cases} \frac{\alpha}{2} = (2m+1)\frac{\pi}{2} \\ k \cdot L + \frac{\alpha}{2} = 2m\frac{\pi}{2} = m\pi \end{cases}$$

$$kL = (2p+1)\frac{\pi}{2} \Rightarrow \frac{2\pi}{\lambda}L = (2p+1)\frac{\pi}{2} \Rightarrow$$

$$\Rightarrow L = \frac{(2p+1)\lambda}{4}$$