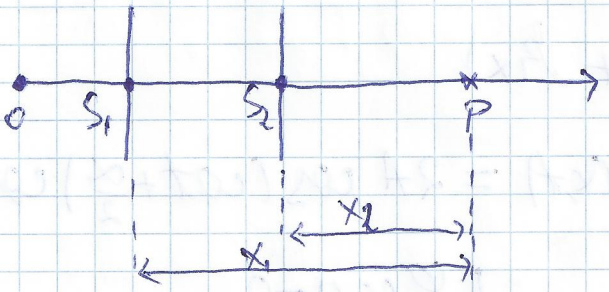
14. Prezentați subiectul: Interferența undelor

a) Interferența undelor plane.

Condiții: 1) undele trebuie să aibă aceeași frecvență
2) undele trebuie să fie coerente

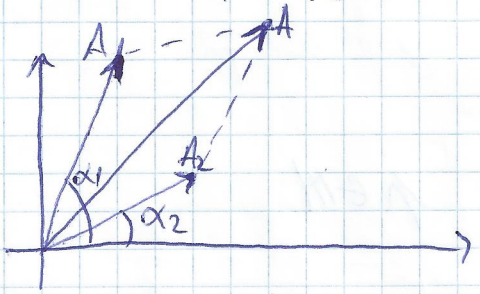


$$\xi_1(x,t) = A_1 \cos(\omega t - kx_1)$$

$$\xi_2(x,t) = A_2 \cos(\omega t - kx_2)$$

$$\xi(x,t) = \xi_1 + \xi_2$$

$$\vec{k} = \frac{2\pi}{\lambda}\vec{n}$$

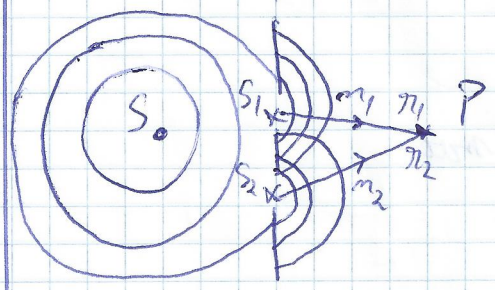


$$A = \sqrt{A_1^2 + A_2^2 + 2A_1A_2\cos k(x_2 - x_1)} =$$

$$= \sqrt{A_1^2 + A_2^2 + 2A_1A_2\cos\frac{2\pi}{\lambda}\Delta x}$$

A → maxim $\Leftrightarrow \frac{2\pi}{\lambda}\Delta x = 2\pi n \Rightarrow \Delta x = 2n\frac{\lambda}{2}$

A → minim $\Leftrightarrow k(x_2 - x_1) = 2(n+1)\pi \Rightarrow \Delta x = (2n+1)\frac{\lambda}{2}$



$$\xi_1(\vec{r}_1, t) = \frac{A}{r_1}\cos(\omega t - kr_1)$$

$$A_1(r_1) = \frac{A}{r_1}$$

$$\xi_2(\vec{r}_2, t) = \frac{A}{r_2}\cos(\omega t - kr_2)$$

$$A_2(r_2) = \frac{A}{r_2}$$

$$k\Delta r = \begin{cases} \text{max}: \Delta r = 2n\frac{\lambda}{2} \\ \text{minim}: \Delta r = (2n+1)\frac{\lambda}{2} \end{cases}$$