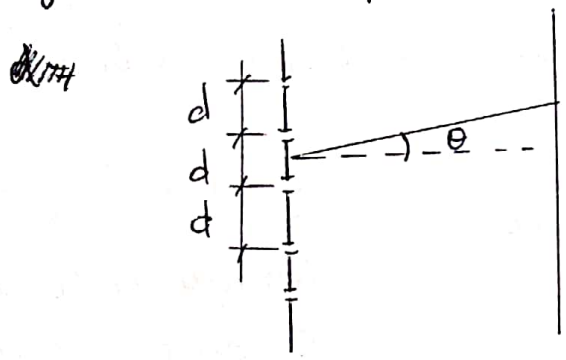
Problema nº 4

Rejilla de difracción $d \operatorname{sen}\theta = m\lambda$ MAX.



$\lambda_1 = 410{,}1$ nm

$\lambda_2 = 434$ nm

$\lambda_3 = 486{,}1$ nm

$\lambda_4 = 656{,}3$ nm

410 $\frac{\text{líneas}}{\text{mm}}$

$$d = \frac{1}{410} = 2{,}44 \times 10^{-3}\ \text{mm} = 2{,}44 \times 10^{-6}\ (m)$$

a) $\Delta\theta = ?$ entre λ_1 y λ_4 en el espectro de orden 1

$$\operatorname{sen}\theta = \frac{m\lambda}{d} \quad \text{con } m = 1$$

$$\operatorname{sen}\theta = \frac{\lambda}{d}$$

$$\operatorname{sen}\theta_1 = \frac{\lambda_1}{d} = \frac{410{,}1 \times 10^{-9}}{2{,}44 \times 10^{-6}} = 0{,}168$$

$$\operatorname{sen}\theta_4 = \frac{\lambda_4}{d} = \frac{656{,}3 \times 10^{-9}}{2{,}44 \times 10^{-6}} = 0{,}269$$

$\theta_1 = \operatorname{sen}^{-1}(0{,}168) = 9{,}67°$

$\theta_2 = \operatorname{sen}^{-1}(0{,}269) = 15{,}6°$

$\Delta\theta = 5{,}93°$

b) $\Delta\theta = ?$ entre λ_1 y λ_3 en el espectro de orden 3

$$\operatorname{sen}\theta = \frac{m\lambda}{d} \quad \text{con } m = 3 \rightarrow \operatorname{sen}\theta = \frac{3\lambda}{d}$$

$$\operatorname{sen}\theta_1 = \frac{3\lambda_1}{d} = \frac{3 \times 410{,}1 \times 10^{-9}}{2{,}44 \times 10^{-6}} = 0{,}5042 \rightarrow \theta_1 = 30{,}27°$$

$$\operatorname{sen}\theta_3 = \frac{3\lambda_3}{d} = 0{,}5977 \rightarrow \theta_3 = 36{,}71$$

$\Delta\theta = 6{,}44°$