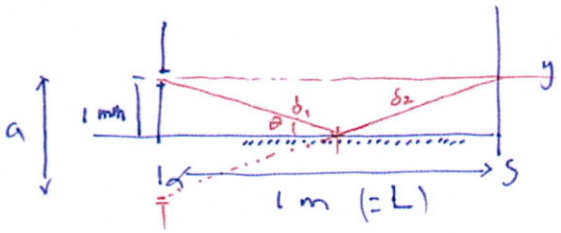
Quiz# 7 EC5107 0331

Sol.

· $\lambda = 546.1$ nm



· path length difference $\delta = 2\delta_1$,

$\delta_1 = \frac{0.5}{\cos\theta}$, $\theta = \tan^{-1}\left(\frac{0.001}{0.5}\right)$

$= 0.115^\circ$

=

· Double-slit exp. with a and L, $a \ll L$, $\sin\theta \sim \tan\theta = \frac{y}{L}$

$I = 2I_0(1+\cos\varphi)$; $\varphi = k\Delta = \frac{2\pi}{\lambda} a\sin\theta = \left(\frac{2\pi a}{\lambda L}\right) y$

$= 4I_0\cos^2\left(\frac{\varphi}{2}\right)$

$= 4I_0\cos^2\left(\frac{115}{cm}\cdot y\right)$.

$= \frac{2\pi \cdot 2\cdot 10^{-3}}{(546.1\times 10^{-9})(1)}\, y$

$\left(= 2\cdot\left(\frac{115}{cm}\right) y\right)$

$\varphi = \pi \cdot (73.3)\, y\,(cm)$

(추가)

• By the mirror reflection

$\delta_2 \to \delta_2 + \pi$

$\therefore\ I = 4I_0\cos^2\left(\frac{\varphi+\pi}{2}\right) = 4I_0\sin^2\left(\frac{\varphi}{2}\right)$

$= 4I_0\sin^2\left(\frac{115}{cm}\cdot y\right)$