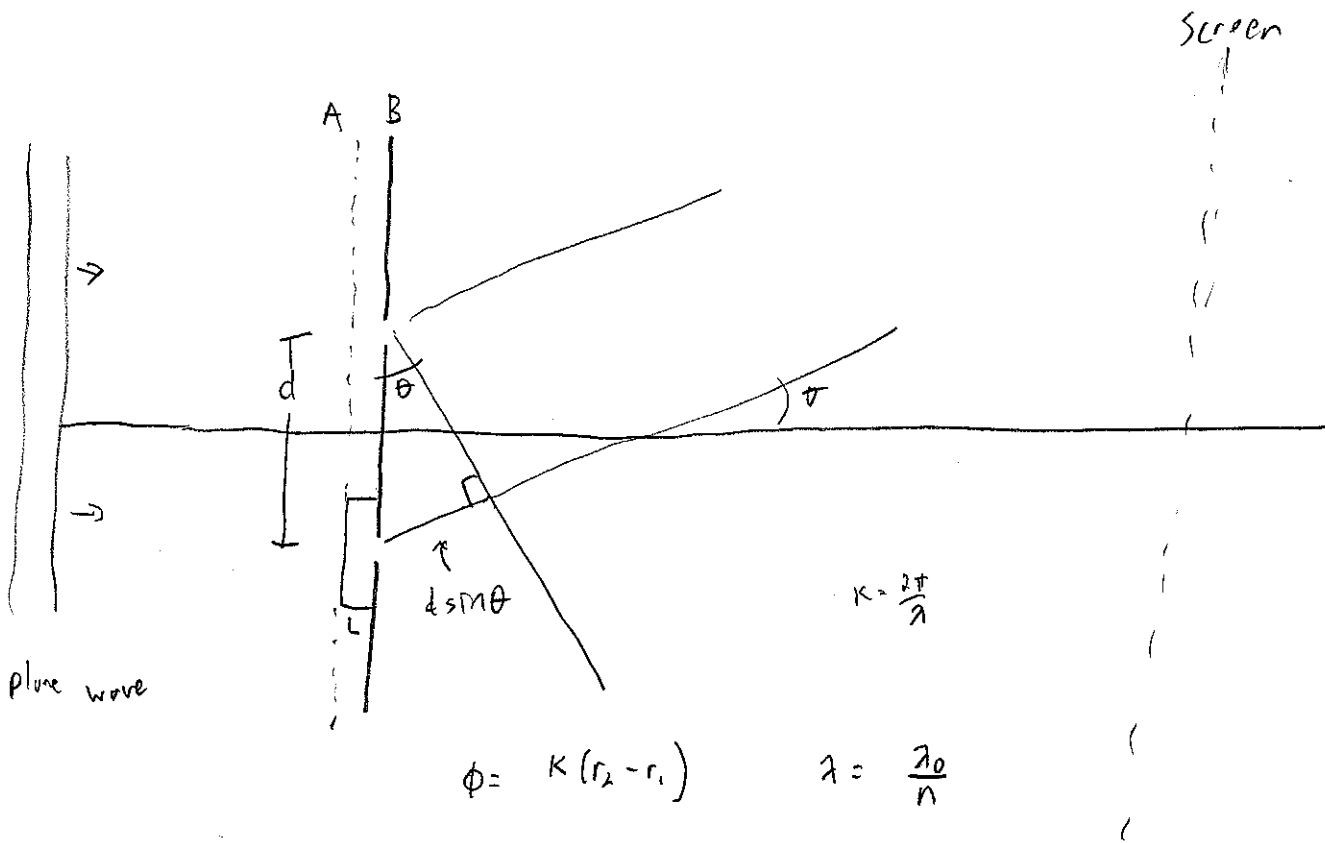


Physics 267 Problem #4 Solution



find angles where phase difference is  $m \times 2\pi$

phase difference due to glass

$$\phi_{\text{glass}} = -\frac{2\pi}{\lambda_0} L + \frac{2\pi n}{\lambda_0} L = \frac{2\pi L}{\lambda_0} (n-1)$$

$\uparrow$  top slit from A to B       $\uparrow$  bottom slit from A to B

phase difference from path length difference.

$$\phi_r = \frac{2\pi}{\lambda_0} d \sin \theta$$

$$\phi_{\text{glass}} + \phi_r = m \cdot 2\pi$$

$$\frac{2\pi L}{\lambda_0} (n-1) + \frac{2\pi}{\lambda_0} d \sin \theta = m \cdot 2\pi$$

take  $\theta$  to be small..

$$\frac{d}{\lambda_0} \sin \theta = m - \frac{L}{\lambda_0} (n-1)$$

$$\theta = \frac{m \lambda_0}{d} - \frac{L}{d} (n-1)$$

$m = 0, \pm 1, \dots$