PHYSICS 232 – CHAPTER 35: INTERFERENCE

Two sources in phase at distance d from each other. Point P far away from the sources. For constructive interference at P,

$$d \sin\theta = m\lambda \quad (m = \cdots -2, -1, 0, 1, 2, \ldots)$$

For destructive interference at P,

$$d \sin\theta = (m + \frac{1}{2})\lambda \quad (m = \cdots -2, -1, 0, 1, 2, \ldots)$$

When θ is very small, the position y_m of the mth bright fringe on a screen located a distance L from the sources is

$$y_m = \frac{m\lambda L}{d}$$

Intensity:

$$I = I_0 \cos^2\left(\frac{\pi d \sin\theta}{\lambda}\right)$$

For constructive interference on a thin film of thickness t,

$$2t = m\lambda \quad (m = 0, 1, 2, \ldots)$$

if film is between materials both of which have either smaller or greater index of refraction. If only one of the materials has a greater index of refraction, then the above condition is for destructive interference.