$path\ difference = BN = d\ sin\theta$ [See $\Delta\ ABN$]

$for\ small\ \theta,$ $\boldsymbol{path\ difference = d \times \theta}$ **… … …** [1]

Also, in triangle ΔPCO ,

$\boldsymbol{tan\theta \approx \theta = \frac{y}{D}}$ … … … [2]

For small angle θ,

$sin\theta \approx \theta$

and, $tan\theta \approx \theta$

The point P on the screen will be a point of secondary minima if,

$$\boldsymbol{path\ difference = even\ number \times \frac{\lambda}{2}}$$

[In this case, the slit AB is assumed to be divided into even number of equal partitions.]

Or, $d \times \theta = n\ \lambda$

Or, $\theta = n\lambda/d$ $[n = 1.2.3\ ...]$

Hence, for n^{th} secondary minima,

$$\boldsymbol{\theta_n = n\lambda/d}$$

For 1^{st} secondary minimum: $\theta_1 = \lambda/d$

For 2^{nd} secondary minimum: $\theta_2 = 2\lambda/d$

and so on.

In terms of linear distance from central maximum:

$$d \times \frac{y}{D} = n\lambda$$

$$\therefore \boldsymbol{y_n = n\lambda D/d}$$

$$y_1 = \lambda D/d$$

$$y_2 = 2\lambda D/d$$ *and so on.*

The point P on the screen will be a point of secondary maxima if,

$$\boldsymbol{path\ difference = odd\ number \times \frac{\lambda}{2}}$$

[In this case, the slit AB is assumed to be divided into odd number of equal partitions.]

Or, $d \times \theta = (2n+1)\ \frac{\lambda}{2}$

Or, $\theta = (2n+1)\frac{\lambda}{2\ d}$ $[n = 1.2.3\ ...]$

Hence, for n^{th} secondary maxima,

$$\boldsymbol{\theta_n = (2n+1)\frac{\lambda}{2\ d}}$$

For 1^{st} secondary maximum: $\theta_1 = \frac{3\ \lambda}{2\ d}$

For 2^{nd} secondary maximum: $\theta_2 = \frac{5\ \lambda}{2\ d}$

and so on.

In terms of linear distance from central maximum:

$$d \times \frac{y}{D} = (2n+1)\frac{\lambda}{2}$$

$$\therefore \boldsymbol{y_n = (2n+1)\frac{\lambda D}{2d}}$$

$$y_1 = \frac{3}{2}\frac{\lambda D}{d}$$

$$y_2 = \frac{5}{2}\frac{\lambda D}{d}$$ *and so on.*

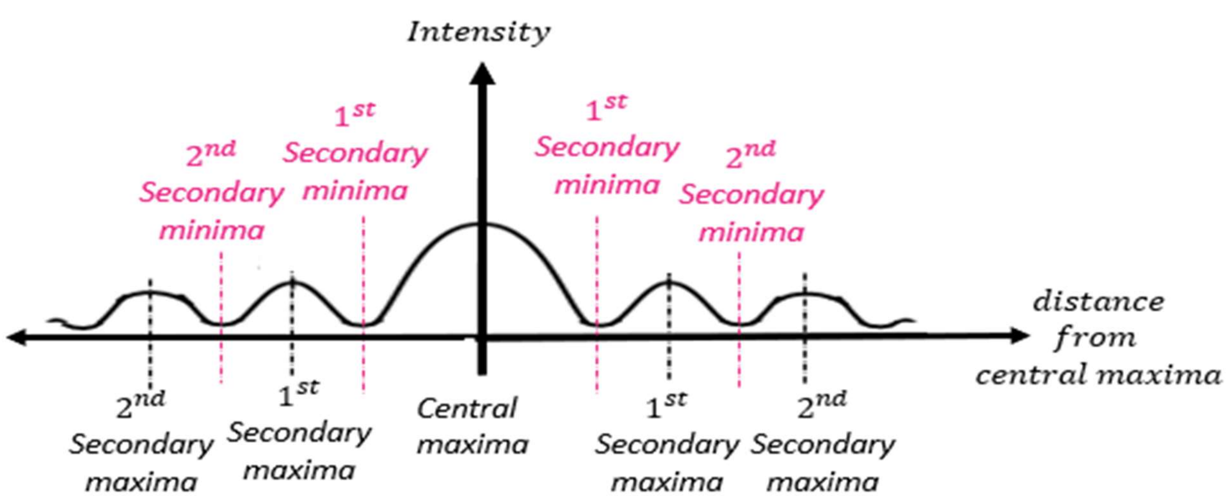

Figure: Intensity variation graph in Fraunhofer Diffraction