

D9FAGRAMPS

Diffraction on an amplitude grating at normal incidence.

Width of openings d , center to center distance of strips a , wavelength λ , distance from grating to screen X and coordinate on Screen Y .

All distances and wavelength in mm, number of lines N .

All parameters are globally defined above the graph.

$D(A)$ is the diffraction factor

$I(A)$ is the interference factor, normalized to 1. The numerator is plotted separately to show where the main maxima are located (0/0).

$P(A)$ is the product of Interference and diffraction factor.

$$D(\theta) := \left[\frac{\sin \left[\pi \cdot \frac{d}{\lambda} \cdot (\sin(\theta)) \right]}{\left[\pi \cdot \frac{d}{\lambda} \cdot (\sin(\theta)) \right]} \right]^2 \quad \theta := -.5001, -.4999 \dots .5$$

$$I(\theta) := \left[\frac{\sin \left[\pi \cdot \frac{a}{\lambda} \cdot (\sin(\theta)) \cdot N \right]}{N \cdot \sin \left[\pi \cdot \frac{a}{\lambda} \cdot (\sin(\theta)) \right]} \right]^2$$

$$P(\theta) := D(\theta) \cdot I(\theta)$$

$$y(\theta) := \sin \left[\pi \cdot \frac{a}{\lambda} \cdot (\sin(\theta)) \cdot N \right]^2$$

$$d \equiv .001 \quad \lambda \equiv .0005 \quad a \equiv .002 \quad N \equiv 6$$

