

D13FAGRRES

Two diffraction pattern of a grating to study resolution.

Diffraction on an amplitude grating with 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 . Normal incidence.

All parameters are globally defined above the graph.

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

The resolution is given as $\lambda/\Delta\lambda = N$ and introduced in the formulas of the second grating.

$$\theta := -.7001, -.6999 \dots .7$$

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

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

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

$$PP(\theta) := DD(\theta) \cdot \Pi(\theta)$$

$$d \equiv .0001 \quad \lambda \equiv .0005 \quad a \equiv .002 \quad N \equiv 6 \quad \lambda\lambda \equiv .0006$$

