C2COHEX

Intensity of an extended source of width s and interfernce diffraction on a double slit.

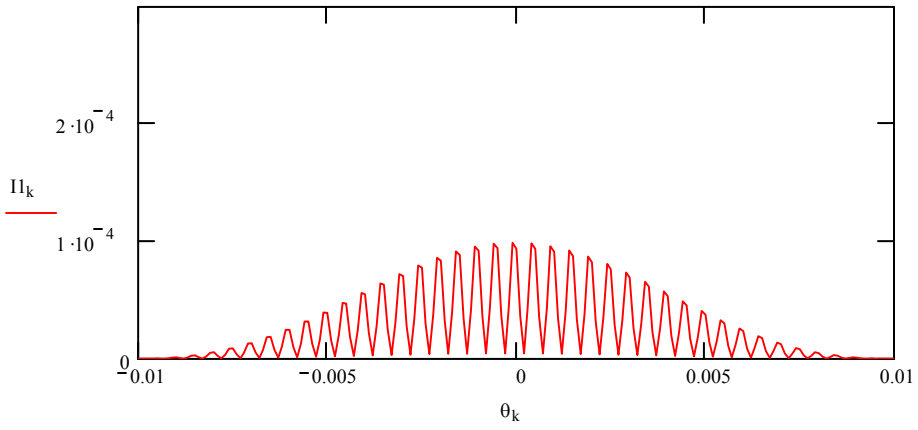
Slit openings d and separation a. Distance from source to slit Z, from slit to screen X, coordinate on screen is Y, small angle approximation Y/X = θ.

$a := 1 \quad d \equiv .05$

$0 \le \psi \le 2 \quad k \equiv 0..200 \quad \theta_k \equiv .01 - k \cdot .0001 \quad \lambda := .0005 \quad Z \equiv 9000$

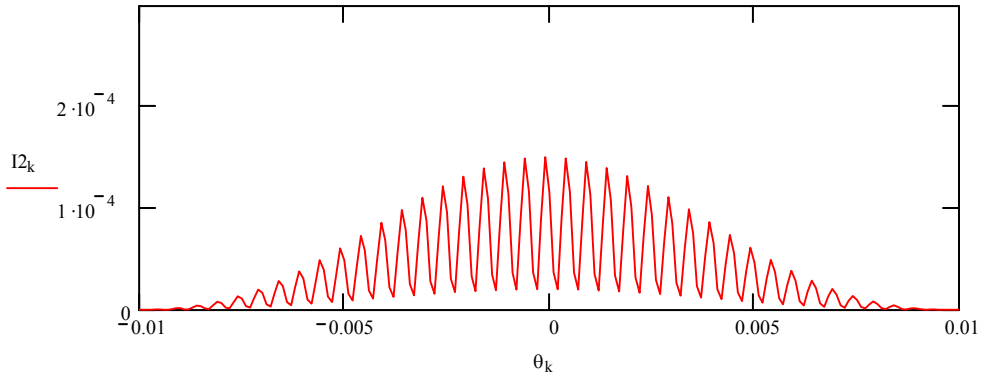
$s1 \equiv 1 \qquad \psi_1 \equiv \frac{s1}{Z}$

$$I1_k := \int_0^{\psi_1} \frac{\sin\left[\pi \cdot \frac{d}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2}{\left[\pi \cdot \frac{d}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2} \cdot \cos\left[\pi \cdot \frac{a}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2 d\psi$$



$s2 \equiv 1.5 \qquad \psi_2 \equiv \frac{s2}{Z}$

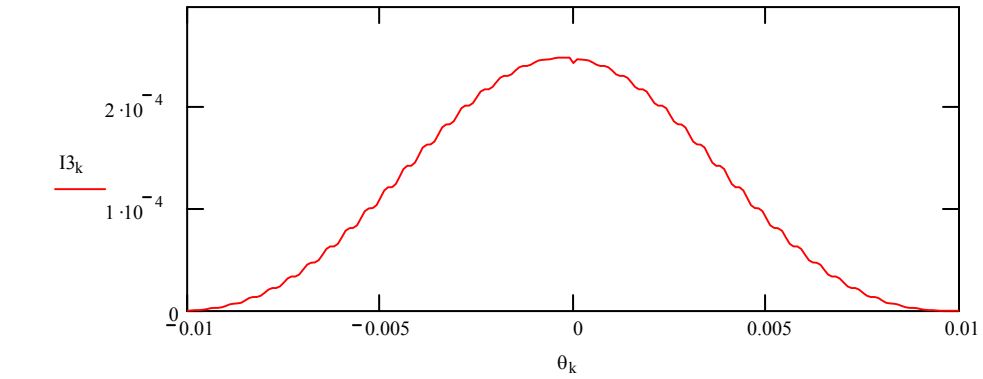
$$I2_k := \int_0^{\psi_2} \frac{\sin\left[\pi \cdot \frac{d}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2}{\left[\pi \cdot \frac{d}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2} \cdot \cos\left[\pi \cdot \frac{a}{\lambda} \cdot \left(\sin(\theta_k) + \sin(\psi)\right)\right]^2 d\psi$$



$s3 \equiv 4.5$

$\psi_3 \equiv \frac{s3}{Z}$

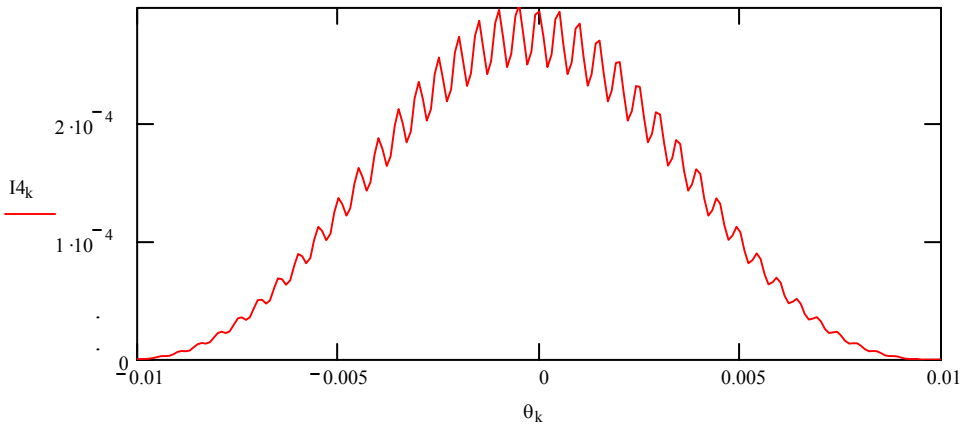
$$I3_k := \int_0^{\psi_3} \frac{\sin\left[\pi\cdot\frac{d}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2}{\left[\pi\cdot\frac{d}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2}\cdot\cos\left[\pi\cdot\frac{a}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2 d\psi$$



$s4 \equiv 5$

$\psi_4 \equiv \frac{s4}{Z}$

$$I4_k := \int_0^{\psi_4} \frac{\sin\left[\pi\cdot\frac{d}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2}{\left[\pi\cdot\frac{d}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2}\cdot\cos\left[\pi\cdot\frac{a}{\lambda}\cdot\left(\sin(\theta_k)+\sin(\psi)\right)\right]^2 d\psi$$


2·10⁻⁴
I4k
1·10⁻⁴
0
-0.01
-0.005
0
0.005
0.01
θk