D15FABAGRS Babinets Theorem. Diffraction on two amplitude gratings, one with width of openings d1, the other with width of opening d2, and both have center to center distance of strips a = d1 +d2.

Wavelength λ, distance from gratings to screen X and coordinate on screen Y. All distances and wavelength in mm, both have number of lines N. Normal incidence.

D1 and D2 are the diffraction factors, I is the interference factor, normalized to 1. P(A) is the product of Interference and diffraction factor.

Diffraction pattern of the two complementary screens, one is a grating of width of opening d1 the other of d2, and the periodicity constant is a = d1 + d2

$$\theta := -.5001, -.4999 \,..\, .5$$

$$D1(\theta) := \left[\frac{\sin\left(\pi\cdot\frac{d1}{\lambda}\cdot\sin(\theta)\right)}{\left(\pi\cdot\frac{d1}{\lambda}\cdot\sin(\theta)\right)}\right]^2 \qquad I(\theta) := \left(\frac{\sin\left(\pi\cdot\frac{a}{\lambda}\cdot\sin(\theta)\cdot N\right)}{N\cdot\sin\left(\pi\cdot\frac{a}{\lambda}\cdot\sin(\theta)\right)}\right)^2$$

$$\lambda \equiv .0005 \qquad N \equiv 6 \qquad P1(\theta) := D1(\theta)\cdot I(\theta)$$

$$D2(\theta) := \left[\frac{\sin\left(\pi\cdot\frac{d2}{\lambda}\cdot\sin(\theta)\right)}{\left(\pi\cdot\frac{d2}{\lambda}\cdot\sin(\theta)\right)}\right]^2$$

$$d2 \equiv .001 \qquad d1 \equiv .002 \qquad a \equiv d1 + d2 \qquad P2(\theta) := D2(\theta)\cdot I(\theta)$$

We see that the intensity of the diffraction peaks is different for the two complementarypattern, but the position of the peaks is the same, and that is what Babinets Principle tells us.