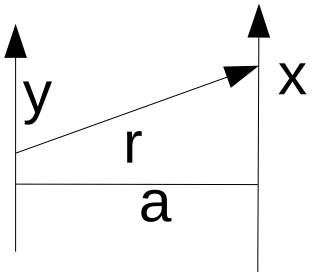
Interference vlnění – sečtení více vln, štěrbina:

Aproximativní vzdálenost bod – stínítko:



$$E = \int E(r)\,dr = \frac{A}{r_0}\int e^{-ikr(x,y)}\,dr$$

$$E = \frac{A}{r_0}e^{-ika}\int e^{[-ikx/a]y}\,dy$$

$$\rightarrow \quad I = E^2 = \left|\frac{A}{r}\right|^2 \quad \ldots$$

$$r=\sqrt{a^2+(x-y)^2}=\sqrt{a^2+x^2-2xy+y^2}\approx\sqrt{a^2+x^2-2xy}\approx\sqrt{a^2-2xy}$$

$$\sqrt{1+z}=(1+z)^{1/2}\approx 1+z/2 \qquad \frac{1}{1+z}\approx 1-z \qquad (1+z)^n\approx 1+nz$$

$$r=a\sqrt{1-2xy/a^2}\approx a(1-xy/a^2)=a-xy/a=a-(x/a)y$$

Difrakce na štěrbině o šířce *d*:

$$E=\int_{-d/2}^{d/2} e^{iqy}\,dy=\frac{1}{iq}\left[e^{+iqd/2}-e^{-iqd/2}\right]=\frac{1}{q}2\sin(qd/2)=\frac{d}{\frac{qd}{2}}\sin(qd/2)=d\,\mathrm{sinc}(qd/2)$$

$$e^{ix}-e^{-ix}=(\cos x+i\sin x)-(\cos x-i\sin x)=2i\sin x$$

$$e^{ix}+e^{-ix}=(\cos x+i\sin x)+(\cos x-i\sin x)=2\cos x$$

$$\mathrm{sinc}\,x\equiv\frac{\sin x}{x}$$