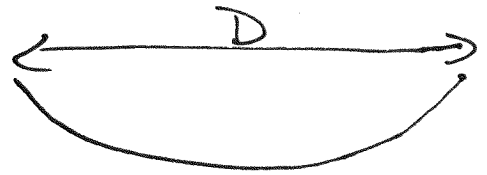


Ch. 4 Prob. 54

$$D = 305 \text{ m}$$

$$\lambda = 4.00 \text{ cm}$$



a) Find The angle between 2 just-resolvable point sources.

Using The Rayleigh criterion for circular aperture we have

$$\theta = 1.22 \frac{\lambda}{D} = 1.22 \left(\frac{4.00 \times 10^{-2} \text{ m}}{305 \text{ m}} \right)$$

$$\theta = 1.60 \times 10^{-4} \text{ rad}$$

b) How close could these sources be in The Andromeda Galaxy

using The arc length relationship to distance + angle gives



$$s = \theta \cdot r = (1.60 \times 10^{-4} \text{ rad})(2 \times 10^6 \text{ ly}) = 320 \text{ ly}$$

Just for reference, Polaris (North Star) is a distance of 433 ly from earth.