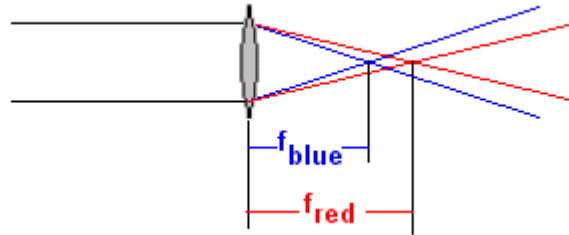


Optics

Dispersion

Problem 1.- Use the lens-maker equation to calculate the focal length of a thin lens for blue light and red light ($n_{\text{blue}}=1.535$ $n_{\text{red}}=1.525$)

Consider a biconvex lens with identical spherical surfaces of 20cm radius.



Solution:

$$\text{For blue: } f = \frac{1}{(n-1)} \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{1}{(1.535-1)} \frac{1}{\frac{1}{20} + \frac{1}{20}} = \mathbf{18.69 \text{ cm}}$$

$$\text{For red: } f = \frac{1}{(n-1)} \frac{1}{\frac{1}{R_1} + \frac{1}{R_2}} = \frac{1}{(1.525-1)} \frac{1}{\frac{1}{20} + \frac{1}{20}} = \mathbf{19.05 \text{ cm}}$$