Phys 5B: Lens Continued

BY KAMERON GILL

Date March 1, 2017

I. Eyes and Corrective Lens

- $n_{\text{cornea}} = 1.38$
- $n_{\text{lens}} = 1.38$

  Adjust f to maintain constant d_i when d_0 changes
- Min d_0 that is easily focused "near point" 25cm
- "Far point" ∞
- Near Sighted: problem with seeing rays from ∞

  Too much bending (f is too small)

  To fix: add a divergent lens

  $\frac{1}{f} = \frac{1}{d_0} + \frac{1}{d_i} \Rightarrow \frac{1}{\infty} + \frac{1}{d_i} \Rightarrow f = d_i$

  Corrective lens places images at far point of eye
- Example

  $\frac{1}{f} + \frac{1}{d_0} + \frac{1}{d_i} \Rightarrow \frac{1}{\infty} + \frac{1}{d_{\text{farpoint}}} \Rightarrow \frac{1}{1m}$
- Far − Sighted: Problem with seeing rays from nearby

  not enough bening (F too big)

  To fix: add converging lens

  Corrective lens places images at near point
- Example:

  $\frac{1}{f} = \frac{1}{d_0} + \frac{1}{d_{\text{nearpoint}-d_{\text{lens}}}} \Rightarrow \frac{1}{25\text{cm}} + \frac{1}{-50} \Rightarrow f = 50\text{cm}$

II. Magnifiers

Image is upright, magnified- Virtual

=>Converging lens needed, $d_0 < f$

$\frac{1}{d_i} = \frac{1}{f} - \frac{1}{d_0} \Rightarrow d_i < 0$ Virtual!

We had defined linear magnifaction: $m = \frac{h_I}{h_0}$

Define angular magnifatction: $M = \frac{\Theta'}{\Theta}$