Light as an EM Wave, Mirrors and Refraction

Equations:

Relation between speed of light, wavelength and frequency:

$$c = \lambda f$$

Energy density in EM field (Energy per volume)

$$U = \frac{\epsilon_0}{2}E^2 + \frac{1}{2\mu_0}B^2$$

Intensity of light wave (Power per area):

$$S = Uc$$

$$\bar{S} = c\epsilon_0 E_{rms}^2 = \frac{c}{\mu_0}B_{rms}^2$$

Focal length of spherical mirror:

$$f = \frac{1}{2}R$$

Magnification of Image:

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

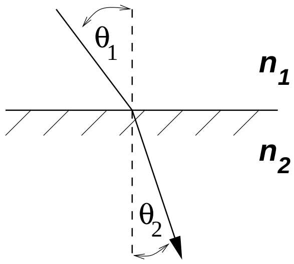
d_0/d_i are object/image distances, h_o/h_i are object/image sizes.

Mirror Equation:

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

Snell's Law:

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$



Critical angle for total internal reflection:

$$\sin\theta_c = \frac{n_1}{n_2}$$

Assorted Facts:

1. Visible light ranges from $\lambda = 380nm$ to $750nm$.
2. For mirrors, f is positive for concave and negative for convex mirrors.
3. If d_i is positive, the image is **real**, in front of the mirror.
4. If d_i is negative, the image is **virtual**, behind the mirror.
5. If the magnification m is negative, the image is inverted.