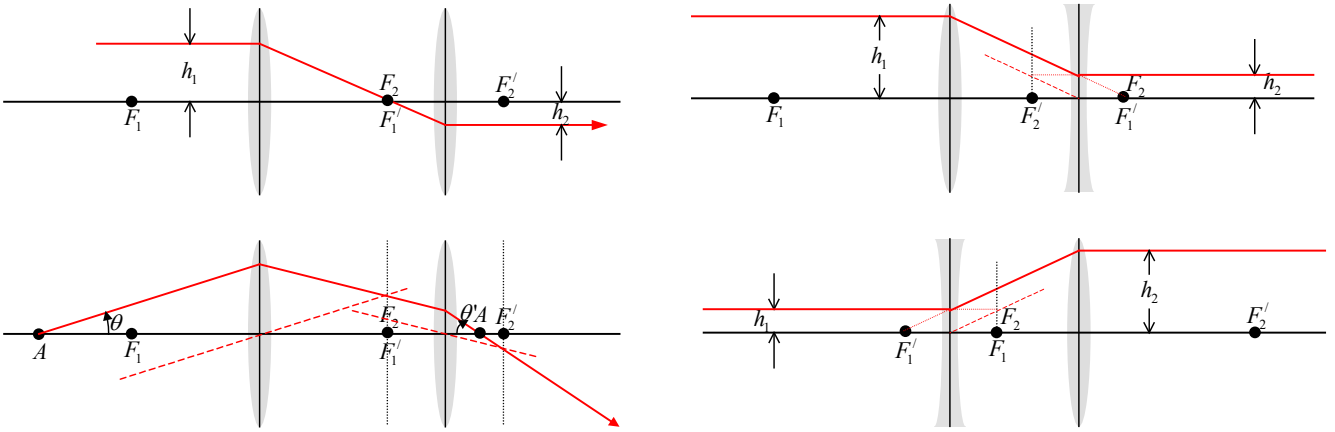
# Afocal Systems




## At the conjugate points A and A'

Image Location: $$x' = f_2' + \frac{f_2'^2}{f_1'}\left(1 + \frac{x}{f_1'}\right) = f_2'\left(1 - m_y\right) + m_x x$$

Optical Invariance: $$ny\theta = n'y'\theta'$$

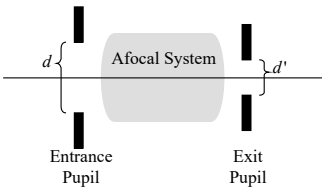
Transverse Magnification: $$m_y = \frac{h_2}{h_1} = -\frac{f_2'}{f_1'} = \frac{1}{m_\alpha} = -\sqrt{m_x}$$

Angular Magnification: $$m_\alpha = \frac{\alpha'}{\alpha} = -\frac{f_1'}{f_2'} = \frac{1}{m_y} = \sqrt{\frac{1}{m_x}}$$

Axial Magnification: $$m_x = \frac{dx'}{dx} = \left(\frac{f_2'}{f_1'}\right)^2 = \frac{1}{m_\alpha^2} = m_y^2$$

## Aperture Stop, Entrance Pupil, and Exit Pupil

The lens with the largest F# is the limiting lens aperture of the system. If no other apertures are present, it is the aperture stop.




$$d' = m_y d$$

## General Notes

1. Afocal systems are formed by collocating the focal point image and focal point object of cascaded lenses.
2. All types of magnification are constant.
3. The lens with the largest F# is the limiting lens aperture of the system. If no other apertures are present, it is the aperture stop.