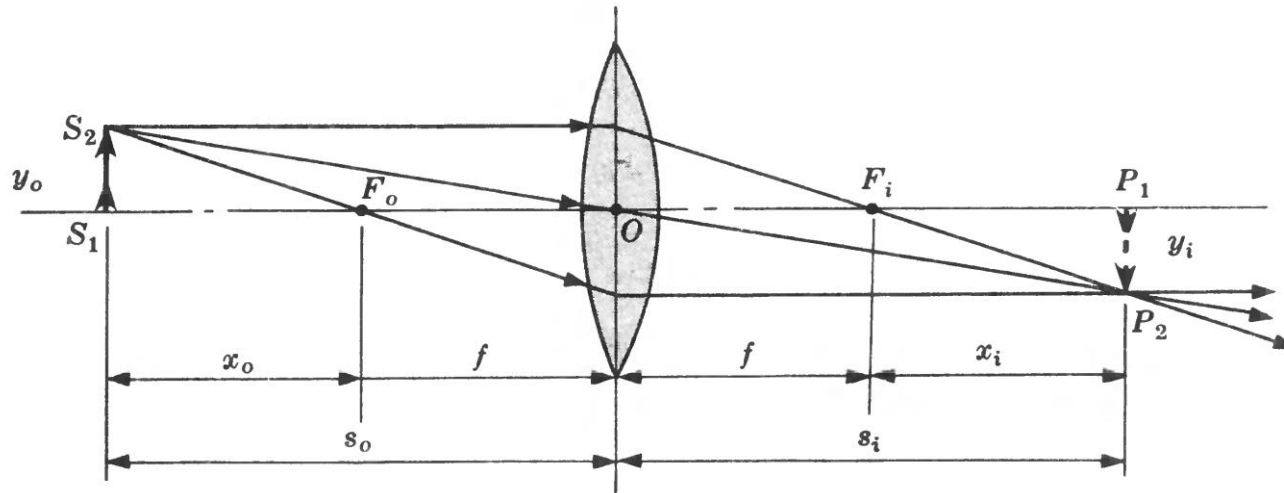Image formation by using a single lens having focal length f

In the above figure s_o, s_i, f and y_o are positive whereas y_i is negative. In this example the object is the erect "solid arrow" on the left and the image is the inverted "dashed arrow" on the right.

$$\frac{1}{s_o} + \frac{1}{s_i} = \frac{1}{f} \qquad \text{thin lens formula}$$

Magnification M:
ratio of the image size y_i to the object size y_o

$$M = \frac{y_i}{y_o}$$

By convention, y_o (y_i) is positive if the object (image) is above the optical axis and negative if the object (image) is below the optical axis.
It can be proved that

$$M = \frac{y_i}{y_o} = -\frac{s_i}{s_o} = -\frac{f}{x_o}$$