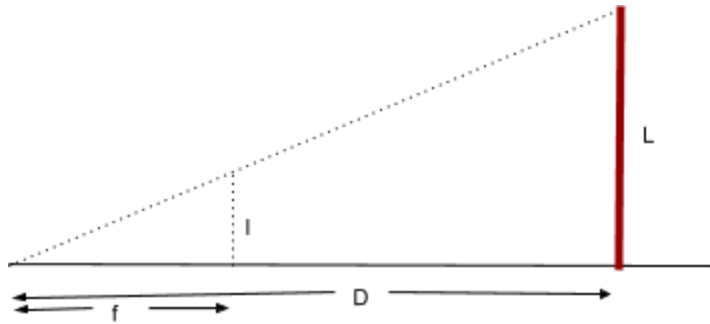


Q5

Let the distance of the vertical bar from pinhole be D

Let the constant velocity with which the bar is moving be v , actual-length of bar be L , focal length of the camera be f .



The length of the bar on the image is given by:

$$l = f * L/D$$

Computing derivative of l with respect to time we get:

$$dl/dt = f * L * v/D^2$$

Time which the bar will take to reach the pinhole is given by:

$$T = D_0/v$$

Dividing l by dl/dt we get:

$$\frac{l}{dl/dt} = D/v$$

Hence we can find the time that the vertical bar will take to reach the pinhole by simply taking the ratio of length of that bar on image and the rate at which that length is changing in the initial image frames.

The rate at which the length of bar in image is changing can be manually calculated by taking differences in the length and dividing it by the time difference between which the two image frames were taken. As the bar has distinctive color with respect to the background we can also code up to find the length of bar in the image by using edge detection algorithms.