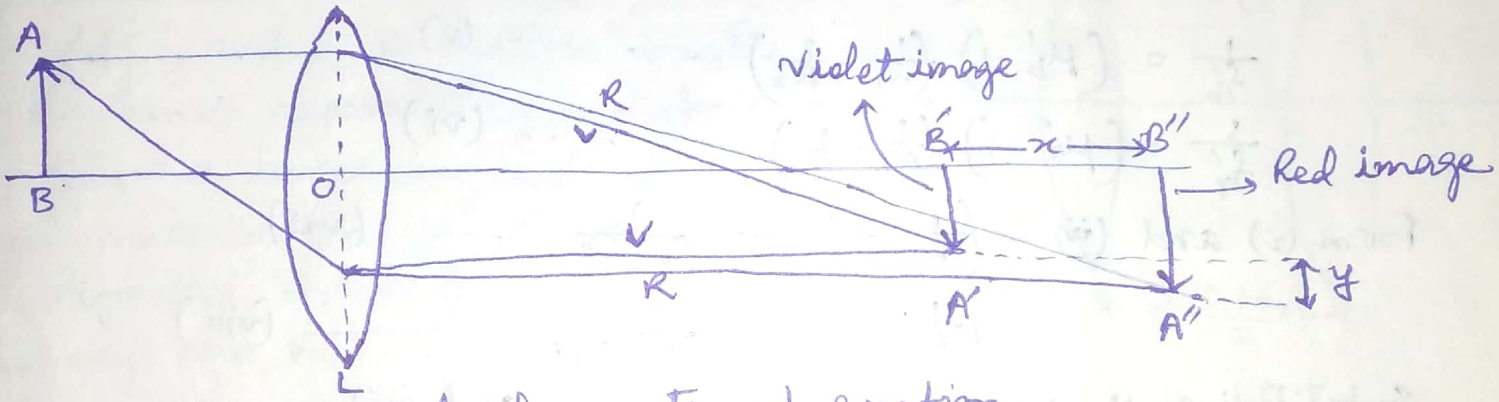
chromatic aberration:- The refractive index of the material of a lens is different for different wavelengths of light. Hence the focal length of a lens is different for different wavelengths. Further, the magnification of the image is dependent on the focal length of a lens, the size of the image is different for different wavelengths. The variation of the image distance from the lens with refractive index measures axial or longitudinal chromatic aberration and the variation in the size of the image measures lateral chromatic aberration.



x = Longitudinal chromatic aberration

y = Lateral chromatic aberration

Chromatic aberration present in an image formed by a single lens L. AB is an object placed in front of the lens. A'B' and A''B'' are the violet and red images. The violet image is formed nearer the lens than the red image. The monochromatic aberrations are assumed to be absent in this case. The images of intermediate colours between violet and red lie between the images A'B' and A''B'' and their increases

from violet to red. At no one position the images are in sharp focus. Thus, a single lens produces a coloured image of an object illuminated by white light and this defect is called chromatic aberration. Elimination of this defect in a system of lenses is called achromatism.