

DERIVATION OF THE DEFINITION OF OPTICAL INFINITY

As an object moves further from a lens, the tip angle of the cone of light rays from a certain object point that enter the lens gets smaller and smaller. When an object is really far away, like the sun (93,000,000 miles) the angle is practically zero.

The tip angle of the rays of light coming from a single object point going into a 50 mm focal length lens working at $f/2$ is given for a variety of object distances. Notice the trend in angular dimension as the object moves further away.

At very far distances there is such a small angle that the rays can be considered parallel to each other. This is the definition of optical infinity.

Light rays coming from infinity will focus one focal length away from the lens, the shortest real image distance for that lens.

