3D Point Projection and Motion Tutorial Exercise

Exercise

Assume a pinhole camera with focal length $f = 9mm$, a target object of size 1×1.33", an image of resolution 352×288 $pixels$ and an object point with a distance of $Z = 2m$ from the camera center. Determine the projection of this point into the image as a function of its (X, Y) position in 3D space. How much does the point have to move in the direction of the Z-axis in order for its projection point to move by 1 $pixel$ horizontally or vertically? What would be the answer if we assumed a camera model with orthographic projection?