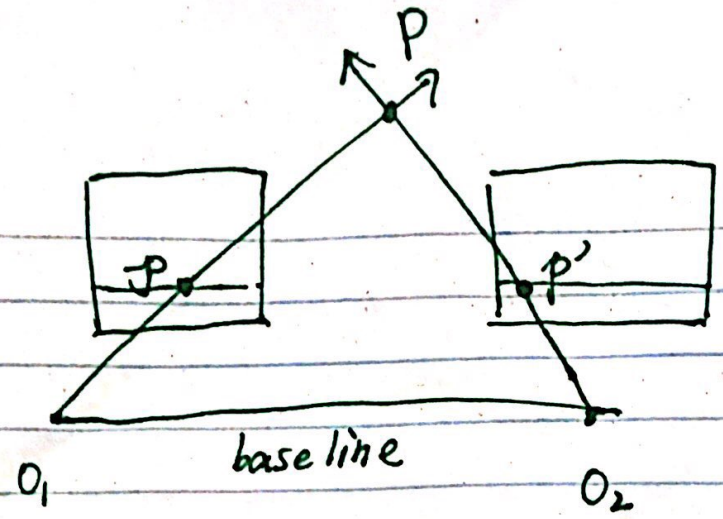
1.1



As epipole is the point of intersection of baseline with image plane. And in this case, as the second camera only differs from the first camera by a pure translation parallel to the image plane, the intersection of the baseline with the image plane is at infinity, the epipoles are at infinity. As epipolar line is the intersection of an epipolar plane defined by baseline & P ~~and~~ with an image plane, and all epipolar lines are projection of baseline on image planes, since ~~there~~ this is a pure translation from camera 1 to camera 2, all epipolar lines are paralled to the baseline. (We can also verify that epipolar lines on an image plane are parallel by saying epipole is at the infinity).

1.2. $\begin{cases} p = K[I\ 0]P \\ p' = K'[R\ t]P \end{cases}$

Generally, we look at the above equation to find p, p'. However, in this special case, P is the intersection of two principal axes and the image coordinates are normalized so that $(0,0)$ coincides with the principal point (not in the corner anymore). From this special scenario, we observe that $p = \begin{bmatrix} u \\ v \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$,

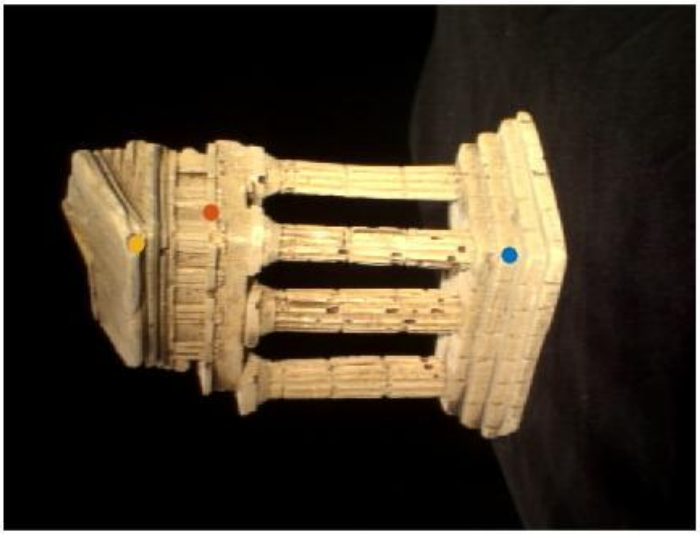
$p' = \begin{bmatrix} u' \\ v' \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

Then we get $[u'\ v'\ 1]\, F \begin{bmatrix} u \\ v \\ 1 \end{bmatrix} = [0\ 0\ 1] \begin{bmatrix} F_{11} & F_{12} & F_{13} \\ F_{21} & F_{22} & F_{23} \\ F_{31} & F_{32} & F_{33} \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$

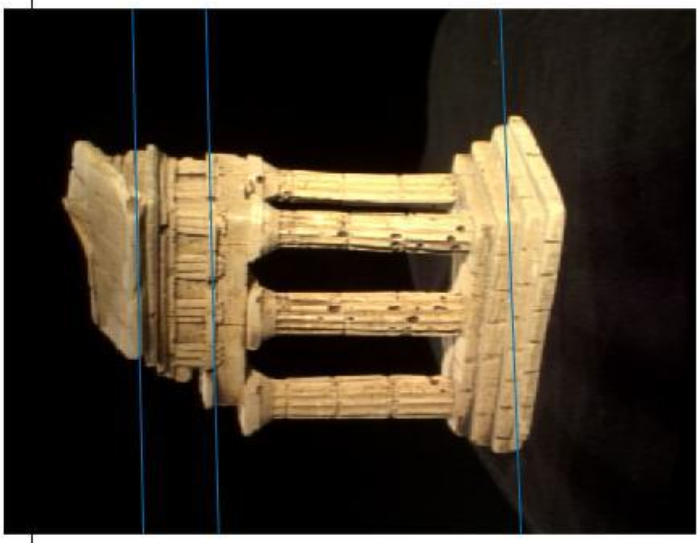
$= [0\ 0\ 1] \begin{bmatrix} F_{13} \\ F_{23} \\ F_{33} \end{bmatrix} = F_{33} = 0$

Thus, F_{33} is zero.

2.1

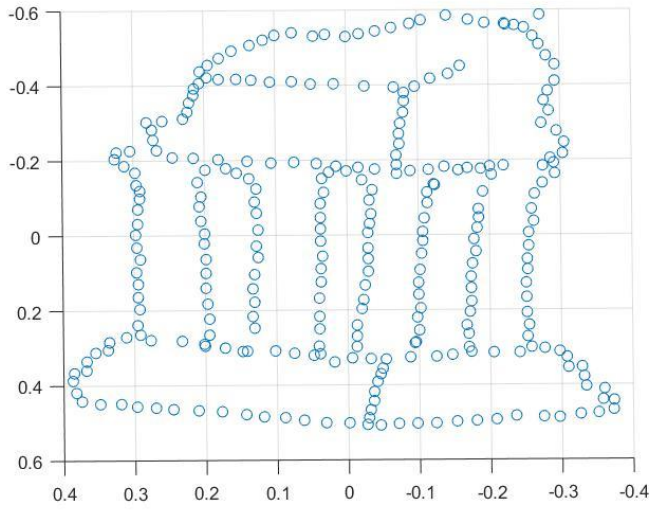


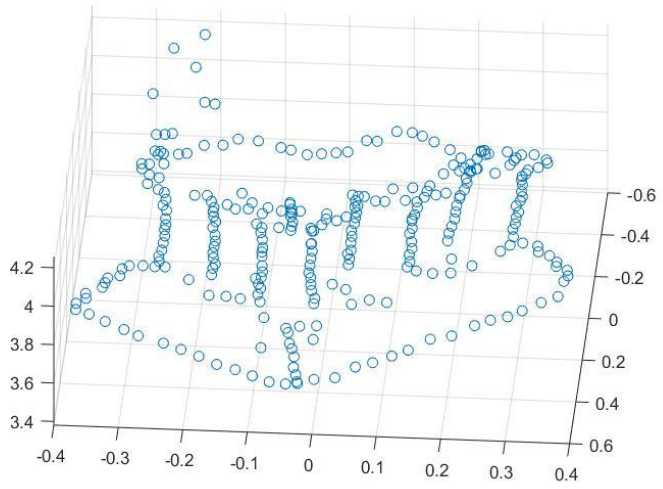
Select a point in this image
(Right-click when finished)

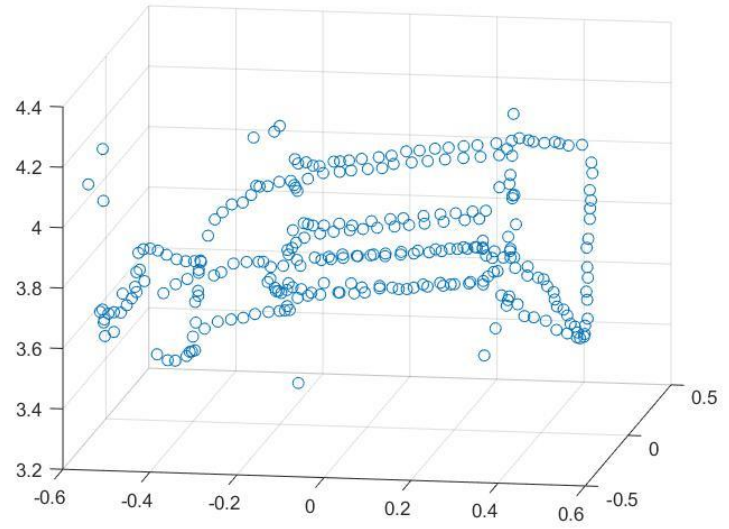


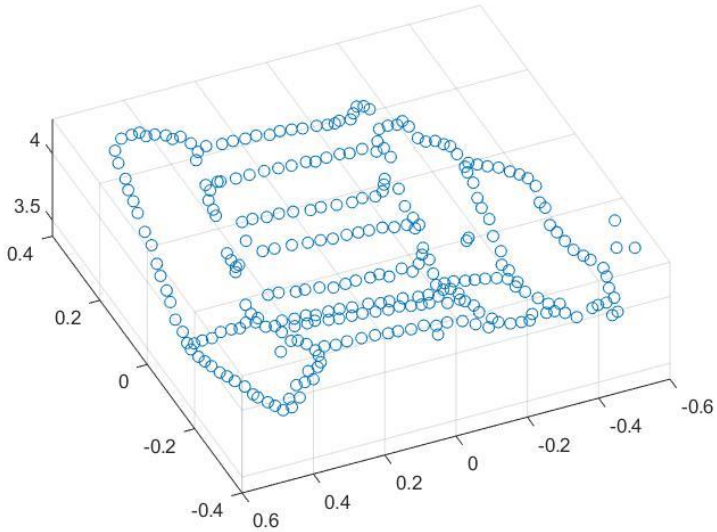
Verify that the corresponding point
is on the epipolar line in this image

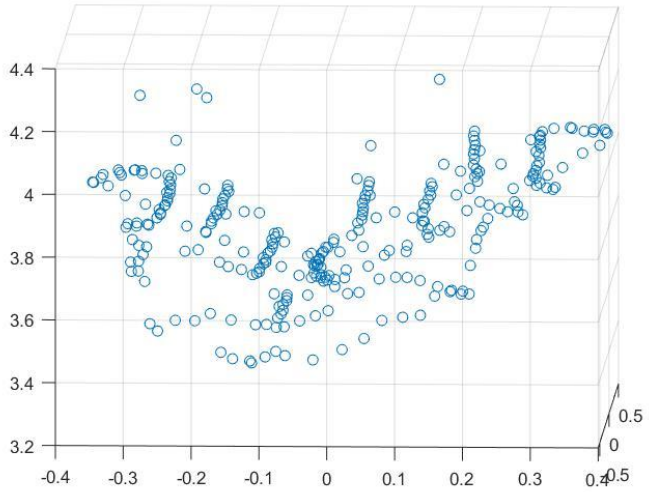
2.2

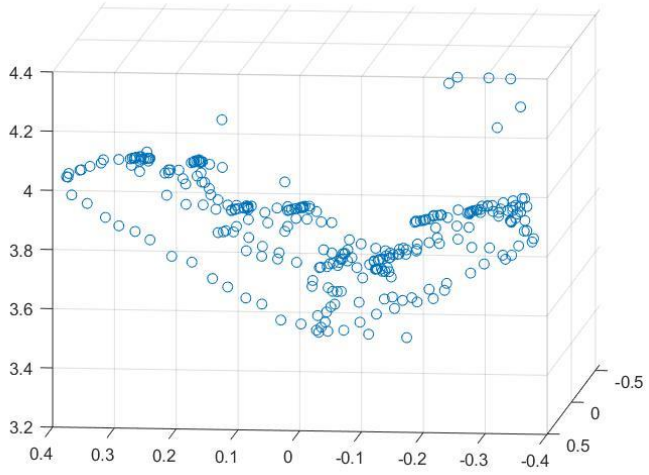


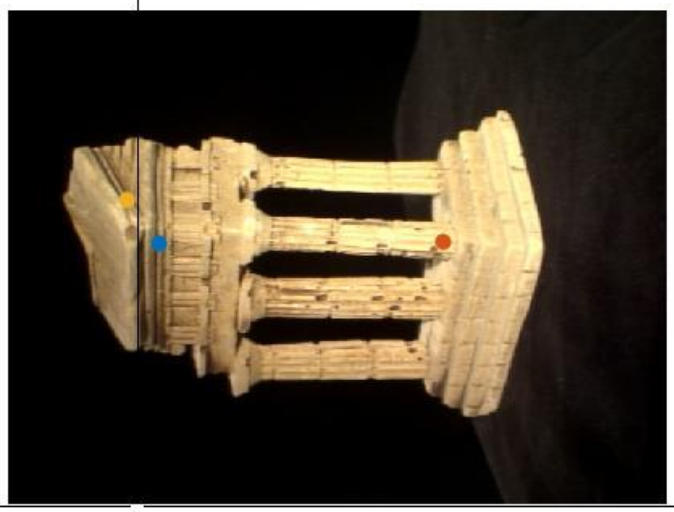

4.2
4
3.8
3.6
3.4
-0.4
-0.3
-0.2
-0.1
0
0.1
0.2
0.3
0.4
-0.6
-0.4
-0.2
0
0.2
0.4
0.6


4.4
4.2
4
3.8
3.6
3.4
3.2
-0.6
-0.4
-0.2
0
0.2
0.4
0.6
0.5
0
-0.5

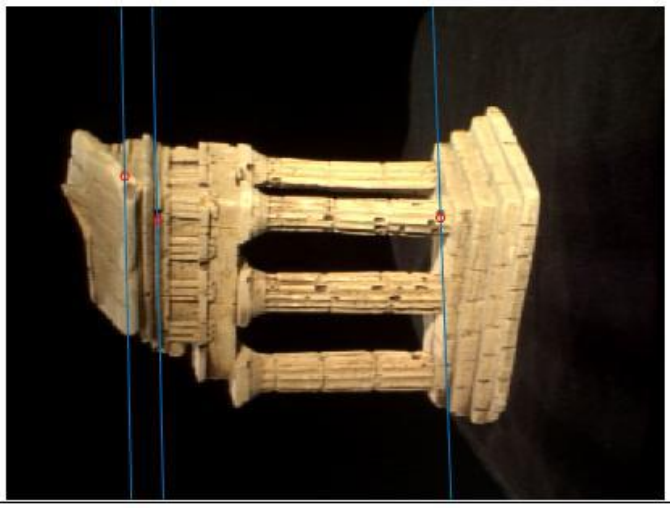

4
3.5
0.4
0.2
0
-0.2
-0.4
0.6
0.4
0.2
0
-0.2
-0.4
-0.6







Select a point in this image
(Right-click when finished)



Verify that the corresponding point
is on the epipolar line in this image

~10 hours