

```
K = [focal_length_x      skew_x  camera_center_x;
      0  focal_length_y  camera_center_y;
      0                  0          1];
```

try using a k of

```
K = [409.4433      0  204.1225
      0  416.0865  146.4133
      0          0   1.0000];
```

$$z = fB/d$$

where

Z = distance along the camera Z axis

f = focal length (in pixels)

B = baseline (in metres)

d = disparity (in pixels)

After Z is determined, X and Y can be calculated using the usual projective camera equations:

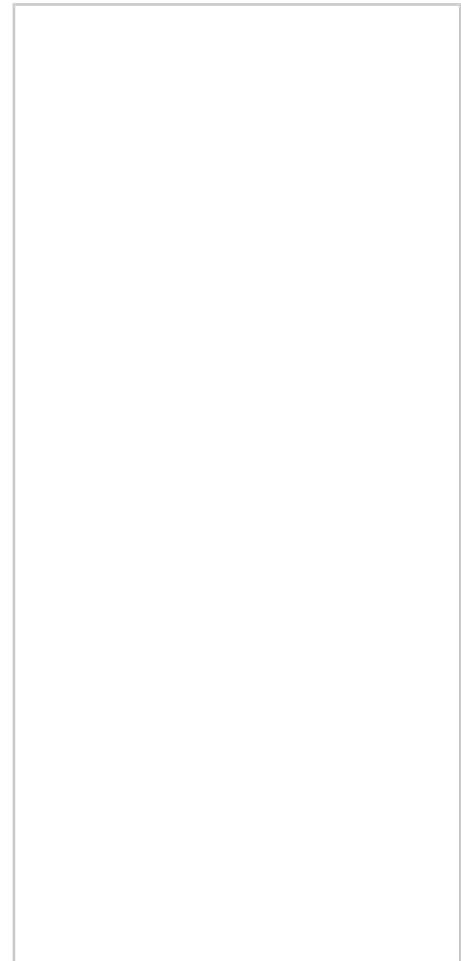
$$X = uZ/f$$

$$Y = vZ/f$$

where

u and v are the pixel location in the 2D image

X, Y, Z is the real 3d position



Use plot3 to show the point cloud of all X,Y,Z points for the disparity map
Also you can try different similarity measures

Similarity Measure	Formula
Sum of Absolute Differences (SAD)	$\sum_{(i,j) \in W} I_1(i,j) - I_2(x+i, y+j) $
Zero-mean Sum of Absolute Differences (ZSAD)	$\sum_{(i,j) \in W} I_1(i,j) - \bar{I}_1(i,j) - I_2(x+i, y+j) + \bar{I}_2(x+i, y+j) $

Locally scaled Sum of Absolute Differences (LSAD)	$\sum_{(i,j) \in W} \left I_1(i,j) - \frac{\bar{I}_1(i,j)}{\bar{I}_2(x+i,y+j)} I_2(x+i,y+j) \right $
Sum of Squared Differences (SSD)	$\sum_{(i,j) \in W} (I_1(i,j) - I_2(x+i,y+j))^2$
Zero-mean Sum of Squared Differences (ZSSD)	$\sum_{(i,j) \in W} (I_1(i,j) - \bar{I}_1(i,j) - I_2(x+i,y+j) + \bar{I}_2(x+i,y+j))^2$
Locally scaled Sum of Squared Differences (LSSD)	$\sum_{(i,j) \in W} \left(I_1(i,j) - \frac{\bar{I}_1(i,j)}{\bar{I}_2(x+i,y+j)} I_2(x+i,y+j) \right)^2$
Normalized Cross Correlation (NCC)	$\frac{\sum_{(i,j) \in W} I_1(i,j) \cdot I_2(x+i,y+j)}{\sqrt{\sum_{(i,j) \in W} I_1^2(i,j) \cdot \sum_{(i,j) \in W} I_2^2(x+i,y+j)}}$
Zero-mean Normalized Cross Correlation (ZNCC)	$\frac{\sum_{(i,j) \in W} (I_1(i,j) - \bar{I}_1(i,j)) \cdot (I_2(x+i,y+j) - \bar{I}_2(x+i,y+j))}{\sqrt{\sum_{(i,j) \in W} (I_1(i,j) - \bar{I}_1(i,j))^2 \cdot \sum_{(i,j) \in W} (I_2(x+i,y+j) - \bar{I}_2(x+i,y+j))^2}}$
Sum of Hamming Distances (SHD)	$\sum_{(i,j) \in W} I_1(i,j) \text{ bitwise XOR } I_2(x+i,y+j)$

Or attempt stereo matching at several scales to improve completeness.

Match at half resolution, quarter resolution, etc. to fill in empty disparity values that fail left right test.