

# GCV Assignment4: Geometric Computer Vision Homework

Dai ZiJia 2022233158

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## 1 Q1: What is the natural initial cube of the translation in (4) on the data?

It is the distance between two point cloud center, add and minus a radius.

$$x_{min} = -radius + dist_x$$

$$x_{max} = radius + dist_x$$

$$y_{min} = -radius + dist_y$$

$$y_{max} = radius + dist_y$$

## 2 Q2: Show the absolute translation error and the number of estimated inliers.

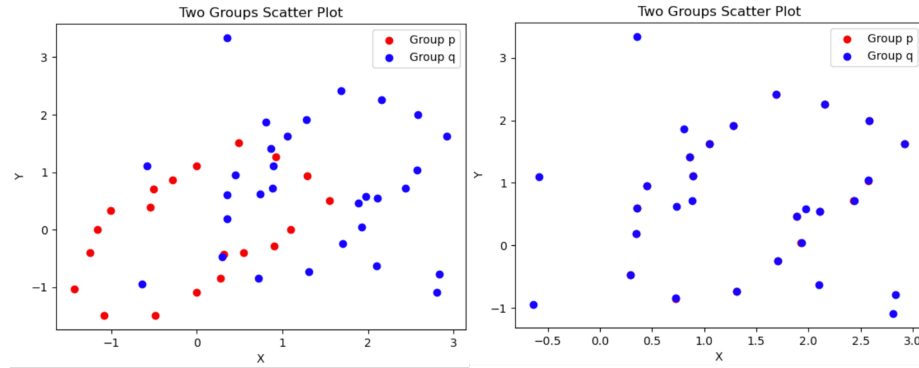


Figure 1: After registration.

Translation error of bound 1: 0.0009988127214888695

The number of estimated inliers: 20

### 3 Q3: Compare two bounds

Yes, it provide a tighter upper bound than the one before. It converge faster than raw ones ( $7 < 9$ ). And has lower translation error for 0.0003909203978461417.

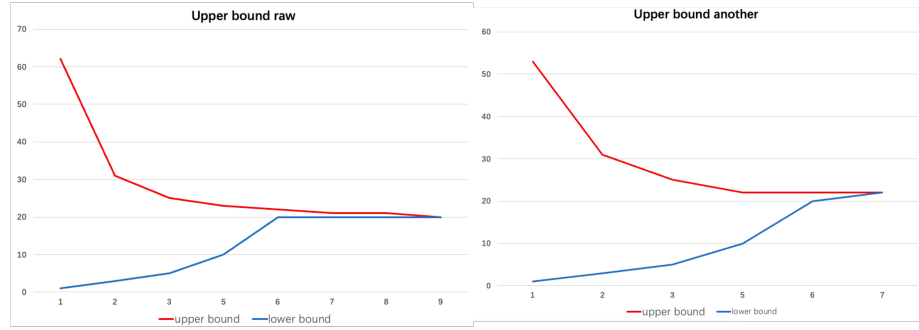


Figure 2: Compare two upper bounds.

### 4 Q4: Extend the 2D point set registration to 3D point set registration

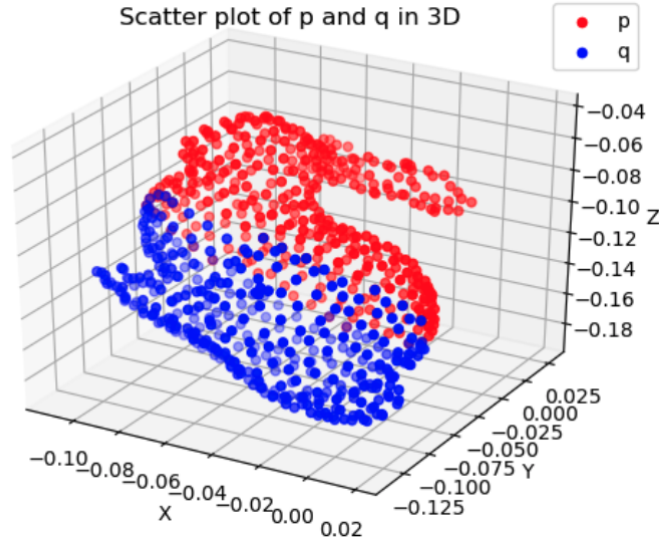


Figure 3: After registration.

$$t_{bnb} : [-0.00257812 - 0.22492187 - 0.09101563]$$