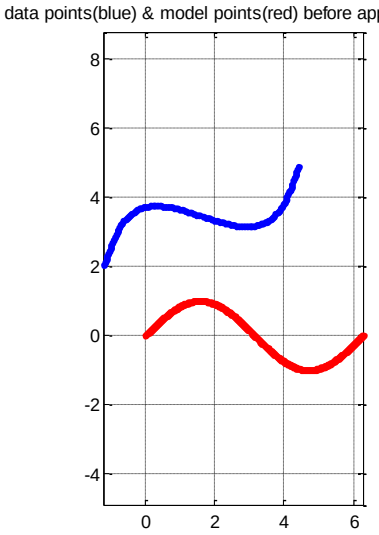
Project #1

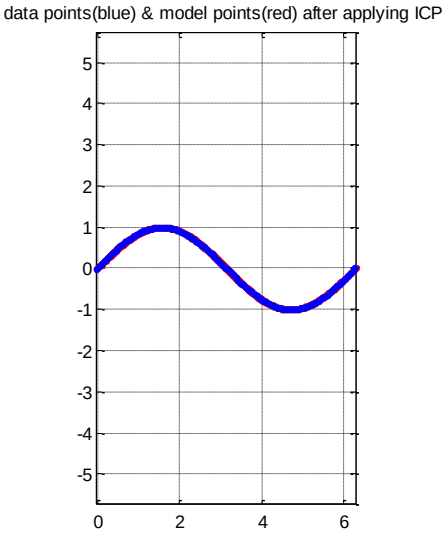
Shuaiyu Liang(sl5352)

Starting date: Sep. 02nd 2015

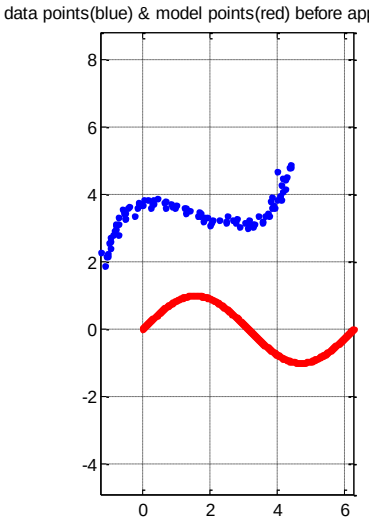
1. Test on all four datasets consequence:

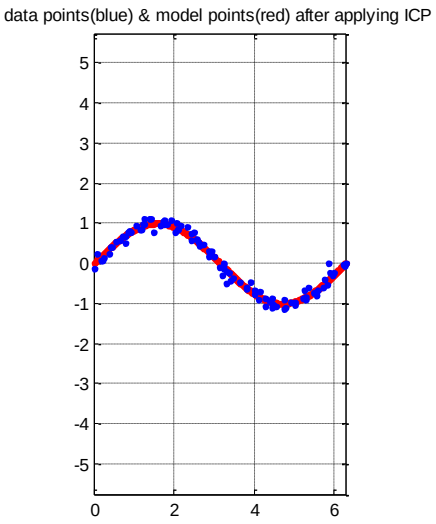
(i) 2D_Line.mat



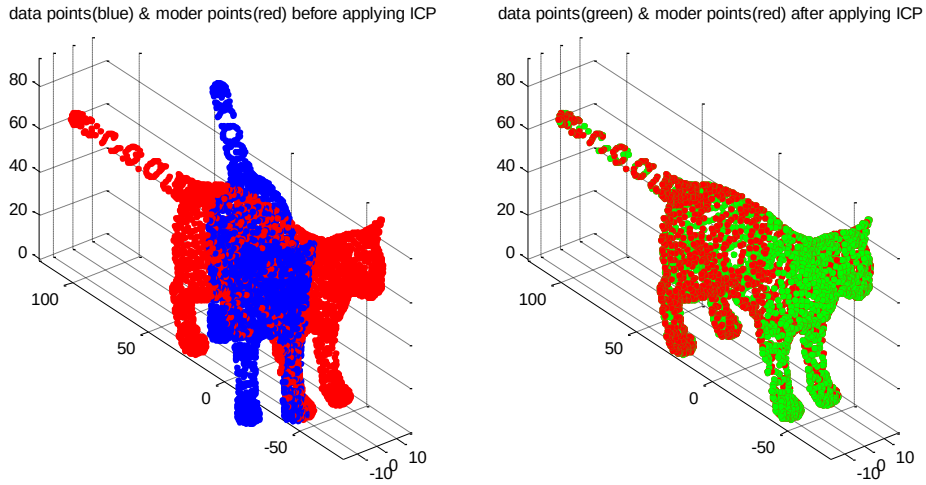


(ii) 2D_Line_Noise.mat

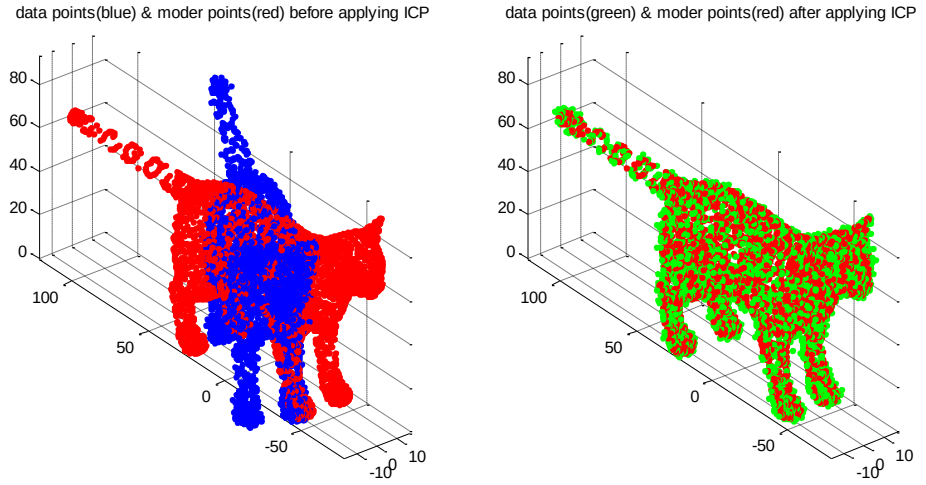




(iii) 3D_Cat.mat



(iv) 3D_Cat_Noise.mat



2. Detailed description on mini project #1

This project's code include 3 parts of file with suffix of .m. That is:

1st, the script, named "Project1_Shuaiyu_Liang_sl5352_script.m"

2nd, ICP function, named "sl5352_icp.m"

3th, plot function, named "sl5352_ploting.m". Because I do not want to write plot function in script several times.

For the core part of this project, ICP function, gives the some basic parameters as minimum and maximum iteration times, threshold to break iteration if distance between two datasets are considered to be closing enough.

When it comes to the iteration part, ICP function find the nearest point first, and return the index and length of correspondence points. Then it compute the centroid of model and source dataset in

current iteration. Then decentered each point by minus centroid point from two datasets respectively. This step prepared for calculating the covariance matrix and this matrix could further help us getting the rotation matrix and translation matrix by using SVD. After acquiring these matrices, ICP function renew the source by implementing the rotation and translation matrix. We could also record each times rotation and translation matrix. Then renew each time's rotation and translation parameters, if we are also interested in finding rotation and translation matrix. Break till iteration end or we are satisfied with two dataset's distance.

For the script, simply type witch mat file you want to load to workspace. After that, lines in script are going to check the input dataset format to figure if it needs further adjustment. Implement ICP by calling the function sl5352_icp, without returning. (Because we here do not interested in rotation and translation matrix.) Call plot function both before and after implement ICP algorithm.