Trimmean()

Mad()

Plot of errors(mean variance) to #nodes actived in the last n seconds

Root mean square of derivation from the true trajectory of EKF

Calibration-Free Localization.m >>

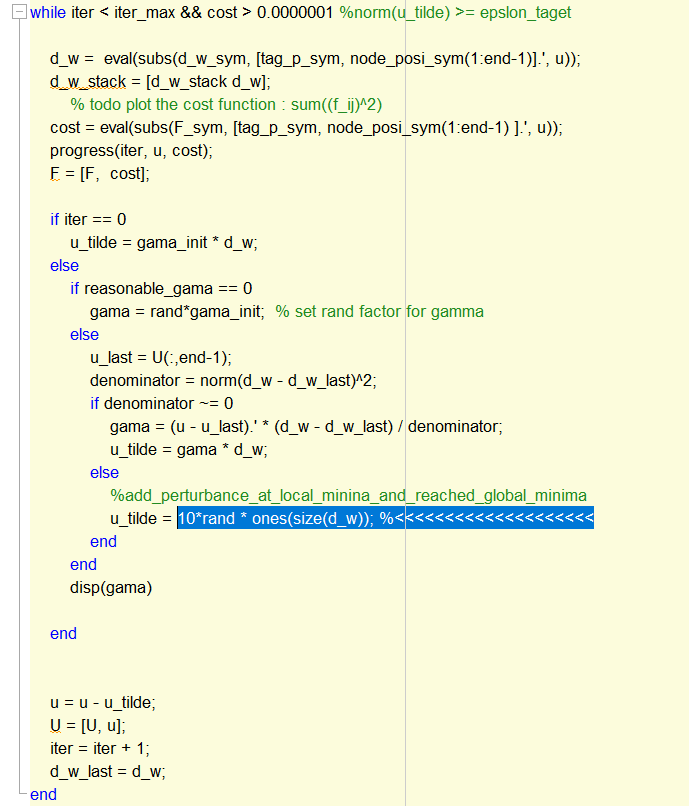
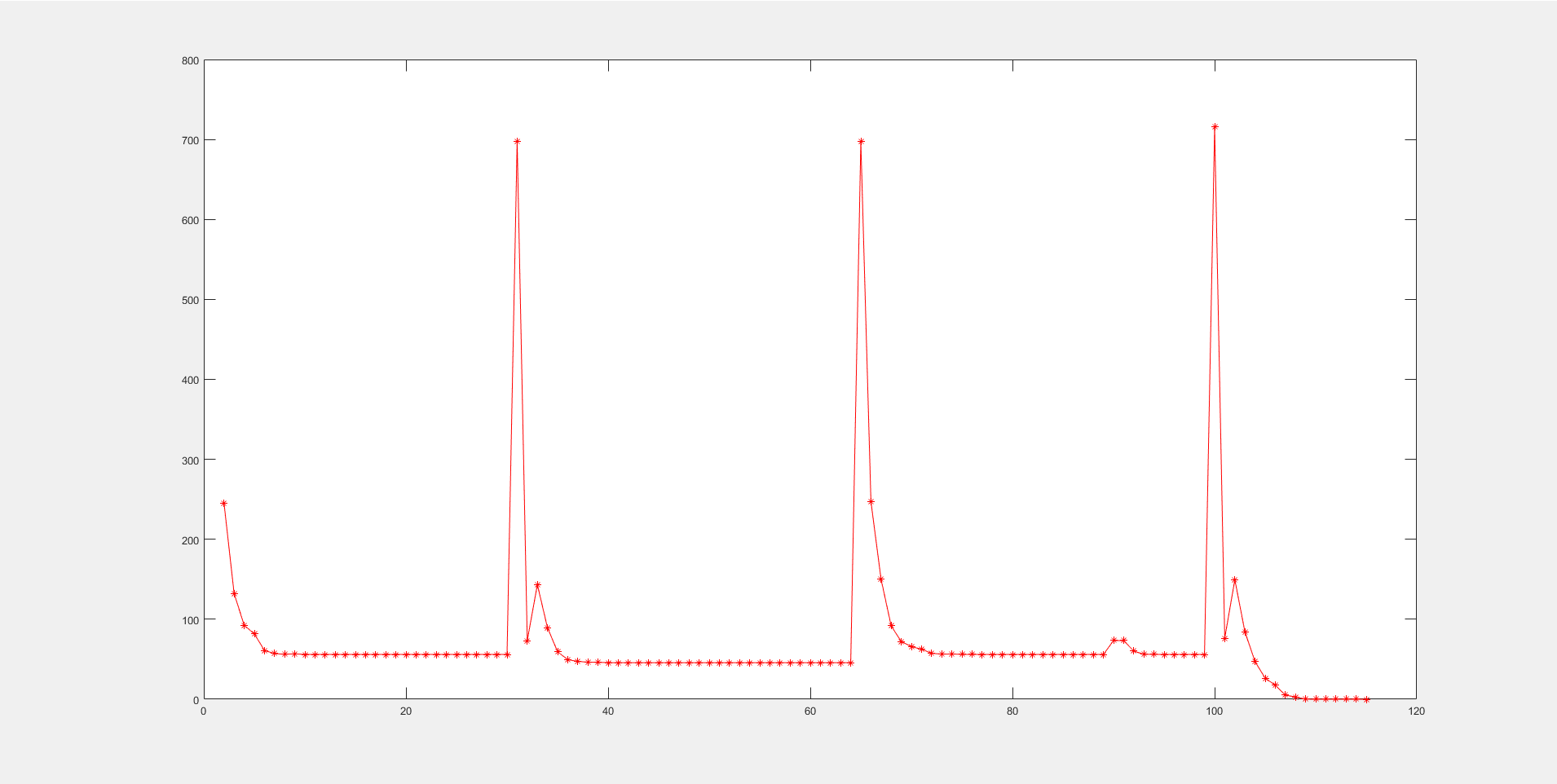
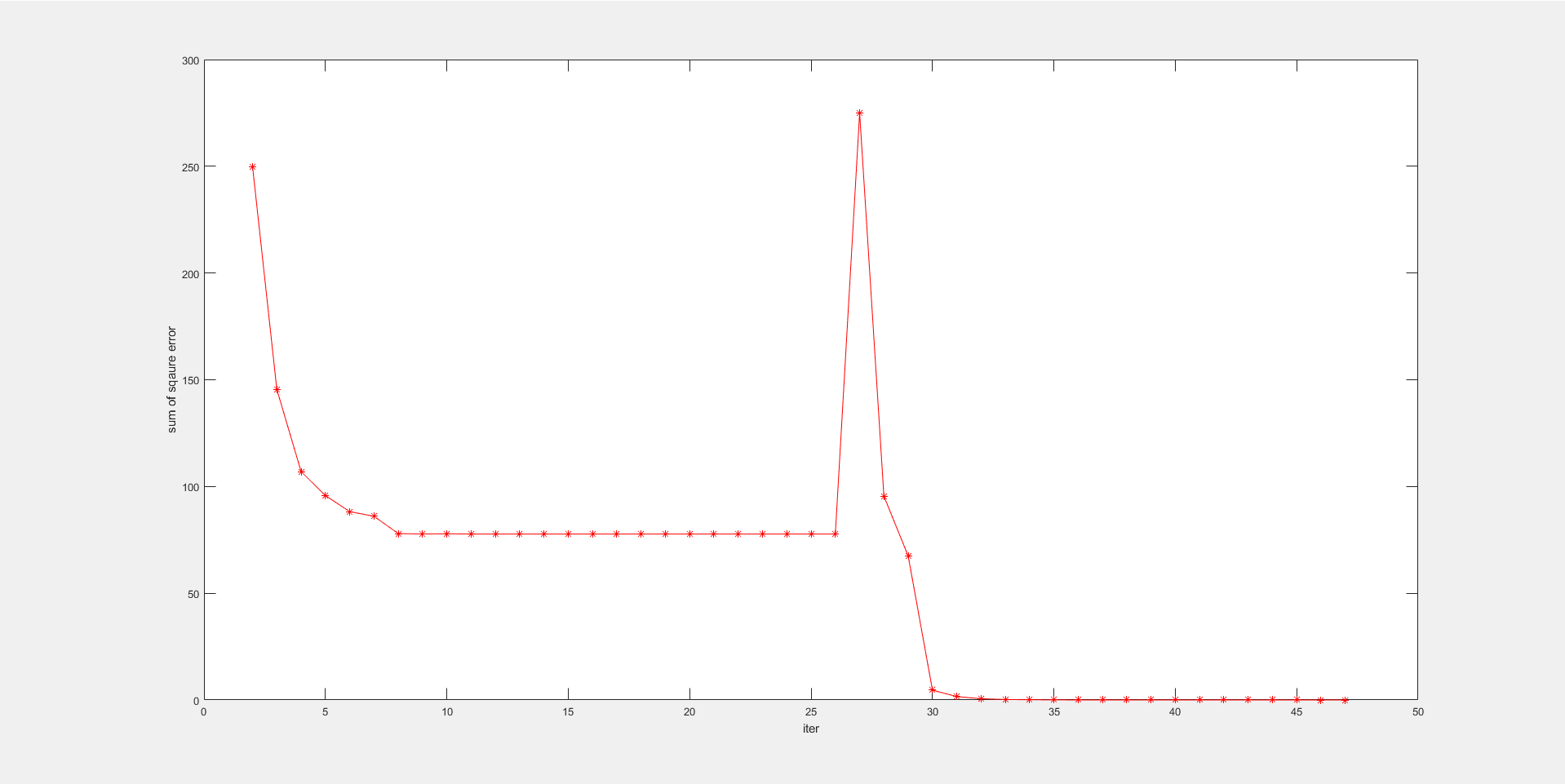
set rand factor for gamma seems could solve local minimal problem :D

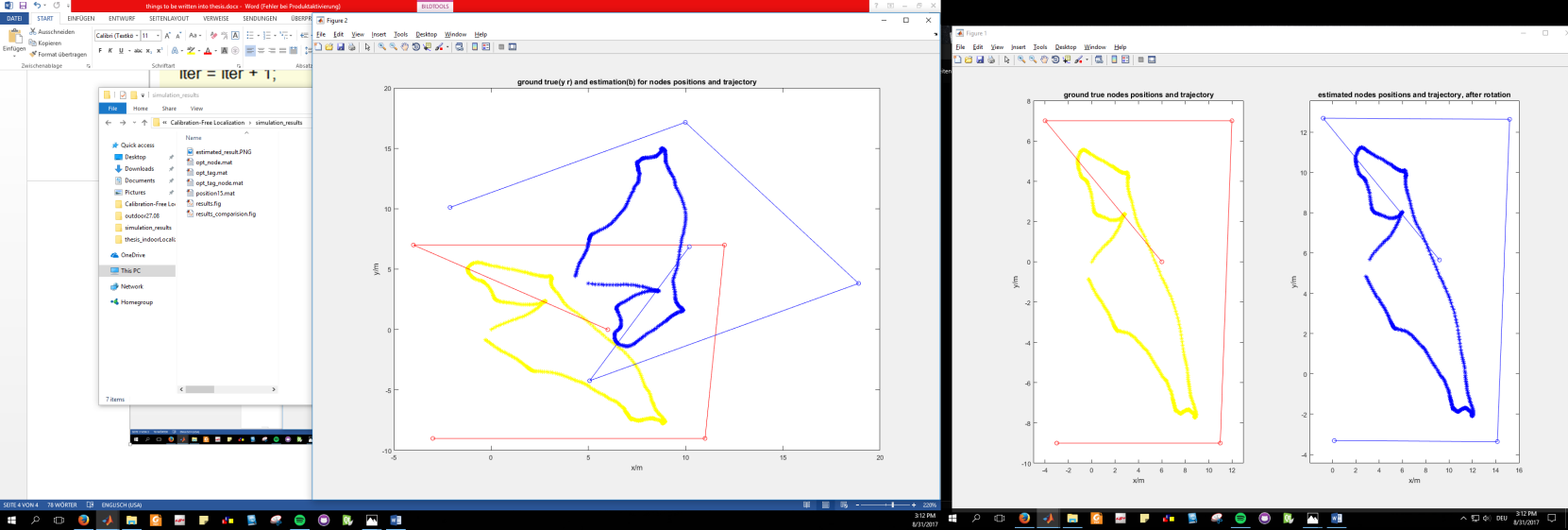
Histogram of outdoor measurements, fitting parameter, fitting results

0x1A1A is much better than others, statistics result to proof that. And that is why the wake up modul should be turn off to test the algorithm

Calibration-Free Localization

add\_perturbance\_at\_local\_minina\_and\_reached\_global\_minima



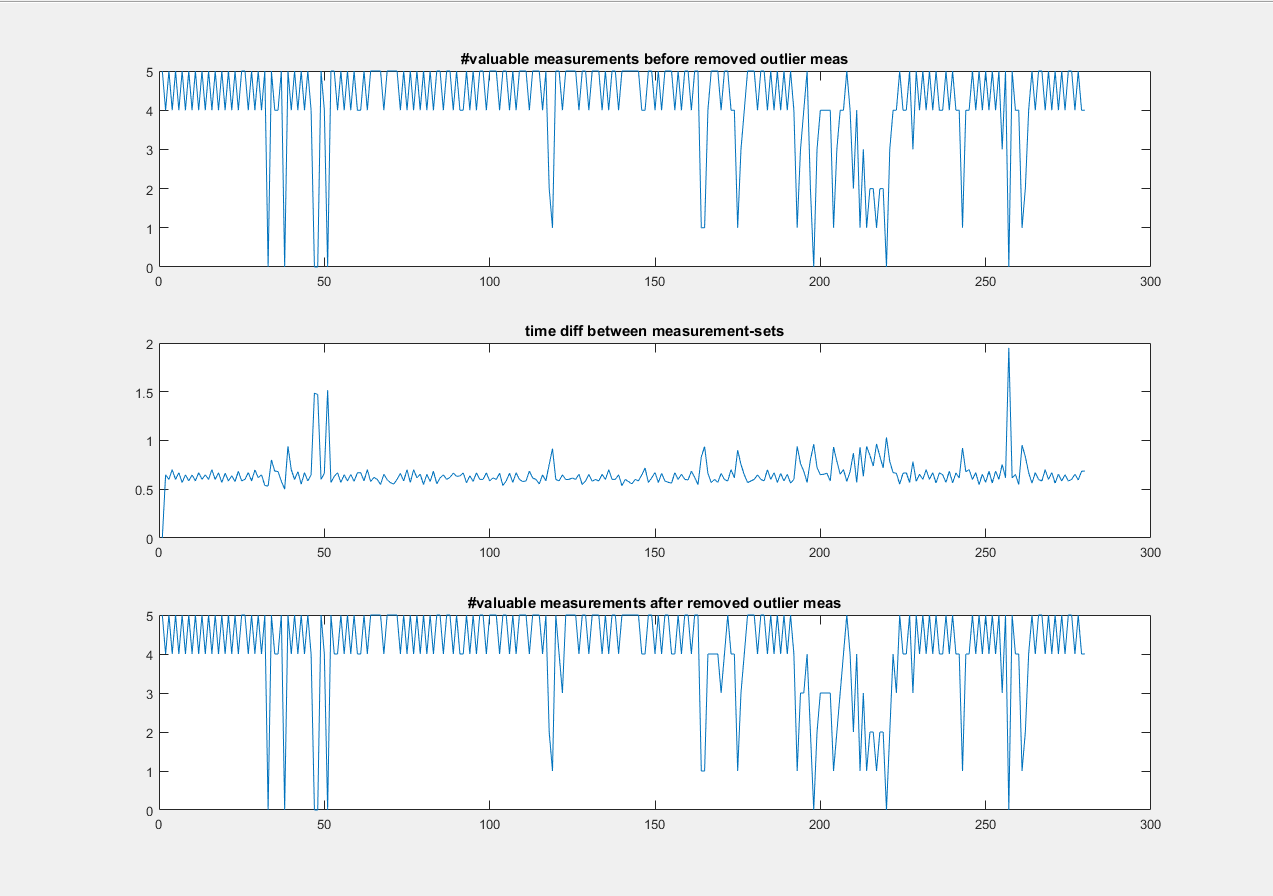


Kstest() matlab

Use hampel() in matlan to find out and remove outlier

Or ekf when time\_diff(i) is too big(>0.9), the estimation for i+1 has bigger Q and smaller R

# Rayleigh distribution



#valuable measurements before/ after removed outlier meas

time diff between measurement-sets

In experiment 4

Command in ‘KF\_using\_HTerm\_data.m’ , ‘title('#valuable measurements before removed outlier meas')’

Save in ‘D:\Yitong\GitHub\thesis\_indoorLocalization\data-from-experiments\experiment\_12.Oct.2017.Hangar\record\_of\_HTerm\outlier\_removement\exper4\NumValuable measurements before-after removed outlier measVStime diff.fig’

Mitigation

Abstract:

Apply EKF usin original meas data, save the residual each step , according to std(residual)-mad(residual), find out the index with big value, treat them as protential bad meas set. Look into this set and look for the residual distribution of this set (5 residual value for 5 meas each set), find out the one far away from the mean(or center), tread this meas value as bad meas, and remove this one from this set. Apply the rest meas to the EKF again.

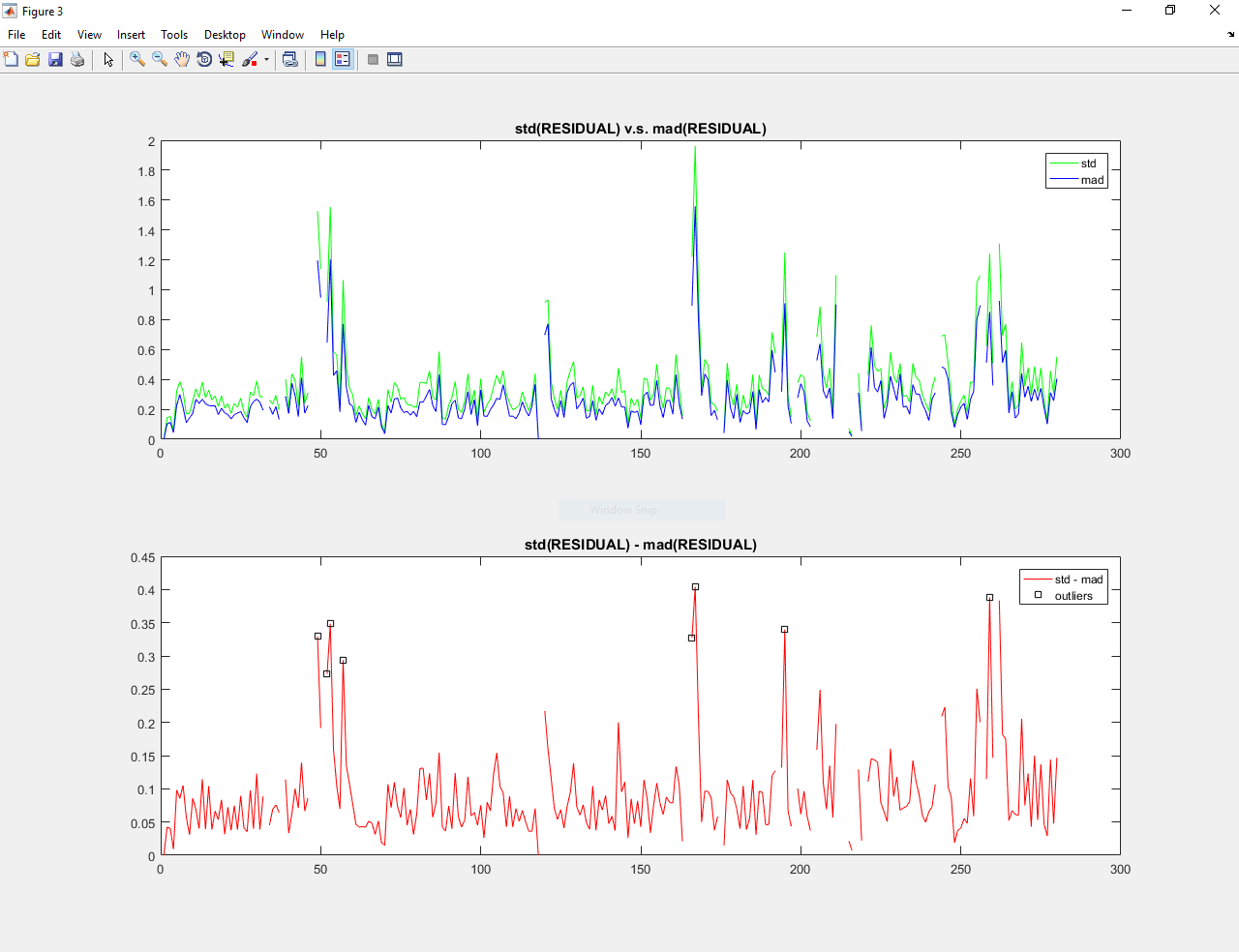
<<<<<

Fig file(D:\Yitong\GitHub\thesis\_indoorLocalization\data-from-experiments\experiment\_12.Oct.2017.Hangar\record\_of\_HTerm\outlier\_removement\exper4\looks like success)

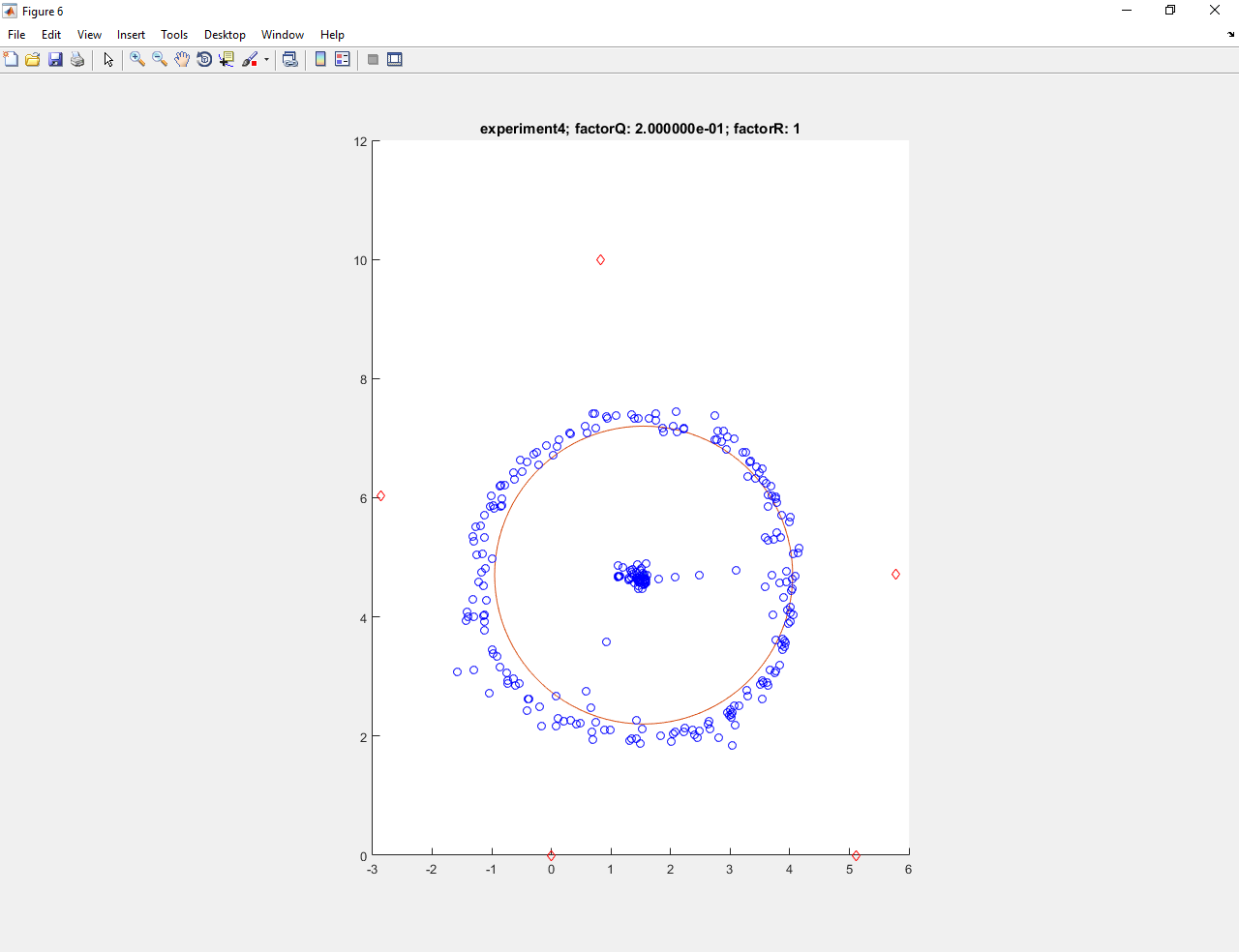
.m file (D:\Yitong\GitHub\thesis\_indoorLocalization\data-from-experiments\experiment\_12.Oct.2017.Hangar\record\_of\_HTerm\KF\_using\_HTerm\_data.m)

<<<<<<<

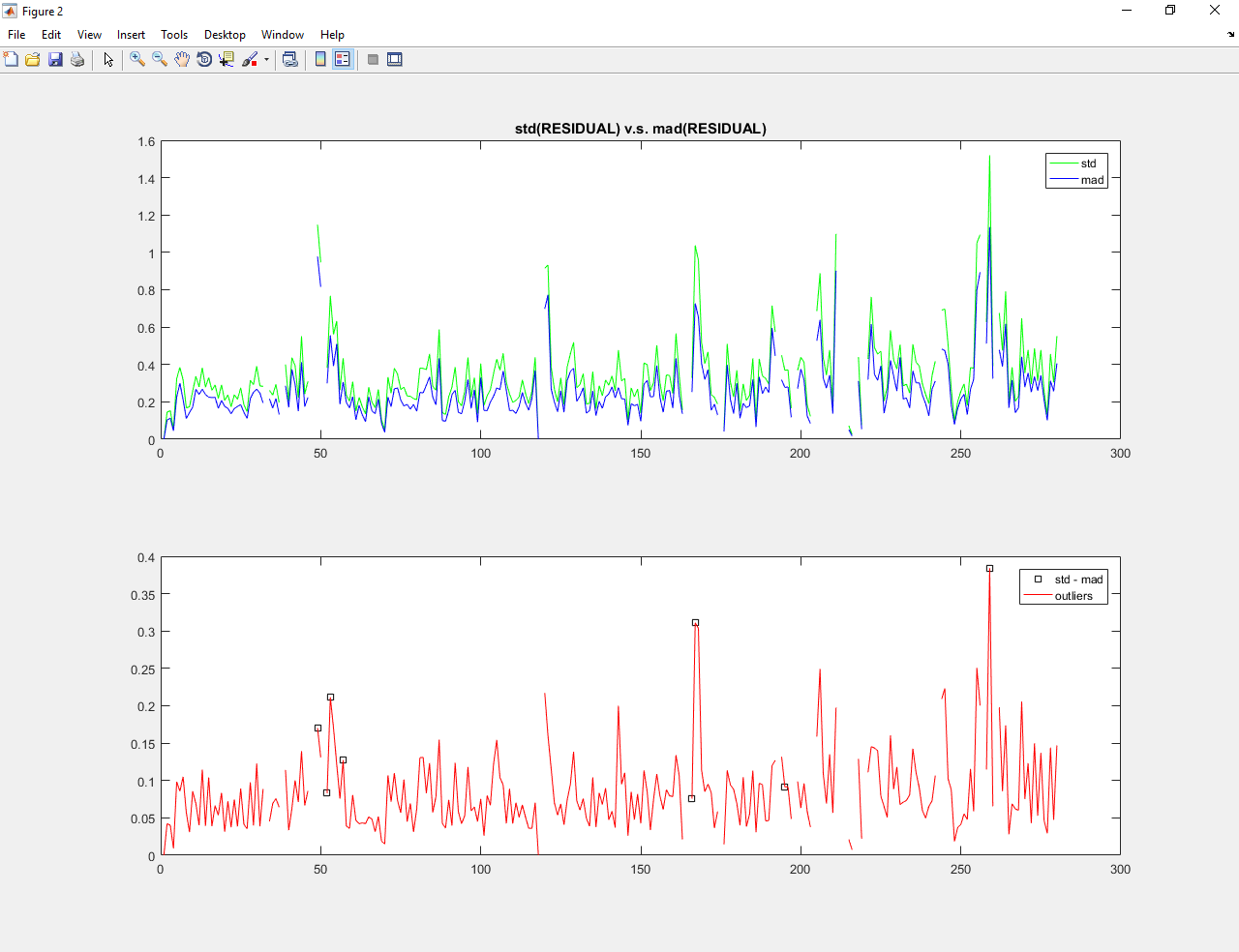
Before



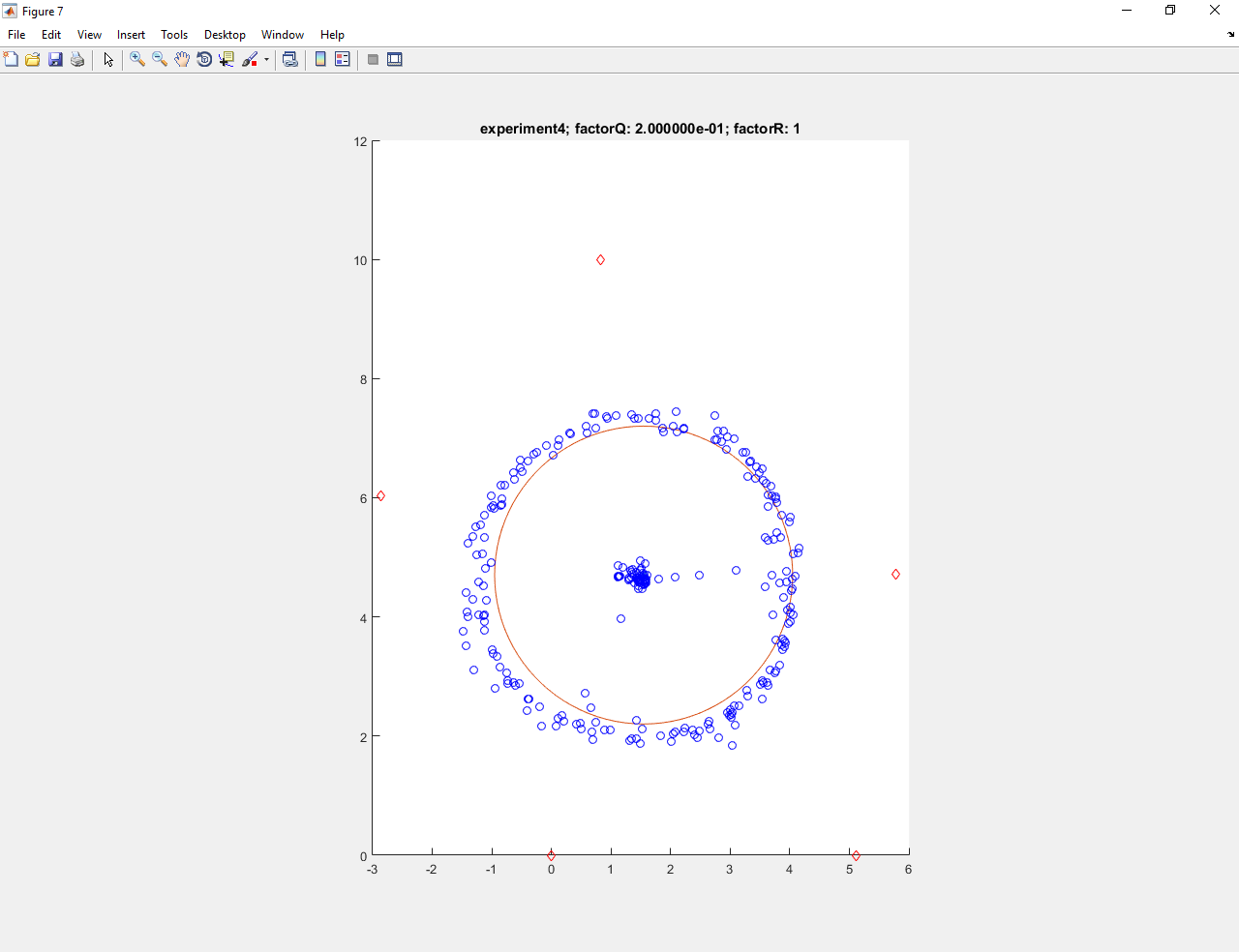
Std-Mad threshold 0.25(the 255-index is excluded because there are only 3 meas, the last one is not included because there are only 2 meas)



After



Result when all data are counted, including the meas set with NaN (dist betwwen tag are not consider)



Self calibration

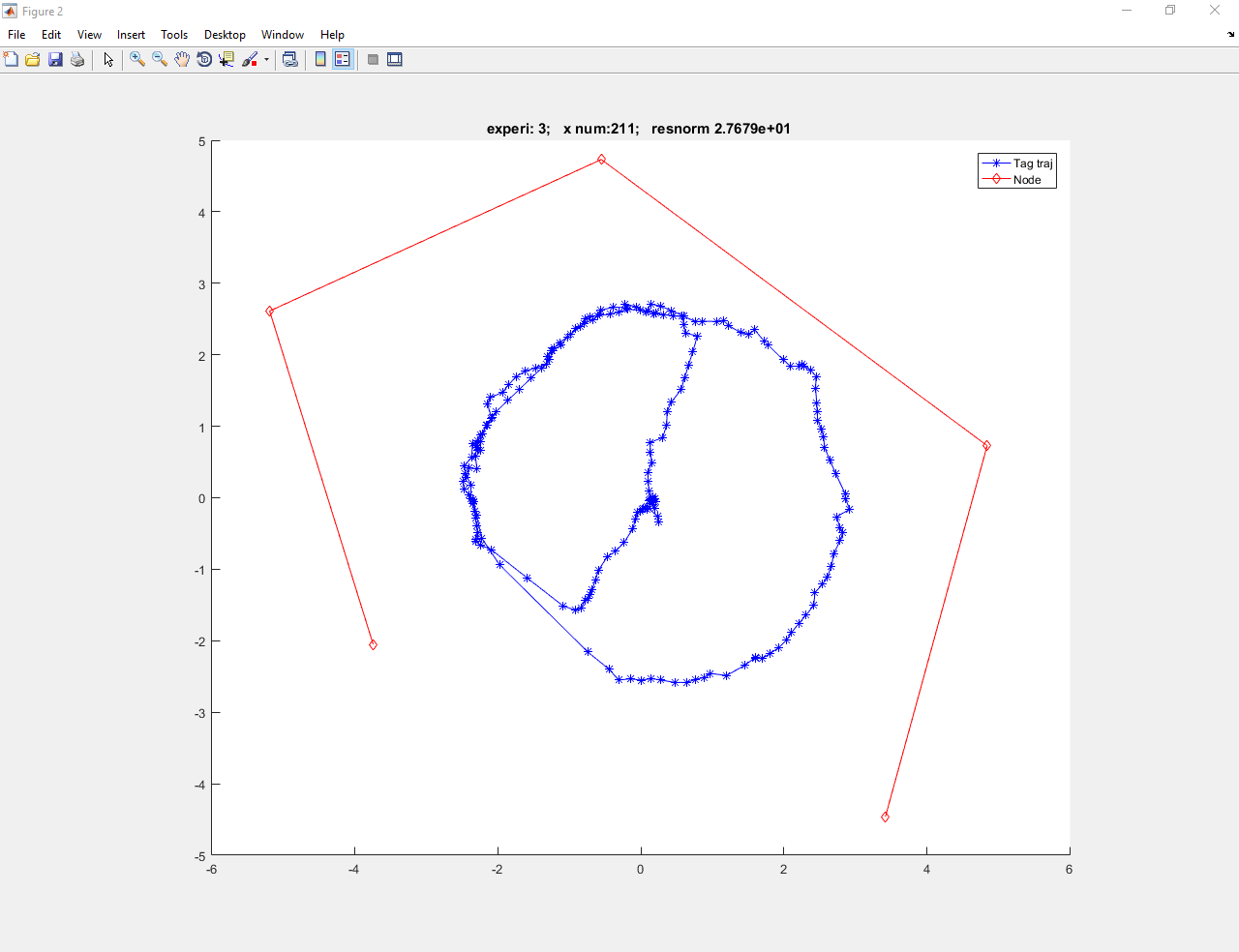
Result are located ’D:\Yitong\GitHub\thesis\_indoorLocalization\data-from-experiments\experiment\_12.Oct.2017.Hangar\record\_of\_HTerm\self\_calibration\_localization\results\full data’

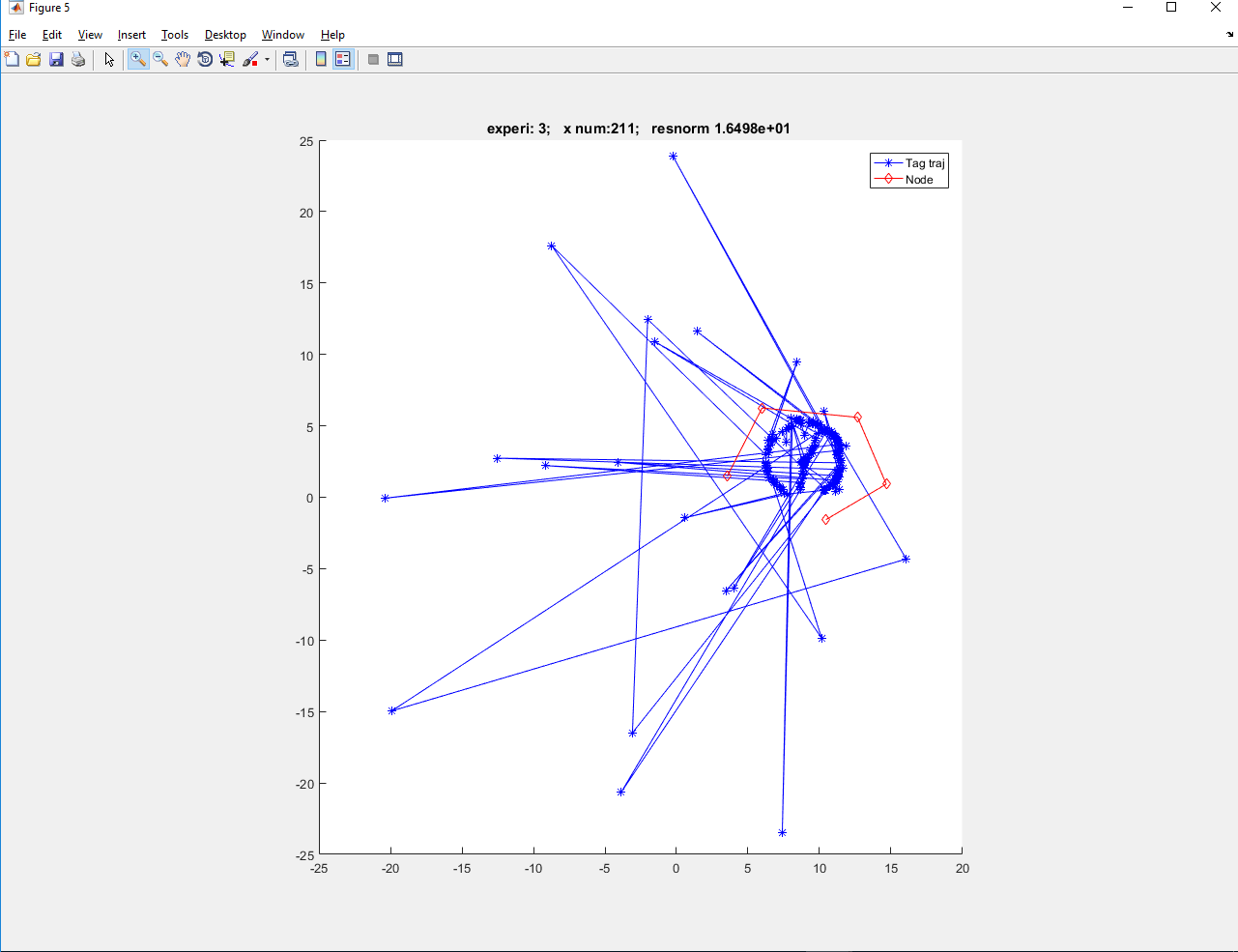
Full data> groupe 0(without any NaN)

1, the whole traj can be recovered instead of only partial

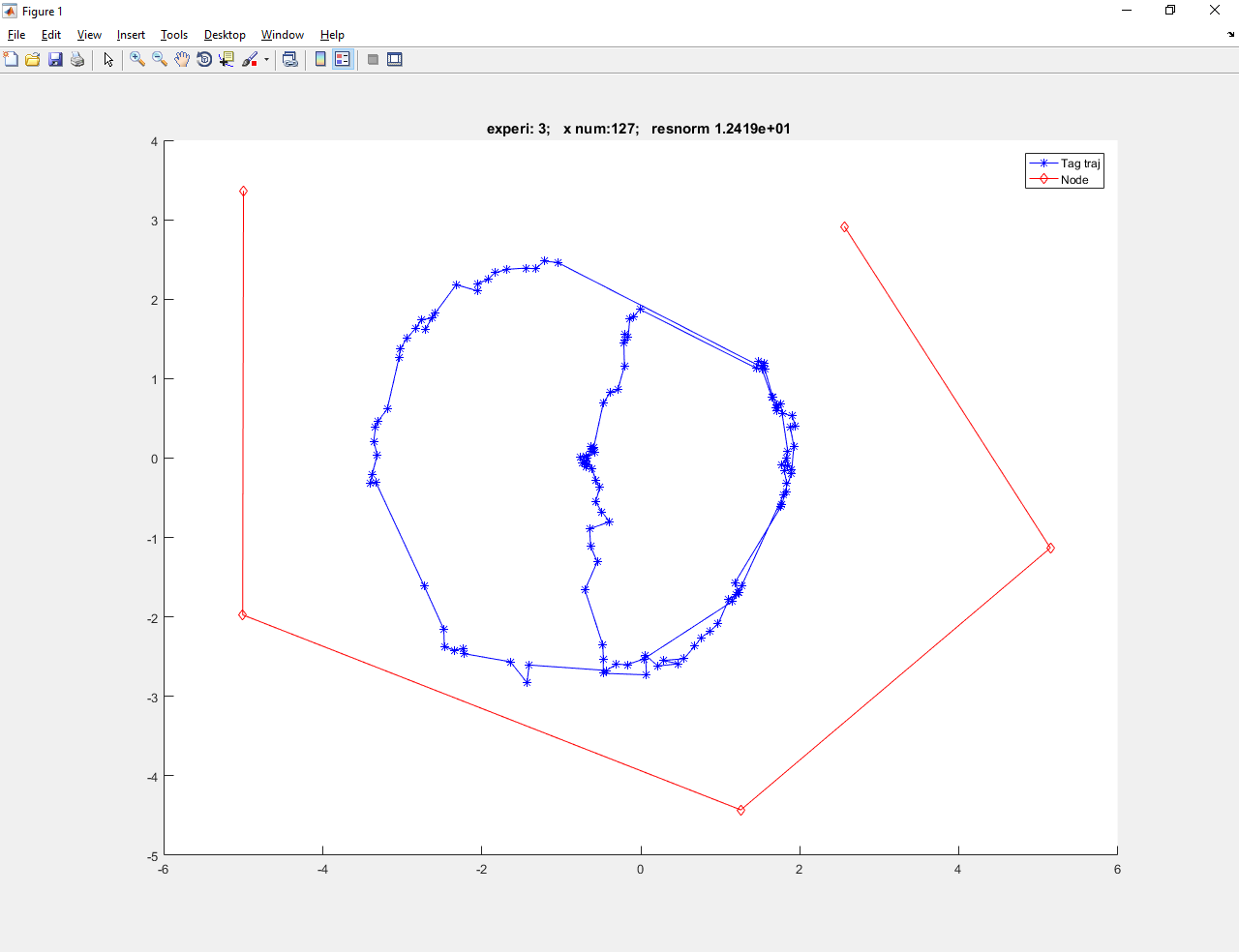
2, the position of the nodes are more accurate, check the value of resnorm after RRT(reflect, rotate, translate)

Result when all data are counted, including the meas set with NaN (dist betwwen tag are consider)

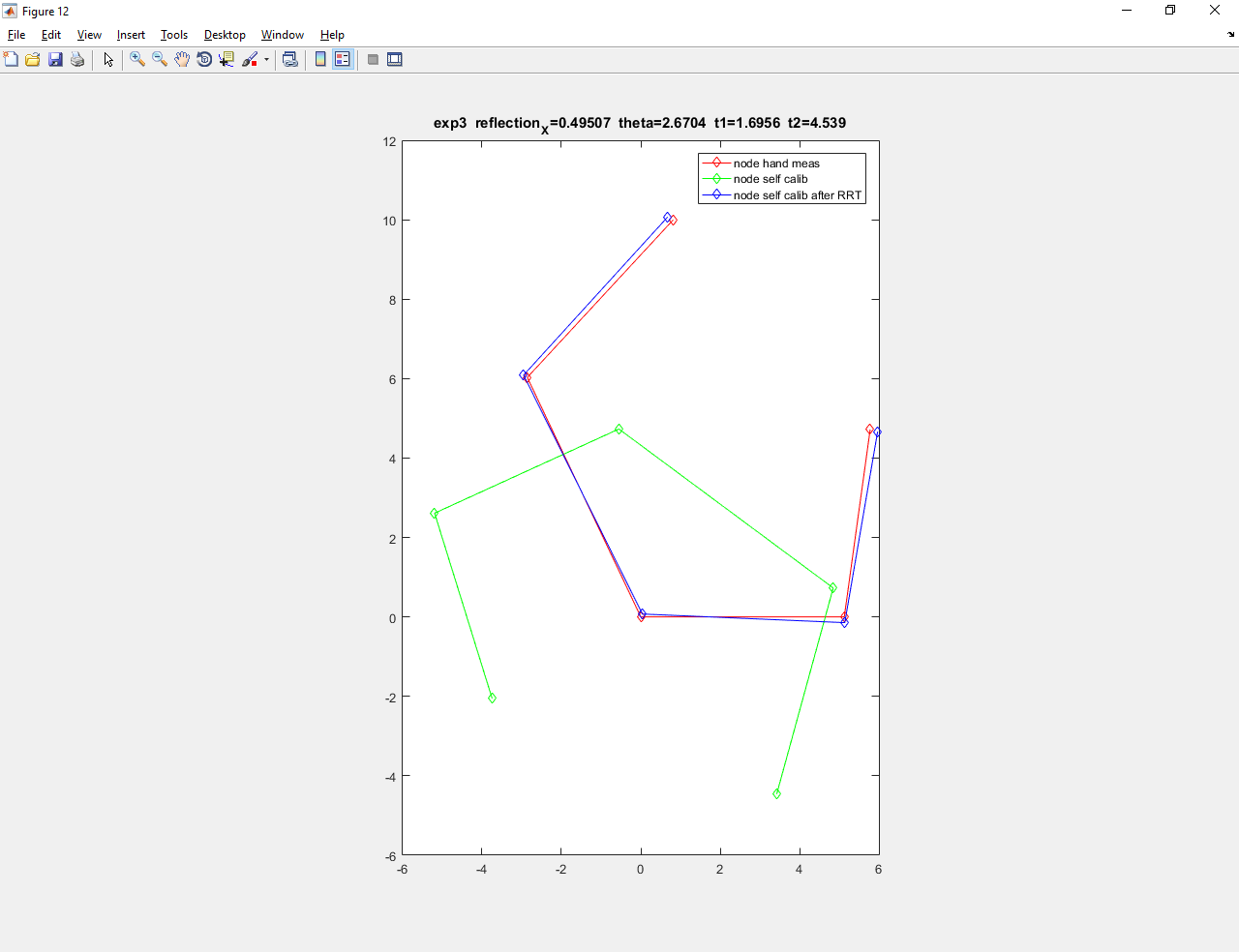


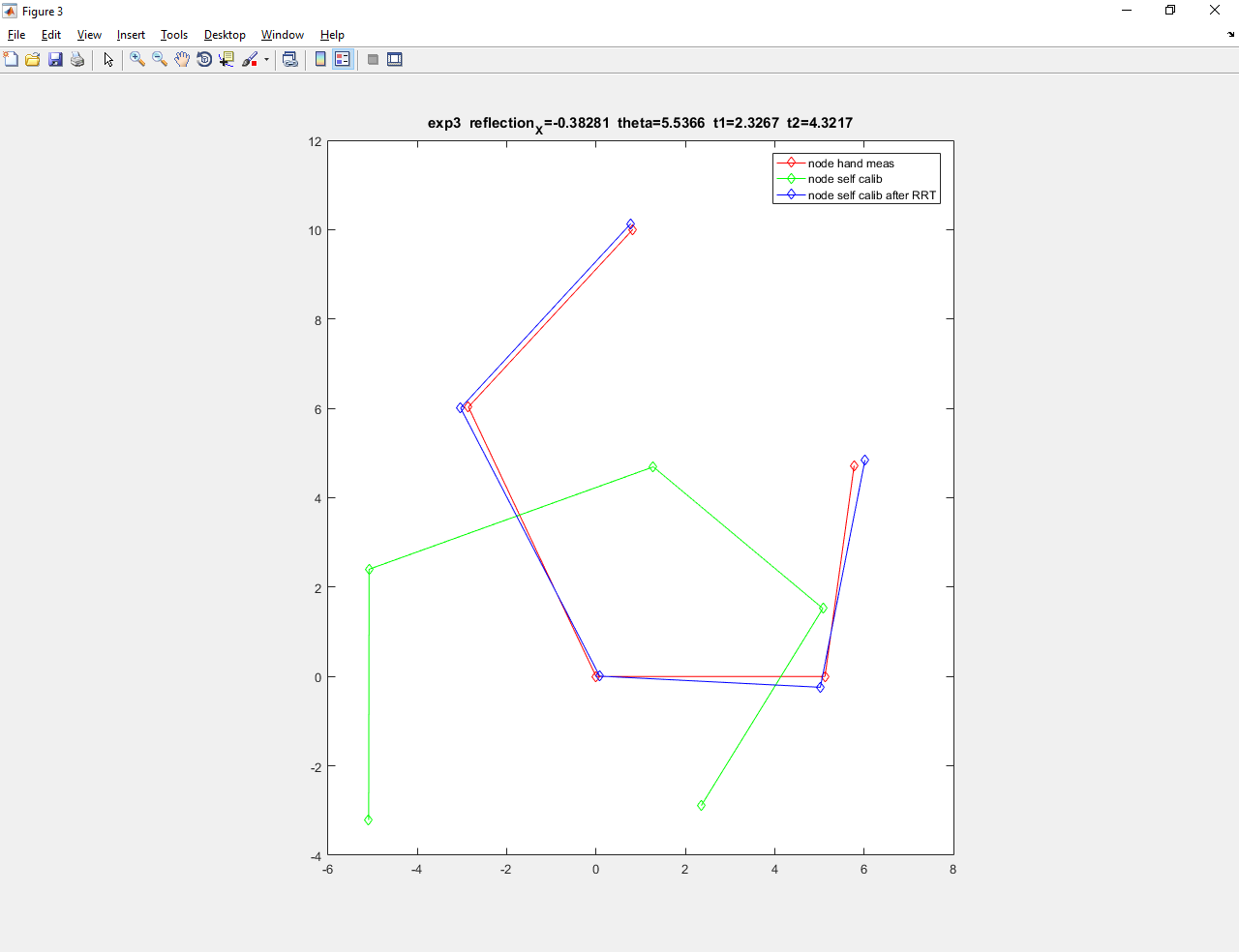


Result when partially data are counted, excluding the meas set with NaN



Compare with hand meas node posi FULL DATA (resnorm\_opt 0.1996)



Compare with hand meas node posi GROUPE0 DATA (resnorm\_opt 0.1033)

1. ms EKF

Location(‘D:\Yitong\GitHub\thesis\_indoorLocalization\trajectory\25ms\_40HzSamplingRate’)