**Task D**
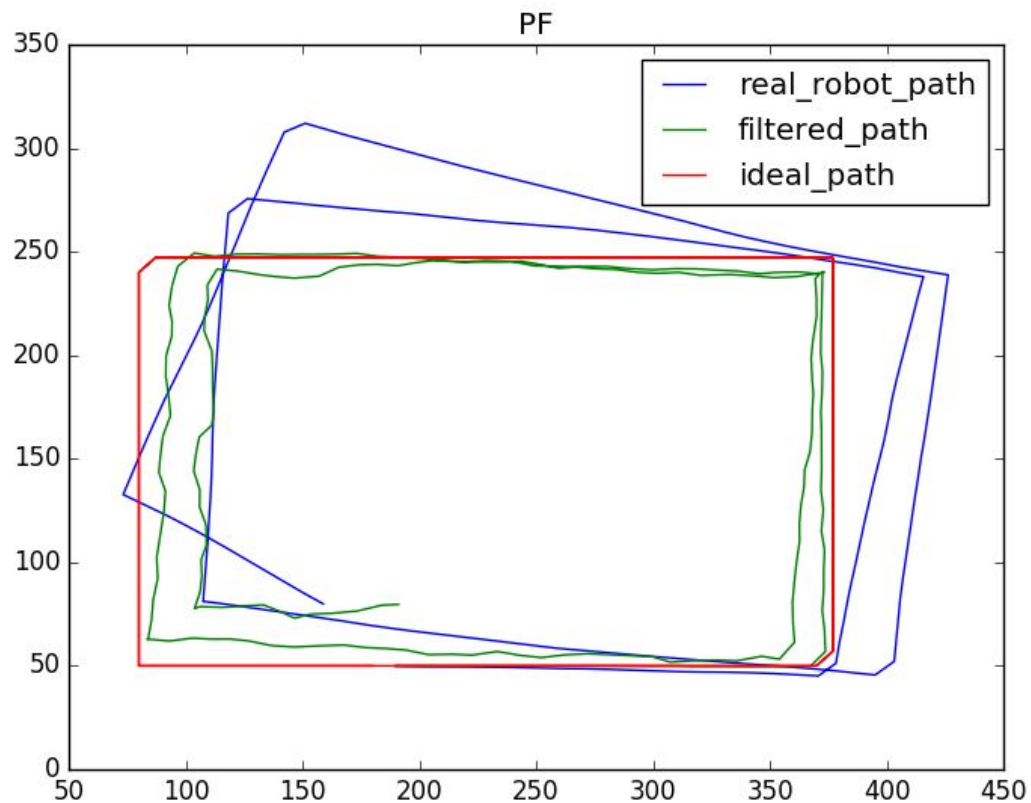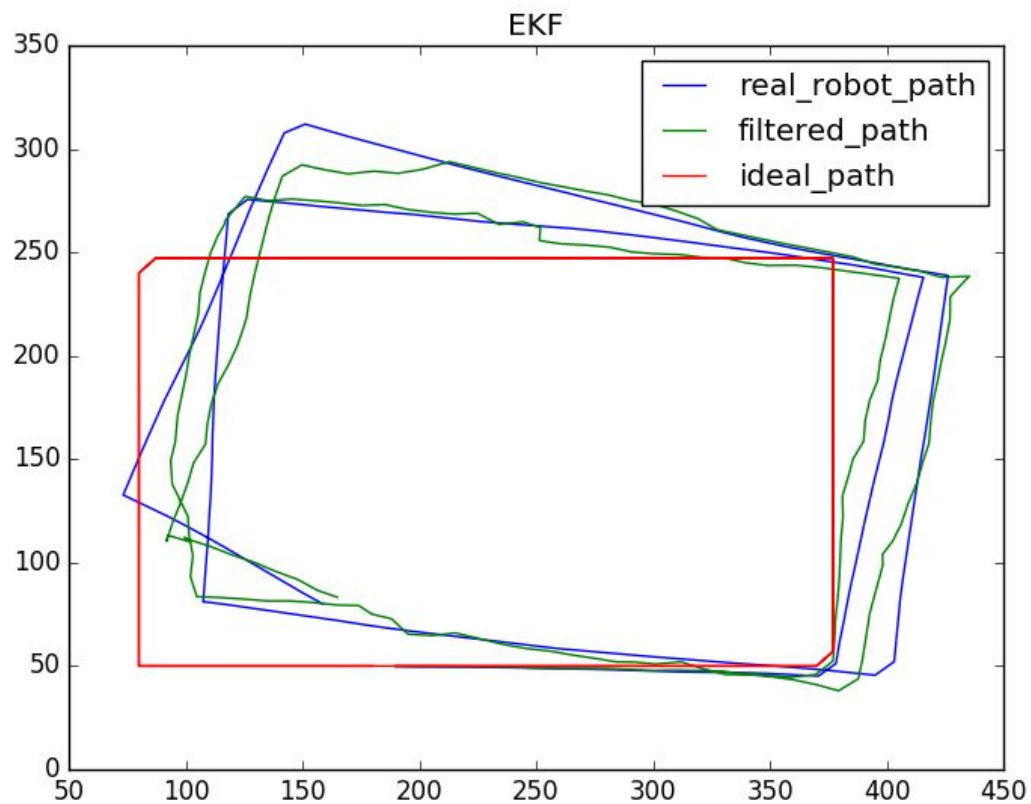
1. Without the sensor the filtered trajectory will follow exactly  actual robots path. The deviation of the blue line from the red is caused by motion noise. If motion noise go toward zero, the robot will move close to the ideal (desired) path.
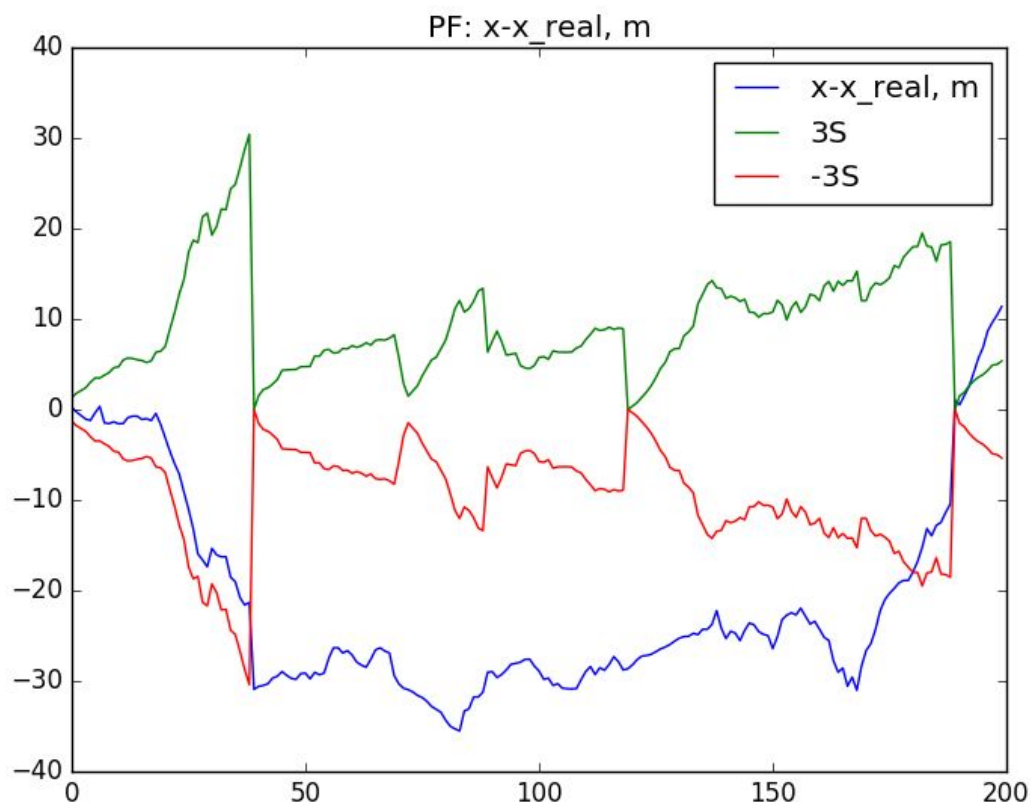


*Observations are **not included** in the filter correction step*

*Observations are **included** in the filter correction step*

2. The accuracy of particle filter decreases if the number of particles decreases. That is why the number of samples affects the accuracy of distribution approximation. However, big number of particles requires more computational resources.

*Particle filter, X-coordinate errors, **100** particles*
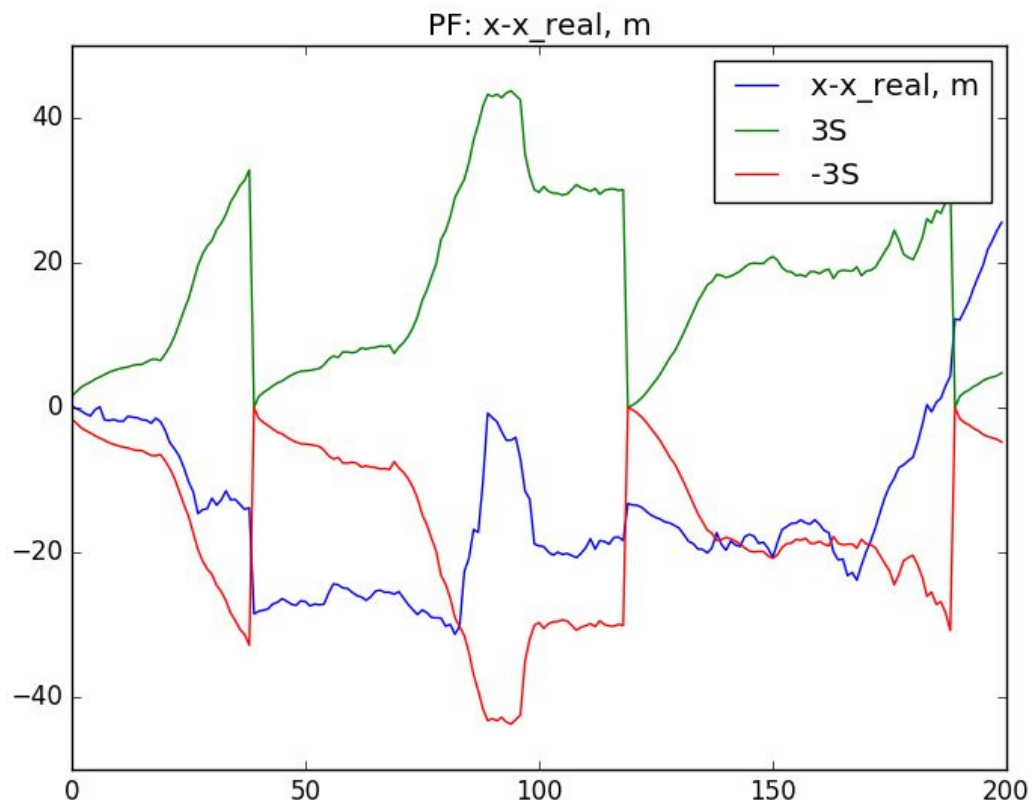
*Particle filter, X-coordinate errors, **1000** particles*

3. Overestimation or underestimation of the noise parameters causes more deviations in robot trajectory from the desired path.