McMaster University

MECHTRON 4AX3

Assignment 4

Satellite based Localization using Extended Kalman Filter

Use the code provided which has Marker (distance,bearing) and Compass (bearing) localization methods for a robot and add the Satellite (distance only) localization.

In the code I added makers **HERE**, these are the places you need to add code. I also give you the gnuplot script to plot Goals:

- If you want you can implement the entire thing in e.g. Matlab or your way. If you skilled programmer thats a good idea, else understand my code which will take you some time too.
- My goal is that you understand whats going on here, that you understand what is model, what is measured and the localization update, and that you play a bit with the noise ...

For the hand in,

1. I only need a plot, use the case with one satellite as its setup initially so we all plot the same.
2. Print only the two procedures

   ```
   void Robot::JacobiHD(Eigen::MatrixXd &H,const Eigen::VectorXd &X,double px, double py)
   ```

   and

   ```
   void Robot::LocalizeS(void)
   ```

   so we can save paper and its easy for us to find what you did .. its only ~ 30-40 lines (if you are a unix person, the best would be to hand in the output of

   ```
   diff satelite_give.cpp  your_code.cpp
   ```

   as then we know exactly what you implemented.