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Pseudocode  
625.714  
Stoch Diff Eq

I have established a github which I will use throughout this project. I intend to store my documents, data, code, and analysis in this github. It can be accessed through this link – please let me know if you have any trouble with it!

<https://github.com/mollyn/SDEFinalProject>

So far in the github I have created:

- Docs folder: This is so that I can keep all articles that I am using accessible. Thus, I can easily track my sources and access them offline (many of them I can only access using my academic license through work). This will be continually updated as I add or remove resources.
- Code folder: Currently includes main.m and utils.m. I will implement all significant parts of the algorithm in main (or possibly break main into several smaller files, if that is a more conducive structure for the algorithms). I will use utils to hold all other content which main needs to operate but which is not directly related to the algorithmic concepts represented in main.
- Analysis folder: This will be the working folder for more dynamic analysis, using the algorithms in the Code folder. I always like to use a properties (props) file to specify all paths and dependencies, so that I can avoid retyping them each time I work. The working file will be where analysis is performed, and of course make use of props.

My course of action will to complete the project will need to be:

- Reread the main paper I am using several times in order to fully understand the algorithm and concepts. Read general Kalman sources in tandem as needed.
- Complete a larger survey of the use of Kalman filters for cybersecurity so that I can provide an overview of the field in my paper. Additionally, do a general survey of methods used for securing cyber physical systems to put the use of the Kalman filter for this application in context.
- Begin with the simpler part of coding: implement state generation for a sample system as described in the paper, using Matlab.
- Continue by implementing the main algorithm from the paper, the Kalman predictor.
- Then turn to more of an analysis focus, and attempt to show examples of a denial of service and a random attack (these were covered in the paper).
- (If possible) Implement the chi-squared test described in the paper, and study if the test can discover attacks such as denial of service and random attack. Perhaps explore the parameters

required from each attack such that the chi-squared test is successful in identifying the attack and does not have too high of a false positive rate.

- Write a summary in the paper about the coding steps and analysis.