

CS295-7 Homework #4

Due before class on Apr. 6th

Goals

1. To familiarize you with Kalman filtering.
2. To get you to implement a Kalman filter and to use it to successfully decode neural data.

The Assignment

Your task is to implement a Kalman filter (as described in Wu et al and the lecture notes) and use it to decode neural data. At the minimum you should implement and run a Kalman filter on same data you used in the first two homework assignments. Above and beyond the implementation and the regular lab report, explain the difference in decoding results between this and particle filtering.

What to Hand In

A “lab report” and your code. Your report will be graded according to the rubric posted on the newsgroup. Your code will be checked for uniqueness and commenting. The report should *minimally* contain plots of reconstructed x and y position vs. actual direction and speed and an analysis of the decoding method. It should also contain a numerical analysis of your results including correlation coefficient and mean square error. It should also introduce, review, and discuss your particle filtering technique and how it worked (or why it didn't). Additionally, compare the results to your particle filter, population vector, and linear filtering results. Explain and comment on the differences. Report relevant decoding results for all.