ECE 8540 Analysis of Tracking Systems

Lab 1 – Model fitting

In this lab, each student is to develop code to fit a model to data. The code can be developed in Matlab, C, or any high level language. No graphics display is required, but a plot of results is required.

For the first part of the lab, fit a 2D line to the following five x,y data points: (5,1); (6,1); (7,2); (8,3); (9,5). Construct the appropriate matrices and solve for the line parameters using the Normal Equations. Report the calculated values of the variables for the line model. Show a plot of the raw data points and the fitted line.

For the second part of the lab, do the same thing but include the point (8,14). What happens? Why?

For the third part of the lab, obtain the data file linked at the web site called "83people-all-meals.txt". The data are for 3,398 meals eaten by 83 different people. The first column is the participant ID, the second column is the meal ID. The third column is the number of bites taken in the meal, and the fourth column is the number of kilocalories consumed. Plot the data using the third column (bites) and the dividend of the fourth and third columns (kilocalories per bite). What type of model looks appropriate for fitting to this data? You will probably need to look at more than one model. Using the normal equations, formulate the matrices and fit that model to the data.

You must submit your report to Canvas. This report is due by midnight of the due date.

We will discuss any questions in class or via email. For this report, any software may be used for graph generation and document writing.