ENGR 231 – Linear Engineering Systems
Spring 2017

Lab 6: In Class Assignment

Create an .m file with the name **lastname_initials_lab6.m** in the cell mode. Upload the published document as a pdf document**.**

In this assignment, we will be using least squares linear fits to measured data as described in the in the prelab. ***Note that other than the form of the design matrix, all formulae for implementation remain the same!*** Perform the following tasks:

1. Create a function called ***linefit*** based on the information in the background file. The function has the following properties:
    a. **Inputs** – X data points (nx1) column vector and Y data points (nx1) column vector.
    b. **Outputs** – Beta values (2x1) column vector and the design matrix D.
    c. **Objective** – Use the X data points to form the ***design matrix D*** for the ***first-degree polynomial estimation***. Use this and the Y column vector to calculate the two beta parameter values.
2. Download *leastSq1.mat* file and load the data into your script. The format of the data is similar to that in Example 2 in the lab instructions. There is a single array with two rows. The first row are the *x* values, the second row the *y* values.
3. Run the ***linefit*** function on the data points
4. Using the resulting beta values from (3), find the estimated Y data points, $\boldsymbol{Y_{EST}}$.
5. Plot the estimated first-degree polynomial fit using the points from (4) and the actual data points.
6. Calculate the ***RMS error*** between the actual data points and the estimated data points.