ECE147C / ME155C Project Required Files Read Me

The zip file includes 2 files: Part1.mat, Part 2.mat

Part 1

“Part1.mat” is the matrix data file for non-parametric identification sine-wave testing. When you load Part1.mat to MATLAB all necessary input output data will appear in the MATLAB workspace.

All readings have 9001 length which is 9 seconds of data. (first second omitted from 10 seconds reading. [1s:10s]) Note that you may need to crop data even further to get rid of transient response fully. Also keep in mind that the data is starting from second 1 not 0 so if you use it as is, the phase information will be wrong. Be careful and calculate where to start/end for each frequency.

There are 40 different frequency readings ranging between 2rad/sec up to 90 rad/sec.

Input data are named in the format: Part1_10rad_s_input_1. Which is a 9001x1 array that includes the input data for the w = 10rad/s reading (unit V).

Output data are named in the format: Part1_20rad_s_output_1. Which is a 9001x3 array that includes output information for w = 20 rad/s. First column is time (unit seconds). Second column is main cart position (unit ticks on its wheel, you need to convert this into meters if your transfer function output unit is meters.) Third column is actual output which is cart position connected to the spring. (Again, unit is ticks so convert to meters if transfer function output unit is meters).

How to convert encoder reading to meters?

Multiplying the encoder reading by 2pi/4096 will yield radians value. Circumference of the wheel is around 0.1 meters.

Part 2

Similar to part 1, there are inputs and outputs in Part2.mat file. Input output naming and columns are same as part 1. Only the frequency naming is different which is explained below. Also note that there are square waves and chirp waves. It is recommended that you plot the inputs in MATLAB to prevent any type of confusions in general especially the square waves.

Chirp wave types will be named like: Part2_chirp_0p001_90_output_1 which indicates that this will be a 9001x3 array that includes similar output information as part 1. Chirp wave frequency range is from 0.001 to 90 Hz.

This part might be tricky so it is recommended that you utilize and explore with both my_id( ) function and MATLAB built in arx( ) function.