Module 11: The Promises and Pitfalls of the FFT, and Bode Plots

M11 Exercise

Instructions

1. Perform a spectral analysis on the data found in file **mod11_spectral_analysis_data.mat**. Create an m-file named "spectral_analysis_LastName.m" that uses the FFT to compute the spectrum of the signal. Plot out the spectrum both in terms of its raw magnitude and in dB relative to the peak value. Use the "text" command to annotate the dB plot to indicate the main and secondary peaks. Also, indicate the level of the secondary peaks (in dB) relative to the main peak. Note: in the data file, 'fs' is the sampling rate in units of samples-per-second; 't' is the time vector in units of seconds; and 's' is the sampled data signal.

2. Download **BodePlot1.m**. Copy lines 78 through the end of the m file. Call the new file "BodePlotHomework_LastName.m". Modify the code to plot a Bode plot for the function:

$$H(s) = \frac{4000(5+s)}{(10+s)(100+s)^2} \quad \frac{V}{V}$$

3. Please use the **Homework template (Word)** when submitting your work.

For this exercise, you should submit the following files in the M11 Exercise submission area:

1. spectral_analysis_LastName.m
2. BodePlotHomework_LastName.m

Note: Substitute your last name for LastName in all submitted files.

Please refer to the Course Schedule for due date.