BME 790.01
Fall 2013
Worksheet 6: Fun with Fourier Series

Instructions: Work in class to modify the following MATLAB Program

1. Download FourierS.m. Open a new .m script file to write your code.
2. Please note that this code isn't quite in the form we used in class. Make the modifications to make the A[k] and B[k] coefficients match our book's Trigonmetric Fourier Series definition.
3. You might also notice that order, as defined by the function, actually counts 0th order as 1st order. Make the modifications so the order actually outputs the correct order Fourier Series.
4. Convert the FourierS program from outputting A[k] and B[k] coefficients from the trigonometric Fourier Series into $X[k]$, complex exponential coefficients.
5. Once you've modified the code to output the $X[k]$ coefficients, input a square wave identical to the one we did in class with a period of 10π and feed it into your modified FourierS program. Using the subplot command, plot the magnitude of $X[k]$ coefficients, the phase of $X[k]$ coefficients as well as the Fourier Series representation of the data for 20 terms. Does this match the solution we found in class? Why or why not?
6. Upload your modified FourierS.m program as well as a .pdf of the subplot result.