

Homework Assignment:

1. Create a new function (or functions) to calculate the average of the power spectral density. Your function(s) should be able to calculate an RMS, linear, and time average. At a minimum, your function(s) should take the time series, sampling frequency, and number of averages as inputs and output the average G_{xx} . As a reminder, for
 - a. RMS averaging: use your power spectral density function to calculate the G_{xx} for each individual record and then average.
 - b. Linear averaging: find the FFT for each individual record, average, and then calculate G_{xx} . *****Remember to allow for synchronous averaging*****
 - c. Time averaging: average the records in the time domain and then calculate G_{xx} . *****Remember to allow for synchronous averaging*****
2. Pulse in Noise
 - a. Download 'HW2_pulsenoise.wav' and read it into Matlab.
 - b. Calculate the power spectral density of the wave form using RMS averaging. How many overtones (including the fundamental frequency) can you reliably distinguish?
 - c. Calculate the power spectral density of the wave form using a vector or time average. Use the 'HW2_pulse.wav' file to synchronize the averages. How many overtones can you reliably distinguish?
 - d. Show a plot comparing RMS and vector / time averaging using the same number of averages. Report your observations.