Week 2 Exercise

- Write a function sinfit [x=sinfit(sinamp,noisamp,sinplot) which takes as input sinamp=the amplitude of a sine wave to generate, noisamp=the amplitude of noise to add, sinplot = 1 if you want to plot the result, and returns x = the fitted constant and amplitude of the sine wave.
- The function should make a time vector t=(0:999)/1000., a sine wave vector s=sin(2*pi*t), and a noise vector r=randn([1,1000]). It should then generate a time series b = s*sinamp + r*noisamp, and a matrix containing the two vectors to fit: A=[ones([1 1000]); s]'
- It should then solve Ax=b' and , if sinplot=1, should plot b and (on top) bfit=Ax. It should return x (i.e. 2 numbers). As a check that your function works - If the noise amplitude is noisamp=0, x should be [0 sinamp].
- Use the function to produce plots for sinamp=1, and 5 different values for noisamp (0.1,0.5,1,2,5).
- Now write a function which 1) creates a variable sest(1000,1), sets noisamp=2, sinamp=1, calls sinfit 1000 times (with sinplot=0)and returns the 1000 values of x(2) in sest (sest stands for estimated amplitude of sine).
- Plot the resulting 1000 different estimates of sinamp, and calculate the mean and standard deviation.
- Change your function to use noisamp=0.5 and repeat.
- Put your plots together into a document, and list the values you have calculated. Comment briefly on how well the fit works with different amounts of noise.
- NB document presentation doesn't have to be beautiful!