EGR 280 Lab 12
Discussion of Results

1. Part I - Linear
    a. The cross correlation was determined at both 20dB and -10dB. For SNR = 20dB, the peak was found at exactly 2000, which is exactly 2 * delta. For SNR = -10dB, however, the peak was found at 1426, which is not very close (note, for other runs at -10dB the peak was at 21, 615, etc.). The maximum noise ratio that still resulted in a decent estimate for the peak was at 9dB, giving a peak at 1997. This maximum noise ratio increased as the sample size increased. The accuracy did not depend on the amount of delay.
2. Part II Sinusoidal
    a. The autocorrelation was determined using different sample sizes, SNRs, and frequencies. Using a frequency of 1Hz, the Ryy signal was quite clean at 20dB for sample sizes of 200, 2000, and 20000. However, using a -10dB SNR and 2000 sample size resulted in indistinguishable data. The maximum noise was found at -2dB, using 2000 samples with a delta t of 0.1s.
    b. At an SNR of -10dB the frequency was changed from 1Hz until the Ryy signal was distinguishable. This required a frequency of 0.01Hz.
    c. Also, the longer data records (although more difficult to see because it was packed into my small screen) was easily more accurate than the smaller data record runs.
    d. In spite of the aforementioned findings, I was never really able to determine my frequency of 1Hz from the Ryy plots. This may have just been my t axis scaling being off, but I could never figure out why.