STAT 496
Homework 3 Problems
due Wed. Sept. 28

4 Problems. Show all work.
Please follow the Lab report directions off the homework web page for R Problems (Problems 3 and 4). Please work in HW Groups!

Indicate the leader for each problem. Be sure to switch leaders on Problem 1 and 2.

1. p. 81: 4.5 (Note: These are AR(1) models.)
You just need to calculate and sketch the autocorrelation function for $k = 0, 1, 2, 3, 4, 5$ lags. You can do this by hand. Your sketches should look similar to the plots on p. 67, except you only need to make the plots for lag $k = 0, 1, 2, 3, 4, 5$. (You can check your calculations by using the R function `ARMAacf` used in the Lab.

2. Similar to p. 81: 4.5, but use the following MA(1) models:
(a) $\theta_1 = 0.6$.
(b) $\theta_1 = -0.6$.
(c) $\theta_1 = 0.95$.
(d) $\theta_1 = 0.3$.

You just need to calculate and sketch the autocorrelation function for $k = 0, 1, 2, 3, 4, 5$ lags. You can do this by hand. Your sketches should look similar to the plots on p. 67, except you only need to make the plots for lag $k = 0, 1, 2, 3, 4, 5$ and these are MA(1) models. (You can check your calculations by using the R function `ARMAacf` used in the Lab.

3. Repeat Problem 1, but use the R function `arima` to simulate a time series of length $n = 500$. Make a time series plot of the data and a sample autocorrelation function plot. (See the Lab.) You should have 4 simulated datasets. How do the sample autocorrleation functions compare to the ones you calculated in Problem 1?

4. Repeat Problem 2, but use the R function `arima` to simulate a time series of length $n = 500$. Make a time series plot of the data and a sample autocorrelation function plot. (See the Lab.) You should have 4 simulated datasets. How do the sample autocorrelation functions compare to the ones you calculated in Problem 2?