

STAT 496
Homework 3 Problems
due Wed. Sept. 26

4 Problems. Show all work.

These problems are to be done by hand. Please hand in a hard copy at the start of class. No electronic submission for this assignment. Please work in HW Groups!

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 $k = 0, 1, 2, 3, 4, 5$. Make sure to include the $k = 0$ and ρ_0 on your plot. (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. Make sure to include the $k = 0$ and ρ_0 on your plot. (You can check your calculations by using the R function `ARMAacf` used in the Lab.)

3. Consider a white noise process: $Y_t = e_t$, where the e_t is a sequence of i.i.d. random variable distributed $N(0, 1)$. Calculate and sketch the autocorrelation function for $k = 0, 1, 2, 3, 4, 5$ lags. You can do this by hand. Make sure to include the $k = 0$ and ρ_0 on your plot.

4. Consider two MA(1) processes with $\theta_1 = 0.5$ and $\theta_1 = 2$. Calculate ρ_1 for each model. What is your conclusion?