STAT 485/685 Lecture 5
Fall 2017
21 September 2017

- I discussed estimating trends.
- I began by recalling my computation of the variance of the mean of a stationary time series.
- Then I computed this variance for an MA(1) process:

$$Y_t = \epsilon_t + a\epsilon_{t-1}.$$

- I showed that $\bar{Y}$ is more variable than for an iid sample with the same value of $\mathrm{Var}(Y)$ if $a > 0$ and less variable if $a < 0$. Averaging positively correlated observations has more variability than if the data being averaged are independent.
- Then I computed the variance for the mean of a random walk.
- That variance gets bigger not smaller as the amount of data increases.
- Then I described how to write linear trends, period trends and cosine trends in the same matrix form:

$$\mathbf{Y} = \mathbf{D}\boldsymbol{\beta} + \text{Error}$$

- I wrote down the Error Sum of Squares for fitting a linear trend and the formula for the slope $\hat{\beta}_1$ and intercept $\hat{\beta}_0$ which minimize the Error Sum of Squares.
- Then I did some computing using `lm` in `R` to fit linear models.
- The code is here.
- In the text I am doing Chapter 3.3 to 3.6.
- You should be Reading all of Chapters 1, 2, and 3.
- Next class I will continue with `R` code and residuals.
- Handwritten slides.