STAT 485/685 Lecture 16
Fall 2017
6 November 2017

- I discussed the accuracy of the sample autocorrelation function

$$r_k = \frac{\sum_{t=k+1}^{T}(Y_t - \bar{Y})(Y_{t-k} - \bar{Y})}{\sum_{t=1}^{T}(Y_t - \bar{Y})^2}$$

  as an estimate of ρ_k.

- I said $\sqrt{T}(r_k - \rho_k)$ has approximately a Normal distribution with mean 0 and variance Σ_{kk}.

- And if I put together

$$\sqrt{T}(r_1 - \rho_1), \ldots, \sqrt{T}(r_k - \rho_k)$$

  then this vector has approximately a multivariate normal distribution with mean 0 and a variance covariance matrix Σ.

- The diagonal entries in this $k \times k$ matrix are $\Sigma_{11}, \ldots, \Sigma_{kk}$; the off-diagonal entries are denoted Σ_{ij} in row i column j.

- Book gives formula as infinite sum.

- I gave formulas for AR(1) and MA(1).

- The dotted lines on the `acf` are the critical values of a hypothesis test of $\rho_j = 0$ computed under the assumption that the series is white noise.

- I discussed the problem of simultaneous comparisons or multiple testing.

- I warned that the dotted lines are not appropriate if the series is not white noise. So if say r_1 is way outside the lines then the dotted lines are not useful for r_2 and so on.

- In general the SE of r_k has the form

$$\frac{\sqrt{\Sigma_{kk}}}{\sqrt{n}}.$$

- For white noise $\Sigma_{kk} = 1$ for all k.

- For AR(1) and MA(1) I discussed how close Σ_{kk} is to 1.

- We are finishing Chapter 6.

- Handwritten slides.