Stat GR5205, Fall 2018

Assignment #5: Due October 31

1. Consider a n-dimensional random variance X with mean covariance matrix Σ. Let A be a $k \times n$ matrix. Show that the covariance matrix of $Y = AX$ is $A\Sigma A^\top$.

2. Consider linear model $y = \beta_0 + \beta_1 x_1 + ... + \beta_p x_p + \varepsilon$ and $\varepsilon \sim N(0, \sigma)$ and hypotheses

$$H_0 : \beta_1 = 0 \quad H_1 : \beta_1 \neq 0.$$

   Show that t-test and F-test are equivalent in the sense that the $T^2 = F$ where T is the t-statistic and F is the F-statistic.

3. Chapter 6, problem 5, a. b. c.

4. Chapter 6, problem 7.

5. Chapter 6, problem 8.

6. Chapter 6, problem 25.