FALL 2021 MATH 484/564 HOMEWORK #5

Due: November 20, 11:59PM, submit in blackboard.

Homework solution is not required to be typed, but must be legible.

All plots must be computer-generated. Hand-sketched plots are not acceptable.

Problem 1 Exercise 9.1 from the TEXT.

Problem 2 Exercise 9.3 from the TEXT. The Gasoline data in Table 9.17 is attached.

Problem 3 Exercise 10.2 from the TEXT.

Problem 4 Using the Longley's data in Table 10.19:

1) Compute the correlation matrix of the six predictors. Do you see any evidence of collinearity? How many different sets of collinearity exist in the data? What are the variables involved in each set of collinearity?

2) Transform the original model ($Y = \beta_0 + \beta_1 X_1 + \ldots + \beta_6 X_6 + \epsilon$) to the standardized model ($\tilde{Y} = \theta_1 \tilde{X}_1 + \ldots + \theta_6 \tilde{X}_6 + \epsilon'$).

3) Compute the principle components. Using Principle Component Regression, first regress $\tilde{Y}$ on all six principle components, provide the estimates of the coefficients θ_j in the standardized model; then decide which principle components you choose to retain and provide the estimates of the coefficients in the standardized model again.

4) Using Ridge Regression, construct the ridge trace. Then use the ridge trace and VIF values, determine the recommended value for k. Provide the estimates of the regression coefficients θ_j in the standardized model using the chosen k value.