MATH 427- Homework 4-Spring 2023

1 Exercise-Using R

This exercise relates to the **Auto** data set, which can be found in Canvas.

(a) Use the appropriate function in R and fit a linear regression model with *mpg* as the response variable and *horsepower* as the predictor, and produce diagnostic plots.

(b) Comment on any problems you see with the fit. Do the residual plots suggest any unusually outliers? Does the leverage plot identify observations with unusually high leverage?

(c) Try a few different transformations of the predictor variable, such as $log(X), \sqrt{X}, X^2$ and produce a scatter plots with the response variable. Which transformation gives the most linear looking plot?

(d) Fit a linear regression model with *mpg* as the response variable and *log(horsepower)* as the predictor variable. Produce the diagnostic plots and comment on your findings.

(e) Now, try the transformations of both, the response variable and the predictor variable $log(X), log(Y)$ and produce the scatter plot.

(f) Fit a linear regression model with *log(mpg)* as the response variable and *log(horsepower)* as the predictor variable. Produce the diagnostic plots. Do you see any improvement?