Assignment 3, 33 Marks
DANA 4810
Fall 2022, Due: Nov 6
Please include your RStudio output and codes to support your answers

Consider question 4.88 form the textbook and the data set: NAVALBASE.

1) [1] The naval base would like to model the projected percentage increase in fleet effectiveness by the end of the decade as a function of the cost of modifying the fleet. Write a quadratic model.

b) [2] Fit the quadratic model to the data.

c) [2] Interpret the value of R_a^2 on the printout.

d) [2] the value of s and interpret it.

e) [2] Perform a test of overall model adequacy. Use $\alpha = 0.05$

f) [2] Is there sufficient evidence to conclude that the percentage improvement increases more quickly for more costly fleet modifications than for less costly fleet modifications? Use $\alpha = 0.05$

g) [2] Determine whether the calculated s in part (d) a reasonable potential error of prediction. What would you recommend?

h) [2] Create a scatterplot to display the relationship between projected percentage improvement at the end of the decade and the cost of modifying the fleet by base. (your graph should have a legend to indicate the categories of the categorical variable, (i.e. Foreign Base, U.S. Base))

i) [1] Does the same overall pattern depicted in part (h) hold for both types of the base? Explain.

j) [4] Compare two fittted curves for both foreign Base and U.S. Base by plotting the two prediction equations on your plot.

k) [2] Based on your conclusion in part (g), (j), propose a model. (Hint: complete second-order model)

l) [2] Fit the complete model of the proposed model in part (k) to the data.

m) [5] Is there sufficient evidence to indicate that type of base (U.S. or foreign) is a useful predictor of percentage improvement? Using $\alpha = .05$ and the critical value approach.

n) [4] What model would you recommend as your best model? Explain your reason(s).