SIE 330R Homework, Spring 2023

HW 5 (Chapter 10)

Homework must be readable! Do not just send in numbers or charts. You must explain the homework answers Preferred to receive homework in Word doc format with any excel or Minitab results pasted into word document. You may choose to use pdf which is also OK.

• Homework #5 10.1, 10.2, 10.5, 10.21

10.1. The tensile strength of a paper product is related to the amount of hardwood in the pulp. Ten samples are produced in the pilot plant, and the data obtained are shown in the following table.

Strength	Percent Hardwood	Strength	Percent Hardwood
160	10	181	20
171	15	188	25
175	15	193	25
182	20	195	28
184	20	200	30

(a) Fit a linear regression model relating strength to percent hardwood.

(b) Test the model in part (a) for significance of regression.

10.2. Plot the residuals from Problem 10.1 and comment on model adequacy.

10.5S. The brake horsepower developed by an automobile engine on a dynamometer is thought to be a function of the engine speed in revolutions per minute (rpm), the road octane number of the fuel, and the engine compression. An experiment is run in the laboratory and the data that follow are collected.

Brake Horsepower	rpm	Road Octane Number	Compression
225	2000	90	100

212	1800	94	95
229	2400	88	110
222	1900	91	96
219	1600	86	100
278	2500	96	110
246	3000	94	98
237	3200	90	100
233	2800	88	105
224	3400	86	97
223	1800	90	100
230	2500	89	104

(a) Fit a multiple linear regression model to the data.

(b) Test for significance of regression. What conclusions can you draw?

(c) Based on *t* tests, do you need all three regressor variables in the model?

10.21. The value of the adjusted R^2 statistic always increases when a new regressor variable is added to the model.

True False