LAB 2: INFERENCE FOR SIMPLE LINEAR REGRESSION

Date Oct. 08th, 2022

Problem 1(Question 2.13). Refer to Grade point average Problem 1.19.

a. Obtain a 95 percent interval estimate of the mean freshman GPA for students whose ACT test score is 28. Interpret your confidence interval.

b. Mary Jones obtained a score of 28 on the entrance test. Predict her freshman GPA using a 95 percent prediction interval. Interpret your prediction interval.

c. Is the prediction interval in part (b) wider than the confidence interval in part (a)? Please explain.

d. Determine the boundary values of the 95 percent confidence band for the regression line when $X_h = 28$. Is your confidence band wider at this point than the confidence interval in part (a)? Please explain.

Question 2: Refer to the Crime rate dataset in Project 1.28.

a) Fit a simple linear regression model to the data. Plot the data points and the fitted line in one graph?

b) Test the hypothesis H_0: $\beta_1 = 0$, use $\alpha = 0.02$?

c) Calculate the coefficient of determination R^2.

d) Find a 95% confidence interval on the slope.

e) Find a 95% confidence interval on the mean Crime rate purity when the percentage of individuals in the county having at least a high-school diploma is 75%.

HOMEWORK: (submit after 1 week)

Problem 3 (Question 2.26). Refer to Plastic hardness Problem 1.22.

a. Set up the ANOVA table.

b. Test by means of an F test whether or not there is a linear association between the hardness of the plastic and the elapsed time. Use α = .01. State the alternatives, decision rule, and conclusion.

c. Plot the deviations $Y_i - \hat{Y}_i$ against X_i on a graph. Plot the deviations $\hat{Y}_i - \bar{Y}$ against X_i on another graph, using the same scales as for the first graph. From your two graphs, does SSE or SSR appear to be the larger component of SSTO? What does this imply about the magnitude of R^2?

d. Calculate R^2 and r.

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