

Stat 482 Homework Set #9

1. A router is used to cut locating notches on a circuit board. The vibration level is considered to be an important characteristic of the process. Two factors are thought to affect vibration (y): bit size (x_1) and cutting speed (x_2). The data is available as a csv file posted on Blackboard.

- (a) Provide a definition for an interaction effect.
- (b) Fit an interaction model using coded variables. Compute the coefficient estimates and the standard error.
- (c) Write the estimated regression as a function of x_1 for $x_2 = 1, 0, -1$.
- (d) Create interaction plots for both the interaction model and the additive effects model.
- (e) Test for an interaction effect. (Compute the test statistic and p-value.) Provide an interpretation, stated in the context of the problem.

2. A sample of healthy females is selected to investigate the relationship between age (x) and the level of a steroid (y). Refer to the data from Exercise 8.6.

- (a) Fit a quadratic model using coded variables. Compute R^2 for the quadratic model.
- (b) Fit a cubic model using coded variables. Compute R^2 for the cubic model.
- (c) Create a scatterplot of the data, comparing the fitted values from the quadratic model with the fitted values from the cubic model. Extrapolate the predictions 10 years beyond the largest age in the data set.