Home Work 5-1

1. A chemical engineer studied the effect of the amount of surfactant (x_1) and time (x_2) on clathrate formation (y). Clathrates are used as cool storage media. File dat_Table_B8.xlsx summarizes the experimental results.

a. Fit a multiple linear regression model relating clathrate formation to these regressors.

b. Construct a normality plot of the residuals from the full model. Does there seem to be any problem with the normality assumption?

c. Construct and interpret a plot of the residuals versus the predicted response.

d. Perform a thorough influence analysis (any influential points) of the clathrate formation model.

e. Perform a thorough residual analysis of these data.

f. Identify any appropriate transformation for these data. Fit this model and compare.

2. The kinematic viscosity (y) of a certain solvent system depends on the ratio of the two solvents (x_1) and the temperature (x_2). File data_Table_B10.xlsx summarizes a set of experimental results.

a. Fit a multiple linear regression model relating the viscosity to the two regressors.

b. Construct a normality plot of the residuals from the full model. Does there seem to be any problem with the normality assumption?

c. Construct and interpret a plot of the residuals versus the predicted response.

d. Compute the PRESS statistic for the model and interpret it.

e. Perform a thorough influence analysis (any influential points) for the model.

f. Perform a thorough residual analysis of these data.