Homework 5 Due April 22, Saturday

Prob-1 KNNL 5.4, KNNL 5.12,
Prob-2 KNNL 5.13. For part c, find the hat matrix H and its rank, and verify that H is idempotent.

Prob-3 KNNL 6.5: The problem description remains the same, but instead of those questions in the book, you are asked to work on the questions given below.

a. Generate the crossed term X1X2 in SAS as follows.

```
data brand;
input Y X1 X2;
X1X2=X1*X2;
datalines;
64   4   2
……
100 10 4
;
```

Suppose that the relation between degree of brand liking (Y) and moisture content (X_1), sweetness (X_2), and their interaction X_1X_2 is linear. Write down the linear regression model in matrix form together with proper assumptions.

b. Obtain the scatter plot matrix and the correlation matrix. What information do these plots and matrices provide here?
c. Fit the regression model you have written down in part a. Report the fitted regression model, ANOVA test results, R^2, adjusted R_a^2, and the estimate of error variance.
d. Obtain the residual plots and comment on the assumptions of the regression model.
e. Suppose you reduce the model used in parts a-d by removing the interaction term X_1X_2. Repeat parts a-d for the reduced model.
f. Compare the two models using the results you have obtained above. Which model would you recommend in practice, and why?