STAT 512

Homework 11 Final Version (25 pts + 5 pts. BONUS) due April 23

A reminder – Please do not hand in any unlabeled or unedited SAS output. Include in your write-up only those results that are necessary to present a complete solution (what you want the grader to grade). In particular, questions must be answered in order (including graphs), and all graphs must be fully labeled (main title should include the question number, and all axes should be labeled). Don't forget to put all necessary information (see course policies) on the first page. Include the SAS input for all questions at the very end of your homework; this could be important even though it won't be graded. You will often be asked to continue problems on successive homework assignments so save all your SAS code.

- 1. (9 pts.) Refer to the soybean sausage dataset of Problem 20.8 (CH20PR08.DAT).
 - (a) Plot the data vs. the temperature factor using three different lines for the three humidity levels (interaction plot). Based on your graph, do you think that interaction is important for this problem?
 - (b) Perform the two-way ANOVA without interaction for this model. Use the results of hypothesis test to determine whether the main effects are significant. Please include the null and alternative hypothesis, the value of the test statistic with the degrees of freedom, the p-value, decision and the conclusion in the context of the problem for each test that you perform.
 - (c) Use the Tukey test for additivity to see if any interaction terms are significant. Please include the null and alternative hypothesis, the value of the test statistic with the degrees of freedom, the p-value, decision and the conclusion in the context of the problem. How does this test compare to your answer in part a)?
 - (d) Use the Tukey multiple comparison to determine all significant differences in means in the main effect for temperature. Please state the conclusion in the context of this problem. Which temperature(s) do you think the soybean sausages should be stored at?
 - (e) Why isn't it necessary to perform a similar Tukey comparison for the main effect of humidity?
- 2. (16 pts.) Refer to the Marketing research contractors data set Problem 24.9 (CH24PR09.DAT).
 - (a) Generate the scatterplot and interaction plots and summarize your impression from them.
 - (b) Run the full three-way analysis of variance for these data. For each of the hypotheses tests for the main and interaction effects (in the correct order), state the null and alternative hypotheses, the test statistic with the degrees of freedom, the p-value, the decision and the conclusion in the context of the situation. Please perform all of the tests even though you might not think they are necessary.
 - (c) BONUS (5 pts.): Check the assumptions for the model using the 'normal' plots. Be sure to include in your conclusion any remedial actions that might be required.
 - (d) If there are any significant interactions, rerun the analysis by pooling any insignificant interactions and combining levels for the significant interactions so that there are no interaction terms in the model (this is similar to what we did in class). Summarize the results of the hypotheses tests for the main effects (include the 'normal' information).
 - (e) The consultant wishes to identify the type(s) of independent marketing research agencies that provide the highest quality of work. Use the appropriate Tukey test procedures to make the desired identifications. Be sure to write your conclusion in the context of the problem.