Homework 3

STAT 514

Instruction: You will need SAS output to answer some of the questions. Please include your SAS code and outcome as always.

1. For the battery experiment, please do the following (3 points each)

- a. Write down the statistical model and explain all terms.
- b. What is your estimate of the variance of the error term?
- c. Find the estimates of the treatment means.
- d. Construct 95% confidence intervals for the treatment means.
- e. Test the hypothesis that all treatments are equal using $\alpha = 0.05$.
- 2. For the battery experiment, construct a set of 95% simultaneous confidence intervals for $\mu_2 \mu_1, \mu_3 \mu_1$ and $\mu_4 - \mu_1$ using
 - a. Bonferroni's method
 - b. Scheffe's method
 - c. Tukey's method
 - d. Dunnett's method.

Which one is the best method for these multiple comparisons? (10 points total, 2 points each)

- 3. Consider the trout experiment in Exercise 15 of Chap. 3 (see p. 67).
 - a. [4pts]Test the hypotheses that the linear trend in hemoglobin content of trout blood due to the amount of sulfamerazine added to the diet is negligible.
 - b. [4pts]Regarding the absence of sulfamerazine in the diet as the control treatment, calculate simultaneous 99% confidence intervals for the three treatment-versus-control comparisons. Which method do you prefer and why?
 - c. [4pts, bonus]Suppose the experiment was to be repeated and the experimenter wants the 95% simultaneous confidence intervals for the all treatment-versus-control comparisons to have a width less than 2. Determine the necessary sample size for each treatment using MSE=2.2022 for the planning purpose, which is the 90% confidence upper limit.