

STAT511 HW #6

Reading: Read Chapters 7 through 9 of Ott & Longnecker.

See Canvas Calendar for due date.

40 points total, 2 points per problem part unless otherwise noted.

1. In an investigation of the possible influence of dietary chromium on diabetic symptoms, 14 rats were fed a low-chromium diet and 10 were fed a control diet. One response variable was activity of the liver enzyme GITH. The data is available as “RatLiver.csv”.
 - A. Construct side-by-side boxplots of the data.
 - B. Use the F-test to test for equality of variances. Give the null hypothesis, test statistic, p-value and conclusion. **(4 pts)**
 - C. Use Levene’s test (with center=”median”) to test for equality of variances. Give the p-value and conclusion.
 - D. Based on your conclusions from the two previous questions, would the pooled variance t-test or Welch-Satterthwaite t-test be preferred?
 - E. Regardless of your answer to the previous question, run a two-sample t-test assuming equal variances. Give the null hypothesis, test statistic, p-value and conclusion. **(4 pts)**
 - F. Rerun the analysis as a one-way ANOVA. Give the ANOVA table in your assignment. Compare your results to the previous question and notice that the p-value is the same and $F = t^2$.
2. Read Problem 8.32 which concerns corn yield. The data is available as “CornYield.csv”.
 - A. Construct a bar plot showing means and SEs for each variety. **(4 pts)**
 - B. Carry out a one-way ANOVA analysis to determine whether there is evidence of differences (using $\alpha=0.05$) in the mean yield for the different varieties. State the null hypothesis, give the test statistic, p-value and conclusion. **(4 pts)**
 - C. Run (unadjusted) pairwise comparisons of means. Give the estimated difference and p-value for each comparison. **(4 pts)**
 - D. Calculate the LSD(0.05) value. Recall that this is the 95% ME for pairwise comparisons of means.
 - E. Construct an (unadjusted) “cld” display including the mean for each variety and assigning number groups (or underlining) varieties that are not “significantly” different. **(4 pts)**
 - F. Summarize your findings from parts C and E.
 - G. Use the plot() function to generate the diagnostic plots from the model from part B. You do not have to include the graphs in your assignment, but discuss the plots of (1) Residuals vs Fitted values and (2) qqplot of residuals and whether assumptions appear to be satisfied based on each plot. **(4 pts)**