

STAT 514 Homework 8

Due: Nov 2

1. An experiment is conducted to study the influence of operating temperature and three types of face-plate glass on the light output of an oscilloscope tube. The following data are collected:

GlassType	Temperature		
	100	125	150
1	58.0,56.8,57.0	107,106.7,106.5	129.2,128.0,128.6
2	55,53,57.9	107,103.5,105	117.8,116.2,109.9
3	54.6,57.5,59.9	106.5,107.3,108.6	101.7,105.4,103.9

- (a) Write down the statistical model. Use ANOVA to test if the involved factorial effects are significant. State the hypotheses and use $\alpha = 5\%$
- (b) Obtain the estimates of the main effects and interactions.
- (c) Use proper plots to check assumptions.
- (d) Generate the interaction plot for glass type and temperature and interpret the interaction.
- (e) Use the Bonferroni procedure to perform pairwise comparison for glass type level means (i.e., row means). What is your conclusions?
- (f) Use Tukey's method for the pairwise comparison between treatment (or cell) means. Report your results.
- (g) It is clear that glass type is a categorical factor and temperature is a continuous factor. Use regression to derive the functional relationships between the response (light output) and temperature for the three types of glass separately.