ST 512 - Lab 3 - From One-Way to Two-Way ANOVA: Orthogonal Contrasts

The point of this lab is to give you some practice

1. formulating contrasts in SAS

2. finding contrasts that represent effects

3. Understanding a 2x2 analysis of a two-way ANOVA using one-way ANOVA

Example: Corn!
You've been provided with a SAS file containing information on the yield of corn plants from four different "varieties."

1. Look at the data. Notice that the variable VARIETY is not truly the variety of corn, but really a combination of two other variables: DENSITY (how closely together the corn plants are located) and TIME (whether planting was done earlier or later than normal).

2. If a one-way model is to be used, how many treatment groups are there? Write the effects model and define all parameters.

3. Use a one-way analysis to determine if there are any differences in the treatment means. Be sure to check assumptions!

4. Determine the contrasts that can be used to split our treatment effects into effects due to DENSITY, TIME, and DENSITY*TIME.

5. Using SAS, conduct a test for $H_0 : \theta_i = 0$ vs. $H_1 : \theta_i \neq 0$ for each of your contrasts.

6. Using the SS and DF from your contrasts, recreate the overall F test from your one-way ANOVA table. In terms of your contrasts, what are the null and alternative hypotheses for this test?

7. Extra time?! See if you can get a profile plot for this data to visually assess the effects of DENSITY, TIME, and DENSITY*TIME on the response?. What are you looking for in the profile plot to determine whether each of those three items has an effect on the response mean?