

Homework Random Effects

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. Refer to the Coil Winding data set of Problem 25.9 (CH25PR09.DAT).
 - (a) Analyze this data using the random effects model. Test whether the null hypothesis that the mean coil winding characteristic is the same in all machines (i.e., test whether $\sigma_A^2 = 0$). Please include the 'normal' information.
 - (b) Give a point estimate of the intraclass correlation coefficient $\frac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma^2}$. Interpret this value in terms of the context of the problem.
2. Refer to the Imitation pearls data set of Problem 25.17 (CH25PR17.DAT). Note: this uses the mixed ANOVA model where the number of coats (Factor A) is fixed and the batches (Factor B) is random.
 - (a) Analyze this data using the mixed effects model and summarize your results from the hypothesis tests for the main and interaction effects in the correct order. In addition to the 'usual' information, be sure to clearly write down the formula for each test statistic.
 - (b) Summarize your conclusions from part a) in a single sentence.
 - (c) What are the values of the variances, σ^2 , σ_B^2 and σ_{AB}^2 ?