MS Module 14: Two-factor ANOVA, interaction effects (overview)

(The attached PDF file has better formatting.)

Reading: §11.5, Two-Factor ANOVA with $K_{ij} > 1$

If $K_{ij} = 1$, we compute the error sum of squares by assuming the model is additive. We can not examine the interaction effects, since discrepancies from the additive model are assumed to be random fluctuations.

If $K_{ij} > 1$, we compute the error sum of squares without assuming the model is additive. We compute the interaction sum of squares and the interaction mean square. We test whether interactions of the classification dimensions affect the data.

Interaction effects are important for actuarial models. Men have higher accident frequencies at young ages than women have, but similar frequencies at older ages. Men have higher mortality rates than women have at most ages, but similar or lower mortality rates at child-bearing ages in traditional societies.

The textbook uses different notation for the two-factor model with interaction effects. The Greek letters α and β are used for several things in the textbook: probabilities of error, two-factor ANOVA, and regression analysis. These parameters have the same name but represent different things.

Actuarial pricing and risk classification scenarios often have many possible factors. Actuaries normally begin with one-way analysis: single-factor ANOVA or simple linear regression for each factor separately. In many scenarios, an interaction is logical, and a multiple-factor analysis is required.

Final exam problems give summary statistics and derive *F* values for the two groups and the interaction. Work through the problem in the textbook; similar problems are tested on the exam.