MS Module 14: Two-factor ANOVA, interaction effects (overview 2nd edition)

(The attached PDF file has better formatting.)

(Readings from the second 2nd edition of the Devore text.)

Read the section "11.5 Two-Factor ANOVA with $K_{ij} > 1$." Know equations 11.16, 11.17, and 11.18. Final exam problems will be like Example 11.16-17). Actuarial applications are like this example, though with more levels in each dimension and with many more observations.

Skip the section "Multiple Comparisons," which deals with Tukey's procedure.

Skip the section "Models with Mixed and Random Effects."

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 problems in the textbook; similar problems are tested on the exam.

Review end of chapter exercises 49 a, b, c, and d, 50 a and b, 51 a, b, and c, and 53.