

MS Module 9: Single-Factor ANOVA (overview)

(The attached PDF file has better formatting.)

Reading: §11.1 Single-factor ANOVA

The concepts and the procedures introduced in this module are also used in two-factor ANOVA, regression analysis, and actuarial risk classification, covered in the rest of the course modules. F tests are used in many of these modules: focus on the treatment sums of squares in the numerator, the error sum of squares in the denominator, and the degrees of freedom for each.

Treatments are also called groups; dimensions are sets of treatments. The readings on actuarial pricing use the term *classes*.

Know the computational formulas (in the sub-section “computational formulas”) for

- total sum of squares
- treatment sums of squares (for each dimension)
- error sum of squares

The final exam problem may give summary statistics to derive sums of squares and mean sums of squares.

Know the format of the ANOVA table (see Table 11.2). The same format is used for two-factor ANOVA and for regression analysis.

Know how to derive the F statistic, and be sure you can determine the p value from the tables in the appendix. The practice problems use exact p values; for final exam problems, you interpolate from tables.

Insurance pricing and risk classification are closely related to single-factor and multiple-factor analysis of variance. Insurers set prices by sex, age, location, and other attributes of the insured. Actuaries determine

- whether a classification dimension is a significant predictor of loss costs (mortality, accidents)
- which groups within a classification dimension are significantly different
- how to estimate expected loss costs within each cell of the classification table

Notation for classification tables uses two or more subscripts, depending on the classification dimensions.