

MS Module 12: Expected values and β 's for ANOVA + unequal sample sizes (overview)

(The attached PDF file has better formatting.)

Reading: §11.3, More on Single-Factor ANOVA

Read the sub-section “An Alternative Description of the ANOVA Model.” Know how to calculate the expected value of the treatment mean square. The final exam tests these expected values, but it does not test the proof of the formula for $E(MSTr)$.

Read the sub-section “ β for the F Test.” Final exam problems may ask

- to compute the noncentrality parameter (given the set of α_i ; σ^2 ; the number of observations per group)
- to determine which set of α_i has the highest or lowest probability of a Type II error.

The textbook shows how to use families of curves to estimate probabilities of Type II errors (Power curves for the ANOVA F test). The final exam does not ask any questions on these curves. One can not derive β (the probability of a Type II error) by pencil and paper for analysis of variance, but one can sometimes determine which scenario has the highest β by comparing the noncentrality parameters. The paragraphs about the SAS function to calculate the cumulative area under a noncentral F curve is not tested on the final exam.

Read the sub-section on “Relationship of the F Test to the t Test.” This topic is tested in the modules on regression analysis.

Read the sub-section on “Single-Factor ANOVA When Sample Sizes Are Unequal.” Final exam problems do not have equal sample sizes for each group. Know the adjustments both for the ANOVA table and for Tukey's honestly statistical difference.

Read the sub-section on “A Random Effects Model.” Final exam problems may ask to calculate the expected value of the mean square treatment for a random effects model.