

REVIEW TOPICS SINCE THE MIDTERM REVIEW

1. Understand the concept of extra sums of squares (like $SS(X_1 | X_2, X_3)$ and so on), and how they are used to test full versus reduced models.
2. Multicollinearity – what it is, what is affected by it, and what’s not.
3. Indicator variables – how to use them to create different intercepts and/or different slopes, and to test for those; setting up the X matrix
4. Interaction in regression – how to interpret it, and how to put it in the model (including when one variable is categorical and the other is continuous).
5. Model selection – overview, including how to think about it and what steps to take.
6. Model selection methods – all (best) subsets, and various stepwise methods.
7. Model selection – comparison criteria (C_p , AIC, Adjusted R^2 , MSE).
8. Case diagnostics to find outliers and influential cases – why use them, what each measure is used to detect, how to interpret them.
9. ANOVA – basics of the one-way case, how to construct the ANOVA table and test.
10. Tukey and Bonferroni procedures and the need for multiple comparisons and/or multiple testing.
11. Two-factor ANOVA, including how to write the model, assumptions, interpretation of interaction and main effects, how the terms “factor” and “treatment” differ.
12. How to interpret cell means (interaction) plots.
13. Partial/adjusted sums of squares compared with sequential sums of squares – when there is a distinction, and what the distinction is.
14. Random effects versus fixed effects – how to recognize random effects, and how they change the model and analysis.
15. Randomized block design – why it’s used and how to analyze it.
16. Crossed and nested factors – how to recognize them, and what terms can be included in the model.
17. Repeated measures designs – how to recognize them and what terms can be included in the model.
18. How expected mean squares are used to determine the test statistic F^* in mixed models.