

Midterm

1. A fisheries biologist randomly selects 3 counties. In each county, three ponds are randomly selected. On three randomly selected days, 10 young-of-year (YOY) largemouth bass are collected from all 9 ponds and their length is measured.
 - (a) Write a complete model for the experiment.
 - (b) What are the EMS for all model terms?
 - (c) How would you test whether variation among counties is zero?

2. Suppose a researcher measuring traffic intensity between the upstate, the midlands and the lowcountry randomly chooses census tracts in each region and then samples intersections within each census tract and measures traffic intensity at the intersection. This is a nested design; region is a fixed factor and census tract is random. Assume the number of intersections within each census tract is fixed at four due to personnel constraints. Construct a power contour plot for an $\alpha = .05$ test for regional differences; one of your axes should be # of census tracts (b) and the other should be standardized effect. What size effects can you detect (with 80% power) using 5 census tracts in each region? Using 50 census tracts in each region?

3. Consider a cross-over design with the following layout:

	Subject					
Period	1	2	3	4	5	6
1	A	B	C	A	B	C
2	B	C	A	C	A	B
3	C	A	B	B	C	A

- (a) Notice that all 6 possible sequences of drug treatments appears in the above design. Suppose the researcher wanted to include an effect due to the *sequence* of drugs administered to each patient. Why would the above design be inadequate?
- (b) A possible solution would be to include 6 more subjects and replicate the above design. How could you test for a sequence effect with this design? *Hint: Remember the CONTRAST statement in PROC GLM.*

	Subject											
Period	1	2	3	4	5	6	7	8	9	10	11	12
1	A	B	C	A	B	C	A	B	C	A	B	C
2	B	C	A	C	A	B	B	C	A	C	A	B
3	C	A	B	B	C	A	C	A	B	B	C	A