

Midterm

- For the following incomplete block design, determine whether the design is balanced. Find the interblock and intrablock estimators and their variances. Find the optimal weight π . Test for treatment effects in the intrablock analysis.

Block				
1	2	3	4	5
A=25.2	A=24.5	A=21.3	A=26.5	
B=18.4	B=18.3	B=17.7		B=23.1
C=17.6	C=22.5		C=23.5	C=22.6
D=25.7		D=22.4	D=31.3	D=31.0
	E=25.9	E=20.7	E=26.7	E=28.0

- A student and three friends want to test four different routes for driving home. They decide that time of day, driver, and automobile may be important factors. Can you help them design a study to test for a route effect taking all these blocking variables into consideration? What is a shortcoming of this study? How might you resolve this problem (propose a different design, identify the design and explain how you would test for a route effect)?
- Gulf, Florida and South Carolina red snapper are tested for population homogeneity. Suppose the variation in the number of times a short tandem repeat marker appears at a polymorphic site has standard deviation 10. How many fish from each population should be sampled if treatment effect $\underline{\tau} = (-4, 0, 4)$ is to be detected with 80% power ($\alpha = .05$)? Suppose we want to study treatment effect $\underline{\tau} = (-k, 0, k)$ as a function of sample size. What sample sizes do we need to detect τ with 80% power for choices of k from 4 to 10?