

Examination #2, Stat 8061 Fall 1999

This is a take-home exam due on Thursday, December 2, 1999, in class. On take-home exams, you are expected to adhere to a strict code of conduct. In particular: (1) All work on this exam must be your own; (2) You may not discuss the exam with anyone except for the instructor or TA. You may not share computer output, nor may you discuss computer problems with anyone except the instructor or TA. Evidence of failure to adhere to these guidelines will result in a failing grade for the course.

The TA and I will have our regular office hours this week. We will also be available via email.

The data in the file `biomass.lsp` on the class web site (or available on Unix simply by typing `(load "biomass")`) was collected in an experiment to identify important soil characteristics influencing biomass production of the marsh grass *Spartina alterniflora* in an area in North Carolina. Three types of areas were sampled: *Dveg* = revegetated "dead" areas; *Short* = areas of primarily short *Spartina*, and *Tall* = areas of predominantly tall *Spartina*. All three types were sampled in each of three locations, *OI* = Oak Island, *SI* = Smith Island and *SM* = Snow's Marsh. Multiple samples of the soil substrate within each location/type combination were obtained, and the measurements in the data were made.

You are to consider several different regression problems, each with response variable *Biomass*, but with the sets of predictors changing in each problem. You may use any of the techniques that we have studied so far in this course.

1. First, consider only the predictors *pH* and *Type*. With up to 2 graphs, 2 tables and 2 paragraphs of prose, provide a complete summary of this regression problem.
2. Consider the regression with predictors (*Salinity*, *pH*, *K*, *Na*, *Z*). With up to 3 graphs, 2 tables and 3 paragraphs of prose, provide a complete summary of this regression problem.
3. Now consider the regression problem with all 7 predictors. With up to 3 graphs, 2 tables and 4 paragraphs of prose, provide a complete summary of this regression problem. Be sure to summarize the important determinants of *Biomass*. In particular, which of the chemicals (*K*, *Na* and *Z*) are important; explain your answer.

Extra credit: In one paragraph describe why the methodology you used in this exam might not be appropriate for these data, and supply any supporting information (particularly graphs) that support your finding.