Econ 673
Problem Set #4
Due: November 7, 2008

For the each part of the following problem, please provide detailed written responses. Also, you should attach copies of computer programs and output if required to answer a question. Finally, be sure to e-mail me a copy of your code.

1) Consider a recreation site selection model in which the individual is choosing among 5 sites. The utility associated with visiting site *j* is assumed to take the form:

$$U_{ij} = \beta_C C_{ij} + \beta_S S_j + \beta_P Q_{ij} + \varepsilon_{ij} \quad (1)$$

where the errors are drawn from a GEV distribution with a corresponding nesting structure {(1,2),(3,4,5)} and

C_{ij} : denotes the cost for individual *i* of visiting site *j*

S_j : denotes the Secchi transparency at site *j*

Q_{ij} : denotes individual *i*'s perceived level of the water quality at site *j*

As the analyst, of course, you do not observe U_{ij}, but instead observe the series of *J*=5 dummy variables:

$$y_{ij} = \begin{cases} 1 & U_{ij} > U_{ik} \; \forall k \neq j \\ 0 & \text{otherwise} \end{cases}$$

You are given access to a sample of 1300 observations generated via a survey, providing data on the last site visited by a household. The data (reacreate.txt on the class website) contains a total of 20 columns, with the first 5 columns containing y_{ij} for the five sites, followed by five columns for C_{ij}, S_j, and Q_{ij}.

a) Write a GAUSS program to estimate the parameters of the model in equation (1) using maximum likelihood estimation and the maxlik routine.

b) Using your parameter estimates, predict

   i) the change in the visitation rates to each of the sites resulting from

      (1) a 50% drop in the Secchi transparency at Site 2.

      (2) the loss of site 2 entirely (e.g., the lake is drained).

   ii) The welfare impact (i.e., compensating variation) associated with the loss of site 2.

   For each of the above computations, be sure to compute the standard error associated with your computations.

c) Notice that in equation (1), you have not allowed for an alternative specific constant. Modify your original model to allow for alternative specific constants.

   i) What can be identified in this new model?

   ii) Estimate those parameters that can be identified using GAUSS and the Maxlik routine.

   iii) Repeat step (b) above for your new model.