

STAT 696, Spring 2011
Homework 3 Problems
due Thurs. Feb. 17

2 Problems. Please follow the Lab report directions off the homework web page.

1. Consider the data in the following regular grid:

1	10	25
5	12	40
7	15	35

Construct (by hand) the sample omnidirectional semivariogram at each possible lag. Plot the sample semivariogram. Comment on the nature of the semivariogram.

2. Return to **Soil pH data**. Data on soil pH comes from an observational study in which samples of soil were collected at the nodes of a grid with 11 rows \times 11 columns. The pH of the samples were measured in a laboratory.

The data is available off the class web page:

<http://www.rohan.sdsu.edu/~babailey/stat696/soilph.dat>

Use the R `read.table` command with the `header=T` option. (You do not need to make your own labels!)

(a) Use the R function `variogram` in the `gstat` package to compute the sample semivariogram assuming isotropy. What are the default `width` and `cutoff` values? Compare the sample semivariogram with the robust semivariogram (`crossie=T` option).

(b) Use the R function `variogram` in the `gstat` package to compute the sample semivariogram assuming isotropy with different `width` and `cutoff` than the default values. Comment on the differences that you observe.

(c) Make plots of the semivariogram in each of 4 (or more) directions. Comment on the nature of each sample semivariogram (i.e. are there nugget effects, are there sills, etc.) Is there any evidence of anisotropy for these data?