Course Outline for Statistics 340

Applied Spatial Statistics

Autumn 2003

Instructor: Michael Stein

Course description. This course will cover statistical models and methods for processes whose value varies in space. Particular attention will be paid to the use of spatial covariance functions to describe spatial dependence of a process, the interpolation of spatial processes and the close relationship between spatial covariance functions and spatial interpolation. Much of the work in the class will be done in groups, including at least one substantial project. The intention is for this course to be accessible to graduate students from a broad range of disciplines with a serious interest in the statistical analysis of spatial data.

Required text:

Peter Kitanidis, Introduction to Geostatistics

Those of you with very strong theoretical backgrounds might consider getting my book Interpolation of Spatial Data: Some Theory for Kriging. I will list suggested readings from it where appropriate.

Homeworks: Every other week on Tuesday, due following Thursday. No late homeworks accepted unless prior arrangements have been made with me.

Grading: Homework 50%, Project 50%

Computing: You may use any software you want that has sufficient capabilities in spatial statistics, including an ability to simulate Gaussian processes. I will be using the statistical language R (an open source version of SPlus) together with the set of macros geoR available through http://www.r-project.org/.

Office hours: Whenever you can find me. In addition, feel free to send me e-mail on any topic relating to the course at stein@galton.uchicago.edu.

Readings:

There will be no class on Thursday, October 2

Tuesday, October 7, Kitanidis, Sections 2.6–2.8 and 3.1–3.2; suggested reading, Stein, Sections 2.1, 2.3 and 2.4

Thursday, October 9, Kitanidis, Sections 3.3 and 3.4; suggested reading, Stein, Sections 2.5, 2.7, 2.9 and 2.10