

ST 810 M, Fall 2000

Spatial Statistics

COURSE OUTLINE

The class will meet two times a week in a standard classroom with lecture format supplemented by some in-class cooperative learning assignments. Approximately once a month the class will meet in the Department of Statistics Instructional Computing Laboratory (SICL) where the students will use the statistical package **SAS** and **S+** on Sun Sparc-stations. This lab now uses the *eos* environment so that students will be familiar with the basic workstation commands.

A *tentative* class-by-class list of activities is as follows. See the web for further updates.

<http://www.stat.ncsu.edu/~fuentes/st810/st810.html>

- **Class No.** Activity [lectures]
1. Lecture 1 - **1.1** Introduction to spatial statistics with an example. (8/22/2000)
 2. Lecture 2 - **1.2** The need for spatial analysis. (8/24/2000)
 3. Lecture 3 - **1.3** An overview of spatial statistics (8/29/2000)
 4. Lecture 4 - **2.1** Spatial Processes(8/31/2000)
 5. Lecture 5 - **2.2.1** Estimating the variogram(9/5/2000)
 6. Lecture 6 - **2.2.2** Fitting parametric models to the sample variogram (9/7/2000)
 7. Lecture 7 - **2.2.3** Maximum likelihood estimation (9/12/2000)
 8. Lecture 8 - **2.2.4** Restricted maximum likelihood (9/14/2000)
 9. Lecture 9 - **2.2.5** Bayesian procedures (9/19/2000)
 10. Lecture 10 - **2.2.6** MINQE estimation (9/21/2000)
 11. Lecture 11 - **2.3** Examples (9/26/2000)
 12. Lecture 12 - **3.1** Kriging: Lagrange multiplier approach (9/28/2000)
 13. Lecture 13 - **3.2** Kriging: conditional inference approach (10/3/2000)
 14. Lecture 14 - **3.3** Bayesian approach to interpolation(10/5/2000)
 15. Lecture 15 - **3.4** Predicting at multiple sites (10/10/2000)
 16. Lecture 16 - **3.5** Frequentist corrections for unknown covariance structure (10/12/2000)
 17. Lecture 17 - **3.6** Model misspecification in kriging. Median polish. (10/19/2000)

18. Lecture 18 - **4.1** Spectral domain: Fourier Theory(10/24/2000)
19. Lecture 19 - **4.2** Spectral Representation of a Spatial Process (10/26/2000)
20. Lecture 20 - **4.3** Spectral Density (10/31/2000)
21. Lecture 21 - **4.4** Periodogram (11/2/2000)
22. Lecture 22 - **4.5** Increasing domain asymptotics (11/7/2000)
23. Lecture 23 - **4.6** Infill asymptotics (11/9/2000)
24. Lecture 24 - **5.1** Nonstationary spatial processes(11/14/2000)
25. Lecture 25 - **5.2** Moving window, and basis expansions of the covariance (11/16/2000)
26. Lecture 26 - **6.1** Network design (11/28/2000)
27. Lecture 27 - **7.1** Lattice data(11/30/2000)
28. Lecture 28 - **7.2** Mantel test(12/5/2000)