Dates and credits

Number of credits: 2 ECTS
Dates: **July, 2-6 2007**
Timetable: 9h30-13h30 15h30-17h30

Location

Aula de Informática, Facultad de Ciencias Económicas y Emprearíales, UdG
Campus de Montilivi, 17071 Girona, Tel 34-972 418040

Number of attendants

Maximum: 20

Registration

Although the fee of the course is actually 600 €, it is subsidised(*) and you only pay 250 € to cover organisational costs.

Bank transfer details to be provided at the registration form.

The registration form can be found at:

http://www.fundacioudg.org

You can also personally collect at Fundació Universitat de Girona: Innovació i Formació. Edifici Mercadal, Plaça Jordi de Sant Jordi 1, 17001 Girona

Information to present with the registration form: Photocopy of DNI (Nacional Identity Card) or passport

Deadline for registration: **June 25, 2007**

GRECS—Universitat de Girona
Campus de Montilivi, 7071 Girona,
Tel 34- 972 418736
http://www.udg.edu/fcee/economia/english/grecs.htm

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FUNDACIÓ UNIVERSITAT DE GIRONA: INNOVACIÓ I FORMACIÓ

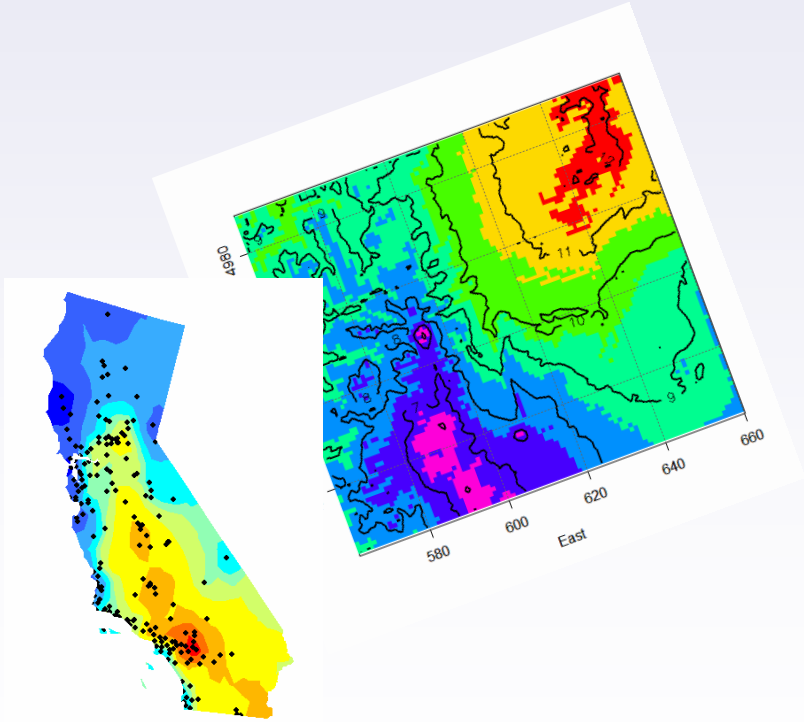
ANALYSIS AND MODELLING OF SPATIAL PROCESSES

SPECIALIZATION COURSE

Module: Geostatistics

Master in Geographical Analysis and Spatial Statistics

2-6 July, 2007



(*) **Ajut per l'organització d'accions mobilitzadores, 2006/ARCS2/00081**

Objectives

Students will learn…

Students will be asked, but guided, to solve several practical exercises using one or several softwares to get a feeling of the general meaning of modeling spatial point patterns and answer questions to some interesting queries:

1. Reading and mapping spatial point processes
2. Simulating completely random spatial point patterns
3. Estimation of first and second-order descriptive characteristics of a point patterns
4. Testing CSR hypothesis
5. Monte-Carlo tests
6. Estimating random labelling and independence for bivariate point processes
7. Fitting models: Estimating parametes

Goals…

The goal is that students completing this course, should be able to answer the following questions/meet the following goals:

1. Identification of the necessity of spatial point pattern analysis
2. (a) Could several patterns have been generated by the same stochastic process?
   (b) If not, how would we describe the differences amongst them?
   (c) What kinds of stochastic models might be plausible for each pattern?
3. Are the locations spatially clustered? Do they tend to be regularly distributed, or are they random (i.e a realization of a homogeneous Poisson process)?
4. Do two different species of tree tend to occur together? Are locations of cancer cases more clustered than a random subset of a control group?
5. What is the average density of trees in an area? What does a map of density look like?
6. Can we describe a point patterns through the use of first and second-order characteristics?
7. Can we distinguish amongst several possible models and consequently fit theoretical models of point processes?
8. Can we simulate a fitted model?
9. Can we analyze orientations in a point pattern?
10. Critical discussion of practical modeling

Prerequisites

Some basic knowledge of statistical inference will be an advantage. Students are expected to read some documents as basic material for the course.
http://www3.uji.es/~mateu

Content

Spatial point processes
1. Introduction
2. Theory setup
3. Models for spatial point processes
4. Monte Carlo Tests (MCT) and MCT-based measures of Complete Spatial Randomness
5. Simulation techniques of Gibbs point processes
6. Estimation procedures for Gibbs point processes
7. Anisotropy and Orientation analysis
8. LISA functions for local product densities
9. Spectral analysis for spatial marked point processes
10. On soft and hard particle motions for stochastic marked point processes
11. Understanding three-dimensional biological images through stochastic Modelling
12. Practical with SPATSTAT and SPLANCS

Geostatistics
1. Introduction
2. Basic geostatistics theory
3. Building of valid spatio-temporal covariance models
4. Practical with GeoR

Organisation

Marc Saez and Carme Saurina
Research Group on Statistics, Applied Economics and Health, GRECS, UdG

Lecturers

Prof. Dr. Jorge Mateu, Emilio Porcu

Universitat Jaume I, Castelló. http://www3.uji.es/~mateu