Seminar Spatial Statistics im Sommersemester 2014

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Overview

Spatial statistics is concerned with the modelling and analysis of data observed at scattered geographic sites. In this seminar, we will study theoretical and applied facets of geostatistical techniques, which are based on Gaussian random field models on continuous domains.

The seminar will be offered within the Master Program. Students are expected to present their talks in English, and to provide a handout (two to four pages) in either English or German, with the contents of the presentation summarized in their own words, and with all references used properly cited. Each seminar presentation will be based on one or two research papers. Broad overviews of the probabilistic foundations covered are available in the handbook articles by Gneiting and Guttorp (2010a, 2010b). All seminar participants are expected to read through these papers carefully, and to be familar with their contents.

Prerequisites include an introductory course in probability and statistics (Einführung in die Stochastik or equivalent) and an advanced course in probability and measure (Wahrscheinlichkeitstheorie or equivalent). The seminar will be offered as a block course within the summer semester, with date and location to be determined.

Presentations available

	Positive definite functions
1	Bochner's Theorem (Bochner 1933, Section 8)
2	Isotropic positive definite functions (Schönberg 1938, Sections 1–3)
	Isotropic correlation functions on Euclidean domains
3	Matérn class (Handcock and Stein 1993; Gneiting und Guttorp 2006)
4	Cauchy class (Gneiting and Schlather 2004, Sections 1–4)
5	Wendland's functions (Wendland 1995)
6	Euclid's hat (Gneiting 1999, Sections 1–4 and 6–7)
	Applications and case studies
7	Risk assessment for nuclear waste repositories (Gotway 1994)
8	Analysis of climate data (Handcock und Wallis 1994)
9	Weather field forecasting (Gel et al. 2004)
	Isotropic correlation functions on spheres
10	Schoenberg's characterization (Schoenberg 1942)
11	Further results (Gneiting 2013)
	Spatio-temporal statistics
12	Case study: Ozone pollution (Carroll et al. 1997)
13	Nonseparable space-time covariance functions (Cressie und Huang 1999)
14	Nonseparable space-time covariance functions (Gneiting 2002)

References

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Handcock, M. S. and Wallis, J. R. (1994). An approach to statistical spatial-temporal modeling of meteorological fields (with discussion). *Journal of the American Statistical Association*, **89**, 368–390.

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