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Altri autori (Persone)	MateuJorge MullerW. G (Werner G.)
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Spatio-temporal design; Contents; Contributors; Foreword; Chapter 1 Collecting spatio-temporal data; 1.1 Introduction; 1.2 Paradigms in spatio-temporal design; 1.3 Paradigms in spatio-temporal modeling; 1.4 Geostatistics and spatio-temporal random functions; 1.4.1 Relevant spatio-temporal concepts; 1.4.2 Properties of the spatio-temporal covariance and variogram functions; 1.4.3 Spatio-temporal kriging; 1.4.4 Spatio-temporal covariance models; 1.4.5 Parametric estimation of spatio-temporal covariograms; 1.5 Types of design criteria and numerical optimization 1.6 The problem set: Upper Austria1.6.1 Climatic data; 1.6.2 Grassland usage; 1.7 The chapters; Acknowledgments; References; Chapter 2 Model-based frequentist design for univariate and multivariate geostatistics; 2.1 Introduction; 2.2 Design for univariate geostatistics; 2.2.1 Data-model framework; 2.2.2 Design criteria; 2.2.3 Algorithms;

2.2.4 Toy example; 2.3 Design for multivariate geostatistics; 2.3.1 Data-model framework; 2.3.2 Design criteria; 2.3.3 Toy example; 2.4 Application: Austrian precipitation data network; 2.5 Conclusions; References

Chapter 3 Model-based criteria heuristics for second-phase spatial sampling  
3.1 Introduction; 3.2 Geometric and geostatistical designs; 3.2.1 Efficiency of spatial sampling designs; 3.2.2 Sampling spatial variables in a geostatistical context; 3.2.3 Sampling designs minimizing the kriging variance; 3.3 Augmented designs: Second-phase sampling; 3.3.1 Additional sampling schemes to maximize change in the kriging variance; 3.3.2 A weighted kriging variance approach; 3.4 A simulated annealing approach; 3.5 Illustration; 3.5.1 Initial sampling designs; 3.5.2 Augmented designs; 3.6 Discussion

References  
Chapter 4 Spatial sampling design by means of spectral approximations to the error process; 4.1 Introduction; 4.2 A brief review on spatial sampling design; 4.3 The spatial mixed linear model; 4.4 Classical Bayesian experimental design problem; 4.5 The Smith and Zhu design criterion; 4.6 Spatial sampling design for trans-Gaussian kriging; 4.7 The spatDesign toolbox; 4.7.1 Covariance estimation and variography software; 4.7.2 Spatial interpolation and kriging software; 4.7.3 Spatial sampling design software; 4.8 An example session; 4.8.1 Preparatory calculations

4.8.2 Optimal design for the BSLM  
4.8.3 Design for the trans-Gaussian kriging; 4.9 Conclusions; References; Chapter 5 Entropy-based network design using hierarchical Bayesian kriging; 5.1 Introduction; 5.2 Entropy-based network design using hierarchical Bayesian kriging; 5.3 The data; 5.4 Spatio-temporal modeling; 5.5 Obtaining a staircase data structure; 5.6 Estimating the hyperparameters  $H_g$  and the spatial correlations between gauge stations; 5.7 Spatial predictive distribution over the 445 areas located in the 18 districts of Upper Austria  
5.8 Adding gauge stations over the 445 areas located in the 18 districts of Upper Austria

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## Sommario/riassunto

"A state-of-the-art presentation of optimum spatio-temporal sampling design - bridging classic ideas with modern statistical modeling concepts and the latest computational methods. Spatio-temporal Design presents a comprehensive state-of-the-art presentation combining both classical and modern treatments of network design and planning for spatial and spatio-temporal data acquisition. A common problem set is interwoven throughout the chapters, providing various perspectives to illustrate a complete insight to the problem at hand. Motivated by the high demand for statistical analysis of data that takes spatial and spatio-temporal information into account, this book incorporates ideas from the areas of time series, spatial statistics and stochastic processes, and combines them to discuss optimum spatio-temporal sampling design. Spatio-temporal Design: Advances in Efficient Data Acquisition: Provides an up-to-date account of how to collect space-time data for monitoring, with a focus on statistical aspects and the latest computational methods. Discusses basic methods and distinguishes between design and model-based approaches to collecting space-time data. Features model-based frequentist design for univariate and multivariate geostatistics, and second-phase spatial sampling. Integrates common data examples and case studies throughout the book in order to demonstrate the different approaches and their integration. Includes real data sets, data generating mechanisms and simulation scenarios. Accompanied by a supporting website featuring R code. Spatio-temporal Design presents an excellent book for graduate level students as well as a valuable reference for researchers and practitioners in the fields of applied

mathematics, engineering, and the environmental and health sciences"

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