1.	Record Nr.	UNINA990000975050403321
	Autore	Chow, Woo Foung
	Titolo	Principles of Tunnel Diode Circuits / Woo Fung Choow
	Pubbl/distr/stampa	New York [etc.] : John Wiley, 1964
	Disciplina	537.5
	Locazione	FI1
	Collocazione	31-082
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia

2.	Record Nr.	UNINA9910377829803321
	Autore	Hristopulos Dionissios T.
	Titolo	Random Fields for Spatial Data Modeling : A Primer for Scientists and Engineers / / by Dionissios T. Hristopulos
	Pubbl/distr/stampa	Dordrecht : , : Springer Netherlands : , : Imprint : Springer, , 2020
	ISBN	9789402419184 9402419187
	Edizione	[1st ed. 2020.]
	Descrizione fisica	1 online resource (XXX, 867 p. 622 illus., 134 illus. in color.)
	Collana	Advances in Geographic Information Science, , 1867-2434
	Disciplina	519.23
	Soggetti	Sociophysics Econophysics Geophysics Statistics Applied mathematics Engineering mathematics Statistical physics Data-driven Science, Modeling and Theory Building Geophysics/Geodesy Statistics for Engineering, Physics, Computer Science, Chemistry and Earth Sciences Geophysics and Environmental Physics Mathematical and Computational Engineering Statistical Physics and Dynamical Systems

Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Introduction -- Preliminary Remarks -- Why Random Fields? -- Notation and Definitions -- Noise and Errors -- Spatial Data and Basic Processing Procedures -- A Personal Selection of Relevant Books -- Trend Models and Estimation -- Empirical Trend Estimation -- Regression Analysis -- Global Trend Models -- Local Trend Models -- Trend Estimation based on Physical Information -- Trend Based on the Laplace Equation -- Basic Notions of Random Fields -- Introduction -- Single-Point Description -- Stationarity and Statistical Homogeneity -- Variogram versus Covariance -- Permissibility of Covariance Functions -- Permissibility of Variogram Functions -- Additional Topics of Random Field Modeling -- Ergodicity -- Statistical Isotropy -- Anisotropy -- Anisotropic Spectral Densities -- Multipoint Description of Random Fields -- Geometric Properties of Random Fields -- Local Properties -- Covariance Hessian Identity and Geometric Anisotropy -- Spectral Moments -- Length Scales of Random Fields -- Fractal Dimension -- Long-Range Dependence -- Intrinsic Random Fields -- Fractional Brownian Motion -- Classification of Random Fields -- Gaussian Random Fields -- Multivariate Normal Distribution -- Field Integral Formulation -- Useful Properties of Gaussian Random Fields -- Perturbation Theory for Non-Gaussian Probability Densities -- Non-stationary Covariance Functions -- Further Reading -- Random Fields based on Local Interactions -- Spartan Spatial Random Fields -- Two-point Functions and Realizations -- Statistical and Geometric Properties -- Bessel-Lommel Covariance Functions -- Lattice Representations of Spartan Random Fields -- Introduction to Gauss-Markov Random Fields -- From Spartan Random Fields to Gauss-Markov Random Fields -- Lattice Spectral Density -- SSRF Lattice Moments -- SSRF Inverse Covariance Operator on Lattices -- Spartan Random Fields and Langevin Equations -- Introduction to Stochastic Differential Equations -- Classical Harmonic Oscillator -- Stochastic Partial Differential Equations -- Spartan Random Fields and Stochastic Partial Differential Equations -- Covariance and Green's functions -- Whittle-Matérn Stochastic Partial Differential Equation -- Diversion in Time Series -- Spatial Prediction Fundamentals -- General Principles of Linear Prediction -- Deterministic Interpolation -- Stochastic Methods -- Simple Kriging -- Ordinary Kriging -- Properties of the Kriging Predictor -- Topics Related to the Application of Kriging -- Evaluating Model Performance -- More on Spatial Prediction -- Linear Generalizations of Kriging -- Nonlinear Extensions of Kriging -- Connections with Gaussian Process Regression -- Bayesian Kriging -- Continuum Formulation of Linear Prediction -- The "Local-Interaction" Approach -- Big Spatial Data -- Basic Concepts and Methods of Estimation -- Estimator Properties -- Estimating the Mean with Ordinary Kriging -- Variogram Estimation -- Maximum Likelihood Estimation -- Cross Validation -- More on Estimation -- The Method of Normalized Correlations -- The Method of Maximum Entropy -- Stochastic Local Interactions -- Measuring Ergodicity -- Beyond the Gaussian Models -- Trans-Gaussian Random Fields -- Gaussian Anamorphosis -- Tukey g-h Random Fields -- Transformations based on Kappa Exponentials -- Hermite Polynomials -- Multivariate Student's t-distribution -- Copula Models -- The Replica Method -- Binary

Sommario/riassunto

This book provides an inter-disciplinary introduction to the theory of random fields and its applications. Spatial models and spatial data analysis are integral parts of many scientific and engineering disciplines. Random fields provide a general theoretical framework for the development of spatial models and their applications in data analysis. The contents of the book include topics from classical statistics and random field theory (regression models, Gaussian random fields, stationarity, correlation functions) spatial statistics (variogram estimation, model inference, kriging-based prediction) and statistical physics (fractals, Ising model, simulated annealing, maximum entropy, functional integral representations, perturbation and variational methods). The book also explores links between random fields, Gaussian processes and neural networks used in machine learning. Connections with applied mathematics are highlighted by means of models based on stochastic partial differential equations. An interlude on autoregressive time series provides useful lower-dimensional analogies and a connection with the classical linear harmonic oscillator. Other chapters focus on non-Gaussian random fields and stochastic simulation methods. The book also presents results based on the author's research on Spartan random fields that were inspired by statistical field theories originating in physics. The equivalence of the one-dimensional Spartan random field model with the classical, linear, damped harmonic oscillator driven by white noise is highlighted. Ideas with potentially significant computational gains for the processing of big spatial data are presented and discussed. The final chapter concludes with a description of the Karhunen-Loève expansion of the Spartan model. The book will appeal to engineers, physicists, and geoscientists whose research involves spatial models or spatial data analysis. Anyone with background in probability and statistics can read at least parts of the book. Some chapters will be easier to understand by readers familiar with differential equations and Fourier transforms.