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Titolo	Environmental modelling [[electronic resource]] : finding simplicity in complexity / / [edited by] John Wainwright and Mark Mulligan
Pubbl/distr/stampa	Chichester [England] ; ; Hoboken, N.J., : Wiley, 2013
ISBN	1-118-35147-9 1-283-99385-6 1-118-36610-7 1-118-35148-7
Edizione	[2nd ed.]
Descrizione fisica	1 online resource (495 p.)
Altri autori (Persone)	WainwrightJohn <1967-> MulliganMark, Dr.
Disciplina	628
Soggetti	Environmental sciences - Mathematical models
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Cover; Title Page; Copyright; Contents; Preface; Preface to the First Edition; List of Contributors; Part I Model Building; Chapter 1 Introduction; 1.1 Introduction; 1.2 Why model the environment?; 1.3 Why simplicity and complexity?; 1.4 How to use this book; 1.5 The book's web site; References; Chapter 2 Modelling and Model Building; 2.1 The role of modelling in environmental research; 2.2 Approaches to model building: chickens, eggs, models and parameters?; 2.3 Testing models; 2.4 Sensitivity analysis and its role; 2.5 Errors and uncertainty; 2.6 Conclusions; References Chapter 3 Time Series: Analysis and Modelling3.1 Introduction; 3.2 Examples of environmental time series; 3.3 Frequency-size distribution of values in a time series; 3.4 White noises and Brownian motions; 3.5 Persistence; 3.6 Other time-series models; 3.7 Discussion and summary; References; Chapter 4 Non-Linear Dynamics, Self-Organization and Cellular Automata Models; 4.1 Introduction; 4.2 Self-organization in complex systems; 4.3 Cellular automaton models; 4.4 Case study: modelling rill initiation and growth; 4.5 Summary and conclusions; 4.6 Acknowledgements; References Chapter 5 Spatial Modelling and Scaling Issues5.1 Introduction; 5.2

Scale and scaling; 5.3 Causes of scaling problems; 5.4 Scaling issues of input parameters and possible solutions; 5.5 Methodology for scaling physically based models; 5.6 Scaling land-surface parameters for a soil-erosion model: a case study; 5.7 Conclusion; References; Chapter 6 Environmental Applications of Computational Fluid Dynamics; 6.1 Introduction; 6.2 CFD fundamentals; 6.3 Applications of CFD in environmental modelling; 6.4 Conclusions; References
Chapter 7 Data-Based Mechanistic Modelling and the Emulation of Large Environmental System Models7.1 Introduction; 7.2 Philosophies of science and modelling; 7.3 Statistical identification, estimation and validation; 7.4 Data-based mechanistic (DBM) modelling; 7.5 The statistical tools of DBM modelling; 7.6 Practical example; 7.7 The reduced-order modelling of large computer-simulation models; 7.8 The dynamic emulation of large computer-simulation models; 7.9 Conclusions; References; Chapter 8 Stochastic versus Deterministic Approaches; 8.1 Introduction; 8.2 A philosophical perspective
8.3 Tools and methods8.4 A practical illustration in Oman; 8.5 Discussion; References; Part II The State of the Art in Environmental Modelling; Chapter 9 Climate and Climate-System Modelling; 9.1 The complexity; 9.2 Finding the simplicity; 9.3 The research frontier; 9.4 Online material; References; Chapter 10 Soil and Hillslope (Eco) Hydrology; 10.1 Hillslope e-c-o-hydrology?; 10.2 Tyger, tyger...; 10.3 Nobody loves me, everybody hates me...; 10.4 Memories; 10.5 I'll avoid you as long as I can?; 10.6 Acknowledgements; References
Chapter 11 Modelling Catchment and Fluvial Processes and their Interactions

Sommario/riassunto

Simulation models are an established method used to investigate processes and solve practical problems in a wide variety of disciplines. Central to the concept of this second edition is the idea that environmental systems are complex, open systems. The authors present the diversity of approaches to dealing with environmental complexity and then encourage readers to make comparisons between these approaches and between different disciplines. Environmental Modelling: Finding Simplicity in Complexity 2nd edition is divided into four main sections: An overview

2. Record Nr. UNINA9910299757703321

Titolo	A Mathematical Approach to Research Problems of Science and Technology : Theoretical Basis and Developments in Mathematical Modeling / / edited by Ryuei Nishii, Shin-ichiro Ei, Miyuki Koiso, Hiroyuki Ochiai, Kanzo Okada, Shingo Saito, Tomoyuki Shirai
Pubbl/distr/stampa	Tokyo : , : Springer Japan : , : Imprint : Springer, , 2014
ISBN	4-431-55060-7
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (497 p.)
Collana	Mathematics for Industry, , 2198-3518 ; ; 5
Disciplina	501.5118
Soggetti	Engineering mathematics Engineering - Data processing Mathematical models Data protection Mathematical and Computational Engineering Applications Mathematical Modeling and Industrial Mathematics Data and Information Security
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	Part I Algebra -- Mathematics - As An Infrastructure of Technology and Science -- Remarks on Quantum Interaction Models by Lie Theory and Modular Forms via Non-Commutative Harmonic Oscillators -- Introduction to Public-Key Cryptography -- Code-Based Public-Key Encryption -- Gröbner bases and its applications -- Part II Geometry -- Stability Analysis for Variational Problems for Surfaces with Constraint -- Discrete Models of Isoperimetric Deformation of Plane Curves -- Computing Optimal Cycles of Homology Groups -- Singularity Theory of Differentiable Maps and Data Visualization -- Part III Analysis -- Mathematical Analysis for Pattern Formation Problems -- Models and Applications of Organism Transportation -- The Renormalization Group Method for Ordinary Differential Equations -- A Phase Field Approach to Mathematical Modeling of Crack Propagation -- Variational Methods in Differential Equations -- Part IV Probability and Statistics -- Finite

Markov Chains and Markov Decision Processes -- Introduction to The Premium Principle Based on The Wang Transform -- Stochastic Process Models -- Signal Detection and Model Selection -- Regression Analysis and Its Development -- Stochastic Analytical Models in Mathematical Finance -- An Introduction to the Minimum Description Length Principle -- An Introduction to Ergodic Theory -- Part V Applied Mathematics -- Discrete Optimization: Network Flows and Matchings -- Strict Feasibility of Conic Optimization Problems -- Theory of Automata, Abstraction and Applications -- Markov Chain Monte Carlo Algorithms -- Modeling of Fluid Flows by Nonlinear Schrödinger Equation -- Financial Applications of Quasi-Monte Carlo Methods -- Pure Mathematics and Applied Mathematics are Inseparably intertwined - Observation of the Early Analysis of the Infinity -- High Performance Computing for Mathematical Optimization Problem -- Part VI Application of Mathematics -- Modeling of Head-Disk Interface for Magnetic Recording -- Non-Stationary Analysis of Blast Furnace ThroughSolution of Inverse Problem and Recurrence Plot -- Time-Periodic Nonlinear Steady Field Analysis -- Mathematical Models in First-Principles Calculations for Materials Science -- Mathematics and Manufacturing -the Symbolic Approach- -- Error Correcting Codes based on Probabilistic Decoding and Sparse Matrices.

Sommario/riassunto

This book deals with one of the most novel advances in mathematical modeling for applied scientific technology, including computer graphics, public-key encryption, data visualization, statistical data analysis, symbolic calculation, encryption, error correcting codes, and risk management. It also shows that mathematics can be used to solve problems from nature, e.g., slime mold algorithms. One of the unique features of this book is that it shows readers how to use pure and applied mathematics, especially those mathematical theory/techniques developed in the twentieth century, and developing now, to solve applied problems in several fields of industry. Each chapter includes clues on how to use "mathematics" to solve concrete problems faced in industry as well as practical applications. The target audience is not limited to researchers working in applied mathematics and includes those in engineering, material sciences, economics, and life sciences.