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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 Models
7.1 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 methods
8.4 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

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