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Nota di contenuto	Physics of Self-Organization and Evolution; Contents; Preface; 1 Introduction to the Field of Self-Organization; 1.1 Basic Concepts; 1.2 History of Evolution as a Short Story; 1.3 Structure, Self-organization, and Complexity; 1.4 Entropy, Equilibrium, and Nonequilibrium; 1.5 Dynamics, Stability, and Instability; 1.6 Self-Organization of Information and Values; 2 Fundamental Laws of Equilibrium and Nonequilibrium Thermodynamics; 2.1 The Thermodynamic Way of Describing Nature - Basic Variables; 2.2 Three Fundamental Laws and the Gibbs Relation of Thermodynamics 2.3 Thermodynamic Potentials, Inequalities, and Variational Principles2. 4 Irreversible Processes and Self-Organization; 2.5 Irreversible Radiation Transport; 2.6 Irreversible Processes and Fluctuations; 2.7

Toward a Thermodynamics of Small Systems Far from Equilibrium; 3 Evolution of Earth and the Terrestrial Climate; 3.1 The Photon Mill; 3.2 Black-Body Radiation Model of Earth; 3.3 Local Seasonal Response; 3.4 Atmospheric Cooling Rate; 3.5 Black-Body Model with Atmosphere; 3.6 Humidity and Latent Heat; 3.7 Greenhouse Effect; 3.8 Spatial Structure of the Planet; 3.9 Early Evolution of Earth
4 Nonlinear Dynamics, Instabilities, and Fluctuations4.1 State Space, Dynamic Systems, and Graphs; 4.2 Deterministic Dynamic Systems; 4.3 Stochastic Models for Continuous Variables and Predictability; 4.4 Graphs - Mathematical Models of Structures and Networks; 4.5 Stochastic Models for Discrete Variables; 4.6 Stochastic Processes on Networks; 5 Self-Reproduction, Multistability, and Information Transfer as Basic Mechanisms of Evolution; 5.1 The Role of Self-Reproduction and Multistability; 5.2 Deterministic Models of Self-Reproduction and Bistability
5.3 Stochastic Theory of Birth-and-Death Processes5.4 Stochastic Analysis of the Survival of the New; 5.5 Survival of the New in Bistable Systems; 5.6 Multistability, Information Storage, and Information Transfer; 6 Competition and Selection Processes; 6.1 Discussion of Basic Terms; 6.2 Extremum Principles; 6.3 Dynamical Models with Simple Competition; 6.4 Stochastic of Simple Competition Processes; 6.5 Competition in Species Networks; 6.6 Selection and Coexistence; 6.7 Hyperselection; 6.8 Selection in Ecological Systems; 6.9 Selection with Sexual Replication
6.10 Selection between Microreactors6.11 Selection in Social Systems; 7 Models of Evolution Processes; 7.1 Sequence-Evolution Models; 7.2 Evolution on Fitness Landscapes; 7.3 Evolution on Smooth Fisher-Eigen Landscapes; 7.4 Evolution on Random Fisher-Eigen Landscapes; 7.5 Evolution on Lotka-Volterra Landscapes; 7.6 Axiomatic Evolution Models; 7.7 Boolean Behavior in the Positive Cone; 7.8 Axiomatic Description of a Boolean Reaction System; 7.9 Reducible, Linear, and Ideal Boolean Reaction Systems; 7.10 Minor and Major of a Boolean Reaction System
7.11 Selection and Evolution in Boolean Reaction Systems

Sommario/riassunto

This thoroughly updated version of the German authoritative work on self-organization has been completely rewritten by internationally renowned experts and experienced book authors to also include a review of more recent literature. It retains the original enthusiasm and fascination surrounding thermodynamic systems far from equilibrium, synergetics, and the origin of life, representing an easily readable book and tutorial on this exciting field. The book is unique in covering in detail the experimental and theoretical fundamentals of self-organizing systems as well as such selected feat