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Nota di contenuto	Contents; Preface; 1. The Local Activity Principle and the Emergence of Complexity; 1.1 Mathematical Definition of Local Activity; 1.2 The Local Activity Theorem; 1.3 Local Activity is the Origin of Complexity; 2. Local Activity and Edge of Chaos in Computer Visualization; 2.1 Local Activity and Edge of Chaos of the Brusselator Equations; 2.2 Local Activity and Edge of Chaos of the Gierer-Meinhardt Equations; 2.3 Local Activity and Edge of Chaos of the FitzHugh-Nagumo Equations; 2.4 Local Activity and Edge of Chaos of the Hodgkin-Huxley Equations 2.5 Local Activity and Edge of Chaos of the Oregonator Equations 3. The Local Activity Principle and the Expansion of the Universe; 3.1 Mathematical Definition of Symmetry; 3.2 Symmetries in the Quantum World; 3.3 Global and Local Symmetries; 3.4 Local Gauge Symmetries and Symmetry Breaking; 4. The Local Activity Principle and the Dynamics of Matter; 4.1 The Local Activity Principle of Pattern Formation; 4.2 The Local Activity Principle and Prigogine's Dissipative Structures; 4.3 The Local Activity Principle and Haken's Synergetics; 5. The Local Activity Principle and the Evolution of Life 5.1 The Local Activity Principle of Turing's Morphogenesis 5.2 The Local Activity Principle in Systems Biology; 5.3 The Local Activity Principle in

Brain Research; 6. The Local Activity Principle and the Co-evolution of Technology; 6.1 The Local Activity Principle of Cellular Automata; 6.2 The Local Activity Principle of Neural Networks; 6.3 The Local Activity Principle of Memristors; 6.4 The Local Activity Principle of Global Information Networks; 7. The Local Activity Principle and Innovation in the Economy and Society; 7.1 The Local Activity Principle in Sociodynamics
7.2 The Local Activity Principle and Emerging Risks
7.3 The Local Activity Principle in Financial Dynamics; 7.4 The Local Activity Principle in Innovation Dynamics; 7.5 The Local Activity Principle of Sustainable Entrepreneurship; 8. The Message of the Local Activity Principle; 8.1 The Local Activity Principle in Culture and Philosophy; 8.2 What can we Learn from the Local Activity Principle in the Age of Globalization?; References; Author Index; Subject Index

Sommario/riassunto

The principle of local activity explains the emergence of complex patterns in a homogeneous medium. At first defined in the theory of nonlinear electronic circuits in a mathematically rigorous way, it can be generalized and proven at least for the class of nonlinear reaction-diffusion systems in physics, chemistry, biology, and brain research. Recently, it was realized by memristors for nanoelectronic device applications. In general, the emergence of complex patterns and structures is explained by symmetry breaking in homogeneous media, which is caused by local activity. This book argues that
