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Autore	Alonso-Sanz Ramon
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Nota di contenuto	Preface; Contents; Chapter 1 Cellular Automata and memory; 1.1 Cellular Automata; 1.2 Memory; Disclaimer; Chapter 2 Average type memory; 2.1 Average memory; 2.2 Two-dimensional lattices; 2.2.1 Totalistic rules; 2.2.2 LIFE; 2.3 One-dimensional layers; 2.3.1 Elementary rules; 2.3.2 Nearest and next-nearest neighbors; Chapter 3 Other memories; 3.1 Average-like memory; 3.2 Limited trailing memory; 3.3 Majority of the last three state memory; 3.4 Elementary rules as memory; 3.5 Minimal memory; Chapter 4 Asynchrony and probabilistic rules; 4.1 Asynchrony; 4.2 Probabilistic rules Chapter 5 Cycles and random sequences5.1 Cycles; 5.2 Random number generation by CA; Chapter 6 Three state automata; 6.1 Totalistic rules; 6.2 Excitable systems; Chapter 7 Reversible dynamics; 7.1 Characterization; 7.2 Reversible rules with memory; Chapter 8 Block cellular automata; 8.1 Characterization; 8.2 Density classification task; Chapter 9 Structurally dynamic systems; 9.1 Introduction; 9.1.1 Reversible SDCA; 9.2 SDCA with memory; 9.2.1 Two state SDCA with

memory; 9.2.2 Three state SDCA; Chapter 10 Boolean networks; 10.1 Automata on networks; 10.2 Boolean networks
10.3 Automata on proximity graphsChapter 11 Coupled layers; 11.1 Coupled cellular automata; 11.2 Coupled Boolean networks; Chapter 12 Continuous state variable; 12.1 Continuous-valued automata; 12.2 Finite difference equations; 12.2.1 One-dimensional maps; 12.2.2 Two-dimensional maps; 12.3 Plane curves; 12.4 Stochastic processes; Chapter 13 Spatial games; 13.1 The prisoner's dilemma; 13.2 Degrees of cooperation and strategies; 13.3 The structurally dynamic PD (SDPD); 13.4 Pavlov versus anti-Pavlov (PAP) in the PD; 13.5 Other spatial games; Appendix A Average memory starting at random
Appendix B Dynamic with short-term memoryAppendix C Heterogeneous and coupled networks; Appendix D Continuous state variable; Appendix E Spatial games; Bibliography; List of Figures; List of Tables; Index

Sommario/riassunto

Memory is a universal function of organized matter. What is the mathematics of memory? How does memory affect the space-time behaviour of spatially extended systems? Does memory increase complexity? This book provides answers to these questions. It focuses on the study of spatially extended systems, i.e., cellular automata and other related discrete complex systems. Thus, arrays of locally connected finite state machines, or cells, update their states simultaneously, in discrete time, by the same transition rule. The classical dynamics in these systems is Markovian: only the actual configurati
