

CONTENTS

Preface	v
Theory of Dynamical Systems	
C. Agnes, M. Rasetti, <i>Complexity, Undecidability and Chaos: A Class of Dynamical Systems with Fractal Orbits</i>	3
S. Isola, <i>Understanding Complex Behaviour. Some Remarks on Method and Interpretation</i>	26
A. Politi, R. Badii, K. Heinzelmann, P. F. Meier, <i>Decay of Correlation Functions and Expansion Rates in Dynamical Systems</i>	36
R. Badii, A. Politi, <i>Phase-Transitions in Hyperbolic Dynamical Systems</i>	42
A. Maritan, <i>Hierarchical Random Networks</i>	49
R. Lima, <i>Lyapunov Exponents and Co.</i>	64
A. Vulpiani, <i>Lyapunov Exponents for Products of Random Matrices in Condensed Matter and Dynamical Systems</i>	74
G. Benettin, <i>A Completely Classical Mechanism for the "Freezing" of High-Frequency Degrees of Freedom</i>	84

C. Alabiso, M. Casartelli, <i>Complexity and Relaxation in Nonlinear Chains and in a Model of Radiant Cavity</i>	93
P. Coullet, L. Gil, J. Lega, <i>Transitions in Systems Far from Equilibrium: A Ginzburg-Landau Approach</i>	99
M. Wolf, <i>A Complex Behaviour of the Gas of Particles Moving According to the Equation $x_{n+1} = (Ax_n + B) \bmod C$</i>	113
Experiments on Spatio-Temporal Chaos	
F. T. Arecchi, <i>Shil'nikov Chaos in Lasers</i>	121
J. P. Gollub, F. Simonelli, J. D. Goldberg, <i>Advances in Experimental Nonlinear Dynamics: Space/Time Patterns</i>	142
M. Dubois, <i>Dynamic of Rayleigh-Benard Spatial Configurations in Confined Geometry</i>	152
M. A. Rubio, S. Ciliberto, P. Bigazzi, <i>Transition between Localized Oscillations and Traveling Waves in Thermal Convection</i>	157
L. Fronzoni, <i>Analogue Simulation of Stochastic Processes by Means of Minimum Components Electronic Devices</i>	171
Networks	
D. Stauffer, <i>Periods, Damage Spreading and Multifractality in Cooperative Systems</i>	185
L. De Arcangelis, <i>Global and Local Periods in Kauffman Cellular Automata</i>	201

J. P. Nadal, <i>Neural Networks: A Path from Neurobiology to Psychology?</i>	208
M. Opper, <i>Statistical Mechanics of Learning in Neural Network Models</i>	219
K. E. Kürten, "Training" Quasirandom Neural Networks	224
R. Serra, G. Zanarini, F. Fasano, <i>Generalized Hopfield Learning Rules</i>	230
S. Patarnello, P. Carnevali, <i>Boolean Networks which Learn to Compute</i>	235
J. Bernasconi, <i>Optimization Problems and Statistical Mechanics</i>	245
 Cellular Automata	
G. Y. Vichniac, <i>Cellular Automata and Complex Systems</i>	263
D. d'Humières, P. Lallemand, J. P. Boon, D. Dab, A. Noullez, <i>Fluid Dynamics with Lattice Gases</i>	278
B. Chopard, M. Droz, <i>Cellular Automata Model for Thermo-Hydrodynamics</i>	302
M. Droz, B. Chopard, <i>Nonequilibrium Phase Transitions and Cellular Automata</i>	307
F. Bagnoli, S. Ciliberto, A. Francescato, R. Livi, S. Ruffo, <i>Cellular Automaton Model for a Fluid Experiment</i>	318
 Biology, Evolution Theory and Biological Networks	
M. Buiatti, <i>Information Flux and Constraints in Development and Evolution: A Critical View</i>	331

S. A. Kauffman, <i>Origins of Order in Evolution: Self-Organization and Selection</i>	349
L. Peliti, <i>Statistical Mechanical Models of the Emergence of Biological Order</i>	388
G. Parisi, <i>Immunological Memory in a Network Perspective</i>	394
I. Madar, <i>On Slow Rythmical Fluctuation of Neuronal Excitability in Cortical Brain Slices: An Experimental Study</i>	407
List of Participants	423