



# Contents

Some Introductory Remarks on Synergetics By H. Haken .....	1
---	---

---

## *Part I* Order, Chaos, Indeterminancies

---

Time Pattern Transitions in Biochemical Processes By B. Hess and M. Markus (With 6 Figures) .....	6
Chaotic Behaviours Observed in Homogeneous Chemical Systems By C. Vidal (With 8 Figures) .....	17
Wave-Number Selection in Rotating Couette-Taylor Flow By G. Ahlers and D.S. Cannell (With 3 Figures) .....	27
Periodic and Chaotic Patterns in Selected Quantum Optical Systems By L.M. Narducci, D.K. Bandy, J.Y. Gao, and L.A. Lugiato (With 16 Figures) ..	33
Chaos in Lasers By R. Graham (With 4 Figures) .....	47
The Falling Pencil and Superfluorescence: Macroscopic Indeterminacies After the Decay of Unstable Equilibria By F. Haake (With 5 Figures) .....	58

---

## *Part II* Ordered Structures and Processes in Biomembranes

---

On the Formation of Transient Order in Biological Membranes By E. Sackmann (With 13 Figures) .....	68
Generalized Moment Description of Brownian Dynamics in Biological Systems By K. Schulten, A. Brünger, W. Nadler, and Z. Schulten (With 4 Figures) .....	80
Nonequilibrium Current Noise Generated by Ordered Ion Transport Processes in Biological Membranes By E. Frehland (With 8 Figures) .....	90
The Molecular Machine of Photosynthesis—Physico-Chemical Aspects By H.T. Witt (With 3 Figures) .....	99

---

## *Part III* Evolution of Structures

---

Polynucleotide Replication and Biological Evolution By P. Schuster (With 7 Figures) .....	106
The Evolution Strategy. A Mathematical Model of Darwinian Evolution By I. Rechenberg (With 14 Figures) .....	122



Multigene Families and their Implications for Evolutionary Theory By T. Ohta (With 5 Figures) .....	133
Evolution of Biothermodynamic Systems By J.U. Keller (With 3 Figures) .....	140
Self-Organising Dynamic Models of Human Systems By P.M. Allen, G. Engelen and M. Sanglier (With 18 Figures) .....	150

---

*Part IV Social Sciences*

---

Some Applications of Basic Ideas and Models of Synergetics to Sociology By A. Wunderlin and H. Haken .....	174
A Synergetic Approach to Energy-Oriented Models of Socio-Economic- Technological Problems By A.B. Cambel (With 6 Figures) .....	183
New Synergisms in Socio-Economic Systems: More Questions than Answers By B. Fritsch .....	197
On the Entropy of Economic Systems By D.T. Spreng (With 3 Figures) .....	207

---

*Part V Complex Systems*

---

Death - From Microscopic to Macroscopic Disorder By F. Cramer (With 11 Figures) .....	220
Local Synaptic Modification Can Lead to Organized Connectivity Patterns in Associative Memory By G. Palm (With 5 Figures) .....	229
The Organization of Action in Time By D. Dörner (With 4 Figures) .....	243
New Problems for an Old Brain - Synergetics, Cognition and Evolutionary Epistemology By G. Vollmer .....	250
<i>Index of Contributors</i> .....	259

