

Table of Contents

Bounds for Properties of Complex Systems	
F.H. Busse	1
Instability Without Instability?	
S. Grossmann	10
Spontaneous Density Fluctuations in Granular Flow and Traffic	
H.J. Herrmann	23
Pattern Selection as a Nonlinear Eigenvalue Problem	
P. Büchel and M. Lücke	35
Conditional Probability Distributions of a Turbulent Cascade	
F. Friedrich and J. Peinke	54
The Couette–Taylor Flow: A Paradigmatic System for Instabilities, Pattern Formation, and Routes to Chaos	
J. Abshagen, A. Schulz, and G. Pfister	63
Instabilities in Smectic Films	
H. Pleiner and S. Ried	73
Why Air Bubbles in Water Glow So Easily	
M. Brenner, S. Hilgenfeldt, and D. Lohse	79
Competition of Growth Patterns in Directed Growth	
H. Müller-Krumbhaar	98
Asymptotic Dynamics in Directional Solidification	
K. Kassner and P. Metzner	114

Chemical Waves in Media with Complex Anisotropy R. Imbihl	126
Experiments on Excitation Waves S.C. Müller	133
Localized Turbulence and Cellular Structures in Systems with Global Coupling D. Battogtokh, A. Preusser, and V. Mikhailov	149
Bifurcation Theory of Meandering Spiral Waves C. Wulff	166
Future Trends in Synergetics H. Haken	179
Synergetic Hardware Concepts for Self-Organizing Neural Networks D. Ruwisch, M. Bode, H.-J. Schulze, and F.-J. Niedernostheide	194
Nonlinear Time Series Analysis – Potentials and Limitations H. Kantz	213
Time Series Analysis of Scalar Time-Delay Systems M.J. Bünner, M. Popp, T. Meyer, A. Kittel, and J. Parisi	229
Control of Chaos by Self-Adapted Delayed Feedback A. Kittel, M. Popp, J. Parisi, and K. Pyragas	239
Mode Analysis of the Generalized Rössler System T. Meyer, M.J. Bünner, A. Kittel, and J. Parisi	248
Combinatorial Optimization with Coupled Chemical Reaction Cells J. Starke	256
On Superimposed Dynamical Multifractals R. Stoop	266
The Thermodynamics of Random Walks with Applications to Fractals and Chaos G. Radons	281

Brownian Rectifiers: How to Convert Brownian Motion into Directed Transport	
P. Hänggi and R. Bartussek	294
Stochastics of Pattern Formation	
H. Hempel, T. Fricke, M. Mieth, and L. Schimansky-Geier	309
Dynamics in Superconducting Arrays of Josephson Junctions	
R.P. Hebener, S.G. Lachenmann, and T. Doderer	325
Scanning Probe Microscopy of Self-Organized Structure Formation in Semiconductor Systems	
W. Clauss, C. Muz, and W. Müller	335
Impurity Breakdown Induced Current Filaments in n-GasAs	
W. Prettl	341
Lattice-Gas Approach to Collective Transport Phenomena in Biological Pattern Formation	
A. Deutsch	353
Simulation of Chemotaxis Equations in Two-Space Dimensions	
A. Stevens	363
Dynamic Instability and Oscillations of Microtubules	
A. Marx and E. Mandelkow	372