

# Contents

<b>Part I</b>	<b>Introduction</b>	
<hr/>		
Propagation in Systems Far from Equilibrium: Introduction and Overview		
By P. Manneville, H.R. Brand, and J.E. Wesfreid . . . . .		2
<b>Part II</b>	<b>Interfaces and Fronts</b>	
<hr/>		
Dendritic Crystal Growth: Recent Progress and Current Issues		
By D.A. Kessler and H. Levine (With 4 Figures) . . . . .		14
Velocity Selection for Needle Crystals in the 2-D One-Sided Model		
By C. Misbah . . . . .		28
The Problem of Directional Solidification Revisited		
By M. Ben Amar, T. Dombre, and V. Hakim (With 3 Figures) . . . .		35
Cellular Instabilities in Directional Solidification		
By S. de Cheveigné and C. Guthmann (With 7 Figures) . . . . .		44
Cellular and Dendritic Fronts in Directional Solidification: Experiments by the Light of Pattern Selection		
By B. Billia, H. Jamgotchian, and L. Capella (With 6 Figures) . . . .		50
On the Analogy of Anomalous Viscous Fingers with Crystalline Dendrites		
By Y. Couder (With 7 Figures) . . . . .		63
Diffuse Interfaces		
By P. Clavin (With 5 Figures) . . . . .		78
<b>Part III</b>	<b>Chemical Waves</b>	
<hr/>		
Chemical Waves and Periodic Precipitation Processes		
By J. Ross (With 5 Figures) . . . . .		90
Wave Propagation in Chemical Nonequilibrium Systems: New Experimental Results		
By Z. Nagy-Ungvarai and S.C. Müller (With 13 Figures) . . . . .		100

Spatio-Temporal Phase Patterns Near a Hopf Bifurcation in 2D Systems	
By D. Walgraef (With 4 Figures) . . . . .	112

---

<b>Part IV</b>	<b>Envelope Equations and Localized Excitations</b>
----------------	---

---

The Dynamics of Patterns: A Survey	
By A.C. Newell (With 11 Figures) . . . . .	122
Phase Turbulence and Mean Flow Effects in Rayleigh-Bénard Convection	
By A. Pocheau (With 7 Figures) . . . . .	156
Defects in Waves	
By L. Gil and J. Lega (With 11 Figures) . . . . .	164
Propagative Structures and Localization in the Convection of a Liquid Crystal	
By A. Joets and R. Ribotta (With 6 Figures) . . . . .	176
Dynamics of Codimension-One Defects	
By P. Coulet, C. Elphick, and D. Repaux (With 3 Figures) . . . . .	185
Localized Instabilities and Nucleation of Dislocations in Convective Rolls	
By X.D. Yang, A. Joets, and R. Ribotta (With 6 Figures) . . . . .	194

---

<b>Part V</b>	<b>Phase Dynamics and Pattern Selection</b>
---------------	---

---

Phase Dynamics – A Review and a Perspective	
By H.R. Brand . . . . .	206
Phase Diffusion in a Ramped Convection Channel	
By I. Rehberg and F.H. Busse (With 13 Figures) . . . . .	225
Pattern Selection in the Bénard-Marangoni Instability	
By C. Perez-Garcia, P. Cerisier, and R. Occelli (With 7 Figures) . . .	232
Pattern Selection in Convective Instabilities with Axial Anisotropy	
By L. Kramer, W. Zimmermann, E. Bodenschatz, and W. Pesch (With 3 Figures) . . . . .	240
Pattern Selection in Salt Fingers	
By C. Normand (With 1 Figure) . . . . .	250
Model Systems for Long-Scale Convection	
By P. Metzener and S.H. Davis (With 2 Figures) . . . . .	258
The Kuramoto-Sivashinsky Equation: A Progress Report	
By P. Manneville (With 7 Figures) . . . . .	265

---

**Part VI      Propagation in Confined Systems**

---

Two-frequency States at the Onset of Convection in Binary Fluid Mixtures By P. Kolodner, C.M. Surko, H.L. Williams, and A. Passner (With 7 Figures) .....	282
A Galerkin Approximation for Convection in Binary Mixtures with Realistic Concentration Boundary Conditions By S.J. Linz and M. Lücke (With 7 Figures) .....	292
Convection in Binary Mixtures By G. Ahlers, D.S. Cannell, R. Heinrichs, and T.S. Sullivan .....	305
Convection in Viscoelastic Fluids By B.J.A. Zielinska (With 1 Figure) .....	307
An Overview of the Flow Regimes in a Circular Couette System By C.D. Andereck and G.W. Baxter (With 7 Figures) .....	315
New Bifurcations in a Partially Filled, Horizontal, Rotating Cylinder By A. Aitta (With 5 Figures) .....	325
New Patterns in the Flow Between Two Horizontal Coaxial Rotating Cylinders with Partially Filled Gap By I. Mutabazi, H. Peerhossaini, and J.E. Wesfreid (With 3 Figures) .....	331
Strong Resonance in Forced Oscillatory Convection By S. Fauve .....	338

---

**Part VII      Open Flow Systems**

---

On the Absolute/Convective Nature of Primary and Secondary Instabilities By P. Huerre (With 13 Figures) .....	340
The Bénard–Von Kármán Instability in Laminar Regimes By M. Provansal (With 5 Figures) .....	354
Nonlinear Limit-Cycle Solutions – A Rational Method for Transition Prediction in Shear Flows? By W. Koch (With 7 Figures) .....	360
Questions About an Experiment on the Wake of a Sphere in a Stratified Fluid By O. Thual (With 3 Figures) .....	369
Experimental and Theoretical Studies of the Three-Dimensional Boundary-Layer Transition By U. Dallmann et al. (With 14 Figures) .....	378

<b>On the Instability of Laminar Boundary Layers Along Concave Walls Towards Görtler Vortices</b>	
By V. Kottke (With 8 Figures) . . . . .	390
<b>Experimental Study of the Taylor-Görtler Instability</b>	
By H. Peerhossaini and J.E. Wesfreid (With 11 Figures) . . . . .	399
<b>Lattice Gas Hydrodynamics</b>	
By D. d'Humières and P. Lallemand (With 3 Figures) . . . . .	413
<b>Index of Contributors</b> . . . . .	425