

Advances in Fluid Mechanics

This is the second volume in a collection which demonstrates the importance of mathematical, computational and experimental techniques to the advancement of research in nonlinear instability, chaotic motions and turbulent flow systems.

Containing original research, research-expository and survey articles, it provides a digest of current developments, together with open questions and unsolved problems which are likely to determine fruitful directions for future advanced study and research. All the chapters are invited and come from fluid dynamicists and applied mathematicians who have made important contributions to this area.

Both thermal and shear flow systems are covered, while applications reviewed include aerodynamics and materials processing, geophysics, oceanography, atmospheric science and astrophysics.

Contents: Turbulence Evolution in Vortex-Dominated Flows; Archetypal Analysis of Data from Spatially Extended Dynamical Systems; Ginzburg-Landau Theory and Symmetry; Hydrodynamic Alpha-Effect in a Convective System; Dynamical Systems and the Kinematics Dynamo; Investigation of Fine-Scale Turbulence in Shear Flows using PVC Technique; Brush Mechanisms in Hydrodynamics; Instability of Multi-Layer Flows; Thermal Effects and Plasma Absorption in Laser Materials Processing; Turbulence Evolution in Vortex-Dominated Flows.

Titles of related interest

NONLINEAR INSTABILITY, CHAOS AND TURBULENCE: VOLUME 1

Editors: R. DEBNATH and D.N. RIAHI

Series: Advances in Fluid Mechanics

ISBN: 1-85312-515-6 1999 368pp

FLOW INSTABILITY

D.N. RIAHI

ISBN: 1-85312-701-9 2000 280pp

WIT_{PRESS}

E-mail: witpress@witpress.com
<http://www.witpress.com>

ISBN: 1-85312-730-2
ISSN: 1353-808X

Preface	x
 Chapter 1	
Turbulence evolution in vortex-dominated flows	
<i>J.S. Marshall & M.L. Beninati</i>	1
 Chapter 2	
Archetypal analysis of data from spatially extended dynamical systems	
<i>E.Stone</i>	41
 Chapter 3	
Ginzburg-Landau theory and symmetry	
<i>I. Melbourne</i>	79
 Chapter 4	
Hydrodynamic alpha-effect in a convective system	
<i>G.V. Levina, S.S.Moiseev & P.B. Rutkevich</i>	111
 Chapter 5	
Dynamical systems and the kinematic dynamo	
<i>D. Armbruster & I. Oprea</i>	163
 Chapter 6	
Investigation of fine-scale turbulence in shear flows using the PVC technique	
<i>Y. Zohar</i>	193
 Chapter 7	
Burst mechanisms in hydrodynamics	
<i>E.Knobloch & J. Moehlis</i>	237

Chapter 8

Instability of multi-layer flows

C. Pozrikidis 289

Chapter 9

Thermal effects and plasma absorption in laser materials processing

W. Guo & A. Kar 335

Chapter 10

Nonlinear thermal instability in spherical shells

D.N. Riahi 377

Index 404