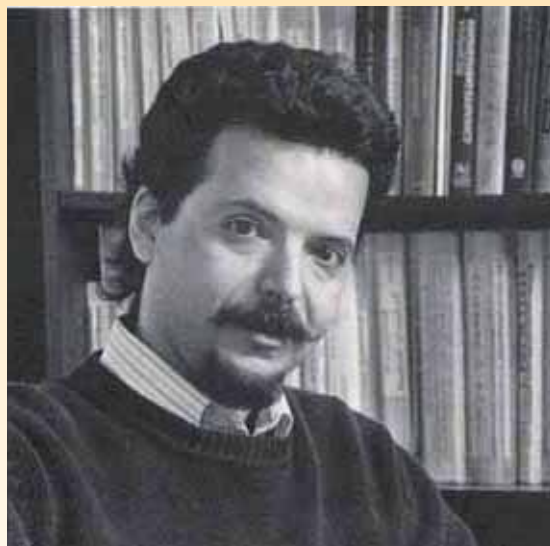


# Essential Titles in Fluid Mechanics

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## About the author:

JOHN G. PAPANSTAVRIDIS, Ph. D., a native of Athens, Greece, and a graduate of its National Technical University [E.M.II. – B. Sc. in Civil Engineering (1965-1970)], and Purdue University [M. Sc. (1970-1972) and Ph. D. (1972-1976) in Continuum Mechanics and Physics], has been teaching Applied Mechanics at the Georgia Institute of Technology (Atlanta, Georgia, USA), first in its School of Engineering Science and Mechanics (1979-1986) and then in its School of Mechanical Engineering (1986-Present).

Professor Papastavridis' research interests are in the areas of Analytical and Structural Mechanics (including Stability, Nonlinear Oscillations, and Variational Principles), Mathematical Methods in Engineering (such as Calculus of Variations and Tensor Analysis) and the History of Mechanics, Physics, and Technology.

Professor Papastavridis has authored over 40 research papers that have appeared in prominent archival publications [e.g. *Il Nuovo Cimento*, *American J. Physics*, *Int'l J. Engineering Sciences*, *J. Guidance, Control, and Dynamics* (AIAA), *J. Applied Mechanics* (ASME)]. He is also the author of (a) the highly acclaimed monograph *Tensor Calculus and Analytical Dynamics* (1999), and (b) *Elementary Mechanics, From an Advanced and Unified Viewpoint, A Compendium of Newtonian-Eulerian Mechanics of Particles, Rigid Bodies and Continua* (under production).

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*"I recommend without hesitation Prof Papastavridis' treatise as a reference source to be acquired by every library of Mathematics, Physics, or Mechanical/Aeronautical/Electrical Engineering department. It is a different book, especially in our Internet era where instant satisfaction is often the primary (sometimes sole) goal of the student or researcher. Putting together 1392 (!!) pages of carefully prepared text and 172 figures (which then become somehow sparse) represents a major effort, to say the least."*

Bulletin of the American Mathematical Society

This is a comprehensive, state-of-the-art, treatise on the energetic mechanics of Lagrange and Hamilton, that is, classical analytical dynamics, and its principal applications to constrained systems (contact, rolling, and servoconstraints). In this edition, corrections (of the original edition, 2002) have been incorporated.

**Contents:** Introduction; Background: Basic Concepts and Equations of Particle and Rigid-Body Mechanics; Kinematics of Constrained Systems; Kinetics of Constrained Systems; Impulsive Motion; Nonlinear Nonholonomic Constraints; Differential Variational Principles, and Associated Generalized Equations of Motion; Time-Integral Theorems and Variational Principles; Introduction to Hamiltonian/Canonical Methods.

1450pp

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978-981-4338-72-1(ebook)

Sep 2011

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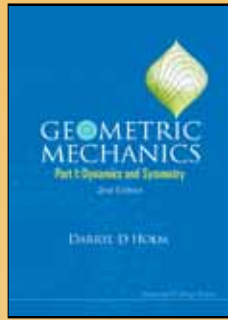
US\$364

£174

**GEOMETRIC MECHANICS**

by **Darryl D Holm** (*Imperial College London, UK*)

This textbook introduces the tools and language of modern geometric mechanics to advanced undergraduates and beginning graduate students in mathematics, physics and engineering. It treats the fundamental problems of dynamical systems from the viewpoint of Lie group symmetry in variational principles. The only prerequisites are linear algebra, calculus and some familiarity with Hamilton's principle and canonical Poisson brackets in classical mechanics at the beginning undergraduate level.



The organisation of the first edition has been preserved in the second edition. However, the substance of the text has been rewritten throughout to improve the flow and to enrich the development of the material. In particular, the role of Noether's theorem about the implications of Lie group symmetries for conservation laws of dynamical systems has been emphasised throughout, with many applications.

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**Part I** The ideas and concepts of geometric mechanics are explained in the context of explicit examples. Through these examples, the student develops skills in performing computational manipulations, starting from Fermat's principle, working through the theory of differential forms on manifolds and transferring these ideas to the applications of reduction by symmetry to reveal Lie–Poisson Hamiltonian formulations and momentum maps in physical applications.

The many Exercises and Worked Answers in the text enable the student to grasp the essential aspects of the subject. In addition, the modern language and application of differential forms is explained in the context of geometric mechanics, so that the importance of Lie derivatives and their flows is clear. All theorems are stated and proved explicitly.

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**200pp** **Feb 2012**  
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The objective of this book is several-fold. Firstly, it collects and describes the most significant experiments that do not find explanation in the classical Newtonian (Navier–Stokes) theory. Then, it introduces some of the most commonly used models of non-Newtonian fluid, including Reiner–Rivlin, power law, simple fluid, and Oldroyd-B models. These models are explored through an updated mathematical investigation, with particular regard to the well-posedness of the corresponding boundary and initial-boundary value problems. Finally, it presents a rigorous mathematical explanation of the relevant experiments.

**Contents:** Why Non-Newtonian Models?; Fluid–Particle Interaction: Some Puzzling Experiments; The Reiner–Rivlin Model; The Power Law Model; Simple Fluids; Small Weissenberg Numbers: The Second-Order Model; The Oldroyd-B and Related Models; Non-Newtonian Fluid and Turbulence Modeling.

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## NAVIER-STOKES EQUATIONS IN PLANAR DOMAINS

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**Jean-Pierre Croisille** (*Universite Paul Verlaine-Metz, France*),  
 & **Dalia Fishelov** (*Tel-Aviv Academic College of Engineering, Israel*)

This volume deals with the classical Navier-Stokes system of equations governing the planar flow of incompressible, viscous fluid. It is a first-of-its-kind book, devoted to all aspects of the study of such flows, ranging from theoretical to numerical, including detailed accounts of classical test problems such as “driven cavity” and “double-driven cavity”. A comprehensive treatment of the mathematical theory developed in the last 15 years is elaborated, heretofore never presented in other books. It gives a detailed account of the modern compact schemes based on a “pure streamfunction” approach. In particular, a complete proof of convergence is given for the full nonlinear problem. This volume aims to present a variety of numerical test problems. It is therefore well positioned as a reference for both theoretical and applied mathematicians, as well as a text that can be used by graduate students pursuing studies in (pure or applied) mathematics, fluid dynamics and mathematical physics.

**260pp** **Nov 2011**  
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**978-1-84816-276-1(ebook)** **US\$103**

## HARMONIC ANALYSIS METHOD FOR NONLINEAR EVOLUTION EQUATIONS, I

by **Baoxiang Wang** (*Peking University, China*),  
**Zhaohui Huo, Chengchun Hao** (*Chinese Academy of Sciences, China*),  
 & **Zihua Guo** (*Peking University, China*)

This monograph provides a comprehensive overview on a class of nonlinear evolution equations, such as nonlinear Schrödinger equation, nonlinear Klein–Gordon equation, KdV equation as well as Navier–Stokes equations and Boltzmann equation. The global wellposedness to the Cauchy problem for those equations is systematically studied by using the harmonic analysis methods.

This book is self-contained and may also be used as an advanced textbook by graduate students in analysis and PDE subjects- and even ambitious undergraduate students.

**300pp** **Sep 2011**  
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Lecture Notes Series, Institute for Mathematical Sciences,  
 National University of Singapore

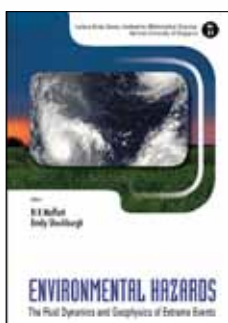
## ENVIRONMENTAL HAZARDS

The Fluid Dynamics and Geophysics of Extreme Events  
 edited by **H K Moffatt** (*University of Cambridge, UK*) &  
**Emily Shuckburgh** (*British Antarctic Survey, UK*)

One of the priority areas of ICSU (The International Council for Science) is “Natural and Human-Induced Environmental Hazards and Disasters”. The School — held at the Institute for Mathematical Sciences, Singapore from 20 April to 2 May 2009 — on which this volume is based on was sponsored by ICSU and by its members from IUTAM (the International Union of Theoretical and Applied Mechanics) and IUGG (the International Union of Geodesy and Geophysics).

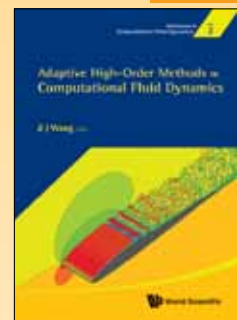
The book provides an indepth graduate-level introduction to the fluid dynamics and geophysics of hazards such as tropical cyclones, flooding, atmospheric pollution and tsunamis. It also includes discussion of the possible effects of climate change on these phenomena. Indeed, the current importance of this area is of great public concern.

**300pp** **Aug 2011**  
**978-981-4313-28-5** **US\$86** **£57**  
**978-981-4366-99-1(pbk)** **US\$44** **£29**  
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## Advances in Computational Fluid Dynamics ADAPTIVE HIGH-ORDER METHODS IN COMPUTATIONAL FLUID DYNAMICS

edited by **Z J Wang**  
 (*Iowa State University, USA*)



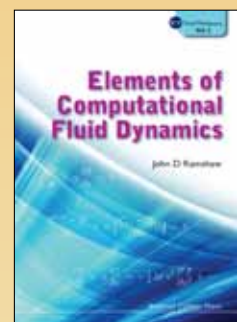
This book consists of important contributions by world-renowned experts on adaptive high-order methods in computational fluid dynamics (CFD). It covers several widely used, and still intensively researched methods, including the discontinuous Galerkin, residual distribution, finite volume, differential quadrature, spectral volume, spectral difference,  $P_N P_M$  and correction procedure via reconstruction methods.

**472pp** **Mar 2011**  
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### Textbook

## ICP Fluid Mechanics ELEMENTS OF COMPUTATIONAL FLUID DYNAMICS

by **John D Ramshaw** (*Portland State University, USA*)



This book is a brief introduction to the fundamental concepts of computational fluid dynamics (CFD). It is addressed to beginners, and presents the ABCs or bare essentials of CFD in their simplest and most transparent form. The approach taken is to describe the principal analytical tools required, including truncation-error and stability analyses, followed by the basic elements or building blocks of CFD, which are numerical methods for treating sources, diffusion, convection, and pressure waves. Finally, it is shown how those ingredients may be combined to obtain self-contained numerical methods for solving the full equations of fluid dynamics. The book should be suitable for self-study, as a textbook for CFD short courses, and as a supplement to more comprehensive CFD and fluid dynamics texts.

**Contents:** Introduction; Finite-Difference Approximations; Finite-Difference Equations; Numerical Stability; Source Terms; Diffusion; Convection; Pressure Waves; Combining the Elements.

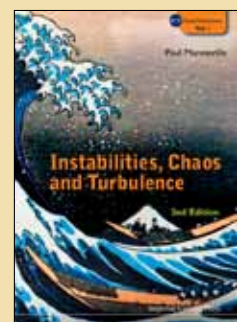
**140pp** **Feb 2011**  
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### Textbook

## ICP Fluid Mechanics INSTABILITIES, CHAOS AND TURBULENCE

**Second Edition**

by **Paul Manneville** (*Ecole Polytechnique, France*)



This book is a self-contained introduction to a wide body of knowledge on nonlinear dynamics and chaos. Manneville emphasises the understanding of basic concepts and the nontrivial character of nonlinear response, contrasting it with the intuitively simple linear response.

**Contents:** Introduction and Overview; First Steps in Nonlinear Dynamics; Life and Death of Dissipative Structures; Nonlinear Dynamics: From Simple to Complex; Characterising and Using Chaos; Nonlinear Dynamics of Patterns; Open Flows: Instability and Transition; Developed Turbulence; Summary and Perspectives.

**456pp** **Jul 2010**  
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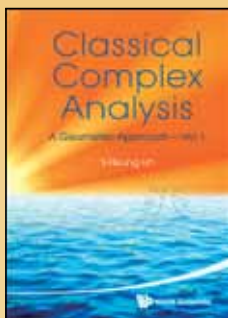
The book is rich in contents, figures, examples and exercises. It is self-contained and is designed for a variety of usages and motivations concerning advanced studies. It can be used both as a textbook for undergraduate and graduate students, and as a reference book in general.



**Vol. 1**

**Contents:** Complex Numbers; Complex-Valued Functions of a Complex Variable; Fundamental Theory: Differentiation, Integration, and Analytic Functions; Fundamental Theory: Integration (Advanced).

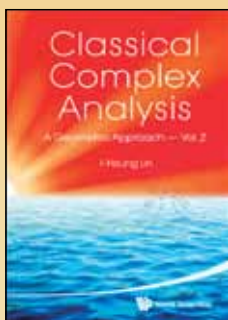
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**Contents:** Fundamental Theory: Sequences, Series, and Infinite Products; Conformal Mapping and Dirichlet's Problem; Riemann Surfaces (Abstract).

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## COMPUTATIONAL FLUID DYNAMICS REVIEW 2010

edited by **M M Hafez** (*University of California, Davis, USA*),  
**K Oshima** (*University of Tokyo, Japan*),  
& **D Kwak** (*NASA Ames Research Center, USA*)

This volume contains 25 review articles by experts which provide up-to-date information about the recent progress in computational fluid dynamics (CFD). Due to the multidisciplinary nature of CFD, it is difficult to keep up with all the important developments in related areas. *CFD Review 2010* would therefore be useful to researchers by covering the state-of-the-art in this fast-developing field.

**Contents:** Unstructured Grids and Adaptive Finite Element Methods; High-Order Efficient Schemes; Simulations of Turbulent Flows and Orthogonal Decomposition Method; Chemically Reacting Flows, Aeroacoustics, Optimization Techniques and Special Topics

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## FRACTIONAL CALCULUS AND WAVES IN LINEAR VISCOELASTICITY

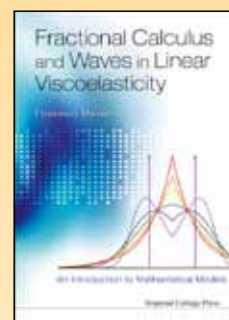
### An Introduction to Mathematical Models

by **Francesco Mainardi** (*University of Bologna, Italy*)

This monograph provides a comprehensive overview of the author's work on the fields of fractional calculus and waves in linear viscoelastic media, which includes his pioneering contributions on the applications of special functions of the Mittag-Leffler and Wright types.

It is intended to serve as a general introduction to the above-mentioned areas of mathematical modeling. This book is likely to be of interest to applied scientists and engineers.

**368pp** **May 2010**  
**978-1-84816-329-4** **US\$75** **£47**  
**978-1-84816-330-0(ebook)** **US\$98**



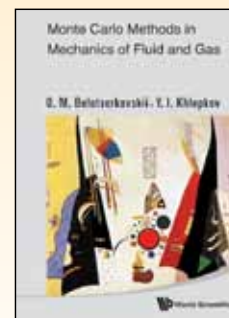
### Textbook

## MONTE CARLO METHODS IN MECHANICS OF FLUID AND GAS

by **O M Belotserkovskii** & **Y I Khlopkov**  
(*Russian Academy of Natural Sciences, Russia*)

This book is devoted to analysis of Monte Carlo methods developed in rarefied gas dynamics. Presented is the short history of the development of such methods, described are their main properties, their advantages and deficiencies. It is shown that the contemporary stage in the progress of computational methods cannot be regarded without a complex approach to the preparation of algorithms taking into account all the peculiarities of the problem under consideration, that is, of the physical nature of a process, the mathematical model and the theoretical aspects of computational mathematics and stochastic processes. Thoroughly investigated is the possibility of application of Monte Carlo methods in some kindred areas of science which are non-traditional for the use of statistical modeling (continuous media, turbulence). Considered are the possible directions of development of statistical modeling.

**280pp** **May 2010**  
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### Textbook

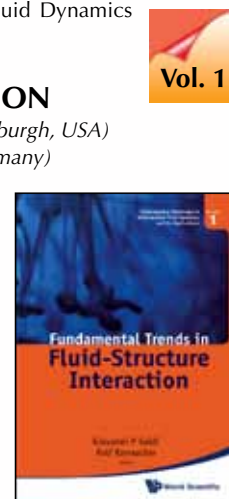
Contemporary Challenges in Mathematical Fluid Dynamics and Its Applications

## FUNDAMENTAL TRENDS IN FLUID-STRUCTURE INTERACTION

edited by **Giovanni P Galdi** (*University of Pittsburgh, USA*)  
& **Rolf Rannacher** (*Heidelberg University, Germany*)

The interaction of a fluid with a solid body is a widespread phenomenon in nature, occurring at different scales and different applied disciplines. Interestingly enough, even though the mathematical theory of the motion of bodies in a liquid is one of the oldest and most classical problems in fluid mechanics, mathematicians have, only very recently, become interested in a systematic study of the basic problems related to fluid-structure interaction, from both analytical and numerical viewpoints.

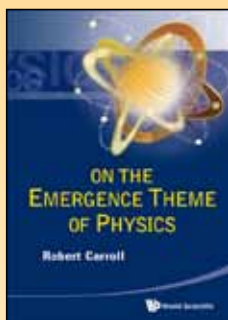
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## ON THE EMERGENCE THEME OF PHYSICS

by **Robert Carroll** (University of Illinois, Urbana-Champaign, USA)

The book surveys mathematical relations between classical and quantum mechanics, gravity, time and thermodynamics from various points of view and many sources (with appropriate attribution). The emergence theme is developed with an emphasis on the meaning via mathematics. A background theme of Bohemian mechanics and connections to the quantum equivalence principle of Matone *et al.* is also developed in great detail. Some original work relating the quantum potential and Ricci flow is also included.



**Contents:** Some Quantum Background; Some Geometric Aspects; Aspects of Emergence; Kaluza–Klein and Cosmology; Remarks on Thermodynamics and Gravity; Geometry and Mechanics; On Time and the Universe; Gravity and the Quantum Potential.

<b>288pp</b>	<b>Jan 2010</b>	
<b>978-981-4291-79-8</b>	<b>US\$61</b>	<b>£40</b>
<b>978-981-4304-82-5 (pbk)</b>	<b>US\$36</b>	<b>£24</b>
<b>978-981-4291-80-4 (ebook)</b>	<b>US\$79</b>	

## STABILITY CRITERIA FOR FLUID FLOWS

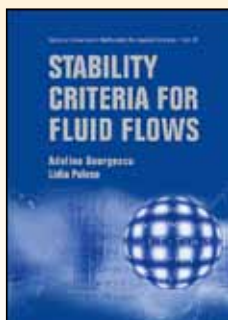
by **Adelina Georgescu** (Academy of Romanian Scientists, Romania) & **Lidia Palese** (University of Bari, Italy)



*“This book is well written, and is going to be a great support to students and researchers in fluid-dynamical stability.”*

### Mathematical Reviews

This is a comprehensive and self-contained introduction to the mathematical problems of thermal convection. The book delineates the main ideas leading to the authors' variant of the energy method. These can be also applied to other variants of the energy method. The importance of the book lies in its focussing on the best concrete results known in the domain of fluid flows stability and in the systematic treatment of mathematical instruments used in order to reach them.



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<b>978-981-4289-56-6</b>	<b>US\$153</b>	<b>£101</b>
<b>978-981-4289-57-3 (ebook)</b>	<b>US\$199</b>	

Series in Contemporary Applied Mathematics

## MULTI-SCALE PHENOMENA IN COMPLEX FLUIDS

**Modeling, Analysis and Numerical Simulation**

edited by **Thomas Y Hou** (California Institute of Technology, USA), **Chun Liu** (Penn State University, USA), & **Jian-Guo Liu** (University of Maryland, USA)



*“The book will be of interest and useful to a wide range of specialists working in the areas of applied mathematics, fluid mechanics, numerical methods for partial differential equations, and heat transfer. The book can be also recommended as a text for seminars and courses, as well as for independent study.”*

### Zentralblatt MATH

This review volume of 5 chapters, covering various fields in complex fluids, places emphasis on multi-scale modeling, analyses and simulations. It will be of special interest to researchers and graduate students who want to work in the field of complex fluids.

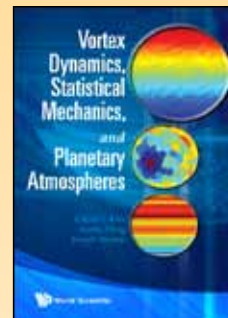


<b>380pp</b>	<b>Jun 2009</b>	
<b>978-981-4273-25-1</b>	<b>US\$120</b>	<b>£79</b>
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## VORTEX DYNAMICS, STATISTICAL MECHANICS, AND PLANETARY ATMOSPHERES

by **Chjan C Lim**, **Xueru Ding**, & **Joseph Nebus** (Rensselaer Polytechnic Institute, USA)

This book introduces the reader with a background in either fluid mechanics or statistical mechanics to the modeling of planetary atmospheres by barotropic and shallow-water models. These potent models are introduced in both analytical and numerical treatments highlighting the ways both approaches inform and enlighten the other. This book builds on *Vorticity*, *Statistical Mechanics*, and *Monte Carlo Simulations* by Lim and Nebus in providing a rare introduction to this intersection of research fields. While the book reaches the cutting edge of atmospheric models, the exposition requires little more than an undergraduate familiarity with the relevant fields of study, and so this book is well suited to individuals hoping to swiftly learn an exciting new field of study.



<b>224pp</b>	<b>Apr 2009</b>	
<b>978-981-283-912-1</b>	<b>US\$119</b>	<b>£78</b>
<b>978-981-283-913-8 (pbk)</b>	<b>US\$70</b>	<b>£46</b>
<b>978-981-283-914-5 (ebook)</b>	<b>US\$155</b>	

## ROBOTICS: STATE OF THE ART AND FUTURE CHALLENGES

by **George Bekey** (University of Southern California, USA), **Robert Ambrose** (NASA Johnson Space Center, USA), **Vijay Kumar** (University of Pennsylvania, USA), **David Lavery** (NASA Headquarters, USA), **Arthur Sanderson** (Rensselaer Polytechnic Institute, USA), **Brian Wilcox** (NASA Jet Propulsion Laboratory, USA), **Junku Yuh** (Korea Aerospace University, Korea), & **Yuan Zheng** (Ohio State University, USA)

This book presents the results of an assessment of the state of robotics in Japan, South Korea, Western Europe and Australia and a comparison of robotics R&D programs in these countries with those in the United States. The comparisons include areas like robotic vehicles, space robotics, service robots, humanoid robots, networked robots, and robots for biological and medical applications, and based on criteria such as quality, scope, funding and commercialization.



<b>152pp</b>	<b>Jul 2008</b>	
<b>978-1-84816-006-4</b>	<b>US\$82</b>	<b>£54</b>
<b>978-1-84816-007-1 (ebook)</b>	<b>US\$107</b>	

### Lecture Notes

## ELEMENTARY FLUID MECHANICS

by **Tsutomu Kambe** (Institute of Dynamical Systems, Tokyo, Japan)

*“The author is to be commended for introducing a chapter on the gauge theory of fluid mechanics, which is quite scarce in fluid mechanics books ... the book can serve as an excellent introduction for graduate students in applied mathematics and physics who are interested in pursuing research in specific areas of fluid mechanics ... One of the strengths of the book is its culmination in a detailed solution to all the problems.”*



	<b>Choice</b>	
<b>404pp</b>	<b>Jan 2007</b>	
<b>978-981-256-416-0</b>	<b>US\$110</b>	<b>£63</b>
<b>978-981-256-597-6 (pbk)</b>	<b>US\$53</b>	<b>£29</b>

**LESSON STUDY**

**Challenges in Mathematics Education**

edited by **Maitree Inprasitha** (*Khon Kaen University, Thailand*), **Masami Isoda** (*University of Tsukuba, Japan*), **Ban-Har Yeap** (*National Institute of Education, Singapore*), & **Patsy Wang-Iverson** (*The Gabriella and Paul Rosenbaum Foundation, USA*)



Classroom Innovations through Lesson Study is an APEC EDNET (Asia-Pacific Economic Cooperation Education Network) project that aims to improve the quality of education in the area of mathematics. This book includes challenges of lesson study in the world, for example, in Japan and Singapore.

Lesson study is one of the best ways to improve the quality of teaching. It is the model approach for improvement of teacher education in the world, and mathematics is the most appropriate subject for sharing the results of lesson study. This book focuses on teacher education and mathematics education, and on curriculum implementation and reforms.

<b>300pp</b>	<b>Oct 2011</b>	
<b>978-981-283-540-6</b>	<b>US\$111</b>	<b>£76</b>
<b>978-981-283-541-3(pbk)</b>	<b>US\$65</b>	<b>£45</b>
<b>978-981-283-542-0(ebook)</b>	<b>US\$144</b>	

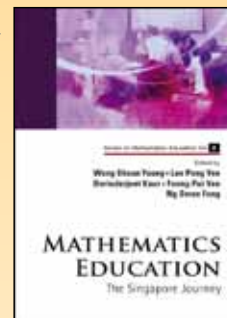
**MATHEMATICS EDUCATION**

**The Singapore Journey**

edited by **Wong Khoon Yoong, Lee Peng Yee, Berinderjeet Kaur, Foong Pui Yee, & Ng Swee Fong** (*Nanyang Technological University, Singapore*)



*"This book provides a comprehensive view of the landscape and terrain of Singapore's journey towards excellence. This would provide many countries with directions for emulating Singapore's success in mathematics education ... this book is indeed a significant contribution that has added to the knowledge of research and practice of mathematics education in the world at large."*



**Journal of Science and Mathematics Education in Southeast Asia**

This comprehensive book is a state-of-the-art review of research and practices of mathematics education in Singapore. It traces the fascinating journey from the original development of the Singapore mathematics curriculum in the 1950s to the present day, and reports on diverse findings about the Singapore experience that are not readily available in print. All of the authors are active mathematics educators or senior mathematics teachers in Singapore, thus adding authenticity and distinctiveness to the stories covered in this book. The issues they so earnestly explore in this book will undoubtedly be of interest to graduate students, mathematics educators, and the international mathematics education community.

<b>564pp</b>	<b>Feb 2009</b>	
<b>978-981-283-375-4</b>	<b>US\$121</b>	<b>£80</b>
<b>978-981-283-376-1(ebook)</b>	<b>US\$157</b>	

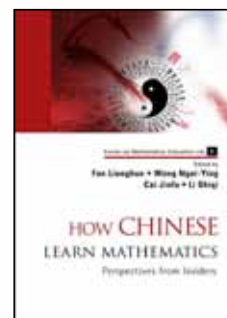
**HOW CHINESE LEARN MATHEMATICS**

**Perspectives from Insiders**

edited by **Fan Lianghuo** (*Nanyang Technological University, Singapore*), **Wong Ngai-Ying** (*Chinese University of Hong Kong, Hong Kong*), **Cai Jinfa** (*University of Delaware, USA*), & **Li Shiqi** (*East China Normal University, China*)



*"A noteworthy feature of the book is that eleven of the chapter authors work in mainland China ... The edited collection is a significant contribution to the research literature and provides an important resource in the field."*



**Research in Mathematics Education**

The book has been written by an international group of very active researchers and scholars who have a passion for the study of Chinese mathematics education. It aims to provide readers with a comprehensive and updated picture of the teaching and learning of mathematics involving Chinese students from various perspectives, including the ways in which Chinese students learn mathematics in classrooms, schools and homes, the influence of the cultural and social environment on Chinese students' mathematics learning, and the strengths and weaknesses of the ways in which Chinese learn mathematics. Furthermore, based on the relevant research findings, the book explores the implications for mathematics education and offers sound suggestions for reform and improvement. This book is a must for anyone who is interested in the teaching and learning of mathematics concerning Chinese learners.

<b>592pp</b>	<b>Aug 2004</b>	
<b>978-981-256-014-8</b>	<b>US\$194</b>	<b>£128</b>
<b>978-981-270-414-6(pbk)</b>	<b>US\$98</b>	<b>£65</b>
<b>978-981-256-224-1(ebook)</b>	<b>US\$252</b>	

Series on Mathematics Education  
**RUSSIAN MATHEMATICS EDUCATION**

**History and World Significance**

edited by **Alexander Karp & Bruce R Vogeli** (*Columbia University, USA*)



This anthology, consisting of two volumes, is intended to equip background researchers, practitioners and students of international mathematics education with intimate knowledge of mathematics education in Russia.

Volume 1 consists of several chapters written by distinguished authorities from Russia, the United States and other nations. It examines the history of mathematics education in Russia and its relevance to mathematics education throughout the world.



<b>400pp</b>	<b>Mar 2010</b>	
<b>978-981-4277-05-1</b>	<b>US\$99</b>	<b>£66</b>
<b>978-981-4277-06-8(ebook)</b>	<b>US\$129</b>	

**RUSSIAN MATHEMATICS EDUCATION**

**Programs and Practices**

edited by **Alexander Karp & Bruce R Vogeli** (*Columbia University, USA*)



This second volume examines specific Russian programs in mathematics, their impact and methodological innovations. Although Russian mathematics education is highly respected for its achievements and was once very influential internationally, it has never been explored in depth. This publication does just that.



**Contents:** On the Mathematics Lesson (*Alexander Karp & Leonid Zvavich*); The History and the Present State of Elementary Mathematical Education in Russia (*Olga Ivashева*); On the Teaching of Geometry in Russia (*Alexander Karp & Alexey Werner*); On Algebra Education in Russian Schools (*Liudmila Kuznetsova, Elena Sedova, Svetlana Suvorova & S Troitskaya*); Elements of Analysis in Russian Schools (*Mikhael Jackubson*); Combinatorics, Probability, and Statistics in the Russian School Curriculum (*Evgeny Bunimovich*); School with an Advanced Course in Mathematics and Schools with an Advanced Course in the Humanities (*Alexander Karp*); Assessment in Mathematics in Russian Schools (*Alexander Karp & Leonid Zvavich*); And other topics.

<b>516pp</b>	<b>Mar 2011</b>	
<b>978-981-4322-70-6</b>	<b>US\$112</b>	<b>£74</b>
<b>978-981-4322-71-3(ebook)</b>	<b>US\$146</b>	

**CALCULUS**

For Science and Engineering Students

by **Sheng Gong & Youhong Gong***(University of Science and Technology of China, China)*

Mathematics is the fundamental knowledge for every scientist. As an academic at the University of Science and Technology of China, Professor Sheng Gong takes his passion for mathematics teaching even further. Besides imparting knowledge to students from the Department of Mathematics, he has created and developed his method of teaching Calculus to help students from physics, engineering and other sciences disciplines understand Calculus faster and deeper in order to meet the needs of applications in their own fields.

This book is based on Professor Sheng Gong's 42 years of teaching experience along with a touch of applications of Calculus in other fields such as computer science, engineering. Science students will benefit from the unique way of illustrating theorems in Calculus and also perceive Calculus as a whole instead of a combination of separate topics. The practical examples provided in the book bring motivation to students to learn Calculus.

<b>550pp</b>	<b>Oct 2011</b>	
<b>978-981-4291-48-4</b>	<b>US\$88</b>	<b>£58</b>
<b>978-981-4291-49-1 (pbk)</b>	<b>US\$48</b>	<b>£32</b>

**Textbook**

Mathematical Olympiad Series

**A SECOND STEP TO MATHEMATICAL OLYMPIAD PROBLEMS**by **Derek Holton** *(University of Otago, New Zealand & University of Melbourne, Australia)*

The International Mathematical Olympiad (IMO) is an annual international mathematics competition held for pre-collegiate students. It is also the oldest of the international science olympiads, and competition for places is particularly fierce. This book is an amalgamation of the booklets originally produced to guide students intending to contend for placement on their country's IMO team. The material contained in this book provides an introduction to the main mathematical topics covered in the IMO, which are: Combinatorics, Geometry and Number Theory. In addition, there is a special emphasis on how to approach unseen questions in Mathematics, and model the writing of proofs. Full answers are given to all questions.

Though this book is written from the perspective of a mathematician, it is written in a way that makes it easily comprehensible to adolescents. This book is also a must-read for coaches and instructors of mathematical competitions.

<b>300pp</b>	<b>Jul 2011</b>	
<b>978-981-4327-87-9 (pbk)</b>	<b>US\$38</b>	<b>£24</b>

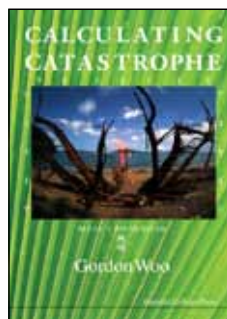
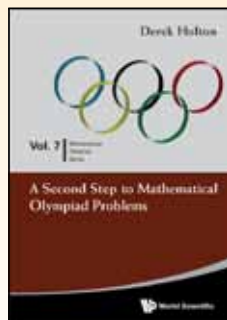
**CALCULATING CATASTROPHE**by **Gordon Woo** *(Risk Management Solutions, USA)*

This book has been written to explain, to a general readership, the underlying philosophical ideas and scientific principles that govern catastrophic events, both natural and man-made. Knowledge of the broad range of catastrophes deepens understanding of individual modes of disaster. This book will be of interest to anyone aspiring to understand catastrophes better, but will be of particular value to those engaged in public and corporate policy, and the financial markets.

The author, Dr. Gordon Woo, was trained in mathematical physics at Cambridge, MIT and Harvard, and has made his career as a calculator of catastrophes. His diverse experience includes consulting for IAEA on the seismic safety of nuclear plants and for BP on offshore oil well drilling. As a catastrophist at Risk Management Solutions, he has advanced the insurance modelling of catastrophes, including designing a model for terrorism risk.

**Contents:** Natural Hazards; Societal Hazards; A Sense of Scale; A Measure of Uncertainty; A Matter of Time; Catastrophe Complexity; Terrorism; Forecasting; Disaster Warning; Disaster Scenarios; Catastrophe Cover; Catastrophe Risk Securitization; Risk Horizons.

<b>368pp</b>	<b>Jun 2011</b>	
<b>978-1-84816-738-4</b>	<b>US\$79</b>	<b>£52</b>
<b>978-1-84816-739-1 (pbk)</b>	<b>US\$29</b>	<b>£19</b>
<b>978-1-84816-740-7 (ebook)</b>	<b>US\$103</b>	

**ACADEMIC GENEALOGY OF MATHEMATICIANS**by **Sooyoung Chang***(Pohang University of Science & Technology, South Korea)*

As modern mathematics has been developed by mathematicians over the past several hundred years, it is interesting to trace the academic genealogy of mathematicians — especially since all mathematicians learnt mathematics from their teachers. In this book, 750 mathematicians are listed along with the detailed descriptions of 464 famous mathematicians of the 19th and 20th centuries.

In addition, interesting life stories and mathematical achievements are included with photographs.

**Contents:** German School; French School; Russian School; British School; Polish School; Hungarian School; Finish School; Swedish School; Norwegian School; Italian School; Dutch School; Belgian School; Austrian School; Japanese School; Korean School; American School; Australian School; Czech School.

<b>524pp</b>	<b>Oct 2010</b>	
<b>978-981-4282-29-1</b>	<b>US\$108</b>	<b>£75</b>

**CREATIVE MINDS, CHARMED LIVES**  
Interviews at Institute for Mathematical Sciences, National University of Singaporeby **Yu Kiang Leong***(National University of Singapore, Singapore)*

This book features interviews of 38 eminent mathematicians and mathematical scientists who were invited to participate in the programs of the Institute for Mathematical Sciences, National University of Singapore. Originally published in its newsletter *Imprints* from 2003 to 2009, these interviews give a fascinating and insightful glimpse into the passion driving some of the most creative minds in modern research in pure mathematics, applied mathematics, statistics, economics and engineering.

**Contents:** *Sun-Yung Alice Chang:* Analyst in Conformal Land; *Jennifer Tour Chayes:* Basic Research, Hidden Returns; *Robert F Engle:* Archway to Nobel; *Takeyuki Hida:* Brownian Motion, White Noise; *Wilfrid Kendall:* Dancing with Randomness; *Lawrence Klein:* Economist for All Seasons; *Fanghua Lin:* Revolution, Transitions, Partial Differential Equations; *Pao Chuen Lui:* Of Science in Defense; *Albert Nikolaevich Shiryaev:* On the Shoulder of a Giant; *Theodore Slaman & W Hugh Woodin:* Logic and Mathematics; *Charles Stein:* The Invariant, the Direct and the "Pretentious"; *Gilbert Strang:* The Changing Face of Applied Mathematics; and other profiles.

<b>352pp</b>	<b>Jun 2010</b>	
<b>978-981-4317-58-0</b>	<b>US\$78</b>	<b>£48</b>
<b>978-981-4317-59-7 (ebook)</b>	<b>US\$101</b>	

