An Introduction to Turbulent Flow

Jean M. Mathieu
and Julian F. Scott
Both from Ecole Centrale de Lyon, France

An Introduction to Turbulent Flow offers a solid grounding in the subject of turbulence, developing both physical insight and the mathematical framework needed to express the theory. It begins with a review of the physical nature of turbulence, statistical tools, and space and time scales of turbulence. Basic theory is presented next, with examples of simple turbulent flows and classical models of jets, wakes, and boundary layers. Remaining chapters cover spectral analysis and its applications and the numerical simulation of turbulent flows.

Features
• Easy-to-read introduction to the difficult topic of turbulence
• Clear presentation of numerical methods for simulating turbulent flow
• Will appeal to a broad range of engineers, applied mathematicians, and physicists

... chapters are well balanced and self-contained and the reader is naturally guided through the subject... provides a balanced introduction to the main elements of the study of turbulence in an uncluttered and literary fashion ... an easily digestible introduction to turbulent flows.

The Times Higher Education Supplement

Contents

2000 384pp 81 illustrations
0 521 77538 8 Paperback £24.95
0 521 57066 2 Hardback £60.00

Turbulent Flows

Stephen B. Pope
Cornell University, New York, USA

This is a graduate text on turbulent flows. It is up-to-date, comprehensive, designed for teaching, and is based on a course taught by the author at Cornell University for a number of years. Part I provides a general introduction to turbulent flows, how they behave, how they can be described quantitatively, and the fundamental physical process involved. Part II examines different approaches for simulating turbulent flows.

Features
• Includes nearly 400 instructional exercises
• Provides comprehensive appendices describing the mathematical techniques used
• Contains copious figures including experimental results

... an excellent textbook that can be heartily recommended to anyone teaching a course in this subject.

International Journal of Multiphase Flow

Contents

2000 806pp 279 illustrations 384 exercises
0 521 59886 9 Paperback £32.95
0 521 59125 2 Hardback £80.00
**Computational Fluid Dynamics**

T. J. Chung
University of Alabama, Huntsville, USA

This concise, applications-oriented introduction to continuum mechanics begins with a review of vectors and tensors and their applications to the domain and boundary integrals. Remaining chapters cover kinematics, equilibrium and kinetics, elastic solids, and Newtonian fluids – all with numerous worked examples and problems.

**Features**
- Comprehensive coverage – from general introduction, to detailed treatment of specific techniques, and practical applications
- Packed with examples and illustrations to make this difficult subject more easily understandable
- Author is an internationally known researcher in CFD and has developed widely used CFD techniques

**Contents**

**Flow Measurement Handbook**

**Industrial Designs, Operating Principles, Performance, and Applications**

Roger C. Baker

Flow Measurement Handbook is an information-packed reference for engineers on flow measuring techniques and instruments. Striking a balance between laboratory ideal and the realities of field experience, this handy tool provides a wealth of practical advice on the design, operation, and performance of a broad range of flowmeters.

- The text is readable and clearly written … the material would appeal to anyone working with flow meters in any capacity. The effort put into this text by the author is enormous, and the text itself is outstanding.

**Applied Mechanical Review**

**Contents**

**Flow Control**

**Passive, Active, and Reactive Flow Management**

Mohamed Gad-el-Hak
University of Notre Dame, USA

A thorough treatment of the basics of flow control and control practices that can be used to produce desired effects. Among topics covered are transition delay, separation prevention, drag reduction, lift augmentation, turbulence suppression, noise abatement, and heat and mass transfer enhancement. The final chapter explores the frontiers of flow control strategies.

- I would certainly recommend the book, at the very least as a useful source of information, but also as a thought provoking read for all those interested in the field.

**The Aeronautical Journal**

**Contents**

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Principles of Helicopter Aerodynamics
J. Gordon Leishman
University of Maryland, College Park, USA
A thorough, modern treatment of the aerodynamic principles of helicopters and other rotating-wing vertical lift aircraft. It covers basic topics of aerodynamic analysis, helicopter performance and design, and advanced topics, including airfoil flows and unsteady aerodynamics. Every chapter includes numerous illustrations, a bibliography, and homework problems.

Not only is this book a good text for the graduate student but it is also a good book for practical engineers and researchers.

AIAA Journal

Contents

Sept 2002 496pp 291 illustrations
109 exercises
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An Introduction to Fluid Dynamics
G.K.Batchelor
University of Cambridge, UK
First published in 1967, Professor Batchelor’s classic text on fluid dynamics is still one of the foremost texts in the subject. The careful presentation of the underlying theories of fluids is still timely and applicable, even in these days of almost limitless computer power.

… an excellent introduction to fluid dynamics … many interesting and important photographs of fluid flows are included in order to help the students who do not have an opportunity of observing flow phenomena in a laboratory. … I find this book by Batchelor especially stimulating and useful for students of applied mathematics and engineering.

Zentralblatt MATH

Contents

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The Motion of Bubbles and Drops in Reduced Gravity
R. Shankar Subramanian
Clarkson University, USA
and R. Balasubramaniam
NASA John H. Glenn Research Center USA
Orbiting spacecraft provide a valuable laboratory for experiments on physical and biological systems in a reduced gravity environment. In these studies, fluid masses containing bubbles and drops are encountered routinely. This book is the first to provide a clear, thorough review of the motion of bubbles and drops in reduced gravity. The emphasis is on theoretical analysis from first principles.

Features
• Internationally renowned author team are experts in the field
• Places particular emphasis on the motion caused by variations in interfacial tension arising from temperature gradients on their surfaces

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Part I. Introduction
Part II. The Motion of Isolated Bubbles and Drops
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Edited by B. Launder
University of Manchester Institute of Science and Technology, UK
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Turbulence modelling is critically important for industries dealing with fluid flow and for applied mathematicians. This collection of lecture courses presented at a Newton Institute instructional conference on the title topic by leading researchers, has been edited and rewritten to provide a coherent account suitable for self-study.

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P. G. Drazin
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This book begins with a basic introduction to three major areas of hydrodynamic stability: thermal convection, rotating and curved flows, and parallel shear flows. There follows a comprehensive account of the mathematical theory for parallel shear flows. The book contains a large number of problems, with hints and references.

**Features**
- Undeniably a classic in the field
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**Contents**

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NEW!

**Introduction to Hydrodynamic Stability**

P. G. Drazin
University of Bristol, UK

Instability of flows and their transition to turbulence are widespread phenomena in engineering and nature, and are also important in many applied sciences. This is a textbook to introduce these phenomena at a level suitable for a graduate course, by modelling them mathematically, and describing numerical simulations and laboratory experiments.

**Features**
- A companion text to the classic Drazin and Reid
- Includes many examples and exercises, making it an ideal textbook

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N. Peters
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