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Fluid Mechanics

Academic Press Suitable for both a first or second course in fluid mechanics at the graduate or advanced undergraduate level, this book presents the study of how fluids behave and interact under various forces and in various applied situations - whether in the liquid or gaseous state or both.

Fluid Mechanics

Academic Press The classic textbook on fluid mechanics is revised and updated by Dr. David Dowling to better illustrate this important subject for modern students. With topics and concepts presented in a clear and accessible way, Fluid Mechanics guides students from the fundamentals to the analysis and application of fluid mechanics, including compressible flow and such diverse applications as aerodynamics and geophysical fluid mechanics. Its broad and deep coverage is ideal for both a first or second course in fluid dynamics at the graduate or advanced undergraduate level, and is well-suited to the needs of modern scientists, engineers, mathematicians, and others seeking fluid mechanics knowledge. Over 100 new examples designed to illustrate the application of the various concepts and equations featured in the text A completely new chapter on computational fluid dynamics (CFD) authored by Prof. Gretar Tryggvason of the University of Notre Dame. This new CFD chapter includes sample Matlab™ codes and 20 exercises New material on elementary kinetic theory, non-Newtonian constitutive relationships, internal and external rough-wall turbulent flows, Reynolds-stress closure models, acoustic source terms, and unsteady one-dimensional gas dynamics Plus 110 new exercises and nearly 100 new figures

Essential Computational Fluid Dynamics

John Wiley & Sons Provides a clear, concise, and self-contained introduction to Computational Fluid Dynamics (CFD) This comprehensively updated new edition covers the fundamental concepts and main methods of modern Computational Fluid Dynamics (CFD). With expert guidance and a wealth of useful techniques, the book offers a clear, concise, and accessible account of the essentials needed to perform and interpret a CFD analysis. The new edition adds a plethora of new information on such topics as the techniques of interpolation, finite volume discretization on unstructured grids, projection methods, and RANS turbulence modeling. The book has been thoroughly edited to improve clarity and to reflect the recent changes in the practice of CFD. It also features a large number of new end-of-chapter problems. All the attractive features that have contributed to the success of the first edition are retained by this version. The book remains an indispensable guide, which: Introduces CFD to students and working professionals in the areas of practical applications, such as mechanical, civil, chemical, biomedical, or environmental engineering Focuses on the needs of someone who wants to apply existing CFD software and understand how it works, rather than develop new codes Covers all the essential topics, from the basics of discretization to turbulence modeling and uncertainty analysis Discusses complex issues using simple worked examples and reinforces learning with problems Is accompanied by a website hosting lecture presentations and a solution manual Essential Computational Fluid Dynamics, Second Edition is an ideal textbook for senior undergraduate and graduate students taking their first course on CFD. It is also a useful reference for engineers and scientists working with CFD applications.

Commentary on Fluid Mechanics

Arnaldo Rodriguez-Gonzalez This textbook on fluid mechanics is the result of a series of lecture notes I wrote while serving as a teaching assistant for the introductory fluid mechanics course at Cornell, designed to be read as a complement for introductory learners of fluid mechanics alongside a more generalized text—many of which you may find in the bibliography section at the end of the text. It was created, in part, to address the questions I saw most often from my students that the canon of introductory fluid mechanics textbooks couldn't answer. What is viscosity, really? Why are the Navier-Stokes equations so difficult to solve, and how do you derive them? Why is drag sometimes linear and sometimes quadratic, but never cubic? In any case, I hope you will find my answers to these questions satisfactory.

Mitigation of Hydrodynamic Resistance

Methods to Reduce Hydrodynamic Drag

World Scientific This text presents the state of the art in friction drag/resistance reduction technologies for BODIES and crafts operating in liquids at and beneath the free surface. It is useful for professionals with backgrounds in advanced fluid dynamics as well as by academics teaching introductory graduate courses in this area. Active control of resistance will include a discussion of friction reduction, for example through the injection of gas that can form air layers and polymers that initially reside adjacent to the hull, including the use of partial and super cavities. The book discusses passive resistance control achieved through changes in the overall hull shape and appendages, including the application of lifting bodies, bulbous bows, and stern flaps. It also addresses passive reduction of skin friction through the application of hull coatings and other elements of hull husbandry. Contents: Introduction Active Techniques: Modification of Drag by Polymer Injection Friction Drag Reduction by Bubble/Gas Injection Transition from BDR and Air Layer Drag Reduction Friction Drag Reduction by Partial Air Cavities or PCDR Passive Techniques: Drag Reduction by Super and Partial Cavities Super-Hydrophobic Surfaces and Coatings Passive Resistance-Mitigation by Appendages: Bulbous Bows, Stern Flaps and Wedges, and Lifting Bodies Readership: Professionals, academics, researchers, and graduate students in ocean engineering, mechanical engineering, fluid mechanics and tribology. Keywords: Drag Reduction; Air Layers; Air Cavities; Polymer Injection; Bubble/Gas Injection; Hydrophobic Surfaces; Passive Drag Mitigation

Elasticity and Fluid Dynamics

Volume 3 of Modern Classical Physics

Princeton University Press A groundbreaking textbook on twenty-first-century fluids and elastic solids and their applications Kip Thorne and Roger Blandford's monumental Modern Classical Physics is now available in five stand-alone volumes that make ideal textbooks for individual graduate or advanced undergraduate courses on statistical physics; optics; elasticity and fluid dynamics; plasma physics; and relativity and cosmology. Each volume teaches the fundamental concepts, emphasizes modern, real-world applications, and gives students a physical and intuitive understanding of the subject. Elasticity and Fluid Dynamics provides an essential introduction to these subjects. Fluids and elastic solids are everywhere—from Earth's crust and skyscrapers to ocean currents and airplanes. They are central to modern physics, astrophysics, the Earth sciences, biophysics, medicine, chemistry, engineering, and technology, and this centrality has intensified in recent years—so much so that a basic understanding of the behavior of elastic solids and fluids should be part of the repertoire of every physicist and engineer and almost every other natural scientist. While both elasticity and fluid dynamics involve continuum physics and use similar mathematical tools and modes of reasoning, each subject can be readily understood without the other, and the book allows them to be taught independently, with the first two chapters introducing and covering elasticity and the last six doing the same for fluid dynamics. The book also can serve as supplementary reading for many other courses, including in astrophysics, geophysics, and aerodynamics. Includes many exercise problems Features color figures, suggestions for further reading, extensive cross-references, and a detailed index Optional "Track 2" sections make this an ideal book for a one-quarter or one-semester course in elasticity, fluid dynamics, or continuum physics An online illustration package is available to professors

Modern Classical Physics

Optics, Fluids, Plasmas, Elasticity, Relativity, and Statistical Physics

Princeton University Press A groundbreaking text and reference book on twenty-first-century classical physics and its applications This first-year graduate-level text and reference book covers the fundamental concepts and twenty-first-century applications of six major areas of classical physics that every masters- or PhD-level physicist should be exposed to, but often isn't: statistical physics, optics (waves of all sorts), elastodynamics, fluid mechanics, plasma physics, and special and general relativity and cosmology. Growing out of a full-year course that the eminent researchers Kip Thorne and Roger Blandford taught at Caltech for almost three decades, this book is designed to broaden the training of physicists. Its six main topical sections are also designed so they can be used in separate courses, and the book provides an invaluable reference for researchers. Presents all the major fields of classical physics except three prerequisites: classical mechanics, electromagnetism, and elementary thermodynamics Elucidates the interconnections between diverse fields and explains their shared concepts and tools Focuses on fundamental concepts and modern, real-world applications Takes applications from fundamental, experimental, and applied physics; astrophysics and cosmology; geophysics, oceanography, and meteorology; biophysics and chemical physics; engineering and optical science and technology; and information science and technology Emphasizes the quantum roots of classical physics and how to use quantum techniques to elucidate classical concepts or simplify classical calculations Features hundreds of color figures, some five hundred exercises, extensive cross-references, and a detailed index An online illustration package is available

Spectral Methods in Chemistry and Physics Applications to Kinetic Theory and Quantum Mechanics

Springer This book is a pedagogical presentation of the application of spectral and pseudospectral methods to kinetic theory and quantum mechanics. There are additional applications to astrophysics, engineering, biology and many other fields. The main objective of this book is to provide the basic concepts to enable the use of spectral and pseudospectral methods to solve problems in diverse fields of interest and to a wide audience. While spectral methods are generally based on Fourier Series or Chebychev polynomials, non-classical polynomials and associated quadratures are used for many of the applications presented in the book. Fourier series methods are summarized with a discussion of the resolution of the Gibbs phenomenon. Classical and non-classical quadratures are used for the evaluation of integrals in reaction dynamics including nuclear fusion, radial integrals in density functional theory, in elastic scattering theory and other applications. The subject matter includes the calculation of transport coefficients in gases and other gas dynamical problems based on spectral and pseudospectral solutions of the Boltzmann equation. Radiative transfer in astrophysics and atmospheric science, and applications to space physics are discussed. The relaxation of initial non-equilibrium distributions to equilibrium for several different systems is studied with the Boltzmann and Fokker-Planck equations. The eigenvalue spectra of the linear operators in the Boltzmann, Fokker-Planck and Schrödinger equations are studied with spectral and pseudospectral methods based on non-classical orthogonal polynomials. The numerical methods referred to as the Discrete Ordinate Method, Differential Quadrature, the Quadrature Discretization Method, the Discrete Variable Representation, the Lagrange Mesh Method, and others are discussed and compared. MATLAB codes are provided for most of the numerical results reported in the book - see Link under 'Additional Information' on the the right-hand column.

Wavelet Numerical Method and Its Applications in Nonlinear Problems

Springer Nature This book summarizes the basic theory of wavelets and some related algorithms in an easy-to-understand language from the perspective of an engineer rather than a mathematician. In this book, the wavelet solution schemes are systematically established and introduced for solving general linear and nonlinear initial boundary value problems in engineering, including the technique of boundary extension in approximating interval-bounded functions, the calculation method for various connection coefficients, the single-point Gaussian integration method in calculating the coefficients of wavelet expansions and unique treatments on nonlinear terms in differential equations. At the same time, this book is supplemented by a large number of numerical examples to specifically explain procedures and characteristics of the method, as well as detailed treatments for specific problems. Different from most of the current monographs focusing on the basic theory of wavelets, it focuses on the use of wavelet-based numerical methods developed by the author over the years. Even for the necessary basic theory of wavelet in engineering applications, this book is based on the author's own understanding in plain language, instead of a relatively difficult professional mathematical description. This book is very suitable for students, researchers and technical personnel who only want to need the minimal knowledge of wavelet method to solve specific problems in engineering.

Advanced Fluid Mechanics

Academic Press Fluid mechanics is the study of how fluids behave and interact under various forces and in various applied situations, whether in liquid or gas state or both. The author of Advanced Fluid Mechanics compiles pertinent information that are introduced in the more advanced classes at the senior level and at the graduate level. "Advanced Fluid Mechanics courses typically cover a variety of topics involving fluids in various multiple states (phases), with both elastic and non-elastic qualities, and flowing in complex ways. This new text will integrate both the simple stages of fluid mechanics ("Fundamentals") with those involving more complex parameters, including Inviscid Flow in multi-dimensions, Viscous Flow and Turbulence, and a succinct introduction to Computational Fluid Dynamics. It will offer exceptional pedagogy, for both classroom use and self-instruction, including many worked-out examples, end-of-chapter problems, and actual computer programs that can be used to reinforce theory with real-world applications. Professional engineers as well as Physicists and Chemists working in the analysis of fluid behavior in complex systems will find the contents of this book useful. All manufacturing companies involved in any sort of systems that encompass fluids and fluid flow analysis (e.g., heat exchangers, air conditioning and refrigeration, chemical processes, etc.) or energy generation (steam boilers, turbines and internal combustion engines, jet propulsion systems, etc.), or fluid systems and fluid power (e.g., hydraulics, piping systems, and so on) will reap the benefits of this text. Offers detailed derivation of fundamental equations for better comprehension of more advanced mathematical analysis Provides groundwork for more advanced topics on boundary layer analysis, unsteady flow, turbulent modeling, and computational fluid dynamics Includes worked-out examples and end-of-chapter problems as well as a companion web site with sample computational programs and Solutions Manual

Elementary Fluid Dynamics

Oxford University Press This textbook provides a clear and concise introduction to both theory and application of fluid dynamics, suitable for all undergraduates coming to the subject for the first time. It has a wide scope, with frequent references to experiments, and numerous exercises illustrating the main ideas.

Advances of Computational Fluid Dynamics in Nuclear Reactor Design and Safety Assessment

Woodhead Publishing Advances of Computational Fluid Dynamics in Nuclear Reactor Design and Safety Assessment presents the latest computational fluid dynamic technologies. It includes an evaluation of safety systems for reactors using CFD and their design, the modeling of Severe Accident Phenomena Using CFD, Model Development for Two-phase Flows, and Applications for Sodium and Molten Salt Reactor Designs. Editors Joshi and Nayak have an invaluable wealth of experience that enables them to comment on the development of CFD models, the technologies currently in practice, and the future of CFD in nuclear reactors. Readers will find a thematic discussion on each aspect of CFD applications for the design and safety assessment of Gen II to Gen IV reactor concepts that will help them develop cost reduction strategies for nuclear power plants. Presents a thematic and comprehensive discussion on each aspect of CFD applications for the design and safety assessment of nuclear reactors Provides an historical review of the development of CFD models, discusses state-of-the-art concepts, and takes an applied and analytic look toward the future Includes CFD tools and simulations to advise and guide the reader through enhancing cost effectiveness, safety and performance optimization

Flow Control Techniques and Applications

Cambridge University Press Master the theory, applications and control mechanisms of flow control techniques.

Origin of Turbulence

Energy Gradient Theory

Springer Nature This book presents the new discovery of the origin of turbulence from Navier-Stokes equations. The fully developed turbulence is found to be composed of singularities of flow field. The mechanisms of flow stability and turbulent transition are described using the energy gradient theory, which states all the flow instability and breakdown resulted from the gradient of the total mechanical energy normal to the flow direction. This approach is universal for flow instability in Newtonian flow and non-Newtonian flow. The theory has been used to solve several problems, such as plane and pipe Poiseuille flows, plane Couette flow, Taylor-Couette flow, flows in straight coaxial annulus, flows in curved pipes and ducts, thermal convection flow, viscoelastic flow, and magnet fluid flow, etc. The theory is in agreement with results from numerical simulations and experiments. The analytical method used in this book is novel and is different from the traditional approaches. This book includes the fundamental basics of flow stability and turbulent transition, the essentials of the energy gradient theory, and the applications of the theory to several practical problems. This book is suitable for researchers and graduate students.

Structural Geology: A Quantitative Introduction

Cambridge University Press Tackling structural geology problems today requires a quantitative understanding of the underlying physical principles, and the ability to apply mathematical models to deformation processes within the Earth. Accessible yet rigorous, this unique textbook demonstrates how to approach structural geology quantitatively using calculus and mechanics, and prepares students to interface with professional geophysicists and engineers who appreciate and utilize the same tools and computational methods to solve multidisciplinary problems. Clearly explained methods are used throughout the book to quantify field data, set up mathematical models for the formation of structures, and compare model results to field observations. An extensive online package of coordinated laboratory exercises enables students to consolidate their learning and put it into practice by analyzing structural data and building insightful models. Designed for single-semester undergraduate courses, this pioneering text prepares students for graduates studies and careers as professional geoscientists.

Boundary and Interior Layers, Computational and Asymptotic Methods BAIL 2016

Springer This volume collects papers associated with lectures that were presented at the BAIL 2016 conference, which was held from 14 to 19 August 2016 at Beijing Computational Science Research Center and Tsinghua University in Beijing, China. It showcases the variety and quality of current research into numerical and asymptotic methods for theoretical and practical problems whose solutions involve layer phenomena. The BAIL (Boundary And Interior Layers) conferences, held usually in even-numbered years, bring together mathematicians and engineers/physicists whose research involves layer phenomena, with the aim of promoting interaction between these often-separate disciplines. These layers appear as solutions of singularly perturbed differential equations of various types, and are common in physical problems, most notably in fluid dynamics. This book is of interest for current researchers from mathematics, engineering and physics whose work involves the accurate approximation of solutions of singularly perturbed differential equations; that is, problems whose solutions exhibit boundary and/or interior layers.

Mathematical Problems of the Dynamics of Incompressible Fluid on a Rotating Sphere

Springer This book presents selected mathematical problems involving the dynamics of a two-dimensional viscous and ideal incompressible fluid on a rotating sphere. In this case, the fluid motion is completely governed by the barotropic vorticity equation (BVE), and the viscosity term in the vorticity equation is taken in its general form, which contains the derivative of real degree of the spherical Laplace operator. This work builds a bridge between basic concepts and concrete outcomes by pursuing a rich combination of theoretical, analytical and numerical approaches, and is recommended for specialists developing mathematical methods for application to problems in physics, hydrodynamics, meteorology and geophysics, as well for upper undergraduate or graduate students in the areas of dynamics of incompressible fluid on a rotating sphere, theory of functions on a sphere, and flow stability.

Fundamentals of Incompressible Fluid Flow

Springer Nature This highly informative and carefully presented book offers a comprehensive overview of the fundamentals of incompressible fluid flow. The textbook focuses on foundational topics to more complex subjects such as the derivation of Navier-Stokes equations, perturbation solutions, inviscid outer and inner solutions, turbulent flows, etc. The author has included end-of-chapter problems and worked examples to augment learning and self-testing. This book will be a useful reference for students in the area of mechanical and aerospace engineering.

Advanced Mechanics of Materials and Applied Elasticity

Pearson Education This systematic exploration of real-world stress analysis has been completely updated to reflect state-of-the-art methods and applications now used in aeronautical, civil, and mechanical engineering, and engineering mechanics. Distinguished by its exceptional visual interpretations of solutions, *Advanced Mechanics of Materials and Applied Elasticity* offers in-depth coverage for both students and engineers. The authors carefully balance comprehensive treatments of solid mechanics, elasticity, and computer-oriented numerical methods—preparing readers for both advanced study and professional practice in design and analysis. This major revision contains many new, fully reworked, illustrative examples and an updated problem set—including many problems taken directly from modern practice. It offers extensive content improvements throughout, beginning with an all-new introductory chapter on the fundamentals of materials mechanics and elasticity. Readers will find new and updated coverage of plastic behavior, three-dimensional Mohr's circles, energy and variational methods, materials, beams, failure criteria, fracture mechanics, compound cylinders, shrink fits, buckling of stepped columns, common shell types, and many other topics. The authors present significantly expanded and updated coverage of stress concentration factors and contact stress developments. Finally, they fully introduce computer-oriented approaches in a comprehensive new chapter on the finite element method.

Essentials of Atmospheric and Oceanic Dynamics

Cambridge University Press This is a modern, introductory textbook on the dynamics of the atmosphere and ocean, with a healthy dose of geophysical fluid dynamics. It will be invaluable for intermediate to advanced undergraduate and graduate students in meteorology, oceanography, mathematics, and physics. It is unique in taking the reader from very basic concepts to the forefront of research. It also forms an excellent refresher for researchers in atmospheric science and oceanography. It differs from other books at this level in both style and content: as well as very basic material it includes some elementary introductions to more advanced topics. The advanced sections can easily be omitted for a more introductory course, as they are clearly marked in the text. Readers who wish to explore these topics in more detail can refer to this book's parent, *Atmospheric and Oceanic Fluid Dynamics: Fundamentals and Large-Scale Circulation*, now in its second edition.

Introduction to Probability Models

Elsevier Ross's classic bestseller has been used extensively by professionals and as the primary text for a first undergraduate course in applied probability. With the addition of several new sections relating to actuaries, this text is highly recommended by the Society of Actuaries.

Incompressible Flow

John Wiley & Sons The most teachable book on incompressible flow— now fully revised, updated, and expanded *Incompressible Flow, Fourth Edition* is the updated and revised edition of Ronald Panton's classic text. It continues a respected tradition of providing the most comprehensive coverage of the subject in an exceptionally clear, unified, and carefully paced introduction to advanced concepts in fluid mechanics. Beginning with basic principles, this Fourth Edition patiently develops the math and physics leading to major theories. Throughout, the book provides a unified presentation of physics, mathematics, and engineering applications, liberally supplemented with helpful exercises and example problems. Revised to reflect students' ready access to mathematical computer programs that have advanced features and are easy to use, *Incompressible Flow, Fourth Edition* includes: Several more exact solutions of the Navier-Stokes equations Classic-style Fortran programs for the Hiemenz flow, the Psi-Omega method for entrance flow, and the laminar boundary layer program, all revised into MATLAB A new discussion of the global vorticity boundary restriction A revised vorticity dynamics chapter with new examples, including the ring line vortex and the Fraenkel-Norbury vortex solutions A discussion of the different behaviors that occur in subsonic and supersonic steady flows Additional emphasis on composite asymptotic

expansions Incompressible Flow, Fourth Edition is the ideal coursebook for classes in fluid dynamics offered in mechanical, aerospace, and chemical engineering programs.

Non-Equilibrium Thermodynamics in Multiphase Flows

Springer Science & Business Media Non-equilibrium thermodynamics is a general framework that allows the macroscopic description of irreversible processes. This book introduces non-equilibrium thermodynamics and its applications to the rheology of multiphase flows. The subject is relevant to graduate students in chemical and mechanical engineering, physics and material science. This book is divided into two parts. The first part presents the theory of non-equilibrium thermodynamics, reviewing its essential features and showing, when possible, some applications. The second part of this book deals with how the general theory can be applied to model multiphase flows and, in particular, how to determine their constitutive relations. Each chapter contains problems at the end, the solutions of which are given at the end of the book. No prior knowledge of statistical mechanics is required; the necessary prerequisites are elements of transport phenomena and on thermodynamics. "The style of the book is mathematical, but nonetheless it remains very readable and anchored in the physical world rather than becoming too abstract. Though it is up-to-date and includes recent important developments, there is a lot of classical material in the book, albeit presented with unprecedented clarity and coherence. The first six chapters are actually a very good introduction to the theory underlying many phenomena in soft matter physics, beyond the focus on flow and transport of the later chapters of the book." Prof Richard A.L. Jones FRS, Pro-Vice-Chancellor for Research and Innovation, University of Sheffield

Instability in Geophysical Flows

Cambridge University Press An Open Access overview of physical processes that generate instability in geophysical flows, emphasising numerical methods and simple rules to predict instability.

Advanced Materials Processing and Manufacturing

Springer This book focuses on advanced processing of new and emerging materials, and advanced manufacturing systems based on thermal transport and fluid flow. It examines recent areas of considerable growth in new and emerging manufacturing techniques and materials, such as fiber optics, manufacture of electronic components, polymeric and composite materials, alloys, microscale components, and new devices and applications. The book includes analysis, mathematical modeling, numerical simulation and experimental study of processes for prediction, design and optimization. It discusses the link between the characteristics of the final product and the basic transport mechanisms and provides a foundation for the study of a wide range of manufacturing processes. Focuses on new and advanced methods of manufacturing and materials processing with traditional methods described in light of the new approaches; Maximizes reader understanding of the fundamentals of how materials change, what transport processes are involved, and how these can be simulated and optimized - concepts not covered elsewhere; Introduces new materials and applications in manufacturing and summarizes traditional processing methods, such as heat treatment, extrusion, casting, injection molding, and bonding, to show how they have evolved and how they could be used for meeting the challenges that we face today.

Foundations of Fluid Mechanics

Applied Fluid Mechanics

Intended for undergraduate-level courses in Fluid Mechanics or Hydraulics in Mechanical, Chemical, and Civil Engineering Technology and Engineering programs. This text covers various basic principles of fluid mechanics - both statics and dynamics.

Flowing Matter

Springer Nature This open access book, published in the Soft and Biological Matter series, presents an introduction to selected research topics in the broad field of flowing matter, including the dynamics of fluids with a complex internal structure -from nematic fluids to soft glasses- as well as active matter and turbulent phenomena. Flowing matter is a subject at the crossroads between physics, mathematics, chemistry, engineering, biology and earth sciences, and relies on a multidisciplinary approach to describe the emergence of the macroscopic behaviours in a system from the coordinated dynamics of its microscopic constituents. Depending on the microscopic interactions, an assembly of molecules or of mesoscopic particles can flow like a simple Newtonian fluid, deform elastically like a solid or behave in a complex manner. When the internal constituents are active, as for biological entities, one generally observes complex large-scale collective motions. Phenomenology is further complicated by the invariable tendency of fluids to display chaos at the large scales or when stirred strongly enough. This volume presents several research topics that address these phenomena encompassing the traditional micro-, meso-, and macro-scales descriptions, and contributes to our understanding of the fundamentals of flowing matter. This book is the legacy of the COST Action MP1305 "Flowing Matter".

Munson, Young and Okiishi's Fundamentals of Fluid Mechanics

John Wiley & Sons Original edition: Munson, Young, and Okiishi in 1990.

Principles of Turbomachinery

Springer Science & Business Media This text outlines the fluid and thermodynamic principles that apply to all classes of turbomachines, and the material has been presented in a unified way. The approach has been used with successive groups of final year mechanical engineering students, who have helped with the development of the ideas outlined. As with these students, the reader is assumed to have a basic understanding of fluid mechanics and thermodynamics. However, the early chapters combine the relevant material with some new concepts, and provide basic reading references. Two related objectives have defined the scope of the treatment. The first is to provide a general treatment of the common forms of turbo machine, covering basic fluid dynamics and thermodynamics of flow through passages and over surfaces, with a brief derivation of the fundamental governing equations. The second objective is to apply this material to the various machines in enough detail to allow the major design and performance factors to be appreciated. Both objectives have been met by grouping the machines by flow path rather than by application, thus allowing an appreciation of points of similarity or difference in approach. No attempt has been made to cover detailed points of design or stressing, though the cited references and the body of information from which they have been taken give this sort of information. The first four chapters introduce the fundamental relations, and the succeeding chapters deal with applications to the various flow paths.

Field and Wave Electromagnetics

Pearson Education India

Schaum's Outline of Fluid Mechanics and Hydraulics, 4th Edition

McGraw Hill Professional Tough Test Questions? Missed Lectures? Not Enough Time? Fortunately, there's Schaum's. This all-in-one package includes more than 600 fully solved problems, examples, and practice exercises to sharpen your problem-solving skills. Plus, you will have access to 20 detailed videos featuring instructors who explain the most commonly tested problems--it's just like having your own virtual tutor! You'll find everything you need to build confidence, skills, and knowledge for the highest score possible. More than 40 million students have trusted Schaum's to help them succeed in the classroom and on exams. Schaum's is the key to faster learning and higher grades in every subject. Each Outline presents all the essential course information in an easy-to-follow, topic-by-topic format. You also get hundreds of examples, solved problems, and practice exercises to test your skills. This Schaum's Outline gives you 622 fully solved problems Extra practice on topics such as buoyancy and flotation, complex pipeline systems, fluid machinery, flow in open channels, and more Support for all the major textbooks for fluid mechanics and hydraulics courses Fully compatible with your classroom text, Schaum's highlights all the important facts you need to know. Use Schaum's to shorten your study time--and get your best test scores! Schaum's Outlines--Problem Solved.

Boundary-Layer Theory

Springer This new edition of the near-legendary textbook by Schlichting and revised by Gersten presents a comprehensive overview of boundary-layer theory and its application to all areas of fluid mechanics, with particular emphasis on the flow past bodies (e.g. aircraft aerodynamics). The new edition features an updated reference list and over 100 additional changes throughout the book, reflecting the latest advances on the subject.

Analytical Mechanics

Petroleum Engineer's Guide to Oil Field Chemicals and Fluids

Gulf Professional Publishing Petroleum Engineer's Guide to Oil Field Chemicals and Fluids is a comprehensive manual that provides end users with information about oil field chemicals, such as drilling muds, corrosion and scale inhibitors, gelling agents and bacterial control. This book is an extension and update of Oil Field Chemicals published in 2003, and it presents a compilation of materials from literature and patents, arranged according to applications and the way a typical job is practiced. The text is composed of 23 chapters that cover oil field chemicals arranged according to their use. Each chapter follows a uniform template, starting with a brief overview of the chemical followed by reviews, monomers, polymerization, and fabrication. The different aspects of application, including safety and environmental impacts, for each chemical are also discussed throughout the chapters. The text also includes handy indices for trade names, acronyms and chemicals. Petroleum, production, drilling, completion, and operations engineers and managers will find this book invaluable for project management and production. Non-experts and students in petroleum engineering will also find this reference useful. Chemicals are ordered by use including drilling muds, corrosion inhibitors, and bacteria control Includes cutting edge chemicals and polymers such as water soluble polymers and viscosity control Handy index of chemical substances as well as a general chemical index

Heat Conduction

John Wiley & Sons The long-awaited revision of the bestseller on heat conduction *Heat Conduction, Third Edition* is an update of the classic text on heat conduction, replacing some of the coverage of numerical methods with content on micro- and nanoscale heat transfer. With an emphasis on the mathematics and underlying physics, this new edition has considerable depth and analytical rigor, providing a systematic framework for each solution scheme with attention to boundary conditions and energy conservation. Chapter coverage includes: Heat conduction fundamentals Orthogonal functions, boundary value problems, and the Fourier Series The separation of variables in the rectangular coordinate system The separation of variables in the cylindrical coordinate system The separation of variables in the spherical coordinate system Solution of the heat equation for semi-infinite and infinite domains The use of Duhamel's theorem The use of Green's function for solution of heat conduction The use of the Laplace transform One-dimensional composite medium Moving heat source problems Phase-change problems Approximate analytic methods Integral-transform technique Heat conduction in anisotropic solids Introduction to microscale heat conduction In addition, new capstone examples are included in this edition and extensive problems, cases, and examples have been thoroughly updated. A solutions manual is also available. *Heat Conduction* is appropriate reading for students in mainstream courses of conduction heat transfer, students in mechanical engineering, and engineers in research and design functions throughout industry.

Thermodynamics DeMYSTiFied

McGraw Hill Professional Take the heat off of understanding thermodynamics Now you can get much-needed relief from the pressure of learning the fundamentals of thermodynamics! This practical guide helps you truly comprehend this challenging engineering topic while sharpening your problem-solving skills. Written in an easy-to-follow format, *Thermodynamics Demystified* begins by reviewing basic principles and discussing the properties of pure substances. The book goes on to cover laws of thermodynamics, power and refrigeration cycles, psychrometrics, combustion, and much more. Hundreds of worked examples and equations make it easy to understand the material, and end-of-chapter quizzes and two final exams help reinforce learning. This hands-on, self-teaching text offers: Numerous figures to illustrate key concepts Details on the first and second laws of thermodynamics Coverage of vapor and gas cycles, psychrometrics, and combustion An overview of heat transfer SI units throughout A time-saving approach to performing better on an exam or at work Simple enough for a beginner, but challenging enough for an advanced student, *Thermodynamics Demystified* is your shortcut to mastering this essential engineering subject.

Vectors, Tensors and the Basic Equations of Fluid Mechanics

Courier Corporation Introductory text, geared toward advanced undergraduate and graduate students, applies mathematics of Cartesian and general tensors to physical field theories and demonstrates them in terms of the theory of fluid mechanics. 1962 edition.

Gas Turbines

Internal Flow Systems Modeling

Cambridge University Press This physics-first, design-oriented textbook explains concepts of gas turbine secondary flows, reduced-order modeling methods, and 3-D CFD.

Heat Transfer

Cambridge University Press This book provides engineers with the tools to solve real-world heat transfer problems. It includes advanced topics not covered in other books on the subject. The examples are complex and timely problems that are inherently interesting. It integrates Maple, MATLAB, FEHT, and Engineering Equation Solver (EES) directly with the heat transfer material.