Low Reynolds Number Hydrodynamics With Special Applications To Particularate Media

Low Reynolds number hydrodynamics Numerical Hydrodynamics in Special Relativity Engineering Fluid Dynamics 2018 Hydrodynamics Special Issue: Animal Locomotion: the Hydrodynamics of Swimming Hydrodynamics of Free Surface Flows Hydrodynamics of Pumps Hydrodynamics and Transport for Water Quality Modeling Special Issue: Coral Reef Hydrodynamics: Recent Developments and Future Directions Encyclopedia of Hydrodynamics Hydrodynamics Around Cylindrical Structures Physicochemical Hydrodynamics Notes on Magneto-hydrodynamics: Special solutions Submarine Hydrodynamics Aero/Hydrodynamics and Symmetry Practical Ship Hydrodynamics Analytical Methods in Marine Hydrodynamics Hydrodynamics Relativistic Numerical Hydrodynamics Hydrodynamics Around Cylindrical Structures Fundamentals of Ship Hydrodynamics Relativistic Hydrodynamics Relativistic Kinetic Theory Microhydrodynamics and Complex Fluids NBS Special Publication A High Order Kinetic Flux Splitting Method for the Special Relativistic Hydrodynamics Hydrodynamics and Transport for Water Quality Modeling CFD Simulations of Marine Hydrodynamics Computational Fluid Dynamics: Principles and Applications Validity of Darcy's Law Under Transient Conditions Fundamentals of Astrophysical Fluid Dynamics Relativistic Hydrodynamics Worlds of Flow Computational Techniques for Fluid Dynamics Hydrodynamics of Pumps Special Topics in fluid dynamics Theoretical Hydrodynamics Waveguide Propagation of Nonlinear Waves Mathematical Approaches in Hydrodynamics Fluid Dynamics of Cavitation and Cavitating Turbopumps

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Validity of Darcy's Law Under Transient Conditions May 04 2020

Relativistic Numerical Hydrodynamics Apr 14 2021 Calculations of relativistic hydrodynamics are crucial to several areas of current research in the physics of supernovae and stellar collapse. This book provides an overview of the computational framework in which such calculations have been developed, with examples of applications to real physical systems. Beginning with the development of the equations and differencing schemes for special relativistic hydrodynamics, the book stresses the viability of the Euler-Lagrange approach to most astrophysical problems. It details aspects of solving the Einstein equations together with the fluid dynamics for various astrophysical systems in one, two and three dimensions.

CFD Simulations of Marine Hydrodynamics Jul 06 2020 CFD is an emerging area and is gaining popularity due to the availability of ever-increasing computational power. If used accurately, CFD methods may overcome the limitations of experimental and other numerical methods, in some respects. This Special Issue focuses on Computational Fluid Dynamics (CFD) Simulations of Marine Hydrodynamics with a specific focus on the applications of naval architecture and ocean engineering, and it comprises 24 original articles that advance state-of-the-art CFD applications in marine hydrodynamics and/or review the progress and future directions of research in this field. The published articles cover a wide range of subjects relevant to naval architecture and ocean engineering, including but not limited to; ship resistance and propulsion, seakeeping and maneuverability, hydrodynamics of marine renewable energy devices, validation and verification of computational fluid dynamics (CFD), EFD/CFD combined methods, fouling/coating hydrodynamics.

Aero/Hydrodynamics and Symmetry Aug 19 2021

Hydrodynamics Around Cylindrical Structures Mar 14 2021 This book discusses the subject of wave/current flow around a cylinder, the forces induced on the cylinder by the flow, and the vibration pattern of slender structures in a marine environment. The primary aim of the book is to describe the flow pattern and the resulting load which develops when waves or current meet a cylinder. Attention is paid to the special case of a circular cylinder. The development in the forces is related to the various flow patterns and is discussed in detail. Regular as well as irregular waves are considered, and special cases like wall proximities (pipelines) are also investigated. The book is intended for MSc students with some experience in basic fluid mechanics and for PhD students. Contents:Flow Around a Cylinder in Steady CurrentForces on a Cylinder in Steady CurrentFlow Around a Cylinder in Oscillatory FlowsForces on a Cylinder in Regular WavesMathematical and Numerical Treatment of Flow Around a CylinderDiffraction Effect. Forces on Large BodiesForces on a Cylinder in Irregular WavesFlow-Induced Vibrations of a Free Cylinder in Steady CurrentsFlow-Induced Vibrations of a Free Cylinder in WavesVibrations of Marine PipelinesMathematical Modelling of Flow-Induced Vibrations. Readership: Civil and ocean engineers. keywords:Pipelines;Offshore Structures;Hydroelastic Vibrations;Flow-induced Vibrations;Forces on Offshore Structures;Flow Around Offshore Structures;Wave Loading;Vibrations;Waves;Steady Currents;Pipeline Stability;Diffraction;Irregular Waves;Oscillatory Flow;Mathematical Modelling;Coastal Structures;Marine Structure;Flow Loading;Vibration of Marine Pipelines "The figures are very good. Many of them are photographs and sketches of aspects of flow that are sometimes difficult to explain in words. The references are extensive, quoting many recent papers. The treatment of the subjects is up-to-date and particularly the chapters on numerical simulation and vibrations contain excellent synopses of new research, much of it by the authors themselves. The style is lucid and the text is well-organized. This book can be highly recommended to anyone who deals with cylindrical structures." Professor J W Kamphuis Coastal Engineering

Engineering Fluid Dynamics 2018 Aug 31 2022 "Engineering Fluid Dynamics 2018". The topic of engineering fluid dynamics includes both experimental as well as computational studies. Of special interest were submissions from the fields of mechanical, chemical, marine, safety, and energy engineering. We welcomed both original research articles as well as review articles. After one year, 28 papers were submitted and 14 were accepted for publication. The average processing time was 37.91 days. The authors had the following geographical distribution: China (9); Korea (3); Spain (1); and India (1). Papers covered a wide range of topics, including analysis of fans, turbines, fires in tunnels, vortex generators, deep sea mining, as well as pumps.

Microhydrodynamics and Complex Fluids Nov 09 2020 A self-contained textbook, Microhydrodynamics and Complex Fluids deals with the main phenomena that occur in slow, inertialess viscous flows often encountered in various industrial, biophysical, and natural processes. It examines a wide range of situations, from flows in thin films, porous media, and narrow channels to flows around suspended particles. Each situation is illustrated with examples that can be solved analytically so that the main physical phenomena are clear. It also discusses a range of numerical modeling techniques. Two chapters deal with the flow of complex fluids, presented first with the formal analysis developed for the mechanics of suspensions and then with the phenomenological tools of non-Newtonian fluid mechanics. All concepts are presented simply, with no need for complex mathematical tools. End-of-chapter exercises and exam problems help you test yourself. Dominique Barthès-Biesel has taught this subject for over 15 years and is well known for her contributions to low Reynolds number hydrodynamics. Building on the basics of continuum mechanics, this book is ideal for graduate students specializing in chemical or mechanical engineering, material science, bioengineering, and physics of condensed matter.

Analytical Methods in Marine Hydrodynamics Jun 16 2021 This book unifies the most important geometries used to develop analytical solutions for hydrodynamic boundary value problems.

Computational Fluid Dynamics: Principles and Applications Jun 04 2020 Computational Fluid Dynamics (CFD) is an important design tool in engineering and also a substantial research tool in various physical sciences as well as in biology. The objective of this book is to provide university students with a solid foundation for understanding the numerical methods employed in today's CFD and to familiarise them with modern CFD codes by hands-on experience. It is also intended for engineers and scientists starting to work in the field of CFD or for those who apply CFD codes. Due to the detailed index, the text can serve as a reference handbook too. Each chapter includes an extensive bibliography, which provides an excellent basis for further studies.

Theoretical Hydrodynamics Sep 27 2019

Fundamentals of Ship Hydrodynamics Feb 10 2021 Fundamentals of Ship Hydrodynamics: Fluid Mechanics, Ship Resistance and Propulsion Lothar Birk, University of New Orleans, USA Bridging the information gap between fluid mechanics and ship hydrodynamics Fundamentals of Ship Hydrodynamics is designed as a textbook for

undergraduate education in ship resistance and propulsion. The book provides connections between basic training in calculus and fluid mechanics and the application of hydrodynamics in daily ship design practice. Based on a foundation in fluid mechanics, the origin, use, and limitations of experimental and computational procedures for resistance and propulsion estimates are explained. The book is subdivided into sixty chapters, providing background material for individual lectures. The unabridged treatment of equations and the extensive use of figures and examples enable students to study details at their own pace. Key features: •Covers the range from basic fluid mechanics to applied ship hydrodynamics. •Subdivided into 60 succinct chapters. •In-depth coverage of material enables self-study. •Around 250 figures and tables. Fundamentals of Ship Hydrodynamics is essential reading for students and staff of naval architecture, ocean engineering, and applied physics. The book is also useful for practicing naval architects and engineers who wish to brush up on the basics, prepare for a licensing exam, or expand their knowledge.

Special Issue: Coral Reef Hydrodynamics: Recent Developments and Future Directions Feb 22 2022

Worlds of Flow Jan 30 2020 This book provides the first fully-fledged history of hydrodynamics, including lively accounts of the concrete problems of hydraulics, navigation, blood circulation, meteorology, and aeronautics that motivated the main conceptual innovations. Richly illustrated, technically competent, and philosophically sensitive, it should attract a broad audience and become a standard reference for any one interested in fluid mechanics.

Relativistic Kinetic Theory Dec 11 2020 This book presents fundamentals, equations, and methods of solutions of relativistic kinetic theory, with applications in astrophysics and cosmology.

Computational Techniques for Fluid Dynamics Dec 31 2019 As indicated in Vol. 1, the purpose of this two-volume textbook is to pro vide students of engineering, science and applied mathematics with the spe cific techniques, and the framework to develop skill in using them, that have proven effective in the various branches of computational fluid dy namics Volume 1 describes both fundamental and general techniques that are relevant to all branches of fluid flow. This volume contains specific tech niques applicable to the different categories of engineering flow behaviour, many of which are also appropriate to convective heat transfer. The contents of Vol. 2 are suitable for specialised graduate courses in the engineering computational fluid dynamics (CFD) area and are also aimed at the established research worker or practitioner who has already gained some fundamental CFD background. It is assumed that the reader is famil iar with the contents of Vol. 1. The contents of Vol. 2 are arranged in the following way: Chapter 11 de velops and discusses the equations governing fluid flow and introduces the simpler flow categories for which specific computational techniques are considered in Chaps. 14-18. Most practical problems involve computational domain boundaries that do not conveniently coincide with coordinate lines. Consequently, in Chap. 12 the governing equations are expressed in generalised curvilinear coordinates for use in arbitrary computational domains. The corresponding problem of generating an interior grid is considered in Chap. 13.

Low Reynolds number hydrodynamics Nov 02 2022 One studying the motion of fluids relative to particulate systems is soon impressed by the dichotomy which exists between books covering theoretical and practical aspects. Classical hydrodynamics is largely concerned with perfect fluids which unfortunately exert no forces on the particles past which they move. Practical approaches to subjects like fluidization, sedimentation, and flow through porous media abound in much useful but uncorrelated empirical information. The present book represents an attempt to bridge this gap by providing at least the beginnings of a rational approach to fluid particle dynamics, based on first principles. From the pedagogic viewpoint it seems worthwhile to show that the Navier-Stokes equations, which form the basis of all systematic texts, can be employed for useful practical applications beyond the elementary problems of laminar flow in pipes and Stokes law for the motion of a single particle. Although a suspension may often be viewed as a continuum for practical purposes, it really consists of a discrete collection of particles immersed in an essentially continuous fluid. Consideration of the actual detailed boundary value problems posed by this viewpoint may serve to call attention to the limitation of idealizations which apply to the overall transport properties of a mixture of fluid and solid particles.

Hydrodynamics of Pumps Apr 26 2022 Hydrodynamics of Pumps is a reference for pump experts and a textbook for advanced students. It examines the fluid dynamics of liquid turbomachines, particularly pumps, focusing on special problems and design issues associated with the flow of liquid through a rotating machine. There are two characteristics of a liquid that lead to problems and cause a significantly different set of concerns than those in gas turbines. These are the potential for cavitation and the high density of liquids, which enhances the possibility of damaging, unsteady flows and forces. The book begins with an introduction to the subject, including cavitation, unsteady flows and turbomachinery, basic pump design and performance principles. Chapter topics include flow features, cavitation parameters and inception, bubble dynamics, cavitation effects on pump performance, and unsteady flows and vibration in pumps - discussed in the three final chapters. The book is richly illustrated and includes many practical examples.

Hydrodynamics of Free Surface Flows May 28 2022 A definitive guide for accurate state-of-the-art modelling of free surface flows Understanding the dynamics of free surface flows is the starting point of many environmental studies, impact studies, and waterworks design. Typical applications, once the flows are known, are water quality, dam impact and safety, pollutant control, and sediment transport. These studies used to be done in the past with scale models, but these are now being replaced by numerical simulation performed by software suites called "hydro-informatic systems". The Telemac system is the leading software package worldwide, and has been developed by Electricité de France and Jean-Michel Hervouet, who is the head and main developer of the Telemac project. Written by a leading authority on Computational Fluid Dynamics, the book aims to provide environmentalists, hydrologists, and engineers using hydro-informatic systems such as Telemac and the finite element method, with the knowledge of the basic principles, capabilities, different hypotheses, and limitations. In particular this book: presents the theory for understanding hydrodynamics through an extensive array of case studies such as tides, tsunamis, storm surges, floods, bores, dam break flood waves, density driven currents, hydraulic jumps, making this a principal reference on the topic gives a detailed examination and analysis of the notorious Malpasset dam failure includes a coherent description of finite elements in shallow water delivers a significant treatment of the state-of-the-art flow modelling techniques using Telemac, developed by Electricité de France provides the fundamental physics and theory of free surface flows to be utilised by courses on environmental flows Hydrodynamics of Free Surface Flows is essential reading for those involved in computational fluid dynamics and environmental impact assessments, as well as hydrologists, and bridge, coastal and dam engineers. Guiding readers from fundamental theory to the more advanced topics in the application of the finite element method and the Telemac System, this book is a key reference for a broad audience of students, lecturers, researchers and consultants, right through to the community of users of hydro-informatics systems.

Special Topics in fluid dynamics Oct 28 2019

Hydrodynamics Jul 30 2022 This classic presentation has never been superseded in its encyclopedic coverage of the subject, and its excellent exposition of fundamental theorems, equations, and detailed methods of solution. Topics include many aspects of the dynamics of liquids and gases and 3-dimensional problems on motion of solids through a liquid. 1932 edition.

Notes on Magneto-hydrodynamics: Special solutions Oct 21 2021

Hydrodynamics and Transport for Water Quality Modeling Mar 26 2022 Hydrodynamics and Transport for Water Quality Modeling presents a complete overview of current methods used to describe or predict transport in aquatic systems, with special emphasis on water quality modeling. The book features detailed descriptions of each method, supported by sample applications and case studies drawn from the authors' years of experience in the field. Each chapter examines a variety of modeling approaches, from simple to complex. This unique text/reference offers a wealth of information previously unavailable from a single source. The book begins with an overview of basic principles, and an introduction to the measurement and analysis of flow. The following section focuses on rivers and streams, including model complexity and data requirements, methods for estimating mixing, hydrologic routing methods, and unsteady flow modeling. The third section considers lakes and reservoirs, and discusses stratification and temperature modeling, mixing methods, reservoir routing and water balances, and dynamic modeling using one-, two-, and three-dimensional models. The book concludes with a section on estuaries, containing topics such as origins and classification, tides, mixing methods, tidally averaged estuary models, and dynamic modeling. Over 250 figures support the text. This is a valuable guide for students and practicing modelers who do not have extensive backgrounds in fluid dynamics.

NBS Special Publication Oct 09 2020

Waveguide Propagation of Nonlinear Waves Aug 26 2019 This book addresses the peculiarities of nonlinear wave propagation in waveguides and explains how the stratification depends on the waveguide and confinement. An example of this is an optical fibre that does not allow light to pass through a density jump. The book also discusses propagation in the nonlinear regime, which is characterized by a specific waveform and amplitude, to demonstrate so-called solitonic behaviour. In this case, a wave may be strongly localized, and propagates with a weak change in shape. In the waveguide case there are additional contributions of dispersion originating from boundary or asymptotic conditions. Offering concrete guidance on solving application problems, this essentially (more than twice) expanded second edition includes various aspects of guided propagation of nonlinear waves as well as new topics like solitonic behaviour of one-mode and multi-mode excitation and propagation and plasma waveguides, propagation peculiarities of electromagnetic waves in metamaterials, new types of dispersion, dissipation, electromagnetic waveguides, planetary waves and plasma waves interaction.The key feature of the solitonic behaviour is based on Coupled KdV and Coupled NS systems. The systems are derived in this book and solved numerically with the proof of stability and convergence. The domain wall dynamics of ferromagnetic microwaveguides and Bloch waves in nano-waveguides are also included with some problems of magnetic momentum and charge transport.

Physicochemical Hydrodynamics Nov 21 2021 Since the first publication of the book, a surge of interest inphysicochemical hydrodynamics (PCH) has produced a flurry

ofadvances in the field, as researchers became aware of thesubject's practical applications across numerous disciplines.The Second Edition of Ronald F. Probstein'sPhysicochemical Hydrodynamics is significantly expanded andrevised to provide increased coverage of the field. All of thematerial was supplemented with problems for students, and asolutions manual is available for instructors. The continued demandfor the book necessitates that the Second Edition be reprinted inpaperback so that it may be more widely available to students andpractitioners. This highly respected book emphasizes rational theory and itsconsequences to demonstrate the underlying unity of PCH, whichallows diverse phenomena to be described in physically andmathematically similar ways. Physicochemical Hydrodynamicscommunicates the fundamentals while, at the same time, conveyingthe importance of applications of PCH to a variety of fields,including: mechanical, chemical, and environmental engineering;materials science, biotechnology, microfluidics, and fluid aspectsof nanotechnology. Numerous illustrations, analogies, and exampleshighlight the text and help to clarify and solidify students'and professionals' understanding of the material.

Hydrodynamics of Pumps Nov 29 2019 Hydrodynamics of Pumps is a reference for pump experts and a textbook for advanced students exploring pumps and pump design. This book is about the fluid dynamics of liquid turbomachines, particularly pumps. It focuses on special problems and design issues associated with the flow of liquid through a rotating machine. There are two characteristics of a liquid that lead to problems and cause a significantly different set of concerns than those in gas turbines. These are the potential for cavitation and the high density of liquids, which enhances the possibility of damaging, unsteady flows and forces. The book begins with an introduction to the subject, including cavitation, unsteady flows, and turbomachinery as well as basic pump design and performance principles. Chapter topics include flow features, cavitation parameters and inception, bubble dynamics, cavitation effects on pump performance, and unsteady flows and vibration in pumps discussed in the three final chapters. The book is richly illustrated and includes many practical examples."

Special Issue: Animal Locomotion: the Hydrodynamics of Swimming Jun 28 2022

Submarine Hydrodynamics Sep 19 2021 This book covers specific aspects of submarine hydrodynamics in a very practical manner. The author reviews basic concepts of ship hydrodynamics and goes on to show how they are applied to submarines, including a look at the use of physical model experiments. The book is intended for professionals working in submarine hydrodynamics, as well as for advanced students in the field. This revised edition includes updated information on empirical methods for predicting the hydrodynamic manoeuvring coefficients, and for predicting the resistance of a submarine. It also includes new material on how to assess propulsors, and includes measures of wake distortion, which has a detrimental influence on propulsor performance. Additional information on safe manoeuvring envelopes is also provided. The wide range of references has been updated to include the latest material in the field.

Mathematical Approaches in Hydrodynamics Jul 26 2019 To honor Professor Marshall P. Tulin on his 65th birthday (March 14, 1991), fluid mechanicians and applied mathematicians who have had close association and collaborated with Tulin during his career contribute papers in various areas related to his main interest naval hydrodynamics. No index. Annota

Practical Ship Hydrodynamics Jul 18 2021 Practical Ship Hydrodynamics provides a comprehensive overview of hydrodynamic experimental and numerical methods for ship resistance and propulsion, maneuvering, seakeeping and vibration. Beginning with an overview of problems and approaches, including the basics of modeling and full scale testing, expert author Volker Bertram introduces the marine applications of computational fluid dynamics and boundary element methods. Expanded and updated, this new edition includes: Otherwise disparate information on the factors affecting ship hydrodynamics, combined to provide one practical, go-to resource. Full coverage of new developments in computational methods and model testing techniques relating to marine design and development. New chapters on hydrodynamic aspects of ship vibrations and hydrodynamic options for fuel efficiency, and increased coverage of simple design estimates of hydrodynamic quantities such as resistance and wake fraction. With a strong focus on essential background for real-life modeling, this book is an ideal reference for practicing naval architects and graduate students.

Fluid Dynamics of Cavitation and Cavitating Turbopumps Jun 24 2019 The book focuses on the fluid dynamics of cavitation with special reference to high power density turbopumps, where it represents the major source of performance and life degradation. While covering the more fundamental aspects of cavitation and the main kinds of cavitating flows, there is focus on the hydrodynamics and instabilities of cavitating turbopumps. The book also illustrates the alternative approaches for modeling and engineering simulation of cavitating flows.

Relativistic Hydrodynamics Jan 12 2021 This book provides an up-to-date, lively and approachable introduction to the mathematical formalism, numerical techniques and applications of relativistic hydrodynamics. The topic is presented here in a form which will be appreciated both by students and researchers in the field.

Encyclopedia of Hydrodynamics Jan 24 2022 This book examines novel viewpoints about procedures and tools used in Hydrodynamics. The phenomena associated with the flow of fluids are usually complex, and tough to quantify. Novel approaches - considering points of view still not investigated - may present useful devices in the study of hydrodynamics and the associated transport phenomenon. The specifications of the flows and the characteristics of the fluids must be studied on a small scale. Subsequently, novel concepts and devices are devised to better explain the fluids and their characteristics. This book provides conclusions about advanced issues of calculated and observed flows. Major topics in this book are radiation, electro-magneto-hydrodynamics and magneto-rheology; special points on simulations and experimental inputs are also discussed.

Numerical Hydrodynamics in Special Relativity Oct 01 2022

A High Order Kinetic Flux Splitting Method for the Special Relativistic Hydrodynamics Sep 07 2020

Hydrodynamics and Transport for Water Quality Modeling Aug 07 2020 Hydrodynamics and Transport for Water Quality Modeling presents a complete overview of current methods used to describe or predict transport in aquatic systems, with special emphasis on water quality modeling. The book features detailed descriptions of each method, supported by sample applications and case studies drawn from the authors' years of experience in the field. Each chapter examines a variety of modeling approaches, from simple to complex. This unique text/reference offers a wealth of information previously unavailable from a single source. The book begins with an overview of basic principles, and an introduction to the measurement and analysis of flow. The following section focuses on rivers and streams, including model complexity and data requirements, methods for estimating mixing, hydrologic routing methods, and unsteady flow modeling. The third section considers lakes and reservoirs, and discusses stratification and temperature modeling, mixing methods, reservoir routing and water balances, and dynamic modeling using one-, two-, and three-dimensional models. The book concludes with a section on estuaries, containing topics such as origins and classification, tides, mixing methods, tidally averaged estuary models, and dynamic modeling. Over 250 figures support the text. This is a valuable guide for students and practicing modelers who do not have extensive backgrounds in fluid dynamics.

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Fundamentals of Astrophysical Fluid Dynamics Apr 02 2020 This book offers an overview of the fundamental dynamical processes, which are necessary to understand astrophysical phenomena, from the viewpoint of hydrodynamics, magnetohydrodynamics, and radiation hydrodynamics. The book consists of three parts: The first discusses the fundamentals of hydrodynamics necessary to understand the dynamics of astrophysical objects such as stars, interstellar gases and accretion disks. The second part reviews the interactions between gases and magnetic fields on fluid motions – the magnetohydrodynamics – highlighting the important role of magnetic fields in dynamical phenomena under astrophysical environments. The third part focuses on radiation hydrodynamics, introducing the hydrodynamic phenomena characterized by the coupling of radiation and gas motions and further on relativistic radiation hydrodynamics. Intended as a pedagogical introduction for advanced undergraduate and graduate students, it also provides comprehensive coverage of the fundamentals of astrophysical fluid dynamics, making it an effective resource not only for graduate courses, but also for beginners wanting to learn about hydrodynamics, magnetohydrodynamics, and radiation hydrodynamics in astrophysics independently.

Hydrodynamics May 16 2021 A complete revision of the first edition this book. The author has added a chapter on turbulence, and has expanded the work on paradoxes and modeling. W.M. Elsasser said of the first edition, "A book such as this, concentrating as it does on the boundaries of fundamental progress, should be indispensable to all those engaged in hydrodynamical research who are concerned with the type of generalization that so often in the past has led to fundamental progress." Originally published in 1960. The Princeton Legacy Library uses the latest print-on-demand technology to again make available previously out-of-print books from the distinguished backlist of Princeton University Press. These editions preserve the original texts of these important books while presenting them in durable paperback and hardcover editions. The goal of the Princeton Legacy Library is to vastly increase access to the rich scholarly heritage found in the thousands of books published by Princeton University Press since its founding in 1905.

Relativistic Hydrodynamics Mar 02 2020 Relativistic hydrodynamics is a very successful theoretical framework to describe the dynamics of matter from scales as small as those of colliding elementary particles, up to the largest scales in the universe. This book provides an up-to-date, lively, and approachable introduction to the mathematical formalism, numerical techniques, and applications of relativistic hydrodynamics. The topic is typically covered either by very formal or by very phenomenological books, but is instead presented here in a form that will be appreciated both by students and researchers in the field. The topics covered in the book are the results of work carried out over the last 40 years, which can be found in rather technical research articles with dissimilar notations and styles. The book is not just a collection of scattered information, but a

well-organized description of relativistic hydrodynamics, from the basic principles of statistical kinetic theory, down to the technical aspects of numerical methods devised for the solution of the equations, and over to the applications in modern physics and astrophysics. Numerous figures, diagrams, and a variety of exercises aid the material in the book. The most obvious applications of this work range from astrophysics (black holes, neutron stars, gamma-ray bursts, and active galaxies) to cosmology (early-universe hydrodynamics and phase transitions) and particle physics (heavy-ion collisions). It is often said that fluids are either seen as solutions of partial differential equations or as "wet". Fluids in this book are definitely wet, but the mathematical beauty of differential equations is not washed out.