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This innovative book uses unifying themes so that the boundaries between thermodynamics, heat transfer, and fluid mechanics become transparent. It begins with an introduction to the numerous engineering applications that may require the integration of principles and tools from these disciplines. The authors then present an in-depth examination of the three disciplines, providing readers with the necessary background to solve various engineering problems. The remaining chapters delve into the topics in more detail and rigor. Numerous practical engineering applications are mentioned throughout to illustrate where and when certain equations, concepts, and topics are needed. A comprehensive introduction to thermodynamics, fluid mechanics, and heat transfer, this title: Develops governing equations and approaches in sufficient detail, showing how the equations are based on fundamental conservation laws and other basic concepts. Explains the physics of processes and phenomena with language and examples that have been seen and used in everyday life. Integrates the presentation of the three subjects with common notation, examples, and problems. Demonstrates how to solve any problem in a systematic, logical manner. Presents material

appropriate for an introductory level course on thermodynamics, heat transfer, and fluid mechanics. Thermofluids, while a relatively modern term, is applied to the well-established field of thermal sciences, which is comprised of various intertwined disciplines. Thus mass, momentum, and heat transfer constitute the fundamentals of thermofluids. This book discusses thermofluids in the context of thermodynamics, single- and two-phase flow, as well as heat transfer associated with single- and two-phase flows. Traditionally, the field of thermal sciences is taught in universities by requiring students to study engineering thermodynamics, fluid mechanics, and heat transfer, in that order. In graduate school, these topics are discussed at more advanced levels. In recent years, however, there have been attempts to integrate these topics through a unified approach. This approach makes sense as thermal design of widely varied systems ranging from hair dryers to semiconductor chips to jet engines to nuclear power plants is based on the conservation equations of mass, momentum, angular momentum, energy, and the second law of thermodynamics. While integrating these topics has recently gained popularity, it is hardly a new approach. For example, Bird, Stewart, and Lightfoot in Transport Phenomena, Rohsenow and Choi in Heat, Mass, and Momentum Transfer, El-Wakil, in Nuclear Heat Transport, and Todreas and Kazimi in Nuclear Systems have pursued a similar approach. These books, however, have been designed for advanced graduate level courses. More recently, undergraduate books using an integral approach are appearing. This book has been written for graduate students, scientists and engineers who need in-depth theoretical foundations to solve two-phase problems in various technological systems. Based on extensive research experiences focused on the fundamental physics of two-phase flow, the authors present the detailed theoretical foundation of multi-phase flow thermofluid dynamics as they apply to a variety of scenarios, including nuclear reactor transient and accident analysis, energy systems, power generation systems and even space propulsion. Introduction to Computational Fluid Dynamics is a textbook for advanced undergraduate and first year graduate students in mechanical, aerospace and chemical engineering. The book emphasizes understanding CFD through physical principles and examples. The author follows a consistent philosophy of control volume formulation of the fundamental laws of fluid motion and energy transfer, and introduces a novel notion of 'smoothing pressure correction' for solution of flow equations on collocated grids within the framework of the well-known SIMPLE algorithm. The subject matter is developed by considering pure conduction/diffusion, convective transport in 2-dimensional boundary layers and in fully elliptic flow situations and phase-change problems in succession. The book includes chapters on discretization of equations for transport of mass, momentum and

energy on Cartesian, structured curvilinear and unstructured meshes, solution of discretised equations, numerical grid generation and convergence enhancement. Practising engineers will find this particularly useful for reference and for continuing education. Over the past several years, significant advances have been made in developing the discontinuous Galerkin finite element method for applications in fluid flow and heat transfer. Certain unique features of the method have made it attractive as an alternative for other popular methods such as finite volume and finite elements in thermal fluids engineering analyses. This book is written as an introductory textbook on the discontinuous finite element method for senior undergraduate and graduate students in the area of thermal science and fluid dynamics. It also can be used as a reference book for researchers and engineers who intend to use the method for research in computational fluid dynamics and heat transfer. A good portion of this book has been used in a course for computational fluid dynamics and heat transfer for senior undergraduate and first year graduate students. It also has been used by some graduate students for self-study of the basics of discontinuous finite elements. This monograph assumes that readers have a basic understanding of thermodynamics, fluid mechanics and heat transfer and some background in numerical analysis. Knowledge of continuous finite elements is not necessary but will be helpful. The book covers the application of the method for the simulation of both macroscopic and micro/nanoscale fluid flow and heat transfer phenomena. *Thermofluids: From Nature to Engineering* presents the fundamentals of thermofluids in an accessible and student-friendly way. Author David Ting applies his 23 years of teaching to this practical reference which works to clarify phenomena, concepts and processes via nature-inspired examples, giving the readers a well-rounded understanding of the topic. It introduces the fundamentals of thermodynamics, heat transfer and fluid mechanics which underpin most engineering systems, providing the reader with a solid basis to transfer and apply to other engineering disciplines. With a strong focus on ecology and sustainability, this book will benefit students in various engineering disciplines including thermal energy, mechanical and chemical, and will also appeal to those coming to the topic from another discipline. Presents abstract and complex concepts in a tangible, accessible way Promotes the future of thermofluid systems with a focus on sustainability Guides the reader through the fundamentals of thermofluids which is essential for further study. This book guides the reader through the process of model creation for heat transfer analysis with the finite element method. The book describes thermal imaging experiments that demonstrate how such models can be validated. It presents application examples, such as heating water in a kettle, to basement insulation, a heated seat, molten rock, pipe flow, and an innovative extended surface. A companion disc provides the files so models can be run (using COMSOL or other software) in order to observe real-world behavior of the applications. Historical background information is provided to show the progression of heat transfer science and mathematical modeling from the earliest developments to the most recent advances in technology. Features:

Includes example models that enable the reader to implement conceptual material in practical scenarios with broad industrial applications Includes companion files with models and geometry files created with COMSOL Multiphysics(R) or imported from a third-party CAD tool. This text is concerned with the methods in which different types of energy are converted from one form to another. In particular, the book examines why so many of the energy conversion processes which involve heat have a low efficiency rating. *Thermofluids: From Nature to Engineering* presents the fundamentals of thermofluids in an accessible and student-friendly way. Author David Ting applies his 23 years of teaching to this practical reference which works to clarify phenomena, concepts and processes via nature-inspired examples, giving the readers a well-rounded understanding of the topic. It introduces the fundamentals of thermodynamics, heat transfer and fluid mechanics which underpin most engineering systems, providing the reader with a solid basis to transfer and apply to other engineering disciplines. With a strong focus on ecology and sustainability, this book will benefit students in various engineering disciplines including thermal energy, mechanical and chemical, and will also appeal to those coming to the topic from another discipline. Presents abstract and complex concepts in a tangible, accessible way Promotes the future of thermofluid systems with a focus on sustainability Guides the reader through the fundamentals of thermofluids which is essential for further study. This book focuses on heat and mass transfer, fluid flow, chemical reaction, and other related processes that occur in engineering equipment, the natural environment, and living organisms. Using simple algebra and elementary calculus, the author develops numerical methods for predicting these processes mainly based on physical considerations. Through this approach, readers will develop a deeper understanding of the underlying physical aspects of heat transfer and fluid flow as well as improve their ability to analyze and interpret computed results. *Fluid Mechanics: An Intermediate Approach* addresses the problems facing engineers today by taking on practical, rather than theoretical problems. Instead of following an approach that focuses on mathematics first, this book allows you to develop an intuitive physical understanding of various fluid flows, including internal compressible flows with simultaneous area change, friction, heat transfer, and rotation. Drawing on over 40 years of industry and teaching experience, the author emphasizes physics-based analyses and quantitative predictions needed in the state-of-the-art thermofluids research and industrial design applications. Numerous worked-out examples and illustrations are used in the book to demonstrate various problem-solving techniques. The book covers compressible flow with rotation, Fanno flows, Rayleigh flows, isothermal flows, normal shocks, and oblique shocks; Bernoulli, Euler, and Navier-Stokes equations; boundary layers; and flow separation. Includes two value-added chapters on special topics that reflect the state of the art in design applications of fluid mechanics Contains a value-added chapter on incompressible and compressible flow network modeling and robust solution methods not found in any leading book in fluid mechanics Gives an overview of CFD technology and turbulence

modeling without its comprehensive mathematical details Provides an exceptional review and reinforcement of the physics-based understanding of incompressible and compressible flows with many worked-out examples and problems from real-world fluids engineering applications *Fluid Mechanics: An Intermediate Approach* uniquely aids in the intuitive understanding of various fluid flows for their physics-based analyses and quantitative predictions needed in the state-of-the-art thermofluids research and industrial design applications. The book provides the theoretical fundamentals on turbulence and a complete overview of turbulence models, from the simplest to the most advanced ones including Direct and Large Eddy Simulation. It mainly focuses on problems of modeling and computation, and provides information regarding the theory of dynamical systems and their bifurcations. It also examines turbulence aspects which are not treated in most existing books on this subject, such as turbulence in free and mixed convection, transient turbulence and transition to turbulence. The book adopts the tensor notation, which is the most appropriate to deal with intrinsically tensor quantities such as stresses and strain rates, and for those who are not familiar with it an Appendix on tensor algebra and tensor notation are provided. Nonlocal continuum field theories are concerned with material bodies whose behavior at any interior point depends on the state of all other points in the body -- rather than only on an effective field resulting from these points -- in addition to its own state and the state of some calculable external field. Nonlocal field theory extends classical field theory by describing the responses of points within the medium by functionals rather than functions (the "constitutive relations" of classical field theory). Such considerations are already well known in solid-state physics, where the nonlocal interactions between the atoms are prevalent in determining the properties of the material. The tools developed for crystalline materials, however, do not lend themselves to analyzing amorphous materials, or materials in which imperfections are a major part of the structure. Nonlocal continuum theories, by contrast, can describe these materials faithfully at scales down to the lattice parameter. This book presents a unified approach to field theories for elastic solids, viscous fluids, and heat-conducting electromagnetic solids and fluids that include nonlocal effects in both space and time (memory effects). The solutions to the field equations agree remarkably well with atomic theories and experimental observations. *Applications of Heat, Mass and Fluid Boundary Layers* brings together the latest research on boundary layers where there has been remarkable advancements in recent years. This book highlights relevant concepts and solutions to energy issues and environmental sustainability by combining fundamental theory on boundary layers with real-world industrial applications from, among others, the thermal, nuclear and chemical industries. The book's editors and their team of expert contributors discuss many core themes, including advanced heat transfer fluids and boundary layer analysis, physics of fluid motion and viscous flow, thermodynamics and transport phenomena, alongside key methods of analysis such as the Merk-Chao-Fagbenle method. This book's multidisciplinary coverage will give engineers, scientists, researchers

and graduate students in the areas of heat, mass, fluid flow and transfer a thorough understanding of the technicalities, methods and applications of boundary layers, with a unified approach to energy, climate change and a sustainable future. Presents up-to-date research on boundary layers with very practical applications across a diverse mix of industries Includes mathematical analysis to provide detailed explanation and clarity Provides solutions to global energy issues and environmental sustainability This text is for introduction to thermal-fluid science including engineering thermodynamics, fluids, and heat transfer. This book presents selected and peer-reviewed proceedings of the International Conference on Thermofluids (KIIT Thermo 2020). It focuses on the latest studies and findings in the areas of fluid dynamics, heat transfer, thermodynamics, and combustion. Some of the topics covered in the book include electronic cooling, HVAC system analysis, inverse heat transfer, combustion, nano-fluids, multiphase flow, high-speed flow, and shock waves. The book includes both experimental and numerical studies along with a few review chapters from experienced researchers, and is expected to lead to new research in this important area. This book is of interest to students, researchers as well as practitioners working in the areas of fluid dynamics, thermodynamics, and combustion. This book comprises the select proceedings of the International Conference on Recent Trends in Developments of Thermofluids and Renewable Energy (TFRE 2020). The major topics covered include aerodynamics, alternate energy, bio fuel, bio heat transfer, computational fluid dynamics, control mechanism for constant power generation, and energy storage. The book also discusses latest developments in the fields of electric vehicles, hybrid power systems, and solar and renewable energy. Given the scope of its contents, this book will be useful for students, researchers, and professionals interested in the field of thermofluids and renewable energy resources. A fully comprehensive guide to thermal systems design covering fluid dynamics, thermodynamics, heat transfer and thermodynamic power cycles Bridging the gap between the fundamental concepts of fluid mechanics, heat transfer and thermodynamics, and the practical design of thermo-fluids components and systems, this textbook focuses on the design of internal fluid flow systems, coiled heat exchangers and performance analysis of power plant systems. The topics are arranged so that each builds upon the previous chapter to convey to the reader that topics are not stand-alone items during the design process, and that they all must come together to produce a successful design. Because the complete design or modification of modern equipment and systems requires knowledge of current industry practices, the authors highlight the use of manufacturer's catalogs to select equipment, and practical examples are included throughout to give readers an exhaustive illustration of the fundamental aspects of the design process. Key Features: Demonstrates how industrial equipment and systems are designed, covering the underlying theory and practical application of thermo-fluid system design Practical rules-of-thumb are included in the text as 'Practical Notes' to underline their importance in current practice and provide additional information Includes an instructor's

manual hosted on the book's companion website Introduction to Thermal and Fluid Engineering combines coverage of basic thermodynamics, fluid mechanics, and heat transfer for a one- or two-term course for a variety of engineering majors. The book covers fundamental concepts, definitions, and models in the context of engineering examples and case studies. It carefully explains the methods used t Pumping Machinery Theory and Practice comprehensively covers the theoretical foundation and applications of pumping machinery. Key features: Covers characteristics of centrifugal pumps, axial flow pumps and displacement pumps Considers pumping machinery performance and operational-type problems Covers advanced topics in pumping machinery including multiphase flow principles, and two and three-phase flow pumping systems Covers different methods of flow rate control and relevance to machine efficiency and energy consumption Covers different methods of flow rate control and relevance to machine efficiency and energy consumption This contributed volume explores innovative research in the modeling, simulation, and control of crowd dynamics. Chapter authors approach the topic from the perspectives of mathematics, physics, engineering, and psychology, providing a comprehensive overview of the work carried out in this challenging interdisciplinary research field. After providing a critical analysis of the current state of the field and an overview of the current research perspectives, chapters focus on three main research areas: pedestrian interactions, crowd control, and multiscale modeling. Specific topics covered in this volume include: crowd dynamics through conservation laws recent developments in controlled crowd dynamics mixed traffic modeling insights and applications from crowd psychology Crowd Dynamics, Volume 2 is ideal for mathematicians, engineers, physicists, and other researchers working in the rapidly growing field of modeling and simulation of human crowds. "This book presents a general picture for the latest research output and the state of the art technology in the bioinformatics in cancer research, and big data, machine learning theory and technologies in the various applications"-- This book provides over 1000 review questions and answers for all types of mechanical engineering exams. It covers all the aspects of mechanical engineering topics including physics, thermodynamics, engineering drawing, materials, engineering mechanics, heat transfer, and more. FEATURES: Includes over 1000 review questions with answers Covers all the aspects of mechanical engineering Combining previously unconnected computational methods, this monograph discusses the latest basic schemes and algorithms for the solution of fluid, heat and mass transfer problems coupled with electrodynamics. It presents the necessary mathematical background of computational thermo-fluid dynamics, the numerical implementation and the application to real-world problems. Particular emphasis is placed throughout on the use of electromagnetic fields to control the heat, mass and fluid flows in melts and on phase change phenomena during the solidification of pure materials and binary alloys. However, the book provides much more than formalisms and algorithms; it also stresses the importance of good, feasible and workable models to understand complex systems,

and develops these in detail. Bringing computational fluid dynamics, thermodynamics and electrodynamics together, this is a useful source for materials scientists, PhD students, solid state physicists, process engineers and mechanical engineers, as well as lecturers in mechanical engineering. Thermofluids An Integrated Approach to Thermodynamics and Fluid Mechanics Principles C. Marquand University of Westminster, London, UK D. Croft Sheffield Hallam University, UK This is a book about Energy. It examines some of the ways in which different types of energy are converted from one form to another. In particular, it considers why so many conversion processes which involve heat have a low efficiency. The text deliberately combines the topics of thermodynamics and fluid mechanics, enabling readers to understand the wider field of energy transfer for thermal and fluid flow systems. The authors adopt a logical and simple-to-follow approach in order to introduce the potentially difficult and confusing aspects of thermofluids. Scores of worked examples are included throughout, many embracing a brief cost analysis. Thermofluid Modeling for Sustainable Energy Applications provides a collection of the most recent, cutting-edge developments in the application of fluid mechanics modeling to energy systems and energy efficient technology. Each chapter introduces relevant theories alongside detailed, real-life case studies that demonstrate the value of thermofluid modeling and simulation as an integral part of the engineering process. Research problems and modeling solutions across a range of energy efficiency scenarios are presented by experts, helping users build a sustainable engineering knowledge base. The text offers novel examples of the use of computation fluid dynamics in relation to hot topics, including passive air cooling and thermal storage. It is a valuable resource for academics, engineers, and students undertaking research in thermal engineering. Includes contributions from experts in energy efficiency modeling across a range of engineering fields Places thermofluid modeling and simulation at the center of engineering design and development, with theory supported by detailed, real-life case studies Features hot topics in energy and sustainability engineering, including thermal storage and passive air cooling Provides a valuable resource for academics, engineers, and students undertaking research in thermal engineering Design of Hydrodynamic Machines provides a broad, yet concise, theoretical background on the relationship between fluid dynamics and geometry. It covers the most important types of turbomachinery used in power generation industrial processes, utilities, and the oil and gas industry. Offering guidance on the hydraulic design aspect of different parts of turbomachinery, such as impellers, diffusers, volute casing, inlet and outlets, the book discusses how to conduct performance characteristics testing and evaluate performance parameters of the designed parts. It also covers aspects of CFD of turbomachinery. Readers will be able to perform hydraulic design of important turbomachinery parts using commercially available software. Intended for final year undergraduates and postgraduates in mechanical, civil, and aeronautical engineering, the book will also be useful for those

involved in the hydraulic design, analysis, and testing of turbomachinery. A practical and accessible introductory textbook that enables engineering students to design and optimize typical thermofluid systems Engineering Design and Optimization of Thermofluid Systems is designed to help students and professionals alike understand the design and optimization techniques used to create complex engineering systems that incorporate heat transfer, thermodynamics, fluid dynamics, and mass transfer. Designed for thermal systems design courses, this comprehensive textbook covers thermofluid theory, practical applications, and established techniques for improved performance, efficiency, and economy of thermofluid systems. Students gain a solid understanding of best practices for the design of pumps, compressors, heat exchangers, HVAC systems, power generation systems, and more. Covering the material using a pragmatic, student-friendly approach, the text begins by introducing design, optimization, and engineering economics—with emphasis on the importance of engineering optimization in maximizing efficiency and minimizing cost. Subsequent chapters review representative thermofluid systems and devices and discuss basic mathematical models for describing thermofluid systems. Moving on to system simulation, students work with the classical calculus method, the Lagrange multiplier, canonical search methods, and geometric programming. Throughout the text, examples and practice problems integrate emerging industry technologies to show students how key concepts are applied in the real world. This well-balanced textbook: Integrates underlying thermofluid principles, the fundamentals of engineering design, and a variety of optimization methods Covers optimization techniques alongside thermofluid system theory Provides readers best practices to follow on-the-job when designing thermofluid systems Contains numerous tables, figures, examples, and problem sets Emphasizing optimization techniques more than any other thermofluid system textbook available, Engineering Design and Optimization of Thermofluid Systems is the ideal textbook for upper-level undergraduate and graduate students and instructors in thermal systems design courses, and a valuable reference for professional mechanical engineers and researchers in the field. This textbook provides a concise and clear incremental evolution of the introductory fluid mechanics and thermodynamics knowledge for first and second year engineering undergraduates. If you are a first or second year student of mechanical, chemical, aeronautical, marine or civil engineering this book is for you. Also this book is a suitable (and cheap) text for other science degrees where core knowledge of fluid mechanics and thermodynamics is required, for instance environmental science and meteorology. It may also help you if you are taking courses online. It is designed to support the lectures and examples you are given and help you answer the questions you are going to try to solve. It does not skip much, but there is not much padding. It does not seek to emulate the standard texts from the major publishers, which include lots of colour, examples, usually a vast array of web resources, DVDs and so on. I take the view that the lecturers who deliver your undergraduate course know their stuff and provide

you with lecture slides which they explain, examples and other questions for you to try yourself. The book delivers the material incrementally, in more-or-less the order the students are actually taught the material over years 1 and 2. The challenge of developing a new introductory 'thermofluids' course, and the dearth of well priced and appropriate textbooks on the subject inspired me to write my own. I also saw no reason to give the rights to a publisher when none of the material is new and self-publishing is so straightforward. Taking this route allows me to keep the cost down to a small fraction of the combined cost of the alternatives. The two associated subjects of thermodynamics and fluid mechanics are combined in this book to provide the reader with an easy-to-follow text which emphasizes the essential coherence of the material. Cavitation and Bubble Dynamics: Fundamentals and Applications examines the latest advances in the field of cavitation and multiphase flows, including associated effects such as material erosion and spray instabilities. This book tackles the challenges of cavitation hindrance in the industrial world, while also drawing on interdisciplinary research to inform academic audiences on the latest advances in the fundamentals. Contributions to the book come from a wide range of specialists in areas including fuel systems, hydropower, marine engineering, multiphase flows and computational fluid mechanics, allowing readers to discover novel interdisciplinary experimentation techniques and research results. This book will be an essential tool for industry professionals and researchers working on applications where cavitation hindrance affects reliability, noise, and vibrations. Covers a wide range of cavitation and bubble dynamics phenomena, including shock wave emission, jetting, and luminescence Provides the latest advice about applications including cavitation tunnels, cavitation testing, flow designs to avoid cavitation in pumps and other hydromachinery, and flow lines Describes novel experimental techniques, such as x-ray imaging and new computational techniques Nano and Bio Heat Transfer and Fluid Flow focuses on the use of nanoparticles for bio application and bio-fluidics from an engineering perspective. It introduces the mechanisms underlying thermal and fluid interaction of nanoparticles with biological systems. This book will help readers translate theory into real world applications, such as drug delivery and lab-on-a-chip. The content covers how transport at the nano-scale differs from the macro-scale, also discussing what complications can arise in a biologic system at the nano-scale. It is ideal for students and early career researchers, engineers conducting experimental work on relevant applications, or those who develop computer models to investigate/design these systems. Content coverage includes biofluid mechanics, transport phenomena, micro/nano fluid flows, and heat transfer. Discusses nanoparticle applications in drug delivery Covers the engineering fundamentals of bio heat transfer and fluid flow Explains how to simulate, analyze, and evaluate the transportation of heat and mass problems in bio-systems Featuring contributions by leading researchers in the field, Nanoparticle Heat Transfer and Fluid Flow explores heat transfer and fluid flow processes in nanomaterials and nanofluids, which are becoming increasingly important across the

engineering disciplines. The book covers a wide range, from biomedical and energy conversion applications to materials properties, and addresses aspects that are essential for further progress in the field, including numerical quantification, modeling, simulation, and presentation. Topics include: A broad review of nanofluid applications, including industrial heat transfer, biomedical engineering, electronics, energy conversion, membrane filtration, and automotive An overview of thermofluids and their importance in biomedical applications and heat-transfer enhancement A deeper look at biomedical applications such as nanoparticle hyperthermia treatments for cancers Issues in energy conversion from dispersed forms to more concentrated and utilizable forms Issues in nanofluid properties, which are less predictable and less repeatable than those of other media that participate in fluid flow and heat transfer Advances in computational fluid dynamic (CFD) modeling of membrane filtration at the microscale The role of nanofluids as a coolant in microchannel heat transfer for the thermal management of electronic equipment The potential enhancement of natural convection due to nanoparticles Examining key topics and applications in nanoscale heat transfer and fluid flow, this comprehensive book presents the current state of the art and a view of the future. It offers a valuable resource for experts as well as newcomers interested in developing innovative modeling and numerical simulation in this growing field. The Engineering Thermofluids is a unique textbook, which brings the three pillars of thermal sciences; thermodynamics, fluid mechanics, and heat transfer under one umbrella. These three distinct, yet intertwined subjects are treated in an integrated manner. The primary audiences for this book are senior undergraduate, graduate, and practicing engineers in the fields of aeronautical, chemical industrial, mechanical, and nuclear engineering. Topics are discussed in detail while still using a simple and easy to follow approach. Numerous walk-through examples are solved and illustrations are provided to guide the reader through more subtle topics. Each chapter starts with a section for the introduction of various terminologies used. The chapter on thermodynamics covers the first law, the second law, the power cycles, and the mixture of gases. The chapter on fluid mechanics covers both steady-state and transient single phase-flow as well as two-phase flow. The chapter on heat transfer covers conduction, convection, radiation, boiling, and condensation. These chapters are followed by the chapter on applications of the engineering thermofluid, which covers the design and operations of various heat exchangers, turbomachines, and flowmeters. Many practical design problems are either solved or provided as homework. Practicing engineers will find this book a useful text to have around for the many practical problems and solutions, illustrations, definitions, methods, tables, and figures provided. The preference throughout the text is on obtaining analytical solutions of a closed form. Numerical solutions as well as experimental results are presented when analytical solutions cannot be found. Volume is indexed by Thomson Reuters CPCI-S (WoS). The book aims at bringing together the current knowledge of academicians, researchers and scholars from all over the world on all aspects of

Thermodynamics, Fluid Mechanics, Heat Transfer and Thermal Engineering. In addition to the fundamentals of thermal phenomena and traditional thermal applications, the contributions also address the emerging domains of thermal transport in fishery, building nano-materials, bio-systems, microsystems, power generation, and energy conversion devices. This book presents the select proceedings of the International Conference on Thermofluids and Manufacturing Science (ICTMS 2022). Some of the topics covered include Heat transfer, fluid dynamics, multiphase flow, flow diagnostics using artificial neural network, aerodynamics, high-speed flows, sustainable energy

technology, propulsion and emissions, Eco-friendly manufacturing, Coating Techniques and Supply chain management etc. Given the scope, the book will be highly useful for researchers and professionals interested in mechanical, production or aerospace engineering This book provides essential information on and case studies in the fields of energy technology, clean energy, energy efficiency, sustainability and the environment relevant to academics, researchers, practicing engineers, technologists and students. The individual chapters present cutting-edge research on key issues and recent developments in thermo-fluid processes, including but not limited to: energy

technologies in process industries, applications of thermo-fluid processes in mining industries, applications of electrostatic precipitators in thermal power plants, biofuels, energy efficiency in building systems, etc. Helping readers develop an intuitive understanding of the relevant concepts in and solutions for achieving sustainability in medium and large-scale industries, the book offers a valuable resource for undergraduate, honors and postgraduate research students in the field of thermo-fluid engineering.

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