Gas Dynamics And Turbomachinery

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It is your extremely own times to put-on reviewing habit. in the midst of guides you could enjoy now is **Gas Dynamics And Turbomachinery** below.

Fluid mechanics and thermodynamics of turbomachinery - Sydney Lawrence Dixon 2013 Fluid Mechanics and Thermodynamics of Turbomachinery is the leading turbomachinery book due to its balanced coverage of theory and application. Starting with background principles in fluid mechanics and thermodynamics, the authors go on to discuss axial flow turbines and compressors, centrifugal pumps, fans, and compressors, and radial flow gas turbines, hydraulic turbines, and wind turbines. In this new edition,more coverage is devoted to modern approaches to analysis and design, including CFD and FEA techniques. Used as a core text in senior undergraduate and graduate level courses this book will also appeal to professional

engineers in the aerospace, global power, oil & gas and other industries who are involved in the design and operation of turbomachines. More coverage of a variety of types of turbomachinery, including centrifugal pumps and gas turbines Addition of numerical and computational tools, including more discussion of CFD and FEA techniques to reflect modern practice in the area More end of chapter exercises and in-chapter worked examples.

Principles of Turbomachinery - Seppo A. Korpela 2012-01-03 The text is based on a course on turbomachinery which the author has taught since year 2000 as a technical elective. Topics include; Energy Transfer in Turbomachines, Gas and Steam Turbines, and Hydraulic Turbines. New material on wind turbines, and three-dimensional effects in axial turbomachines is included. The level is kept as such that students can smoothly move from a study of the most successful books in thermodynamics, fluid dynamics, and heat transfer to the subject of turbomachinery. The chapters are organized in such a way that the more difficult material is left to the later sections of each chapter. Thus, depending on the level of the students, instructors can tailor their course by omitting some sections. Key features: Combines theory and applications to show how gas turbines, pumps and compressor function Allows for a smooth transition from the study of thermodynamics, fluid dynamics, and heat transfer to the subject of turbomachinery for students and professionals Relates turbomachinery to new areas such as wind power and three-dimensional effects in axial turbomachines Provides information on several types of turbomachinery rather than concentrating specifically on one type

such as centrifugal compressors

Fundamentals of Propulsion - V. Babu 2021-08-25

p="" This highly informative book offers a comprehensive overview of the fundamentals of propulsion. The book focuses on foundational topics in propulsion, namely gas dynamics, turbomachinery, and combustion to more complex subjects such as practical design aspects of aircraft engines and thermodynamic aspects and analysis. It also includes pedagogical aspects such as end-of-chapter problems and worked examples to augment learning and self-testing. This book is a useful reference for students in the area of mechanical and aerospace engineering. Also, scientists and engineers working in the areas of aerospace propulsion and gas dynamics find this book a valuable addition. ^

Turbomachinery - Rama S.R. Gorla 2003-08-12

Turbomachinery presents the theory and design of turbomachines with step-by-step procedures and worked-out examples. This comprehensive reference emphasizes fundamental principles and construction guidelines for enclosed rotators and contains end-of-chapter problem and solution sets, design formulations, and equations for clear understanding of key aspects in machining function, selection, assembly, and construction. Offering a wide range of illustrative examples, the book evaluates the components of incompressible and compressible fluid flow machines and analyzes the kinematics and dynamics of turbomachines with valuable definitions, diagrams, and dimensionless parameters.

Fluid Mechanics and Thermodynamics of Turbomachinery - S. L. Dixon 1998

Turbomachinery Flow Physics and Dynamic Performance - Meinhard

T. Schobeiri 2012-05-01 With this second revised and extended edition, the readers have a solid source of information for designing state-of-the art turbomachinery components and systems at hand. Based on fundamental principles of turbomachinery thermo-fluid mechanics, numerous CFD based calculation methods are being developed to simulate the complex 3-dimensional, highly unsteady turbulent flow within turbine or compressor stages. The objective of this book is to present the fundamental principles of turbomachinery fluid-thermodynamic design process of turbine and compressor components, power generation and aircraft gas turbines in a unified and compact manner. The book provides senior undergraduate students, graduate students and engineers in the turbomachinery industry with a solid background of turbomachinery flow physics and performance fundamentals that are essential for understanding turbomachinery performance and flow complexes. While maintaining the unifying character of the book structure in this second revised and extended edition all chapters have undergone a rigorous update and enhancement. Accounting for the need of the turbomachinery community, three chapters have been added, that deal with computationally relevant aspects of turbomachinery design such as boundary layer transition, turbulence and boundary layer.

Fundamentals of Compressible Flow - S. M. Yahya 2009

This work covers compressible flow in 14 well organized chapters in a lucid style. A large mass of theoretical material and equations has been supported by a number of figures and graphical depictions.

Gas Tables - S. M. Yahya 2012

* Properties of the

atmosphere are given * Tables for isothermal flow and oblique shock are included * Pressure drop in gas pipe lines is also tabulated * Gives pumping power for fans, blowers and compressors * These gas tables can be used in Mechanical Engineering, Aerospace Engineering, Chemical Engineering and Gas Engineering

Turbomachinery Flow Physics and Dynamic Performance - Meinhard T. Schobeiri 2006-01-16

Over the past three decades turbomachines experienced a steep increase in efficiency and performance. Based on fundamental principles of turbomachinery thermo-fluid mechanics, numerous CFD based calculation methods are being developed to simulate the complex 3-dimensional, highly unsteady turbulent flow within turbine or compressor stages. The objective of this book is to present the fundamental principals of turbomachinery fluid-thermodynamic design process of turbine and compressor components, power generation and aircraft gas turbines in a unified and compact manner. The book provides senior undergraduate students, graduate students and engineers in the turbomachinery industry with a solid background of turbomachinery flow physics and performance fundamentals that are essential for understanding turbomachinery performance and flow complexes.

Current Problems in Turbomachinery Fluid Dynamics - E. M. Greitzer 1984

A multi-investigator program on problems of current interest in turbomachinery fluid dynamics is being conducted at the MIT Gas Turbine and Plasma Dynamics Lab. Within the scope of this effort, four different tasks, encompassing both design and off-design problems, have been identified. These are: 1) Investigation of fan and compressor design point

fluid dynamics (including formation of design procedures using current three-dimensional transonic codes and development of advanced measurement techniques for use in transonic fans); 2) Studies of basic mechanisms of compressor stability enhancement using compressor casing/hub treatment; 3) Fluid mechanics of inlet vortex flow distortions in gas turbine engines; and 4) Investigations of three-dimensional analytical and numerical computations of flows in highly loaded turbomachinery blading.

Fluid Mechanics and Thermodynamics of Turbomachinery - S. Larry Dixon 2013-10-10 Fluid Mechanics and Thermodynamics of Turbomachinery is the leading turbomachinery book due to its balanced coverage of theory and application. Starting with background principles in fluid mechanics and thermodynamics, the authors go on to discuss axial flow turbines and compressors, centrifugal pumps, fans, and compressors, and radial flow gas turbines, hydraulic turbines, and wind turbines. In this new edition,more coverage is devoted to modern approaches to analysis and design, including CFD and FEA techniques. Used as a core text in senior undergraduate and graduate level courses this book will also appeal to professional engineers in the aerospace, global power, oil & gas and other industries who are involved in the design and operation of turbomachines. More coverage of a variety of types of turbomachinery, including centrifugal pumps and gas turbines Addition of numerical and computational tools, including more discussion of CFD and FEA techniques to reflect modern practice in the area More end of chapter exercises and in-chapter worked examples

Aerothermodynamics of Turbomachinery - Naixing

Chen 2011-09-23 Computational Fluid Dynamics (CFD) is now an essential and effective tool used in the design of all types of turbomachine, and this topic constitutes the main theme of this book. With over 50 years of experience in the field of aerodynamics, Professor Naixing Chen has developed a wide range of numerical methods covering almost the entire spectrum of turbomachinery applications. Moreover, he has also made significant contributions to practical experiments and real-life designs. The book focuses on rigorous mathematical derivation of the equations governing flow and detailed descriptions of the numerical methods used to solve the equations. Numerous applications of the methods to different types of turbomachine are given and, in many cases, the numerical results are compared to experimental measurements. These comparisons illustrate the strengths and weaknesses of the methods - a useful guide for readers. Lessons for the design of improved blading are also indicated after many applications. Presents real-world perspective to the past, present and future concern in turbomachinery Covers direct and inverse solutions with theoretical and practical aspects Demonstrates huge application background in China Supplementary instructional materials are available on the companion website Aerothermodynamics of Turbomachinery: Analysis and Design is ideal for senior undergraduates and graduates studying in the fields of mechanics, energy and power, and aerospace engineering; design engineers in the business of manufacturing compressors, steam and gas turbines; and research engineers and scientists working in the areas of fluid

mechanics, aerodynamics, and heat transfer. Supplementary lecture materials for instructors are available at www.wiley.com/go/chenturbo

Fluid Mechanics and Thermodynamics of Turbomachinery - Prabhu Nirajan 2015-08

Turbomachinery is a challenging and diverse field, with applications for professionals and students in many subsets of the mechanical engineering discipline, including fluid mechanics, combustion and heat transfer, dynamics and vibrations, as well as structural mechanics and materials engineering. Originally published more than 40 years ago, Fluid Mechanics and Thermodynamics of Turbomachinery is the leading turbomachinery textbook. Used as a core text in senior undergraduate and graduate level courses this book will also appeal to professional engineers in the aerospace, global power, oil & gas and other industries who are involved in the design and operation of turbomachines. Turbomachinery is a challenging and diverse field, with applications for professionals and students in many subsets of the mechanical engineering discipline, including fluid mechanics, combustion and heat transfer, dynamics and vibrations, as well as structural mechanics and materials engineering.

Fluid Mechanics and Thermodynamics of Turbomachinery - Sydney Lawrence Dixon 1998

In the intervening 20 years since the 3rd edition of this textbook many advances have been made in the design of turbines and greater understanding of the processes involved have been gained. This 4th edition brings the book up to date.

Advances in Fluid Mechanics and Turbomachinery - Hans J. Rath 2012-12-06

The papers in this volume are mostly in the

area of computational fluid dynamics (CFD). Furthermore, to some extend this volume contains also contributions from the field of new experimental mehtods and diagnostics applied to fluid dynamics, combustions and turbomachniery. the contributed papers cover diverse topics such as pipe flows, shock tube flows, compressor flows as well as velocity and turbulence measurements of flow conditioners. There is also a survey article on recent flow computations on high performance computers. Articles are also devoted to liquid-liquid systems, rotating fluid flows and combustion diagnostics.

Fundamentals of Turbomachines - Erik Dick 2015-03-09

This book explores the working principles of all kinds of turbomachines. The same theoretical framework is used to analyse the different machine types. Fundamentals are first presented and theoretical concepts are then elaborated for particular machine types, starting with the simplest ones.For each machine type, the author strikes a balance between building basic understanding and exploring knowledge of practical aspects. Readers are invited through challenging exercises to consider how the theory applies to particular cases and how it can be generalised. The book is primarily meant as a course book. It teaches fundamentals and explores applications. It will appeal to senior undergraduate and graduate students in mechanical engineering and to professional engineers seeking to understand the operation of turbomachines. Readers will gain a fundamental understanding of turbomachines. They will also be able to make a reasoned choice of turbomachine for a particular application and to understand its operation. Basic design

of the simplest turbomachines as a centrifugal fan, an axial steam turbine or a centrifugal pump, is also possible using the topics covered in the book.

Technical Gas Dynamics - Mikhail Efimovich Deĭch 1964

Contents: Fundamental concepts and equations of gas dynamics; one-dimensional motion of gas; two-dimensional motion of gas with constant entropy; compression shocks; motion of gas during presence of friction; outflow of gas from narrowing nozzles and apertures: the laval nozzle; movement of gas in diffusers: stage of ejector; flow of gas through turbomachine cascades; flow of gas in a turbomachine stage; methods of experimental investigation of gas flows and blading of turbomachines.

Gas Turbine Engineering Handbook - Meherwan P. Boyce 2011-12-12

Chapter 1: Overview of Gas Turbines -- Chapter 2: Theoretical and Actual Cycle Analysis -- Chapter 3: Compressor and Turbine Performance Characteristics -- Chapter 4: Performance and Mechanical Standards -- Chapter 5: Rotor Dynamics -- Chapter 6: Centrifugal Compressors -- Chapter 7: Axial-Flow Compressors -- Chapter 8: Radial-Inflow Turbines -- Chapter 9: Axial-Flow Turbines -- Chapter 10: Combustors -- Chapter 11: Materials -- Chapter 12: Gas Clean Up System -- Chapter 13: Bearings and Seals -- Chapter 14: Gears -- Chapter 15: Lubrication -- Chapter 16: Spectrum Analysis -- Chapter 17: Balancing -- Chapter 18: Couplings and Alignment -- Chapter 19: Control Systems and Instrumentation -- Chapter 20: Gas Turbine Performance Test -- Chapter 21: Maintenance Techniques -- Chapter 22: Case Studies -- Appendix: Equivalent Units.

Principles of Turbomachinery - Seppo A. Korpela 2019-07-11

A newly updated and expanded edition that

combines theory and applications of turbomachinery while covering several different types of turbomachinery In mechanical engineering, turbomachinery describes machines that transfer energy between a rotor and a fluid, including turbines, compressors, and pumps. Aiming for a unified treatment of the subject matter, with consistent notation and concepts, this new edition of a highly popular book provides all new information on turbomachinery, and includes 50% more exercises than the previous edition. It allows readers to easily move from a study of the most successful textbooks on thermodynamics and fluid dynamics to the subject of turbomachinery. The book also builds concepts systematically as progress is made through each chapter so that the user can progress at their own pace. Principles of Turbomachinery, 2nd Edition provides comprehensive coverage of everything readers need to know, including chapters on: thermodynamics, compressible flow, and principles of turbomachinery analysis. The book also looks at steam turbines, axial turbines, axial compressors, centrifugal compressors and pumps, radial inflow turbines, hydraulic turbines, hydraulic transmission of power, and wind turbines. New chapters on droplet laden flows of steam and oblique shocks help make this an incredibly current and well-rounded resource for students and practicing engineers. Includes 50% more exercises than the previous edition Uses MATLAB or GNU/OCTAVE for all the examples and exercises for which computer calculations are needed, including those for steam Allows for a smooth transition from the study of thermodynamics, fluid dynamics, and heat transfer to the subject of turbomachinery for

students and professionals Organizes content so that more difficult material is left to the later sections of each chapter, allowing instructors to customize and tailor their courses for their students Principles of Turbomachinery is an excellent book for students and professionals in mechanical, chemical, and aeronautical engineering.

Design of Radial Turbomachines - A. Whitfield 1990

During the past three decades advances have been made in the fluid dynamic and thermodynamic design and understanding of radial flow turbomachines. Radial turbomachines possess their own distinctive characteristics, and present the engineer with as full a range of complexities as any fluid flow problem. This book describes the current technology and design methods for centrifugal compressors and radial turbines working in compressible flow. These are of particular relevance to gas turbine engines, internal combustion engine turbochargers, process compressors and cryogenic expanders. The aerodynamic design of the turbomachine is preliminary design to the specification of blade forms and computational fluid dynamic analysis of vane and blade passage flows. The treatment throughout is modern, with full recognition of current computer-aided design methods. However throughout the book a clear separation is made between the fundamental gas dynamics and the empiricism necessary to close the gap between theory and practice in situations of such complexity. Computer program listings for preliminary design are included. The problems posed by specific applications are dealt with in details: for example, techniques for the suppression of surge in centrifugal

compressors and a consequent widening of the operating range, and the problems of pulse operation of radial turbines as encountered in turbocharger applications. The book contains comprehensive surveys of the literature in all these fields.

Proceedings of the 3rd International Seminar on Non-Ideal Compressible Fluid Dynamics for Propulsion and Power - Matteo Pini 2021-02-12

This book contains a collection of the main contributions from the third edition of the NICFD conference, organized by the Special Interest Group on Non-Ideal Compressible Fluid Dynamics (SIG-49). It provides insight on the latest research findings in the field of NICFD that are relevant to a number of engineering applications related to the conversion of renewable and waste energy sources, like organic Rankine cycles, supercritical CO2 cycle power plants, combustors operating with supercritical fluids, and heat pumps. The various chapters of the book document research encompassing theoretical, computational, and experimental aspects of the gas dynamics of non-ideal reactive and non-reactive flows and their impact for the design of internal flow components (turbomachinery, heat exchangers, combustors). Since the accurate calculation of fluid thermo-physical properties is of great concern in NICFD, all the chapters address this problem by describing state-of-the-art models for the characterization of the properties of pure fluids and mixtures.

Fluid Dynamics and Heat Transfer of Turbomachinery - Budugur Lakshminarayana 1995-12-15

Over the past three decades, information in the aerospace and mechanical engineering fields in general and turbomachinery in particular has grown at an exponential rate.

Fluid Dynamics and Heat Transfer of Turbomachinery is the first book, in one complete volume, to bring together the modern approaches and advances in the field, providing the most up-to-date, unified treatment available on basic principles, physical aspects of the aerothermal field, analysis, performance, theory, and computation of turbomachinery flow and heat transfer. Presenting a unified approach to turbomachinery fluid dynamics and aerothermodynamics, the book concentrates on the fluid dynamic aspects of flows and thermodynamic considerations rather than on those related to materials, structure, or mechanical aspects. It covers the latest material and all types of turbomachinery used in modern-day aircraft, automotive, marine, spacecraft, power, and industrial applications; and there is an entire chapter devoted to modern approaches on computation of turbomachinery flow. An additional chapter on turbine cooling and heat transfer is unique for a turbomachinery book. The author has undertaken a systematic approach, through more than three hundred illustrations, in developing the knowledge base. He uses analysis and data correlation in his discussion of most recent developments in this area, drawn from over nine hundred references and from research projects carried out by various organizations in the United States and abroad. This book is extremely useful for anyone involved in the analysis, design, and testing of turbomachinery. For students, it can be used as a two-semester course of senior undergraduate or graduate study: the first semester dealing with the basic principles and analysis of turbomachinery, the second exploring three-dimensional viscid flows, computation, and

heat transfer. Many sections are quite general and applicable to other areas in fluid dynamics and heat transfer. The book can also be used as a self-study guide to those who want to acquire this knowledge. The ordered, meticulous, and unified approach of Fluid Dynamics and Heat Transfer of Turbomachinery should make the specialization of turbomachinery in aerospace and mechanical engineering much more accessible to students and professionals alike, in universities, industry, and government. Turbomachinery theory, performance, and analysis made accessible with a new, unified approach For the first time in nearly three decades, here is a completely up-to-date and unified approach to turbomachinery fluid dynamics and aerothermodynamics. Combining the latest advances, methods, and approaches in the field, Fluid Dynamics and Heat Transfer of Turbomachinery features: The most comprehensive and complete coverage of the fluid dynamics and aerothermodynamics of turbomachinery to date A spotlight on the fluid dynamic aspects of flows and the thermodynamic considerations for turbomachinery (rather than the structural or material aspects) A detailed, step-by-step presentation of the analytical and computational models involved, which allows the reader to easily construct a flowchart from which to operate Critical reviews of all the existing analytical and numerical models, highlighting the advantages and drawbacks of each Comprehensive coverage of turbine cooling and heat transfer, a unique feature for a book on turbomachinery An appendix of basic computation techniques, numerous tables, and listings of common terminology, abbreviations, and nomenclature Broad in

scope, yet concise, and drawing on the author's teaching experience and research projects for government and industry, Fluid Dynamics and Heat Transfer of Turbomachinery explains and simplifies an increasingly complex field. It is an invaluable resource for undergraduate and graduate students in aerospace and mechanical engineering specializing in turbomachinery, for research and design engineers, and for all professionals who are—or wish to be—at the cutting edge of this technology.

Gas Dynamics And Space Propulsion - M. C. Ramaswamy 2007-01-01

Gas dynamics and space propulsion has become a core subject for students of mechanical engineering in many universities. Gas dynamics forms the basis for the study of aerodynamics. This book covers the basics of compressible fluid flow with fluid mechanics, thermodynamics and heat transfer principles. It discusses in detail gas dynamics under different flow conditions with and without heat transfer and friction.The subject has been made simple and easy to understand with practical applications, figures and graphs. Students studying the subject at the undergraduate level and also teachers will find this book to be a guide and good reference.

Turbomachinery Fluid Dynamics and Heat Transfer - Hah 2017-10-02

This festschrift in honor of Professor Budugur Lakshminarayana's 60th birthday-based on the proceedings of a symposium on Turbomachinery Fluid Dynamics and Heat Transfer held recently at The Pennsylvania State University, University Park-provides authoritative and conclusive research results as well as new insights into complex flow features found in the turbomachinery used for propulsion, power, and industrial

applications. Explaining in detail compressors, heat transfer fields in turbines, computational fluid dynamics, and unsteady flows, Turbomachinery Fluid Dynamics and Heat Transfer covers: Mixing mechanisms, annulus wall boundary layers, and the flow field in transonic turbocompressors The numerical implementation of turbulence models in a computer code Secondary flows, film cooling, and thermal turbulence modeling The visualization method of modeling using liquid crystals Innovative techniques in the computational modeling of compressor and turbine flows measurement in unsteady flows as well as axial flows and compressor noise generation And much more Generously illustrated and containing key bibliographic citations, Turbomachinery Fluid Dynamics and Heat Transfer is an indispensable resource for mechanical, design, aerospace, marine, manufacturing, materials, industrial, and reliability engineers; and upper-level undergraduate and graduate students in these disciplines.

Gas Dynamics of Diffusers and Exhaust Ducts of Turbomachines - M. Ye Deych 1970

The Aerothermodynamics of Aircraft Gas Turbine Engines - Gordon C. Oates 1978

On the Gas Dynamics of a Rotating Impeller - Adolf Busemann 1956
Abstract: It is shown that for a compressible flow with constant entropy the pressure rise maintains the direct relation to the circulation around the blades existing for incompressible flow. In contrast, however, the torque, and with it the power consumption, is increased because of sound waves traveling to infinity already at subsonic circumferential speeds.

Fluid Mechanics and Turbomachinery - Bijay K Sultanian 2021-07-21

Reflecting the author's years of industry and teaching experience, Fluid Mechanics and Turbomachinery features many innovative problems and their systematically worked solutions. To understand fundamental concepts and various conservation laws of fluid mechanics is one thing, but applying them to solve practical problems is another challenge. The book covers various topics in fluid mechanics, turbomachinery flowpath design, and internal cooling and sealing flows around rotors and stators of gas turbines. As an ideal source of numerous practice problems with detailed solutions, the book will be helpful to senior-undergraduate and graduate students, teaching faculty, and researchers engaged in many branches of fluid mechanics. It will also help practicing thermal and fluid design engineers maintain and reinforce their problem-solving skills, including primary validation of their physics-based design tools.

Handbook of Turbomachinery - Earl Logan, Jr. 2003-05-01

Building on the success of its predecessor, Handbook of Turbomachinery, Second Edition presents new material on advances in fluid mechanics of turbomachinery, high-speed, rotating, and transient experiments, cooling challenges for constantly increasing gas temperatures, advanced experimental heat transfer and cooling effectiveness techniques, and propagation of wake and pressure disturbances. Completely revised and updated, it offers updated chapters on compressor design, rotor dynamics, and hydraulic turbines and features six new chapters on topics such as aerodynamic instability, flutter prediction, blade modeling in steam turbines, multidisciplinary design optimization.

Fluid Machinery - Terry

Wright 2009-12-16 Published nearly a decade ago, Fluid Machinery: Performance, Analysis, and Design quickly became popular with students, professors, and professionals because of its comprehensive and comprehensible introduction to the fluid mechanics of turbomachinery. Renamed to reflect its wider scope and reorganized content, this second edition provides a more logical flow of information that will enhance understanding. In particular, it presents a consistent notation within and across chapters, updating material when appropriate. Although the authors do account for the astounding growth in the field of computational fluid dynamics that has occurred since publication of the first edition, this text emphasizes traditional "one-dimensional" layout and points the way toward using CFD for turbomachinery design and analysis. Presents Extensive Examples and Design Exercises to Illustrate Performance Parameters and Machine Geometry By focusing on the preliminary design and selection of equipment to meet performance specifications, the authors promote a basic yet thorough understanding of the subject. They cover topics including gas and hydraulic turbines and equipment that is widely used in the industry, such as compressors, blowers, fans, and pumps. This book promotes a pragmatic approach to turbomachinery application and design, examining a realistic array of difficulties and conflicting requirements. The authors use examples from a broad range of industrial applications to illustrate the generality of the basic design approach and the common ground of seemingly diverse areas of application. With a variety of

illustrations, examples, and exercises that emphasize real-world industrial applications, this book not only prepares students to face industrial applications with confidence, but also supplies professionals with a compact and easy-to-use reference.

Turbomachinery Fluid Dynamics and Heat Transfer - Hah 2017-10-02

This festschrift in honor of Professor Budugur Lakshminarayana's 60th birthday-based on the proceedings of a symposium on Turbomachinery Fluid Dynamics and Heat Transfer held recently at The Pennsylvania State University, University Park-provides authoritative and conclusive research results as well as new insights into complex flow features found in the turbomachinery used for propulsion, power, and industrial applications. Explaining in detail compressors, heat transfer fields in turbines, computational fluid dynamics, and unsteady flows, Turbomachinery Fluid Dynamics and Heat Transfer covers: Mixing mechanisms, annulus wall boundary layers, and the flow field in transonic turbocompressors The numerical implementation of turbulence models in a computer code Secondary flows, film cooling, and thermal turbulence modeling The visualization method of modeling using liquid crystals Innovative techniques in the computational modeling of compressor and turbine flows measurement in unsteady flows as well as axial flows and compressor noise generation And much more Generously illustrated and containing key bibliographic citations, Turbomachinery Fluid Dynamics and Heat Transfer is an indispensable resource for mechanical, design, aerospace, marine, manufacturing, materials, industrial, and reliability

engineers; and upper-level undergraduate and graduate students in these disciplines.
The Aerothermodynamics of Aircraft Gas Turbine Engines - Gordon C. Oates 1978

Turbo-Machinery Dynamics - A. S. Rangwala 2005-05-05
This comprehensive text details the design, development, and operation of turbo-machinery. Starting with the fundamentals of thermodynamics and advancing to the latest trends in the development and production of turbo-machines, the author provides in-depth methods for analyzing new design procedures and maximizing their structural integrity and operating efficiency.
Applied Gas Dynamics - Ethirajan Rathakrishnan 2019-02-25
A revised edition to applied gas dynamics with exclusive coverage on jets and additional sets of problems and examples The revised and updated second edition of Applied Gas Dynamics offers an authoritative guide to the science of gas dynamics. Written by a noted expert on the topic, the text contains a comprehensive review of the topic; from a definition of the subject, to the three essential processes of this science: the isentropic process, shock and expansion process, and Fanno and Rayleigh flows. In this revised edition, there are additional worked examples that highlight many concepts, including moving shocks, and a section on critical Mach number is included that helps to illuminate the concept. The second edition also contains new exercise problems with the answers added. In addition, the information on ram jets is expanded with helpful worked examples. It explores the entire spectrum of the ram jet theory and includes a set of exercise problems to aid in the understanding of the theory presented. This important text: Includes

a wealth of new solved examples that describe the features involved in the design of gas dynamic devices Contains a chapter on jets; this is the first textbook material available on high-speed jets Offers comprehensive and simultaneous coverage of both the theory and application Includes additional information designed to help with an understanding of the material covered Written for graduate students and advanced undergraduates in aerospace engineering and mechanical engineering, Applied Gas Dynamics, Second Edition expands on the original edition to include not only the basic information on the science of gas dynamics but also contains information on high-speed jets.

The Design of High-Efficiency Turbomachinery and Gas Turbines, second edition, with a new preface - David Gordon Wilson 2014-09-12

The second edition of a comprehensive textbook that introduces turbomachinery and gas turbines through design methods and examples. This comprehensive textbook is unique in its design-focused approach to turbomachinery and gas turbines. It offers students and practicing engineers methods for configuring these machines to perform with the highest possible efficiency. Examples and problems are based on the actual design of turbomachinery and turbines. After an introductory chapter that outlines the goals of the book and provides definitions of terms and parts, the book offers a brief review of the basic principles of thermodynamics and efficiency definitions. The rest of the book is devoted to the analysis and design of real turbomachinery configurations and gas turbines, based on a consistent application of thermodynamic theory and a more empirical treatment of fluid

dynamics that relies on the extensive use of design charts. Topics include turbine power cycles, diffusion and diffusers, the analysis and design of three-dimensional free-stream flow, and combustion systems and combustion calculations. The second edition updates every chapter, adding material on subjects that include flow correlations, energy transfer in turbomachines, and three-dimensional design. A solutions manual is available for instructors. This new MIT Press edition makes a popular text available again, with corrections and some updates, to a wide audience of students, professors, and professionals.

Fluid Mechanics and Thermodynamics of Turbomachinery - S. Larry Dixon 2005-03-30

The new edition will continue to be of use to engineers in industry and technological establishments, especially as brief reviews are included on many important aspects of Turbomachinery, giving pointers towards more advanced sources of information. For readers looking towards the wider reaches of the subject area, very useful additional reading is referenced in the bibliography. The subject of Turbomachinery is in continual review, and while the basics do not change, research can lead to refinements in popular methods, and new data can emerge. This book has applications for professionals and students in many subsets of the mechanical engineering discipline, with carryover into thermal sciences; which include fluid mechanics, combustion and heat transfer; dynamics and vibrations, as well as structural mechanics and materials engineering. An important, long overdue new chapter on Wind Turbines, with a focus on blade aerodynamics, with useful worked examples Includes important material on axial flow compressors and pumps

Example questions and answers throughout

Gas Dynamics of Diffusers and Exhaust Ducts of Turbomachines - 1972

Certain problems of the gas dynamics of diffusers and exhaust ducts for single positons of the boundary layer theory are given in the book. Methods of calculation, generalized experimental data and recommendations as to the choice of various parameters of diffusers are given. New effective designs of exhaust ducts, such as branck connections with cross-cut and elliptical diffusers are described. The book is intended for workers of design offices and research laboratories of turbine factories and also for students and post-graduate students.

Gas Dynamics - Mehmet Halûk Aksel 1994

Gas Dynamics covers all the material required for mainstream introductory courses in Advanced Fluid Mechanics, and Compressible Fluid Flow. In order to ensure complete understanding of the physical behaviour of compressible fluid flow and the principles underlying modern-day industrial experience and techniques, the authors begin with basic one-dimensional steady flow and progress to introductory two-dimensional flows and unsteady flows. Applications cover aerodynamics, turbomachinery, gas turbines and common engineering designs. Each chapter begins with basic principles, provides full derivation of results, explores the theory via worked problems and exercises (answers provided in a separate solutions manual), and has been extensively class-tested.

Fundamentals of Gas Dynamics - Robert D. Zucker 2002-08-22

Provides all necessary equations, tables, and charts as well as self tests. Included chapters cover reaction propulsion systems and

real gas effects. Written and organized in a manner that makes it accessible for self learning.

Logan's Turbomachinery - Bijay Sultanian 2019-01-15

Logan's Turbomachinery: Flowpath Design and Performance Fundamentals, Third Edition is the long-awaited revision of this classic textbook, thoroughly updated by Dr. Bijay Sultanian. While the basic concepts remain constant, turbomachinery design has advanced since the Second Edition was published in 1993. Airfoils in modern turbomachines feature three-dimensional geometries, Computational Fluid Mechanics (CFD) has become a standard design tool, and major advances have been made in the materials and manufacturing technologies that affect turbomachinery design. The new edition adresses these trends to best serve today's students, and design engineers working in turbomachinery industries.