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Levelized Cost of Energy in Sustainable Energy Communities Miguel de Simón-Martín 2022 The main aim of this book is to provide a state of the art of the Levelized Cost of Energy calculation for energy communities from both a theoretical, defining a systematic analysis approach, and a practical point of view, providing results for three representative real case studies. The book is structured in four clear chapters which cover everything from the fundamentals of power system configuration and the LCOE concept, to the definition of the aggregated system LCOE and its impact on electricity markets and energy policies. It presents case studies, within multiple examples for energy generation and storage, making it a brief but well-rounded review. The book will be useful for researchers and academics in energy economics, power systems and energy policies, for energy policy makers and students.

Heat Transfer Younes Shabany 2009-12-17 The continuing trend toward miniaturization and high power density electronics results in a growing interdependency between different fields of engineering. In particular, thermal management has become essential to the design and manufacturing of most electronic systems. *Heat Transfer: Thermal Management of Electronics* details how engineers can use intelligent thermal design to prevent heat-related failures, increase the life expectancy of the system, and reduce emitted noise, energy consumption, cost, and time to market. Appropriate thermal management can also create a significant market differentiation, compared to similar systems. Since there are more design flexibilities in the earlier stages of product design, it would be productive to keep the thermal design in mind as early as the concept and feasibility phase. The author first provides the basic knowledge necessary to understand and solve simple electronic cooling problems. He then delves into more detail about heat transfer fundamentals to give the reader a deeper understanding of the physics of heat transfer. Next, he describes experimental and numerical techniques and tools that are used in a typical thermal design process. The book concludes with a chapter on some advanced cooling methods. With its comprehensive coverage of thermal design, this book can help all engineers to develop the necessary expertise in thermal management of electronics and move a step closer to being a multidisciplinary engineer.

Scaling Chemical Processes Jonathan Worstell 2016-10-27 *Scaling Chemical Processes: Practical Guides in Chemical Engineering* is one of a series of short texts that each provides a focused introductory view on a single subject. The full library spans the main topics in the chemical process industries for engineering professionals who require a basic grounding in various related topics. They are 'pocket publications' that the professional engineer can easily carry with them or access electronically while working. Each text is highly practical and applied, and presents first principles for engineers who need to get up to speed in a new area fast. The focused facts provided in each guide will help you converse with experts in the field, attempt your own initial troubleshooting, check calculations, and solve rudimentary problems. This book discusses scaling chemical processes from a laboratory through a pilot plant to a commercial plant. It bases scaling on similarity principles and uses dimensional analysis to derive the dimensionless parameters necessary to ensure a successful chemical process development program. This series is fully endorsed and

co-branded by the IChemE, and they help to promote the series. Offers practical, short, concise information on the basics to help you get an answer or teach yourself a new topic quickly Includes industry examples to help you solve real world problems Provides key facts for professionals in convenient single subject volumes Discusses scaling chemical processes from a laboratory through a pilot plant to a commercial plant

Heat and Mass Transfer Yunus A. Çengel 2007 With complete coverage of the basic principles of heat transfer and a broad range of applications in a flexible format, "Heat and Mass Transfer: A Practical Approach" provides the perfect blend of fundamentals and applications. The text provides a highly intuitive and practical understanding of the material by emphasizing the physics and the underlying physical phenomena involved. Key: Text covers the standard topics of heat transfer with an emphasis on physics and real-world every day applications, while de-emphasizing the intimidating heavy mathematical aspects. This approach is designed to take advantage of students' intuition, making the learning process easier and more engaging. Key: The new edition will add helpful web-links for students. Key: 50% of the Homework Problems including design, computer, essay, lab-type, and FE problems are new or revised to this edition. Using a reader-friendly approach and a conversational writing style, the book is self-instructive and entertains while it teaches. It shows that highly technical matter can be communicated effectively in a simple yet precise language.

Careers in Focus: Alternative Energy, Third Edition Ferguson 2021-06-01 Ferguson's Careers in Focus books are a valuable career exploration tool for libraries and career centers. Written in an easy-to-understand yet informative style, this series surveys a wide array of commonly held jobs and is arranged into volumes organized by specific industries and interests. Each of these informative books is loaded with up-to-date career information presented in a featured industry article and a selection of detailed professions articles. The information here has been researched, vetted, and analyzed by Ferguson's editors, drawing from government and industry sources, professional groups, news reports, career and job-search resources, and a variety of other sources. For readers making career choices, these books offer a wealth of helpful information and resources. Each profession article includes: Quick Facts: a snapshot of important job facts Overview: briefly introduces duties and responsibilities History: describes the origins and history of the job The Job: describes primary and secondary goals and duties Earnings: discusses salary ranges and typical fringe benefits Work Environment: looks at typical work conditions and surroundings associated with the job Exploring: offers suggestions on how to gain experience and knowledge about—or even test drive—a career before making a commitment Education and Training Requirements: discusses required high school and post-secondary education and training Certification, Licensing, and Special Requirements: explains recommended and required certifications or prerequisites for the job Experience, Skills, and Personality Traits: summarizes the personal traits and skills and professional experience needed to get started and succeed Employer Prospects: gives an overview of typical places of employment and the best ways to land a job Advancement Prospects: presents an expected career path and how to travel it Outlook: summarizes the job's potential growth or decline in terms of the general economy and industry projections Unions and Associations: lists essential and helpful professional groups Tips for Entry: additional tips for preparing for a career and getting a foot in the door For More Information: lists organizations that provide career information, networking, and professional development Sidebars: short features showcasing stats, trivia, and insight about a profession or industry Careers in Focus: Alternative Energy, Third Edition covers 37 jobs, including: Bioenergy/Biofuels Workers Biofuels/Biodiesel Technology and Product Development Managers Biofuels Processing Technicians Biofuels Production Managers Biomass Plant Technicians Biomass Power Plant Managers Energy Brokers Energy Conservation Technicians Environmental Engineers Environmental Lobbyists Environmental Planners Environmental Scientists Environmental Technicians Fuel Cell Engineers Fuel Cell Technicians Fuel Cell Technology Workers Futurists Geotechnical Engineers Geothermal Energy Industry Workers Geothermal Production Managers Geothermal Technicians Green Builders Green Transportation Careers Hydroelectric Plant Technicians Hydroelectric Production Managers Hydropower and Marine Energy Industry Workers Renewable Energy Careers Renewable Energy Engineers Solar Energy Industry

Workers Solar Engineers Wind Energy Industry Workers

***Introduction to Thermodynamics and Heat Transfer + EES Software* Yunus A. Cengel, Dr. 2007-09-12**

Introduction to Thermodynamics and Heat Transfer provides balanced coverage of the basic concepts of thermodynamics and heat transfer. Together with the clear and numerous illustrations, student-friendly writing style, and manageable math, this is an ideal text for an introductory thermal science course for non-mechanical engineering majors. Continuing in the tradition of Cengel/Boles: Thermodynamics, this lavishly illustrated text presents the key topics in thermodynamics and heat transfer, in a highly accessible student-friendly fashion. The flexibly organized text can accommodate courses that spend anywhere from 1/3rd to 2/3rds or more of class time on thermodynamics and the rest on key heat transfer topics. The intuitive approach is supported by a wealth of physical explanations and analogies that draw parallels between the subject and the students' everyday experiences. Many of the 150 thoroughly worked out examples and almost 2,000 real-world problems, highlight applications from civil and electrical engineering. Over 1,000 illustrations help students visualize concepts. This approach and contents make this text an ideal resource for introduction to thermodynamics and/or thermal science courses intended for non-mechanical engineering majors.

Finite Element Analysis of Composite Materials using Abaqus™ Ever J. Barbero 2013-04-18 Developed from the author's graduate-level course on advanced mechanics of composite materials, **Finite Element Analysis of Composite Materials with Abaqus** shows how powerful finite element tools address practical problems in the structural analysis of composites. Unlike other texts, this one takes the theory to a hands-on level by actually solving

Fundamentals of Thermal-fluid Sciences Yunus A. Çengel 2008 The authors present coverage of the three major subject areas comprising thermal-fluid engineering: thermodynamics, fluid mechanics and heat transfer. By emphasizing the underlying physical phenomena involved, they encourage both creative thinking and development of a deeper understanding of the subject.

Intelligent Computer Based Engineering Thermodynamics and Cycle Analysis Chih Wu 2002 This book and the accompanying computer software are intended to enhance and streamline the study of the field of thermodynamics. The package is design and problem-solving oriented. Released from the drain of repetitive and iterative hand calculation, students can be led to a far wider and deeper study than has been possible previously.

Understanding the World Around Through Simple Mathematics M. Kemal Atesmen 2011 This book uses different mathematical tools that we learned in high school and in college to solve in detail one hundred everyday problems from credit card interest, basal metabolic rate to earthquake magnitude.

EBOOK: Fluid Mechanics Fundamentals and Applications (SI units) Yunus Cengel 2013-10-16 **Fluid Mechanics: Fundamentals and Applications** is written for the first fluid mechanics course for undergraduate engineering students, with sufficient material for a two-course sequence. This Third Edition in SI Units has the same objectives and goals as previous editions: **Communicates directly with tomorrow's engineers in a simple yet precise manner** Covers the basic principles and equations of fluid mechanics in the context of numerous and diverse real-world engineering examples and applications **Helps students develop an intuitive understanding of fluid mechanics by emphasizing the physical underpinning of processes and by utilizing numerous informative figures, photographs, and other visual aids to reinforce the basic concepts** Encourages creative thinking, interest and enthusiasm for fluid mechanics **New to this edition** All figures and photographs are enhanced by a full color treatment. **New photographs for conveying practical real-life applications of materials have been added throughout the book.** **New Application Spotlights** have been added to the end of selected chapters to introduce industrial applications and exciting research projects being conducted by leaders in the field about material presented in the chapter. **New sections on Biofluids** have been added to Chapters 8 and 9. **Addition of Fundamentals of Engineering (FE) exam-type problems** to help students prepare for Professional Engineering exams.

Sustainable Utility Systems Petar Sabev Varbanov 2020-12-07 This book provides a thorough guidance on maximizing the performance of utility systems in terms of sustainability. It covers general structure, typical components and efficiency trends, and applications such as top-level analysis for steam pricing and

selection of processes for improved heat integration. Examples are provided to illustrate the discussed models and methods to give sufficient learning experience for the reader.

International Conference on Industrial Engineering and Management Science-2013 Dr. X. Chen, 2013-10-16 ICIEMS 2013 is to provide a platform for researchers, engineers, academicians as well as industrial professionals from all over the world to present their research results and development activities in Industrial Engineering and Management Science. This conference provides opportunities for the delegates to exchange new ideas and experiences face to face, to establish business or research relations and to find global partners for future collaboration.

Fuels, Energy, and the Environment Ghazi A. Karim 2016-04-19 The need for cleaner, sustainable energy continues to drive engineering research, development, and capital projects. Recent advances in combustion science and technology, including sophisticated diagnostic and control equipment, have enabled engineers to improve fuel processes and systems and reduce the damaging effects of fuels on the environment.

Paths to Sustainable Energy Artie Ng 2010-12-30 The world's reliance on existing sources of energy and their associated detrimental impacts on the environment- whether related to poor air or water quality or scarcity, impacts on sensitive ecosystems and forests and land use - have been well documented and articulated over the last three decades. What is needed by the world is a set of credible energy solutions that would lead us to a balance between economic growth and a sustainable environment. This book provides an open platform to establish and share knowledge developed by scholars, scientists and engineers from all over the world about various viable paths to a future of sustainable energy. It has collected a number of intellectually stimulating articles that address issues ranging from public policy formulation to technological innovations for enhancing the development of sustainable energy systems. It will appeal to stakeholders seeking guidance to pursue the paths to sustainable energy.

Finite Element Analysis of Composite Materials Using ANSYS®, Second Edition Ever J. Barbero 2013-12-11 Designing structures using composite materials poses unique challenges, especially due to the need for concurrent design of both material and structure. Students are faced with two options: textbooks that teach the theory of advanced mechanics of composites, but lack computational examples of advanced analysis, and books on finite element analysis that may or may not demonstrate very limited applications to composites. But there is a third option that makes the other two obsolete: Ever J. Barbero's **Finite Element Analysis of Composite Materials Using ANSYS®, Second Edition**. The Only Finite Element Analysis Book on the Market Using ANSYS to Analyze Composite Materials. By layering detailed theoretical and conceptual discussions with fully developed examples, this text supplies the missing link between theory and implementation. In-depth discussions cover all of the major aspects of advanced analysis, including three-dimensional effects, viscoelasticity, edge effects, elastic instability, damage, and delamination. This second edition of the bestseller has been completely revised to incorporate advances in the state of the art in such areas as modeling of damage in composites. In addition, all 50+ worked examples have been updated to reflect the newest version of ANSYS. Including some use of MATLAB®, these examples demonstrate how to use the concepts to formulate and execute finite element analyses and how to interpret the results in engineering terms. Additionally, the source code for each example is available to students for download online via a companion website featuring a special area reserved for instructors. Plus a solutions manual is available for qualifying course adoptions. Cementing applied computational and analytical experience to a firm foundation of basic concepts and theory, **Finite Element Analysis of Composite Materials Using ANSYS, Second Edition** offers a modern, practical, and versatile classroom tool for today's engineering classroom.

Molecular Physical Chemistry for Engineering Applications Florin Emilian Daneş 2021-07-06 This textbook introduces the molecular side of physical chemistry. It offers students and practitioners a new approach to the subject by presenting numerous applications and solved problems that illustrate the concepts introduced for varied and complex technical situations. The book offers a balance between theory, tools, and practical applications. The text aims to be a practical manual for solving engineering problems in industries where processes depend on the chemical composition and physical properties of matter. The book is organized into three main topics: (I) the molecular structure of matter, (II) molecular models in

thermodynamics, and (III) transport phenomena and mechanisms. Part I presents methods of analysis of the molecular behavior in a given system, while the following parts use these methods to study the equilibrium states of a material system and to analyze the processes that can take place when the system is in a state of non-equilibrium, in particular the transport phenomena. **Molecular Physical Chemistry for Engineering Applications** is designed for upper-level undergraduate and graduate courses in physical chemistry for engineers, applied physical chemistry, transport phenomena, colloidal chemistry, and transport/transfer processes. The book will also be a valuable reference guide for engineers, technicians, and scientists working in industry. Offers modeling techniques and tools for solving exercises and practical cases; Provides solutions and conclusions so students can follow results more closely; Step-by-step problem solving enables students to understand how to approach complex issues.

Efficiency and Power in Energy Conversion and Storage Thomas Christen 2018-10-10 This book provides fundamental theoretical concepts for the understanding, the modelling, and the optimisation of energy conversion and storage devices. The discussion is based on the general footing of efficiency-power relations and energy-power relations (Ragone plots). **Efficiency and Power in Energy Conversion and Storage: Basic Physical Concepts**, is written for engineers and scientists with a bachelor-degree level of knowledge in physics. It contains: An introductory motivation of the topic A review on equilibrium thermodynamics A primer to linear non-equilibrium thermodynamics and irreversible processes An introduction to endoreversible thermodynamics The basics on the theory of Ragone plots Derivations of efficiency-power relations or Ragone plots for illustrative examples like heat engines, batteries, capacitors, kinetic energy storage devices, solar power, photodiodes, electro-motors, transformers, and flow turbines An excursion to impedance matching and the optimization of technical devices with respect to economic and related objectives

South Africa and the Global Hydrogen Economy The Mapungubwe Institute for Strategic Reflection 2014-07-01 South Africa and the Global Hydrogen Economy is the publication of a MISTRA research project on the use of strategic minerals in the global putative hydrogen economy. The book highlights the global significance of platinum group metals (PGM) and explores the strategic opportunities that arise out of South Africa's endowment of these strategic resources. From their extraction to their applications in fuel cells, what options are available for the country, the region and the world to better leverage this endowment towards supporting growth and development objectives? In view of their expanding range of applications, do PGM need the hydrogen economy? Conversely, does the hydrogen economy need PGM? Addressed to all industry stakeholders, including those in the public and private sectors, the options explored in this book are based on a thorough analysis of the global dynamics that should inform policy and business models related to PGM.

A Conceptual Guide to Thermodynamics Bill Poirier 2014-07-16 Thermodynamics is the science that describes the behavior of matter at the macroscopic scale, and how this arises from individual molecules. As such, it is a subject of profound practical and fundamental importance to many science and engineering fields. Despite extremely varied applications ranging from nanomotors to cosmology, the core concepts of thermodynamics such as equilibrium and entropy are the same across all disciplines. **A Conceptual Guide to Thermodynamics** serves as a concise, conceptual and practical supplement to the major thermodynamics textbooks used in various fields. Presenting clear explanations of the core concepts, the book aims to improve fundamental understanding of the material, as well as homework and exam performance. Distinctive features include: **Terminology and Notation Key:** A universal translator that addresses the myriad of conventions, terminologies, and notations found across the major thermodynamics texts. **Content Maps:** Specific references to each major thermodynamic text by section and page number for each new concept that is introduced. **Helpful Hints and Don't Try Its:** Numerous useful tips for solving problems, as well as warnings of common student pitfalls. **Unique Explanations:** Conceptually clear, mathematically fairly simple, yet also sufficiently precise and rigorous. A more extensive set of reference materials, including older and newer editions of the major textbooks, as well as a number of less commonly used titles, is available online at <http://www.conceptualthermo.com/> <http://www.conceptualthermo.com/a>. Undergraduate and

graduate students of chemistry, physics, engineering, geosciences and biological sciences will benefit from this book, as will students preparing for graduate school entrance exams and MCATs.

Electricity Markets Chris Harris 2006-05-18 Understand the electricity market, its policies and how they drive prices, emissions, and security, with this comprehensive cross-disciplinary book. Author Chris Harris includes technical and quantitative arguments so you can confidently construct pricing models based on the various fluctuations that occur. Whether you're a trader or an analyst, this book will enable you to make informed decisions about this volatile industry.

Nano and Bio Heat Transfer and Fluid Flow Majid Ghassemi 2017-03-15 **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

Thermodynamics Yunus A. Çengel 2018 Accompanying DVD-ROM contains the Limited Academic Version of EES (Engineering Equation Solver) software with scripted solutions to selected text problems.

Ballistics Donald E. Carlucci 2018-03-15 With new chapters, homework problems, case studies, figures, and examples, **Ballistics: Theory and Design of Guns and Ammunition, Third Edition** encourages superior design and innovative applications in the field of ballistics. It examines the analytical and computational tools for predicting a weapon's behavior in terms of pressure, stress, and velocity, demonstrating their applications in ammunition and weapons design. New coverage in the Third Edition includes gas-powered guns, and naval ordinance. With its thorough coverage of interior, exterior and terminal ballistics, this new edition continues to be the standard resource for those studying the technology of guns and ammunition.

Design and Optimization of Thermal Systems, Third Edition Yogesh Jaluria 2019-09-06 **Design and Optimization of Thermal Systems, Third Edition: with MATLAB® Applications** provides systematic and efficient approaches to the design of thermal systems, which are of interest in a wide range of applications. It presents basic concepts and procedures for conceptual design, problem formulation, modeling, simulation, design evaluation, achieving feasible design, and optimization. Emphasizing modeling and simulation, with experimentation for physical insight and model validation, the third edition covers the areas of material selection, manufacturability, economic aspects, sensitivity, genetic and gradient search methods, knowledge-based design methodology, uncertainty, and other aspects that arise in practical situations. This edition features many new and revised examples and problems from diverse application areas and more extensive coverage of analysis and simulation with MATLAB®.

Pressure Correction for Intermediate-pressure Steam Turbine Efficiency DeVon A. Washington 2004

Heat and Mass Transfer Sudheer Siddapureddy 2019-07-18 Heat transfer is the exchange of thermal energy between physical systems. ... The three fundamental modes of heat transfer are conduction, convection and radiation. Mass transfer is the net movement of mass from one location, usually meaning stream, phase, fraction or component, to another.

Introduction to Food Engineering R Paul Singh 2013-06-20 Long recognized as the bestselling textbook for teaching food engineering to food science students, this 5e transitions with today's students from traditional textbook learning to integrated presentation of the key concepts of food engineering. Using carefully selected examples, Singh and Heldman demonstrate the relationship of engineering to the chemistry, microbiology, nutrition and processing of foods in a uniquely practical blend. This approach facilitates comprehensive learning that has proven valuable beyond the classroom as a lifetime professional reference. New to this Edition: Communicates key concepts using audio, video, and animations Integrates

interactive tools to aid in understanding complex charts and graphs Features multimedia guide to setting up Excel spreadsheets and working with formulae Demonstrates key processes and engineering in practice through videos Shows the relationship of engineering to the chemistry, microbiology, nutrition and processing of foods via carefully selected examples Presents a practical, unique and challenging blend of principles and applications for comprehensive learning Ideal for classroom use, valuable as a lifetime professional reference

Nuclear Reactor Thermal Hydraulics Robert E. Masterson 2019-08-21 Nuclear Thermal-Hydraulic Systems provides a comprehensive approach to nuclear reactor thermal-hydraulics, reflecting the latest technologies, reactor designs, and safety considerations. The text makes extensive use of color images, internet links, computer graphics, and other innovative techniques to explore nuclear power plant design and operation. Key fluid mechanics, heat transfer, and nuclear engineering concepts are carefully explained, and supported with worked examples, tables, and graphics. Intended for use in one or two semester courses, the text is suitable for both undergraduate and graduate students. A complete Solutions Manual is available for professors adopting the text.

Proceedings of International Conference of Aerospace and Mechanical Engineering 2019 Parvathy Rajendran 2020-06-12 This book presents selected papers from the International Conference of Aerospace and Mechanical Engineering 2019 (AeroMech 2019), held at the Universiti Sains Malaysia's School of Aerospace Engineering. Sharing new innovations and discoveries concerning the Fourth Industrial Revolution (4IR), with a focus on 3D printing, big data analytics, Internet of Things, advanced human-machine interfaces, smart sensors and location detection technologies, it will appeal to mechanical and aerospace engineers.

Fluid Mechanics Fundamentals and Applications Yunus A. Cengel, Dr. 2013-01-30 Cengel and Cimbala's Fluid Mechanics Fundamentals and Applications, communicates directly with tomorrow's engineers in a simple yet precise manner. The text covers the basic principles and equations of fluid mechanics in the context of numerous and diverse real-world engineering examples. The text helps students develop an intuitive understanding of fluid mechanics by emphasizing the physics, using figures, numerous photographs and visual aids to reinforce the physics. The highly visual approach enhances the learning of Fluid mechanics by students. This text distinguishes itself from others by the way the material is presented - in a progressive order from simple to more difficult, building each chapter upon foundations laid down in previous chapters. In this way, even the traditionally challenging aspects of fluid mechanics can be learned effectively. McGraw-Hill's Connect, is also available as an optional, add on item. Connect is the only integrated learning system that empowers students by continuously adapting to deliver precisely what they need, when they need it, how they need it, so that class time is more effective. Connect allows the professor to assign homework, quizzes, and tests easily and automatically grades and records the scores of the student's work. Problems are randomized to prevent sharing of answers and may also have a "multi-step solution" which helps move the students' learning along if they experience difficulty.

Contact Modeling for Solids and Particles Alexander Popp 2018-05-19 The book conveys modern techniques and the latest state-of-the-art with regard to the most fundamental aspects of computational contact mechanics. However, since contact can readily be interpreted as a special type of interface problem, it seems advisable not to isolate contact mechanics, but rather to address it in the context of a broader class of problems denoted as computational interface mechanics. The book gives a clear understanding of the underlying physics of interfaces, and a comprehensive insight into the current state-of-the-art and selected cutting-edge research directions in the computational treatment of interface effects. It focuses on the modeling of friction, wear, lubrication, cohesive interfaces, grain boundaries, phase boundaries, fracture, thermo-mechanics and particulate contact (e.g. granular media). Also the most important computational aspects are addressed, including discretization techniques for finite deformations, solution algorithms for single- and multi-processor computing environments, multi-scale approaches, discrete element models and multi-physics problems including contact and interface constraints. Among the computational techniques covered in this book are finite element (FEM) and boundary element (BEM) methods, atomistic models, molecular dynamics (MD), discrete element methods (DEM), coupling approaches for multi-scale

simulations, and tools for an efficient automated FEM code generation.

Advanced Visual Interfaces. Supporting Big Data Applications Marco X. Bornschlegl 2016-12-15 This book constitutes the thoroughly refereed post-workshop proceedings of the AVI 2016 Workshop on Road Mapping Infrastructures for Advanced Visual Interfaces Supporting Big Data Applications in Virtual Research Environments, AVI-BDA 2016, held in Bari, Italy, in June 2016. The 10 revised full papers in this volume present the elaborated outcome of the initial position papers capturing the results of the roadmapping discussions in the workshop at which comments of several external reviewers for these full publications were also integrated.

Fundamentals of Thermal-Fluid Sciences Robert Turner 2016-03-04

Advances in Heat Transfer Unit Operations Georgina Calderon-Dominguez 2016-10-03 **Advances in Heat Transfer Unit Operations: Baking and Freezing in Bread Making** explains the latest understanding of heat transfer phenomena involved in the baking and freezing of bread and describes the most recent advanced techniques used to produce higher quality bread with a longer shelf life. Heat transfer phenomena occur during key bread-making stages (cold storage, resting, and fermentation) in which temperature and amount of heat transfer must be carefully controlled. This book combines the engineering and technological aspects of heat transfer operations and discusses how these operations interact with the bread making process; the book also discusses how baking and freezing influence the product quality. Divided into fourteen chapters, the book covers the basics of heat and mass transfer, fluid dynamics, and surface phenomena in bread-making industrial operations, mathematical modelling in porous systems, the estimation of thermo-physical properties related to bread making, design of equipment, and industrial applications.

Thermodynamics and Heat Powered Cycles Chih Wu 2007 Due to the rapid advances in computer technology, intelligent computer software and multimedia have become essential parts of engineering education. Software integration with various media such as graphics, sound, video and animation is providing efficient tools for teaching and learning. A modern textbook should contain both the basic theory and principles, along with an updated pedagogy. Often traditional engineering thermodynamics courses are devoted only to analysis, with the expectation that students will be introduced later to relevant design considerations and concepts. Cycle analysis is logically and traditionally the focus of applied thermodynamics. Type and quantity are constrained, however, by the computational efforts required. The ability for students to approach realistic complexity is limited. Even analyses based upon grossly simplified cycle models can be computationally taxing, with limited educational benefits. Computerised look-up tables reduce computational labour somewhat, but modelling cycles with many interactive loops can lie well outside the limits of student and faculty time budgets. The need for more design content in thermodynamics books is well documented by industry and educational oversight bodies such as ABET (Accreditation Board for Engineering and Technology). Today, thermodynamic systems and cycles are fertile ground for engineering design. For example, niches exist for innovative power generation systems due to deregulation, co-generation, unstable fuel costs and concern for global warming. Professor Kenneth Forbus of the computer science and education department at Northwestern University has developed ideal intelligent computer software for thermodynamic students called CyclePad. CyclePad is a cognitive engineering software. It creates a virtual laboratory where students can efficiently learn the concepts of thermodynamics, and allows systems to be analyzed and designed in a simulated, interactive computer aided design environment. The software guides students through a design process and is able to provide explanations for results and to coach students in improving designs. Like a professor or senior engineer, CyclePad knows the laws of thermodynamics and how to apply them. If the user makes an error in design, the program is able to remind the user of essential principles or design steps that may have been overlooked. If more help is needed, the program can provide a documented, case study that recounts how engineers have resolved similar problems in real life situations. CyclePad eliminates the tedium of learning to apply thermodynamics, and relates what the user sees on the computer screen to the design of actual systems. This integrated, engineering textbook is the result of fourteen semesters of CyclePad usage and evaluation of a course designed to exploit the power of the software, and to chart a path that truly

integrates the computer with education. The primary aim is to give students a thorough grounding in both the theory and practice of thermodynamics. The coverage is compact without sacrificing necessary theoretical rigor. Emphasis throughout is on the applications of the theory to actual processes and power cycles. This book will help educators in their effort to enhance education through the effective use of intelligent computer software and computer assisted course work.

Generalized van der Waals Theory of Molecular Fluids in Bulk and at Surfaces Sture Nordholm
2018-09-05 **Generalized van der Waals Theory of Molecular Fluids in Bulk and at Surfaces** presents successful research on the development of a new density theory of fluids that makes it possible to understand and predict a wide range of properties and phenomena. The book brings together recent advances relating to the Generalized van der Waals Theory and its use in fluid property calculations. The mathematics presentation is oriented to an audience of varying backgrounds, and readers will find exercises that can be used as a textbook for a course at the upper undergraduate or graduate level in physics or chemistry. In addition, it is ideal for scientists from other areas, such as geophysics, oceanography and molecular biology who are interested in learning about, and understanding, molecular fluids. Presents an approximate, but fully derived and physically explained, theory of molecular fluids to facilitate broad applications Derives a density functional theory of classical fluids and applies it to obtain equations of state, as well as non-uniform fluid properties, e.g., surface tension and adsorption Demonstrates how the theory can be applied to complex multi-center molecules forming a polymer fluid Provides user-friendly programs to redraw figures for variable parameters and to perform calculations in particular applications Includes a set of exercises to support use of the book in a course

Reliability Technology Norman Pascoe 2011-03-08 A unique book that describes the practical processes necessary to achieve failure free equipment performance, for quality and reliability engineers, design, manufacturing process and environmental test engineers. This book studies the essential requirements for successful product life cycle management. It identifies key contributors to failure in product life cycle management and particular emphasis is placed upon the importance of thorough Manufacturing Process Capability reviews for both in-house and outsourced manufacturing strategies. The readers' attention is also drawn to the many hazards to which a new product is exposed from the commencement of manufacture through to end of life disposal. Revolutionary in focus, as it describes how to achieve failure free performance rather than how to predict an acceptable performance failure rate (reliability technology rather than reliability engineering) Author has over 40 years experience in the field, and the text is based on classroom tested notes from the reliability technology course he taught at Massachusetts Institute of Technology (MIT), USA Contains graphical interpretations of mathematical models together with diagrams, tables of physical constants, case studies and unique worked examples

Heating and Cooling of Buildings T. Agami Reddy 2016-09-01 **Heating and Cooling of Buildings: Principles and Practice of Energy Efficient Design, Third Edition** is structured to provide a rigorous and comprehensive technical foundation and coverage to all the various elements inherent in the design of energy efficient and green buildings. Along with numerous new and revised examples, design case studies, and homework problems, the third edition includes the HCB software along with its extensive website material, which contains a wealth of data to support design analysis and planning. Based around current codes and standards, the Third Edition explores the latest technologies that are central to design and operation of today's buildings. It serves as an up-to-date technical resource for future designers, practitioners, and researchers wishing to acquire a firm scientific foundation for improving the design and performance of buildings and the comfort of their occupants. For engineering and architecture students in undergraduate/graduate classes, this comprehensive textbook:

Basics of Engineering Turbulence David Ting 2016-02-23 **Basics of Engineering Turbulence** introduces flow turbulence to engineers and engineering students who have a fluid dynamics background, but do not have advanced knowledge on the subject. It covers the basic characteristics of flow turbulence in terms of its many scales. The author uses a pedagogical approach to help readers better understand the fundamentals of turbulence scales, especially how they are derived through the order of magnitude analysis. This book is intended for those who have an interest in flowing fluids. It provides some

background, though of limited scope, on everyday flow turbulence, especially in engineering applications. The book begins with the 'basics' of turbulence which is necessary for any reader being introduced to the subject, followed by several examples of turbulence in engineering applications. This overall approach gives readers all they need to grasp both the fundamentals of turbulence and its applications in practical instances. Focuses on the basics of turbulence for applications in engineering and industrial settings Provides an understanding of concepts that are often challenging, such as energy distribution among the turbulent structures, the effective diffusivity, and the theory behind turbulence scales Offers a user-friendly approach with clear-and-concise explanations and illustrations, as well as end-of-chapter problems

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