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FUNDAMENTALS OF ENGINEERING THERMODYNAMICS International Conference on Industrial Engineering and Management Science-2013 Exergy Controlling Exposure to Diesel Emissions in Underground Mines An Expedition to Continuum Theory Advances in Smart Grid Automation and Industry 4.0 Progress in Clean Energy, Volume 1 Energy Sustainable Aviation Optimization of Energy Systems Exergy for A Better Environment and Improved Sustainability 1 Electrically Assisted Forming Efficiency and Sustainability in the Energy and Chemical Industries Process Design, Integration, and Intensification Thermodynamics of Heat Engines Transactions on Engineering Technologies Combined Cycle Driven Efficiency for Next Generation Nuclear Power Plants Progress in Exergy, Energy, and the Environment Advanced Power Generation Systems Sustainability Science and Technology Heat Transfer Proceedings of the 3rd International Gas Processing Symposium Hydrogen as a Future Energy Carrier Clean Energy Systems in the Subsurface: Production, Storage and Conversion Combustion for Power Generation and Transportation Water Resources of Mexico Complementary Resources for Tomorrow ECOS 2012 The 25th International Conference on Efficiency, Cost, Optimization and Simulation of Energy Conversion Systems and Processes (Perugia, June 26th-June 29th, 2012) Introduction to Food Engineering Computational Fluid Dynamics and Energy Modelling in Buildings Biomass as a Sustainable Energy Source for the Future Thermodynamics In Nuclear Power Plant Systems Progress in Clean Energy, Volume 2 Energy Management and Energy Efficiency in Industry Spons' Dictionary of Engineering, Civil, Mechanical, Military, and Naval; with Technical Terms in French, German, Italian, and Spanish Implementing Strategic Environmental Assessment Renewable Energy Integration with Building Energy Systems Engine Modeling and Simulation Energy Efficient Thermal Management of Data Centers Novel Internal Combustion Engine Technologies for Performance Improvement and Emission Reduction

International Conference on Industrial Engineering and Management Science-2013 Jan 31 2023 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.

Spons' Dictionary of Engineering, Civil, Mechanical, Military, and Naval; with Technical Terms in French, German, Italian, and Spanish Mar 28 2020

Renewable Energy Integration with Building Energy Systems Jan 25 2020 Construction as an industry sector is responsible for around one-third of the total world-wide energy usage, and about 20% of greenhouse gas emissions. The rise in number of buildings and floor space area for both residential and commercial purposes has imposed enormous pressure on existing sources of energy. Implementations like efficient usage of building energy systems, design measures, utilization of local energy resources, energy storage and renewable energy sources for meeting electricity demand are currently under development and deployment to improve the energy performance index. However, integrating all such measures and evaluation of developed nearly zero-energy and zero-emission buildings is yet to be explored. In this book, different control techniques together with intelligent building technology used to improve the energy performance of buildings have been illustrated. Every building energy control system has a two-fold objective for energy and comfort requirements to achieve a high comfort index (for thermal, visual, air quality, humidity and various plug loads) and to increase the energy performance index. The most significant aspect of the design of buildings' energy control system is modelling. All the components, methodologies and processes involved in developing a renewable energy-driven building are covered in detail. This book is intended for graduates and professionals working towards the development of sustainable built environment using renewable energy sources.

Heat Transfer Jun 11 2021 Thermal energy is present in all aspects of our lives, including when cooking, driving, or turning on the heat or air conditioning. Sometimes this thermal management is not evident, but it is essential for our comfort and lifestyle. In addition, heat transfer is vital in many industrial processes. Thermal energy analysis is a complex task that usually requires different approaches. With five sections, this book provides information on heat transfer problems and using experimental techniques and computational models to analyse them.

Energy Jul 25 2022 This revised and updated 3rd edition of the book allows readers to develop a practical understanding of the major aspects of energy. It also includes two new chapters addressing renewable energy, and energy management and economics. The book begins by introducing basic definitions, and then moves on to discuss the primary and secondary energy types, internal energy and enthalpy, and energy balance, heat of reaction and heat transfer. Each chapter features fully solved example problems and practice problems to support learning and the application of the topics discussed, including: energy production and conversion; energy conservation; energy storage; energy coupling; sustainability in energy systems; renewable energy; and energy management and economics. Written for students across a range of engineering and science disciplines, the book provides a comprehensive study guide. It is particularly suitable for courses in energy technology, sustainable energy technologies and energy conversion & management, and offers an ideal reference text for students, engineers, energy researchers and industry professionals. A updated solutions manual to this textbook's problems is available to course instructors on request from the author and online on www.springer.com.

Water Resources of Mexico Jan 07 2021 This comprehensive volume presents the topic of water resources of Mexico from a different angle. Besides covering the geohydrology it also offers a brief account of the ancient water resources works, explains from where the water is coming, how the water is being used in homes and in the industry, how the dams are operated in the hurricane season, some aspects of the water-energy-food securities nexus and the expectations for the future in connection with global climate change. The book is of interest to every one connected with the water resources of Mexico, e.g. federal and state employees of agencies related with water management, water supply and wastewater treatment. It is also of value to those in academia and employed at water related professional associations and the general public.

Novel Internal Combustion Engine Technologies for Performance Improvement and Emission Reduction Oct 23 2019 This monograph covers different aspects of internal combustion engines including engine performance and emissions and presents various solutions to resolve these issues. The contents provide examples of utilization of methanol as a fuel for CI engines in different modes of transportation, such as railroad, personal vehicles or heavy duty road transportation. The volume provides information about the current methanol utilization and its potential, its effect on the engine in terms of efficiency, combustion, performance, pollutants formation and prediction. The contents are also based on review of technologies present, the status of different combustion and emission control technologies and their suitability for different types of IC engines. Few novel technologies for spark ignition (SI) engines have been also included in this book, which makes this book a complete solution for both kind of engines. This book will be useful for engine researchers, energy experts and students involved in fuels, IC engines, engine instrumentation and environmental research.

Progress in Exergy, Energy, and the Environment Sep 14 2021 This thorough and highly relevant volume examines exergy, energy and the environment in the context of energy systems and applications and as a potential tool for design, analysis, optimization. It further considers their role in minimizing and/or eliminating environmental impacts and providing for sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered.

An Expedition to Continuum Theory Oct 28 2022 This book introduces field theory as required in solid and fluid mechanics as well as in electromagnetism. It includes the necessary applied mathematical framework of tensor algebra and tensor calculus, using an inductive approach particularly suited to beginners. It is geared toward undergraduate classes in continuum theory for engineers in general, and more specifically to courses in continuum mechanics.

Students will gain a sound basic understanding of the subject as well as the ability to solve engineering problems by applying the general laws of nature in terms of the balances for mass, momentum, and energy in combination with

material-specific relations in terms of constitutive equations, thus learning how to use the theory in practice for themselves. This is facilitated by numerous examples and problems provided throughout the text.

Combustion for Power Generation and Transportation Feb 05 2021 This research monograph presents both fundamental science and applied innovations on several key and emerging technologies involving fossil and alternate fuel utilization in power and transport sectors from renowned experts in the field. Some of the topics covered include: autoignition in laminar and turbulent nonpremixed flames; Langevin simulation of turbulent combustion; lean blowout (LBO) prediction through symbolic time series analysis; lasers and optical diagnostics for next generation IC engine development; exergy destruction study on small DI diesel engine; and gasoline direct injection. The book includes a chapter on carbon sequestration and optimization of enhanced oil and gas recovery. The contents of this book will be useful to researchers and professionals working on all aspects on combustion.

Sustainable Aviation Jun 23 2022 This expansive reference on the use of clean energy technologies in the aviation industry focuses on tools and solutions for maximizing the energy efficiency of aircrafts, airports, and other auxiliary components of air transit. Key topics range from predicting impacts of avionics and control systems to energy/exergy performance analyses of flight mechanics and computational fluid dynamics. The book includes findings both from experimental investigations and functional extant systems, ranging from propulsion technologies for aerospace vehicles to airport design to energy recovery systems. Engineers, researchers and students will benefit from the broad reach and numerous engineering examples provided.

Hydrogen as a Future Energy Carrier Apr 09 2021 This book fills the gap for concise but comprehensive literature on this interdisciplinary topic, involving chemical, physical, biological and engineering challenges. It provides broad coverage of the most important fields of modern hydrogen technology: hydrogen properties, production, storage, conversion to power, and applications in materials science. In so doing, the book covers all the pertinent materials classes: metal hydrides, inorganic porous solids, organic materials, and nanotubes. The authors present the entire view from fundamental research to viable devices and systems, including the latest scientific results and discoveries, practical approaches to design and engineering, as well as functioning prototypes and advanced systems.

Proceedings of the 3rd International Gas Processing Symposium May 11 2021 Natural gas continues to be the fuel of choice for power generation and feedstock for a range of petrochemical industries. This trend is driven by environmental, economic and supply considerations with a balance clearly tilting in favor of natural gas as both fuel and feedstock. Despite the recent global economic uncertainty, the oil and gas industry is expected to continue its growth globally, especially in emerging economies. The expansion in LNG capacity beyond 2011 and 2012 coupled with recently launched and on-stream GTL plants poses real technological and environmental challenges. These important developments coupled with a global concern on green house gas emissions provide a fresh impetus to engage in new and more focused research activities aimed at mitigating or resolving the challenges facing the industry. Academic researchers and plant engineers in the gas processing industry will benefit from the state of the art papers published in this collection that cover natural gas utilization, sustainability and excellence in gas processing.

Provides state-of-the-art contributions in the area of gas processing Covers solutions to technical and environmental problems Input from academia and industry

Progress in Clean Energy, Volume 1 Aug 26 2022 This expansive reference on clean energy technologies focuses on tools for system modelling and analysis, and their role in optimizing designs to achieve greater efficiency, minimize environmental impacts and support sustainable development. Key topics ranging from predicting impacts of on-grid energy storage to environmental impact assessments to advanced exergy analysis techniques are covered. The book includes findings both from experimental investigations and functional extant systems, ranging from microgrid to utility-scale implementations. Engineers, researchers and students will benefit from the broad reach and numerous engineering examples provided.

Sustainability Science and Technology Jul 13 2021 Sustainability Science and Technology: An Introduction explains the root causes of global failures in natural and human systems, as well as the most readily available technological solutions. The book dispels risky scientific and technological ideas that further complicate the current environmental and socioeconomic predicaments. It also bridges gaps among scientific and technological fields and systematically translates current findings for a wide technical and public audience. Written at a level accessible to all, the story is told one bite-sized chapter at a time, about the size of a scientific journal article. The chapters are self-contained, each grappling with a large topic. This provides more in-depth coverage of a topic than a standard encyclopedia article and promotes the widest possible dialog around sustainability issues and their solutions. Case studies from all continents and all technological development levels expound viable solutions for each of the planetary systems: water, soils, and atmosphere. In turn, the wider socioeconomic context of sustainable science and technology is examined. One of the first books to address the full scope of sustainability, it sets the stage for discussion and sustainability re(training) across professional divides. The editor and contributors take a balanced approach that is neither too technical nor too focused on any particular field. They highlight global and regional perspectives and the linkages between different planetary and human systems. The book helps you understand the thorny essence of sustainability issues—often fraught with ethical dilemmas, obsolete technologies, and lifestyle implications—and how to develop solutions to them.

Energy Management and Energy Efficiency in Industry Apr 29 2020 This book is presented to demonstrate how energy efficiency can be achieved in existing systems or in the design of a new system, as well as a guide for energy savings opportunities. Accordingly, the content of the book has been enriched with many examples applied in the industry. Thus, it is aimed to provide energy savings by successfully managing the energy in the readers' own businesses. The authors primarily present the necessary measurement techniques and measurement tools to be used for energy saving, as well as how to evaluate the methods that can be used for improvements in systems. The book also provides information on how to calculate the investments to be made for these necessary improvements and the payback periods. The book covers topics such as: • Reducing unit production costs by ensuring the reduction of energy costs, • Efficient and quality energy use, • Meeting market needs while maintaining competitive conditions, • Ensuring the protection of the environment by reducing CO₂ and CO emissions with energy saving and energy efficiency, • Ensuring the correct usage of systems by carrying out energy audits. In summary, this book explains how to effectively design energy systems and manage energy to increase energy savings. In addition, the study has been strengthened by giving some case studies and their results in the fields of intensive energy consumption in industry. This book is an ideal resource for practitioners, engineers, researchers, academics, employees and investors in the fields of energy, energy management, energy efficiency and energy saving.

Thermodynamics of Heat Engines Dec 18 2021 Optimizing the process of converting heat into mechanical power is a major challenge when it comes to meeting targets for protecting primary energy resources and minimizing our environmental impact. For many years to come, the use of thermal engines will continue to be necessary for transportation on land, by sea and by air, as well as for many industrial applications. Against this background, Thermodynamics of Heat Engines aims to present a comprehensive overview of the thermodynamic concepts, including combustion, that are necessary for understanding the phenomena governing the energy efficiency of internal and external combustion engines as well as that of gas turbines and jet propulsion engines. Existing and developing industrial applications, based on combined heat and power (CHP) or the use of staged cycles, are presented, with particular attention paid to the recovery of lowtemperature waste heat. This book, which is mainly intended for university and engineering students but is also useful for engineers and technicians working in the fields concerned, provides a basis for reflection on the optimization of energy systems.

Complementary Resources for Tomorrow Dec 06 2020 This book brings together the state-of-the-art in energy and resources research. It covers wind, solar, hydro and geothermal energy, as well as more conventional power generation technologies, such as internal combustion engines. Related areas of research such as the environmental sciences, carbon dioxide emissions, and energy storage are also addressed.

Biomass as a Sustainable Energy Source for the Future Aug 02 2020 Focusing on the conversion of biomass into gas or liquid fuels the book covers physical pre-treatment technologies, thermal, chemical and biochemical conversion technologies • Details the latest biomass characterization techniques • Explains the biochemical and thermochemical conversion processes • Discusses the development of integrated biorefineries, which are similar to petroleum refineries in concept, covering such topics as reactor configurations and downstream processing • Describes how to mitigate the environmental risks when using biomass as fuel • Includes many problems, small projects, sample calculations and industrial application examples

Exergy Dec 30 2022 This book deals with exergy and its applications to various energy systems and applications as a potential tool for design, analysis and optimization, and its role in minimizing and/or eliminating environmental impacts and providing sustainable development. In this regard, several key topics ranging from the basics of the thermodynamic concepts to advanced exergy analysis techniques in a wide range of applications are covered as outlined

in the contents. Offers comprehensive coverage of exergy and its applications, along with the most up-to-date information in the area with recent developments Connects exergy with three essential areas in terms of energy, environment and sustainable development Provides a number of illustrative examples, practical applications, and case studies Written in an easy-to-follow style, starting from the basics to advanced systems

Controlling Exposure to Diesel Emissions in Underground Mines Nov 28 2022 The use of diesel-powered equipment in underground mining operations provides many benefits to the industry. It also presents many challenges to the health and safety of workers as it is a significant source of submicrometer aerosols and noxious gases. This book was developed to assist the coal and metal/nonmetal underground mining industries in their efforts to reduce the exposure of workers to aerosols and gases from diesel-powered equipment. It includes information collected by researchers at the National Institute for Occupational Safety and Health/Office of Mine Safety and Health Research (NIOSH/OMSHR). Prior to the production of this text, the knowledge on this complex issue was fragmented. The goal of this volume is to make the information available in one easy-to-use reference. The book includes comprehensive, mine-specific programs for use by mechanics, mine ventilation engineers, industrial hygienists, mine managers, union health and safety representatives, and personnel responsible for the acquisition of diesel vehicles, engines, exhaust aftertreatment systems, fuels, and lubricants. The description of methods to reduce exposure to diesel aerosols includes curtailment of diesel particulate matter and gaseous emissions at their source, and controlling airborne pollutants with ventilation and personal protective equipment. This information should also help researchers in industry, government, and academia to identify areas that need to be addressed in future research and development efforts.

Transactions on Engineering Technologies Nov 16 2021 This volume contains fifty-one revised and extended research articles written by prominent researchers participating in the international conference on Advances in Engineering Technologies and Physical Science (London, UK, 2-4 July, 2014), under the World Congress on Engineering 2014 (WCE 2014). Topics covered include mechanical engineering, bioengineering, internet engineering, wireless networks, image engineering, manufacturing engineering and industrial applications. The book offers an overview of the tremendous advances made recently in engineering technologies and the physical sciences and their applications and also serves as an excellent reference for researchers and graduate students working in these fields.

Energy Efficient Thermal Management of Data Centers Nov 24 2019 Energy Efficient Thermal Management of Data Centers examines energy flow in today's data centers. Particular focus is given to the state-of-the-art thermal management and thermal design approaches now being implemented across the multiple length scales involved. The impact of future trends in information technology hardware, and emerging software paradigms such as cloud computing and virtualization, on thermal management are also addressed. The book explores computational and experimental characterization approaches for determining temperature and air flow patterns within data centers. Thermodynamic analyses using the second law to improve energy efficiency are introduced and used in proposing improvements in cooling methodologies. Reduced-order modeling and robust multi-objective design of next generation data centers are discussed.

Electrically Assisted Forming Mar 21 2022 Maximizing reader insights into the latest research findings and applications of Electrically-Assisted Forming (EAF) – whereby metals are formed under an electric current field – this book explains how such a process produces immediate improved formability of metals beyond the extent of thermal softening, and allows metals to be formed to greater elongation with lower mechanical energy as well as allowing for lightweight brittle metals such as magnesium and titanium to be formed without external heating or annealing, enabling the more effective use of these lightweight metals in design. Including case studies that illustrate and support the theoretical content and real-world applications of the techniques discussed, this book also serves to enrich readers understanding of the underlying theories that influence electro-plastic behaviour. The authors have extensive experience in studying Electrically-Assisted Forming and have written extensively with publications including experimental works, technical briefs, conference proceedings, journal articles, and analytical models.

FUNDAMENTALS OF ENGINEERING THERMODYNAMICS Mar 01 2023 Updated and enhanced with numerous worked-out examples and exercises, this Second Edition continues to present a thorough, concise and accurate discussion of fundamentals and principles of thermodynamics. It focuses on practical applications of theory and equips students with sound techniques for solving engineering problems. The treatment of the subject matter emphasizes the phenomena which are associated with the various thermodynamic processes. The topics covered are supported by an extensive set of example problems to enhance the student's understanding of the concepts introduced. The end-of-chapter problems serve to aid the learning process, and extend the material covered in the text by including problems characteristic of engineering design. The book is designed to serve as a text for undergraduate engineering students for a course in thermodynamics.

Engine Modeling and Simulation Dec 26 2019 This book focuses on the simulation and modeling of internal combustion engines. The contents include various aspects of diesel and gasoline engine modeling and simulation such as spray, combustion, ignition, in-cylinder phenomena, emissions, exhaust heat recovery. It also explored engine models and analysis of cylinder bore piston stresses and temperature effects. This book includes recent literature and focuses on current modeling and simulation trends for internal combustion engines. Readers will gain knowledge about engine process simulation and modeling, helpful for the development of efficient and emission-free engines. A few chapters highlight the review of state-of-the-art models for spray, combustion, and emissions, focusing on the theory, models, and their applications from an engine point of view. This volume would be of interest to professionals, post-graduate students involved in alternative fuels, IC engines, engine modeling and simulation, and environmental research.

Advances in Smart Grid Automation and Industry 4.0 Sep 26 2022 This book comprises select proceedings of the International Conference on Emerging Trends for Smart Grid Automation and Industry 4.0 (ICETSGAI4.0 2019). The contents discuss the recent trends in smart grid technology and related applications. The topics covered include data analytics for smart grid operation and control, integrated power generation technologies, green technologies as well as advances in microgrid operation and planning. The book highlights the enhancement in technology in the field of smart grids, and how IoT, big data, robotics and automation, artificial intelligence, and wide area measurement have become prerequisites for the fourth industrial revolution, also known as Industry 4.0. The book can be a valuable reference for researchers and professionals interested in smart grid automation incorporating features of Industry 4.0.

Process Design, Integration, and Intensification Jan 19 2022 With the growing emphasis on enhancing the sustainability and efficiency of industrial plants, process integration and intensification are gaining additional interest throughout the chemical engineering community. Some of the hallmarks of process integration and intensification include a holistic perspective in design, and the enhancement of material and energy intensity. The techniques are applicable for individual unit operations, multiple units, a whole industrial facility, or even a cluster of industrial plants. This book aims to cover recent advances in the development and application of process integration and intensification. Specific applications are reported for hydraulic fracturing, palm oil milling processes, desalination, reactive distillation, reaction network, adsorption processes, herbal medicine extraction, as well as process control.

Efficiency and Sustainability in the Energy and Chemical Industries Feb 17 2022 Using classic thermodynamic principles as the point of departure, this new edition of a popular resource supplies the understanding and tools required to measure process efficiency and sustainability with much improved accuracy. Exploring the driving forces in the chemical and power industries, Efficiency and Sustainability in the Energy and Chemic

Introduction to Food Engineering Oct 04 2020 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

Exergy for A Better Environment and Improved Sustainability 1 Apr 21 2022 This multi-disciplinary book presents the most recent advances in exergy, energy, and environmental issues. Volume 1 focuses on fundamentals in the field and covers current problems, future needs, and prospects in the area of energy and environment from researchers worldwide. Based on selected lectures from the Seventh International Exergy, Energy and Environmental Symposium

(IEEES7-2015) and complemented by further invited contributions, this comprehensive set of contributions promote the exchange of new ideas and techniques in energy conversion and conservation in order to exchange best practices in "energetic efficiency". Included are fundamental and historical coverage of the green transportation and sustainable mobility sectors, especially regarding the development of sustainable technologies for thermal comforts and green transportation vehicles. Furthermore, contributions on renewable and sustainable energy sources, strategies for energy production, and the carbon-free society constitute an important part of this book. Exergy for Better Environment and Sustainability, Volume 1 will appeal to researchers, students, and professionals within engineering and the renewable energy fields.

Thermodynamics In Nuclear Power Plant Systems Jul 01 2020 This book covers the fundamentals of thermodynamics required to understand electrical power generation systems, honing in on the application of these principles to nuclear reactor power systems. It includes all the necessary information regarding the fundamental laws to gain a complete understanding and apply them specifically to the challenges of operating nuclear plants. Beginning with definitions of thermodynamic variables such as temperature, pressure and specific volume, the book then explains the laws in detail, focusing on pivotal concepts such as enthalpy and entropy, irreversibility, availability, and Maxwell relations. Specific applications of the fundamentals to Brayton and Rankine cycles for power generation are considered in-depth, in support of the book's core goal- providing an examination of how the thermodynamic principles are applied to the design, operation and safety analysis of current and projected reactor systems. Detailed appendices cover metric and English system units and conversions, detailed steam and gas tables, heat transfer properties, and nuclear reactor system descriptions.

Optimization of Energy Systems May 23 2022 An essential resource for optimizing energy systems to enhance design capability, performance and sustainability Optimization of Energy Systems comprehensively describes the thermodynamic modelling, analysis and optimization of numerous types of energy systems in various applications. It provides a new understanding of the system and the process of defining proper objective functions for determination of the most suitable design parameters for achieving enhanced efficiency, cost effectiveness and sustainability. Beginning with a general summary of thermodynamics, optimization techniques and optimization methods for thermal components, the book goes on to describe how to determine the most appropriate design parameters for more complex energy systems using various optimization methods. The results of each chapter provide potential tools for design, analysis, performance improvement, and greenhouse gas emissions reduction. Key features: Comprehensive coverage of the modelling, analysis and optimization of many energy systems for a variety of applications. Examples, practical applications and case studies to put theory into practice. Study problems at the end of each chapter that foster critical thinking and skill development. Written in an easy-to-follow style, starting with simple systems and moving to advanced energy systems and their complexities. A unique resource for understanding cutting-edge research in the thermodynamic analysis and optimization of a wide range of energy systems, Optimization of Energy Systems is suitable for graduate and senior undergraduate students, researchers, engineers, practitioners, and scientists in the area of energy systems.

Computational Fluid Dynamics and Energy Modelling in Buildings Sep 02 2020 COMPUTATIONAL FLUID DYNAMICS AND ENERGY MODELLING IN BUILDINGS A Comprehensive Overview of the Fundamentals of Heat and Mass Transport Simulation and Energy Performance in Buildings In the first part of Computational Fluid Dynamics and Energy Modelling in Buildings: Fundamentals and Applications, the author explains the fundamentals of fluid mechanics, thermodynamics, and heat transfer, with a specific focus on their application in buildings. This background knowledge sets the scene to further model heat and mass transport in buildings, with explanations of commonly applied simplifications and assumptions. In the second part, the author elaborates how the fundamentals explained in part 1 can be used to model energy flow in buildings, which is the basis of all commercial and educational building energy simulation tools. An innovative illustrative nodal network concept is introduced to help readers comprehend the basics of conservation laws in buildings. The application of numerical techniques to form dynamic simulation tools are then introduced. In general, understanding these techniques will help readers to identify and justify their choices when working with building energy simulation tools, rather than using default settings. Detailed airflow information in buildings cannot be obtained in building energy simulation techniques. Therefore, part three is focused on introducing computational fluid dynamics (CFD) as a detailed modelling technique for airflow in buildings. This part starts with an introduction to the fundamentals of the finite volume method used to solve the governing fluid equations and the related challenges and considerations are discussed. The last chapter of this part covers the solutions to some practical problems of airflow within and around buildings. The key aspect of Computational Fluid Dynamics and Energy Modelling in Buildings: Fundamentals and Applications is that it is tailored for audiences without extensive past experience of numerical methods. Undergraduate or graduate students in architecture, urban planning, geography, architectural engineering, and other engineering fields, along with building performance and simulation professionals, can use this book to gain additional clarity on the topics of building energy simulation and computational fluid dynamics.

Clean Energy Systems in the Subsurface: Production, Storage and Conversion Mar 09 2021 Anthropogenic greenhouse gas emissions, energy security and sustainability are three of the greatest contemporary global challenges today. This year the Sino-German Cooperation Group "Underground Storage of CO₂ and Energy", is meeting on the 21-23 May 2013 for the second time in Goslar, Germany, to convene its 3rd Sino-German conference on the theme "Clean Energy Systems in the Subsurface: Production, Storage and Conversion". This volume is a collection of diverse quality scientific works from different perspectives elucidating on the current developments in CO₂ geologic sequestration research to reduce greenhouse emissions including measures to monitor surface leakage, groundwater quality and the integrity of caprock, while ensuring a sufficient supply of clean energy. The contributions herein have been structured into 6 major thematic research themes: Integrated Energy and Environmental Utilization of Geo-reservoirs: Law, Risk Management & Monitoring CO₂ for Enhanced Gas and Oil Recovery, Coal Bedded Methane and Geothermal Systems Trapping Mechanisms and Multi-Barrier Sealing Systems for Long-Term CO₂ Storage Coupled THMC-Processes and Numerical Modelling Rock Mechanical Behaviour Considering Cyclic Loading, Dilatancy, Damage, Self-sealing and Healing Underground Storage and Supply of Energy "Clean energy systems in the subsurface" will be invaluable to researchers, scientists and experts in both academia and industry trying to find a long lasting solution to the problems of global climate change, energy security and sustainability.

ECOS 2012 The 25th International Conference on Efficiency, Cost, Optimization and Simulation of Energy Conversion Systems and Processes (Perugia, June 26th-June 29th, 2012) Nov 04 2020 The 8-volume set contains the Proceedings of the 25th ECOS 2012 International Conference, Perugia, Italy, June 26th to June 29th, 2012. ECOS is an acronym for Efficiency, Cost, Optimization and Simulation (of energy conversion systems and processes), summarizing the topics covered in ECOS: Thermodynamics, Heat and Mass Transfer, Exergy and Second Law Analysis, Process Integration and Heat Exchanger Networks, Fluid Dynamics and Power Plant Components, Fuel Cells, Simulation of Energy Conversion Systems, Renewable Energies, Thermo-Economic Analysis and Optimisation, Combustion, Chemical Reactors, Carbon Capture and Sequestration, Building/Urban/Complex Energy Systems, Water Desalination and Use of Water Resources, Energy Systems- Environmental and Sustainability Issues, System Operation/ Control/Diagnosis and Prognosis, Industrial Ecology.

Advanced Power Generation Systems Aug 14 2021 Advanced Power Generation Systems examines the full range of advanced multiple output thermodynamic cycles that can enable more sustainable and efficient power production from traditional methods, as well as driving the significant gains available from renewable sources. These advanced cycles can harness the by-products of one power generation effort, such as electricity production, to simultaneously create additional energy outputs, such as heat or refrigeration. Gas turbine-based, and industrial waste heat recovery-based combined, cogeneration, and trigeneration cycles are considered in depth, along with Syngas combustion engines, hybrid SOFC/gas turbine engines, and other thermodynamically efficient and environmentally conscious generation technologies. The uses of solar power, biomass, hydrogen, and fuel cells in advanced power generation are considered, within both hybrid and dedicated systems. The detailed energy and exergy analysis of each type of system provided by globally recognized author Dr. Ibrahim Dincer will inform effective and efficient design choices, while emphasizing the pivotal role of new methodologies and models for performance assessment of existing systems. This unique resource gathers information from thermodynamics, fluid mechanics, heat transfer, and energy system design to provide a single-source guide to solving practical power engineering problems. The only complete source of info on the whole array of multiple output thermodynamic cycles, covering all the design options for environmentally-conscious combined production of electric power, heat, and refrigeration Offers crucial instruction on realizing more efficiency in traditional power generation systems, and on implementing renewable technologies, including solar, hydrogen, fuel cells, and biomass Each cycle description clarified through schematic diagrams, and linked to sustainable development scenarios through detailed energy, exergy, and efficiency analyses Case studies and examples demonstrate how novel systems and performance assessment methods function in practice

Progress in Clean Energy, Volume 2 May 30 2020 This expansive reference provides readers with the broadest available single-volume coverage of leading-edge advances in the development and optimization of clean energy

technologies. From innovative biofuel feed stocks and processing techniques, to novel solar materials with record-breaking efficiencies, remote-sensing for offshore wind turbines to breakthroughs in high performance PEM fuel cell electrode manufacturing, phase change materials in green buildings to bio sorption of pharmaceutical pollutants, the myriad exciting developments in green technology described in this book will provide inspiration and information to researchers, engineers and students working in sustainability around the world.

Combined Cycle Driven Efficiency for Next Generation Nuclear Power Plants Oct 16 2021 Introduces the concept of combined cycles for next generation nuclear power plants, explaining how recent advances in gas turbines have made these systems increasingly desirable for efficiency gains and cost-of-ownership reduction. Promulgates modelling and analysis techniques to identify opportunities for increased thermodynamic efficiency and decreased water usage over current Light Water Reactor (LWR) systems. Examines all power conversion aspects, from the fluid exiting the reactor to energy releases into the environment, with special focus on heat exchangers and turbo-machinery. Provides examples of small projects to facilitate nuanced understanding of the theories and implementation of combined-cycle nuclear plants. This book explores combined cycle driven efficiency of new nuclear power plants and describes how to model and analyze a nuclear heated multi-turbine power conversion system operating with atmospheric air as the working fluid. The included studies are intended to identify paths for future work on next generation nuclear power plants (GEN-IV), leveraging advances in natural-gas-fired turbines that enable coupling salt-cooled, helium-cooled, and sodium-cooled reactors to a Nuclear Air-Brayton Combined Cycle (NACC). These reactors provide the option of operating base-load nuclear plants with variable electricity output to the grid using natural gas or stored heat to produce peak power. The author describes overall system architecture, components and detailed modelling results of Brayton-Rankine Combined Cycle power conversion systems and Recuperated Brayton Cycle systems, since they offer the highest overall energy conversion efficiencies. With ever-higher temperatures predicted in GEN-IV plants, this book's investigation of potential avenues for thermodynamic efficiency gains will be of great interest to nuclear engineers and researchers, as well as power plant operators and students.

Implementing Strategic Environmental Assessment Feb 26 2020 This comprehensive Handbook describes the implementation of SEA in 18 countries around the world, as well as a critical analysis of different SEA methodologies. It introduces key SEA principles and the legal requirements of the new European SEA Directive, which became law in 2004, and describes the implementation of SEA in 11 European Union countries, as well as the USA, Canada and New Zealand. This is contrasted with SEA requirements of four developing countries.

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