Nuclear Engineering Handbook Kok

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KENDALL GRAHAM

Nuclear Reactor Technology Development and Utilization Nuclear Engineering Handbook

Fuel Cells: Principles, Design, and Analysis considers the latest advances in fuel cell system development and deployment, and was written with engineering and science students in mind. This book provides readers with the fundamentals of fuel cell operation and design, and incorporates techniques and methods designed to analyze different fuel cell *Handbook of Advanced Ceramics* Walter de Gruyter GmbH & Co KG
Fractional-Order Models for Nuclear Reactor Analysis presents fractional modeling issues in the context of anomalous diffusion processes in an accessible and practical way. The book emphasizes the importance of non-Fickian diffusion in heterogeneous systems as the core of the nuclear reactor, as well as different variations of diffusion processes in nuclear reactors which are presented to establish the importance of nuclear and thermohydraulic phenomena and the physical side effects of feedback. In addition, the book analyzes core issues in fractional modeling in nuclear reactors surrounding phenomenological description and important analytical sub-diffusive processes in the transport neutron. Users will find the most innovative modeling techniques of nuclear reactors using operator differentials of fractional order and applications in nuclear design and reactor dynamics. Proposed methods are tested with Boltzmann equations and non-linear order models alongside real data from nuclear power plants, making this a valuable resource for nuclear professionals, researchers and graduate students, as well as those working in nuclear research centers with expertise in mathematical modeling, physics and control. Presents and analyzes a new paradigm of nuclear reactor phenomena with fractional modeling Considers principles of fractional calculation, methods of solving differential equations of fractional order, and their applications Includes methodologies of linear and nonlinear analysis, along with design and dynamic analyses
Principles of Sustainable Energy Systems, Second Edition Woodhead Publishing
What role will biofuels play in the scientific portfolio that might bring energy independence and security, revitalize rural infrastructures, and wean us off of our addiction to oil? The shifting energy landscape of the 21st century, with its increased demand for renewable energy technology, poses a worrying challenge. Discussing the multidisciplin
Linear and Non-linear Stability Analysis in Boiling Water Reactors John Wiley & Sons
Nuclear chemistry represents a vital field of basic and applied research. Modern applications cover, for example, fundamental aspects of energetics and high-sensitive, high-selective and non-destructive analytical technologies. Nuclear chemistry and radiopharmaceutical chemistry are increasingly used to bridge pharmaceutical and medical research with state-of-the-art non-invasive molecular diagnosis as well as with patient-individual treatment. While volume I on Introduction to Nuclear Chemistrydescribes the origin of unstable atoms and their pathways to stabilize, this volume II illustrates the spectrum of modern applications of

nuclear and radiochemistry. In various chapters, leading scientists address -the measurement of radiation, -the dosimetric action of radioactive radiation and radiation safety -nuclear dating - elemental analysis by neutron activation, - radiation mass spectroscopy and chemicals speciation, - radiochemical separations, -applications of radiochemistry to life sciences, -the chemistry of radioelements: Tc and At, actinides and the transactinides - fundamentals of modern nuclear energy.

Principles of Sustainable Energy Systems, Third Edition Academic Press

The book considers the implications of the nuclear energy revival for global governance in the areas of safety, security and non-proliferation. Increased global warming, the energy demands of China, India and other emerging economic powerhouses and the problems facing traditional and alternative energy sources have lead many to suggest that there will soon be a nuclear energy 'renaissance'. This book examines comprehensively the drivers of and constraints on the revival, its nature and scope and the possibility that nuclear power will spread significantly beyond the countries which currently rely on it. Of special interest are developing countries which aspire to have nuclear energy and which currently lack the infrastructure, experience and regulatory structures to successfully manage such a major industrial enterprise. Of even greater interest are countries that may see in a nuclear energy program a 'hedging' strategy for a future nuclear weapons option. Following on from this assessment, the author examines the likely impact of various revival scenarios on the current global governance of nuclear energy, notably the treaties, international organizations, arrangements and practices designed to ensure that nuclear power is safe, secure and does not contribute to the proliferation of nuclear weapons. The book concludes with recommendations to the international community on how to strengthen global governance in order to manage the nuclear energy revival prudently. This book will be of much interest to students of energy security, global governance, security studies and IR in general.

Fuel Cells Woodhead Publishing

Uranium for Nuclear Power: Resources, Mining and Transformation to Fuel discusses the nuclear industry and its dependence on a steady supply of competitively priced uranium as a key factor in its long-term sustainability. A better understanding of uranium ore geology and advances in exploration and mining methods will facilitate the discovery and exploitation of new uranium deposits. The practice of efficient, safe, environmentally-benign exploration, mining and milling technologies, and effective site decommissioning and remediation are also fundamental to the public image of nuclear power. This book provides a comprehensive review of developments in these areas. Provides researchers in academia and industry with an authoritative overview of the front end of the nuclear fuel cycle Presents a comprehensive and systematic coverage of geology, mining, and conversion to fuel,

alternative fuel sources, and the environmental and social aspects Written by leading experts in the field of nuclear power, uranium mining, milling, and geological exploration who highlight the best practices needed to ensure environmental safety

Heating and Cooling of Buildings Woodhead Publishing

A transition from a fossil fuel–based economy to one that uses renewable energy has become inevitable; this transition will not only be an engineering challenge, but will also be an economic and environmental one. Offering an interdisciplinary, quantitative approach, Principles of Sustainable Energy presents a comprehensive overview of the major renewable energy technologies currently available, including biomass and biofuels, solar thermal conversion, photovoltaics, and wind energy conversion. Written by renowned expert Frank Kreith, the book emphasizes economics as well as energy return on investment analyses for each technology and integrates the need for energy conservation with the overall aspects of building a sustainable energy system with renewable sources. The author covers energy storage in depth, because it is considered one of the most important, and problematic, requirements for building a sustainable renewable energy system. Treatments of the economics of nuclear power and options for transportation systems are also included. The book contains worked-out example problems illustrating engineering analyses from a systems perspective and problem sets to reinforce concepts and applications. Examples and exercises relating to solar energy systems cover latitudes in the Northern and Southern Hemispheres and use current worldwide solar radiation data. But this text is not merely academic: its clearheaded look at the energy picture from the ground up, and the environmental, economic, and sustainability benefits that renewable energy systems can provide, make it a resource for government and industry as well as a text for engineering students.

Introduction to Nuclear Science CRC Press

This three-volume handbook contains a wealth of information on energy sources, energy generation and storage, fossil and renewable fuels as well as the associated processing technology. Fossil as well as renewable fuels, nuclear technology, power generation and storage technologies are treated side by side, providing a unique overview of the entire global energy industry. The result is an in-depth survey of industrial-scale energy technology. Your personal ULLMANN’S: A carefully selected “best of” compilation of topical articles brings the vast knowledge of the Ullmann’s encyclopedia to the desks of energy and process engineers Chemical and physical characteristics, production processes and production figures, main applications, toxicology and safety information are all found here in one single resource New or updated articles include classical topics such as coal technologies, oil and gas as well as cutting-edge technologies like biogas, thermoelectricty and solar technology 3 Volumes

Nuclear Engineering Handbook Woodhead Publishing

Pressurized Heavy Water

Reactors: CANDU, the seventh volume in the JSME Series on Thermal and Nuclear Power Generation series, provides a comprehensive and complete review of a single type of reactor in a very accessible and practical way. The book presents the full lifecycle, from design and manufacturing to operation and maintenance, also covering fitness-for-service and long-term operation. It does not relate to any specific vendor-based technology, but rather provides a broad overview of the latest technologies from a variety of active locations which will be of great value to countries invested in developing their own nuclear programs. Including contemporary capabilities and challenges of nuclear technology, the book offers practical solutions to common problems faced, along with the safe and approved processes to reach suitable solutions. Professionals involved in nuclear power plant lifecycle assessment and researchers interested in the development and improvement of nuclear energy technologies will gain a deep understanding of PHWR nuclear reactor physics, chemistry and thermal-hydraulic properties. Provides a complete reference dedicated to the latest research on Pressurized Heavy Water Reactors and their economic and environmental benefits Goes beyond CANDU reactors to analyze the popular German and Indian designs, as well as plant design in Korea, Romania, China and Argentina Spans all phases of the nuclear power plant lifecycle, from design, manufacturing, operation, maintenance and long-term operation

Three Mile Island, Chernobyl and Fukushima

CRC Press

Linear and Non-Linear Stability Analysis in Boiling Water Reactors: The Design of Real-Time Stability Monitors presents a thorough analysis of the most innovative BWR reactors and stability phenomena in one accessible resource. The book presents a summary of existing literature on BWRs to give early career engineers and researchers a solid background in the field, as well as the latest research on stability phenomena (propagation phenomena in BWRs), nuclear power monitors, and advanced computer systems used to for the prediction of stability. It also emphasizes the importance of BWR technology and embedded neutron monitoring systems (APRMs and LPRMs), and introduces non-linear stability parameters that can be used for the onset detection of instabilities in BWRs. Additionally, the book details the scope, advantages, and disadvantages of multiple advanced linear and non linear signal processing methods, and includes analytical case studies of existing plants. This combination makes Linear and Non-Linear Stability Analysis in Boiling Water Reactors a valuable resource for nuclear engineering students focusing on linear and non-linear analysis, as well as for those working and researching in a nuclear power capacity looking to implement stability methods and estimate decay ratios using non-linear techniques. Explores the nuclear stability of Boiling Water Reactors based on linear and non-linear models Evaluates linear signal processing

methods such as autoregressive models, Fourier-based methods, and wavelets to calculate decay ratios Proposes novel non-linear signal analysis techniques linked to non-linear stability indicators Includes case studies of various existing nuclear power plants as well as mathematical models and simulations *Essentials of Mechanical Stress Analysis* CRC Press For many transportation systems, the cost of expanding the infrastructure is too high. Therefore, the focus must shift to improving the quality of transportation within the existing infrastructure. The second edition of a bestseller, Intelligent Transport Systems: Smart and Green Infrastructure Design critically examines the successes and failures *Nuclear Energy and Global Governance* CRC Press
Exploring how to counteract the world's energy insecurity and environmental pollution, this volume covers the production methods, properties, storage, engine tests, system modification, transportation and distribution, economics, safety aspects, applications, and material compatibility of alternative fuels. The esteemed editor highlights the importance of moving toward alternative fuels and the problems and environmental impact of depending on petroleum products. Each self-contained chapter focuses on a particular fuel source, including vegetable oils, biodiesel, methanol, ethanol, dimethyl ether, liquefied petroleum gas, natural gas, hydrogen, electric, fuel cells, and fuel from nonfood crops. Weatherization and Energy Efficiency Improvement for Existing Homes Elsevier
Nuclear Reactor Technology Development and Utilization presents the theory and principles of the most common advanced nuclear reactor systems and provides a context for the value and utilization of nuclear power in a variety of applications both inside and outside a traditional nuclear setting. As countries across the globe realize their plans for a sustainable energy future, the need for innovative nuclear reactor design is increasing, and this book will provide a deep understanding of how these technologies can aid in a region’s goal for clean and reliable energy. Dr Khan and Dr Nakhabov, alongside their team of expert contributors, discuss a variety of important topics, including nuclear fuel cycles, plant decommissioning and hybrid energy systems, while considering a variety of diverse uses such as nuclear desalination, hydrogen generation and radioisotope production. Knowledge acquired enables the reader to conduct further research in academia and industry, and apply the latest design, development, integration, safety and economic guidance to their work and research. Combines reactor fundamentals with a contemporary look at evolving trends in the design of advanced reactors and their application to both nuclear and non-nuclear uses Analyses the latest research and uses of hybrid systems which bring together nuclear technology with renewable energy technologies Presents applications, economic factors and an analysis of sustainability factors in one comprehensive resource

Energy Conversion CRC Press
A major concern about the global expansion of nuclear power is the potential spread of nuclear fuel cycle technology -- particularly uranium enrichment and spent fuel reprocessing -- that could be used for nuclear weapons. Despite 30 years of effort to limit access to uranium enrichment, several undeterred states pursued clandestine nuclear programs. Contents of this report: (1) Intro.; (2) Worldwide Nuclear Power Status; Nuclear Fuel Services Market; Waste Disposal and Energy Security; (3) Assurance of Fuel Supply: Supplier Guarantees, Fuel Reserves, and Enrichment Services; Supply-Side approaches; (4) Comparison of Proposals; (5) Prospects for Implementing Fuel Assurance Mechanisms. This is a print on demand report.
Energy-Efficient Electrical Systems for Buildings CRC Press
Energy Efficiency in the Urban Environment is a study of energy crisis, urbanisation, and climate change, as well as a discussion of how to combat these global challenges. With a special focus on Egypt, this book addresses the macroscale of urbanism from the perspective of city dwellers' quality of life, and explores the microscale of buildings and the perspective of ensuring indoor air quality within the boundaries of energy efficiency. Offering an integrated view of energy systems and urban planning supported by extensive data, references, and case studies, this text: Examines the energy efficiency performance of cities following sustainable urbanism principles Investigates how informal areas in developing countries achieve sustainable development Presents energy-efficient urban planning as a tool for improving city energy performance Proposes the development of a common procedure for obtaining an energy performance certificate Calculates the energy performance of buildings, accounting for heating/cooling systems and other variables Energy Efficiency in the Urban Environment demonstrates the importance of implementing an energy performance directive to aid energy savings in large buildings and set regulations for energy-efficient designs based on standard calculation methods. This book provides engineers working with sustainable energy systems, urban planners needing information on energy systems and optimisation, and professors and students of engineering, environmental science, and urban planning with a valuable reference on energy sustainability.
Nuclear News CRC Press
Completely revised and updated, Principles of Sustainable Energy Systems, Second Edition presents broad-based coverage of sustainable energy sources and systems. The book is designed as a text for undergraduate seniors and first-year graduate students. It focuses on renewable energy technologies, but also treats current trends such as the expanding use of natural gas from fracking and development of nuclear power. It covers the economics of sustainable energy, both from a traditional monetary as well as from an energy return on energy invested (EROI) perspective. The book provides complete and up-to-date coverage of all

renewable technologies, including solar and wind power, biological processes such as anaerobic digestion and geothermal energy. The new edition also examines social issues such as food, water, population, global warming, and public policies of engineering concern. It discusses energy transition—the process by which renewable energy forms can effectively be introduced into existing energy systems to replace fossil fuels. See What's New in the Second Edition: Extended treatment of the energy and social issues related to sustainable energy Analytic models of all energy systems in the current and future economy Thoroughly updated chapters on biomass, wind, transportation, and all types of solar power Treatment of energy return on energy invested (EROI) as a tool for understanding the sustainability of different types of resource conversion and efficiency projects Introduction of the System Advisor Model (SAM) software program, available from National Renewable Energy Lab (NREL), with examples and homework problems Coverage of current issues in transition engineering providing analytic tools that can reduce the risk of unsustainable fossil resource use Updates to all chapters on renewable energy technology engineering, in particular the chapters dealing with transportation, passive design, energy storage, ocean energy, and bioconversion Written by Frank Kreith and Susan Krumdieck, this updated version of a successful textbook takes a balanced approach that looks not only at sustainable energy sources, but also provides examples of energy storage, industrial process heat, and modern transportation. The authors take an analytical systems approach to energy engineering, rather than the more general and descriptive approach usually found in textbooks on this topic.

Air Distribution in Buildings CRC Press Providing a proven set of energy efficiency measures and opportunities for saving energy and reducing operating costs for existing homes, this volume presents general tools and procedures for performing home weatherization such as insulation improvements as well as methods to reduce air leakage. The author describes several techniques and technologies that can reduce energy use or operating costs, including methods to retrofit existing homes to be net-zero energy buildings. Each chapter contains simplified calculation methods used to evaluate the effectiveness of various efficiency measures. The final chapter offers a series of case studies including examples of weatherized homes.

Design and Control of Automotive Propulsion Systems CRC Press NUCLEAR ENGINEERING FUNDAMENTALS is the most modern, up-to-date, and reader friendly nuclear engineering textbook on the market today. It provides a thoroughly modern alternative to classical nuclear engineering textbooks that have not been updated over the last 20 years. Printed in full color, it conveys a sense of awe and wonder to anyone interested in the field of nuclear energy. It discusses nuclear reactor design, nuclear fuel cycles, reactor thermal-hydraulics, reactor

operation, reactor safety, radiation detection and protection, and the interaction of radiation with matter. It presents an in-depth introduction to the science of nuclear power, nuclear energy production, the nuclear chain reaction, nuclear cross sections, radioactivity, and radiation transport. All major types of reactors are introduced and discussed, and the role of internet tools in their analysis and design is explored. Reactor safety and reactor containment systems are explored as well. To convey the evolution of nuclear science and engineering, historical figures and their contributions to evolution of the nuclear power industry are explored. Numerous examples are provided throughout the text, and are brought to life through life-like portraits, photographs, and colorful illustrations. The text follows a well-structured pedagogical approach, and provides a wide range of student learning features not available in other textbooks including useful equations, numerous worked examples, and lists of key web resources. As a bonus, a complete Solutions Manual and .PDF slides of all figures are available to qualified instructors who adopt the text. More than any other fundamentals book in a generation, it is student-friendly, and truly impressive in its design and its scope. It can be used for a one semester, a two semester, or a three semester course in the fundamentals of nuclear power. It can also serve as a great reference book for practicing nuclear scientists and engineers. To date, it has achieved the highest overall satisfaction of any mainstream nuclear engineering textbook available on the market today.

Uranium for Nuclear Power CRC Press

Building upon the success of the first edition, the Nuclear Engineering Handbook, Second Edition, provides a comprehensive, up-to-date overview of nuclear power engineering. Consisting of chapters written by leading experts, this volume spans a wide range of topics in the areas of nuclear power reactor design and operation, nuclear fuel cycles, and radiation detection. Plant safety issues are addressed, and the economics of nuclear power generation in the 21st century are presented. The Second Edition also includes full coverage of Generation IV reactor designs, and new information on MRS technologies, small modular reactors, and fast reactors.

Nuclear Engineering Handbook Springer Nature

Applications of Nuclear and Radioisotope Technology: For Peace and Sustainable Development presents the latest technology and research on nuclear energy with a practical focus on a variety of applications. Author Dr. Khalid Al-Nabhani provides a thorough and well-rounded view of the status of nuclear power generation in order to promote its benefits towards a sustainable, clean and secure future. This book offers innovative theoretical, analytical, methodological and technological approaches, encourages a positive societal and political uptake. This book enhances awareness of peaceful nuclear applications across a broad spectrum of industries, including power generation, agriculture, and medicine. It presents successful

examples and lessons learned across many countries that are working towards their sustainability goals in cooperation with the IAEA and AAEA, to benefit researchers, professionals and decision-makers implementing and developing their own nuclear strategies for the future. Presents theoretical and scientific knowledge which is supported with real examples and successful experiences Provides prevailing perceptions of nuclear safety and security concerns by presenting the most advanced safety and security systems Applies technologies to a variety of applications to guide the reader to make informed decisions to help meet sustainability goals