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Nuclear Systems Volume I Nuclear Systems Volume II
Engineering Thermofluids Thermal-Hydraulics of Water
Cooled Nuclear Reactors Nuclear Energy Nuclear Fission
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Technology of Pressurized Water Reactors Nuclear Power
Safety Thermal Power Plants - Volume II Fundamentals of
Nuclear Engineering Optimal Control of Distributed Nuclear
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Magnetic Fusion Technology Nuclear Energy Materials And
Reactors - Volume II Nuclear Engineering Handbook
Thermal-hydraulics of Nuclear Reactors Target Station

Optimization for the High-Brilliance Neutron Source HBS
Nuclear Reactor Engineering (Principle and Concepts)
Thermal Power Plants Molten Salt Reactors and Thorium
Energy Information Sources in Energy Technology
Alternative Energy Sources Handbook of Alternative Fuel
Technologies, Second Edition Handbook of Alternative Fuel
Technologies

Nuclear Safety Aug 01 2021

Handbook of Alternative Fuel Technologies Oct 11 2019

In addition to enabling a clean and energy efficient future, alternative fuel sources are fast becoming a necessity for meeting today's growing demands for low-cost and convenient energy. The Handbook of Alternative Fuel Technologies offers a thorough guide to the science and available technologies for developing alternatives to petroleum fuel sour

Thermal-Hydraulics of Water Cooled Nuclear Reactors

Feb 07 2022 Thermal Hydraulics of Water-Cooled Nuclear Reactors reviews flow and heat transfer phenomena in nuclear systems and examines the critical contribution of this analysis to nuclear technology development. With a strong focus on system thermal hydraulics (SYS TH), the book provides a detailed, yet approachable, presentation of current approaches to reactor thermal hydraulic analysis, also considering the importance of this discipline for the design and operation of safe and efficient water-cooled and moderated reactors. Part One presents the background to nuclear thermal hydraulics, starting with a historical perspective, defining key terms, and considering thermal

hydraulics requirements in nuclear technology. Part Two addresses the principles of thermodynamics and relevant target phenomena in nuclear systems. Next, the book focuses on nuclear thermal hydraulics modeling, covering the key areas of heat transfer and pressure drops, then moving on to an introduction to SYS TH and computational fluid dynamics codes. The final part of the book reviews the application of thermal hydraulics in nuclear technology, with chapters on V&V and uncertainty in SYS TH codes, the BEPU approach, and applications to new reactor design, plant lifetime extension, and accident analysis. This book is a valuable resource for academics, graduate students, and professionals studying the thermal hydraulic analysis of nuclear power plants and using SYS TH to demonstrate their safety and acceptability. Contains a systematic and comprehensive review of current approaches to the thermal-hydraulic analysis of water-cooled and moderated nuclear reactors Clearly presents the relationship between system level (top-down analysis) and component level phenomenology (bottom-up analysis) Provides a strong focus on nuclear system thermal hydraulic (SYS TH) codes Presents detailed coverage of the applications of thermal-hydraulics to demonstrate the safety and acceptability of nuclear power plants

Nuclear Engineering Fundamentals Nov 23 2020

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. *Magnetic Fusion Technology* Sep 21 2020 Magnetic Fusion Technology describes the technologies that are required for successful development of nuclear fusion power plants using strong magnetic fields. These technologies include: • magnet systems, • plasma heating systems, • control systems, • energy conversion systems, • advanced materials development, • vacuum systems, • cryogenic systems, • plasma diagnostics, • safety systems, and • power plant design studies. Magnetic Fusion Technology will be useful to students and to specialists working in energy research.

Nuclear Reactor Engineering Jun 30 2021 Dr. Samuel Glasstone, the senior author of the previous editions of this book, was anxious to live until his ninetieth birthday, but passed away in 1986, a few months short of this milestone. I am grateful for the many years of stimulation received during our association, and in preparing this edition have attempted to maintain his approach. Previous editions of this book were intended to serve as a text for students and a reference for practicing engineers. Emphasis was given to the broad perspective, particularly for topics important to reactor design and operation, with basic coverage provided in such supporting areas as neutronics, thermal-hydraulics, and materials. This, the Fourth Edition, was prepared with these same general objectives in mind. However, during the past three decades, the nuclear industry and university educational programs have matured considerably, presenting some challenges in meeting the objectives of this book. Nuclear power reactors have become much more complex, with an accompanying growth in supporting technology. University

programs now offer separate courses covering such basic topics as reactor physics, thermal hydraulics, and materials. Finally, the general availability of inexpensive xv xvi Preface powerful micro-and minicomputers has transformed design and analysis procedures so that sophisticated methods are now commonly used instead of earlier, more approximate approaches.

Information Sources in Energy Technology Jan 14 2020

Information Sources in Energy Technology presents the major sources in the field of energy technology. The book is comprised of 16 chapters that are organized into three parts. The first part covers energy in general and discusses both local and international agencies that deal with energy technology along with its primary and secondary sources. The next part deals with fuel technology; this part details combustion, steam and boiler plant, electrical energy, and energy conservation. The last part talks about specific energy sources, including nuclear, solar, and geothermal. The text will be of great use to individuals involved in energy industry. Scientists and engineers involved in energy projects will also benefit from the book.

Nuclear Science Abstracts Oct 23 2020

Thermal Power Plants Mar 16 2020 Thermal Power Plants theme is a component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty Encyclopedias. The Theme on Thermal Power Plants presents three main topics which are then expanded into multiple subtopics, each as a chapter. The first topic covers the basic theory including

fossil fuel combustion, nuclear fission, thermal fluids and thermodynamic cycles. It then deals with those aspects important to the maintenance of high efficiency and good reliability such as exergy analysis, material characteristics and life extension. The second topic deals with the production of steam. Although this is only the heat receiving part of the steam cycle it is consistent with the general layout of the power plant where the fossil fuel fired boiler or nuclear fission reactor is a separate and distinct part with its own ancilliary equipment. Fossil boilers and nuclear reactors both produce steam but are so different that each is covered separately in its respective series of chapters. The third topic deals with the generation of power utilizing the steam produced in the boiler or reactor. Several chapters cover steam turbine design and operation. Since power must be produced to exactly match the demand, consideration is given to operational constraints and protective devices. Heat rejection in cooling towers is important where no large body of water exists and is addressed in one chapter. Gas turbines are used for peak power generation and, with steam turbines, for combined cycle plants so are dealt with in two chapters. Conversion of mechanical power from the turbine to electrical power for distribution to the consumer is an important aspect and is covered by the last chapter. These three volumes are aimed at the following five major target audiences: University and College Students Educators, Professional Practitioners, Research Personnel and Policy Analysts, Managers, and Decision Makers, NGOs and GOs. *Alternative Energy Sources* Dec 13 2019 *Alternative Energy Sources*, Part B contains the proceedings of the Alternative

Energy Sources Symposium of the International Symposium Series of the Kuwait Foundation for the Advancement of Sciences, held in Kuwait in February 1980. The symposium provided a forum for discussing alternative energy sources and for reviewing and assessing those technologies that complement and will most likely replace oil and gas extracted by conventional techniques. Comprised of seven chapters, this book begins with an overview of the state of the art in nuclear fission power plants, along with the basics of nuclear fission and energy derived from nuclear reactions. The discussion then turns to fusion power and its prospects; the state of the art of energy storage systems used by electric utilities for peak shaving; and the outlook for transportation and energy through 2000. The next chapter focuses on the shortcomings of techniques that are typically used for the comparative evaluation of energy projects and suggests improvements, based on a present value approach, which allow for a more meaningful comparison. Mathematical techniques for the analysis of capital ventures are also described, with special reference to investments in the field of energy. The final chapter sets into context the mechanics of Third World development and the role of alternative energy systems in that process. This monograph will be of interest to researchers in the energy field as well as energy policymakers.

Nuclear Energy Conversion Aug 13 2022 This text presents and illustrates the conversion of nuclear energy into useful power. Different types of nuclear power plants and reactor designs, their energy conversion principles, cycles, and load-following characteristics are analyzed. Each chapter

concludes with homework problems.

Fundamentals of Nuclear Engineering Feb 24 2021

Fundamentals of Nuclear Engineering is derived from over 25 years of teaching undergraduate and graduate courses on nuclear engineering. The material has been extensively class tested and provides the most comprehensive textbook and reference on the fundamentals of nuclear engineering. It includes a broad range of important areas in the nuclear engineering field; nuclear and atomic theory; nuclear reactor physics, design, control/dynamics, safety and thermal-hydraulics; nuclear fuel engineering; and health physics/radiation protection. It also includes the latest information that is missing in traditional texts, such as space radiation. The aim of the book is to provide a source for upper level undergraduate and graduate students studying nuclear engineering.

Nuclear Energy ebook Collection Oct 03 2021 Nuclear

Energy ebook Collection contains 6 of our best-selling titles, providing the ultimate reference for every nuclear energy engineer's library. Get access to over 3500 pages of reference material, at a fraction of the price of the hard-copy books. This CD contains the complete ebooks of the following 6 titles: Petrangeli, Nuclear Safety, 9780750667234 Murray, Nuclear Energy, 9780750671361 Bayliss, Nuclear Decommissioning, 9780750677448 Suppes, Sustainable Nuclear Power, 9780123706027 Lewis, Fundamentals of Nuclear Reactor Physics, 9780123706317 Kozima, The Science of the Cold Fusion Phenomenon, 9780080451107 *Six fully searchable titles on one CD providing instant access to the ULTIMATE library of

engineering materials for nuclear energy professionals *3500 pages of practical and theoretical nuclear energy information in one portable package. *Incredible value at a fraction of the cost of the print books

Nuclear Engineering Handbook Jul 20 2020 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 Power Safety Apr 28 2021 A concise and current treatment of the subject of nuclear power safety, this work addresses itself to such issues of public concern as: radioactivity in routine effluents and its effect on human health and the environment, serious reactor accidents and their consequences, transportation accidents involving radioactive waste, the disposal of radioactive waste, particularly high-level wastes, and the possible theft of special nuclear materials and their fabrication into a weapon by terrorists. The implementation of the defense-in-depth concept of nuclear power safety is also discussed. Of interest to all undergraduate and graduate students of nuclear engineering, this work assumes a basic understanding of scientific and engineering principles and some familiarity

with nuclear power reactors

Thermal Power Plants - Volume II Mar 28 2021 This book has been derived from the work of several professors in the nuclear and power industry all of whom have been directly involved with the industry as managers or consultants. The text has been written as educational material and many of the individual chapters have been written as course material for advanced university courses. Also several chapters include material related to plant operation which is prescribed for operator training. Hence it bridges the gap between academic study and practical training. While it is not intended to be comprehensive in all respects it does provide an overview of the topic with sufficient technical depth for a general understanding of power plant technology and a basis for further study in a particular area. When used as a reference in this way each chapter can stand alone and be read independently of the others. Overall it meets the general philosophy of EOLSS in providing a source of knowledge for sustainable development and technological progress for educators and decision makers

Introduction to Nuclear Reactor Physics Dec 25 2020

INTRODUCTION TO NUCLEAR REACTOR PHYSICS is the most comprehensive, modern and readable textbook for this course/module. It explains reactors, fuel cycles, radioisotopes, radioactive materials, design, and operation. Chain reaction and fission reactor concepts are presented, plus advanced coverage including neutron diffusion theory. The diffusion equation, Fisk's Law, and steady state/time-dependent reactor behavior. Numerical and analytical solutions are also covered. The text has full color illustrations

throughout, and a wide range of student learning features.

Nuclear Systems Volume II Apr 09 2022 This book provides advanced coverage of a wide variety of thermal fluid systems and technologies in nuclear power plants, including discussions of the latest reactor designs and their thermal/fluid technologies. Beyond the thermal hydraulic design and analysis of the core of a nuclear reactor, the book covers other components of nuclear power plants, such as the pressurizer, containment, and the entire primary coolant system. Placing more emphasis on the appropriate models for small-scale resolution of the velocity and temperature fields through computational fluid mechanics, the book shows how this enhances the accuracy of predicted operating conditions in nuclear plants. It introduces considerations of the laws of scaling and uncertainty analysis, along with a wider coverage of the phenomena encountered during accidents.

FEATURES Discusses fundamental ideas for various modeling approaches for the macro- and microscale flow conditions in reactors Covers specific design considerations, such as natural convection and core reliability Enables readers to better understand the importance of safety considerations in thermal engineering and analysis of modern nuclear plants Features end-of-chapter problems Includes a solutions manual for adopting instructors This book serves as a textbook for advanced undergraduate and graduate students taking courses in nuclear engineering and studying thermal/hydraulic systems in nuclear power plants.

Fusion Technology Oct 15 2022

Optimal Control of Distributed Nuclear Reactors Jan 26 2021 This book is devoted to the mathematical optimization

theory and modeling techniques that recently have been applied to the problem of controlling the shape and intensity of the power density distribution in the core of large nuclear reactors. The book has been prepared with the following purposes in mind: 1. To provide, in a condensed manner, the background preparation on reactor kinetics required for a comprehensive description of the main problems encountered in designing spatial control systems for nuclear reactor cores. 2. To present the work that has already been done on this subject and provide the basic mathematical tools required for a full understanding of the different methods proposed in the literature. 3. To stimulate further work in this challenging area by weighting the advantages and disadvantages of the existing techniques and evaluating their effectiveness and applicability. In addition to coverage of the standard topics on the subject of optimal control for distributed parametersystems, the book includes, at a mathematical level suitable for graduate students in engineering, discussions of concepts of functional analysis, the representation theory of groups, and integral equations. Although these topics constitute a requisite for a full understanding of the new developments in the area of reactor modeling and control, they are seldom treated together in a single book and, when they are, their presentation is often directed to the mathematician. They are thus relatively unknown to the engineering community.

Thermal-hydraulics of Nuclear Reactors Jun 18 2020

The Technology of Pressurized Water Reactors May 30

2021 This book offers a complete panorama of the pressurized water reactor industry, beginning from its origin

in the USA and the realization of nuclear engines for naval propulsion, to its most recent developments in the field of civil energy production, particularly in France with the 56 reactors of the multinational electric utility company, Electricité de France (EDF). This comprehensive two-volume masterwork features detailed descriptions of all the crucial components driving a pressurized water nuclear reactor. Volume 1 deals with the main components, such as the main primary circuit, the reactor core, and the steam generators. Volume 2 covers the secondary circuit and the cold source, including components such as the turbine, condenser, alternator, transformers and power supply. Written by Serge Marguet, a leading specialist in reactor physics and author of several books on the subject, this book draws on his experience of more than 35 years in research and development at EDF, a global leader in civil nuclear energy. Featuring a richly illustrated, full-color iconography, as well as a detailed index and bibliography, *The Technology of Pressurized Water Reactors* is an indispensable work for seasoned nuclear energy professionals, as well as inquisitive newcomers to the field.

Nuclear Heat Transport Feb 19 2023 This book covers the processes of energy (heat) generation in nuclear processes, the transport of that energy by the reactor coolant to the power cycle, and the limitations imposed by the transport mechanism on the design of nuclear reactor cores.

Homework problems are presented at the end of each chapter.

Nuclear Systems Jun 11 2022 Nuclear power is in the midst of a generational change—with new reactor designs, plant

subsystems, fuel concepts, and other information that must be explained and explored—and after the 2011 Japan disaster, nuclear reactor technologies are, of course, front and center in the public eye. Written by leading experts from MIT, *Nuclear Systems Volume I: Thermal Hydraulic Fundamentals, Second Edition* provides an in-depth introduction to nuclear power, with a focus on thermal hydraulic design and analysis of the nuclear core. A close examination of new developments in nuclear systems, this book will help readers—particularly students—to develop the knowledge and design skills required to improve the next generation of nuclear reactors. Includes a CD-ROM with Extensive Tables for Computation Intended for experts and senior undergraduate/early-stage graduate students, the material addresses: Different types of reactors Core and plant performance measures Fission energy generation and deposition Conservation equations Thermodynamics Fluid flow Heat transfer Imparting a wealth of knowledge, including their longtime experience with the safety aspects of nuclear installations, authors Todreas and Kazimi stress the integration of fluid flow and heat transfer, various reactor types, and energy source distribution. They cover recent nuclear reactor concepts and systems, including Generation III+ and IV reactors, as well as new power cycles. The book features new chapter problems and examples using concept parameters, and a solutions manual is available with qualifying course adoption.

Nuclear Power Engineering Jan 18 2023

Nuclear Reactor Thermal Hydraulics Nov 04 2021

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.

Target Station Optimization for the High-Brilliance Neutron Source HBS May 18 2020 In the present work, the target station of the accelerator-driven neutron source HBS is optimized in comprehensive parameter studies using the Monto-Carlo method. The dependence of the most important performance characteristics of such a system on the external parameters is investigated neglecting technical and mechanical limitations. In this way, qualitative and quantitative statements for all possible configurations and envisaged applications can be derived and should be considered in the detailed planning of such facilities. For this purpose, different scenarios are considered that place completely different requirements on the design of the target station. The central statements derived in this thesis can be transferred to any framework conditions, such as different accelerator energies, so that these results can be used in the development of other neutron sources, which together with the HBS form a European network and provide a prosperous

community in neutron science.

Powerplant Technology Jul 12 2022 Designed for courses in powerplant technology, powerplant engineering, and energy conversion, this text covers fossil, nuclear and renewable-energy powerplants with equal emphasis, giving students an understanding of the spectrum of power generation systems. It is suitable as a supplement to courses in energy analysis.

Nuclear Reactor Engineering (Principle and Concepts)

Apr 16 2020 The book exposes the student to the various facets of nuclear fuel cycle right from mining to waste disposal. It introduces the student to the heat transfer and fluid flow processes in different types of reactors viz. Pressurized Water Reactor, Pressurized Heavy Water Reactor, Boiling Water Reactor, Gas Cooled Reactors and Fast Reactors besides aspects of nuclear safety. To help the student in better understanding Figures and Tables have been provided at various places in the text.

Proceedings of the ... Multi-Phase Flow and Heat Transfer Symposium-Workshop Sep 14 2022

Nuclear Energy Jan 06 2022 Energy -- Atoms and nuclei -- Radioactivity -- Nuclear processes -- Radiation and materials -- Fission -- Fusion -- Particle accelerators -- Isotope separators -- Radiation detectors -- Neutron chain reactions -- Nuclear heat energy -- Breeder reactors -- Fusion reactors -- The history of nuclear energy -- Biological effects of radiation -- Information from isotopes -- Useful radiation effects -- Reactor safety -- Nuclear propulsion -- Radiation protection -- Radioactive waste disposal -- Laws, regulations, and organizations -- Energy economics -- International nuclear power -- Nuclear explosions -- The future.

Handbook of Alternative Fuel Technologies, Second Edition

Nov 11 2019 While strides are being made in the research and development of environmentally acceptable and more sustainable alternative fuels—including efforts to reduce emissions of air pollutants associated with combustion processes from electric power generation and vehicular transportation—fossil fuel resources are limited and may soon be on the verge of depletion in the near future. Measuring the correlation between quality of life, energy consumption, and the efficient utilization of energy, the Handbook of Alternative Fuel Technologies, Second Edition thoroughly examines the science and technology of alternative fuels and their processing technologies. It focuses specifically on environmental, technoeconomic, and socioeconomic issues associated with the use of alternative energy sources, such as sustainability, applicable technologies, modes of utilization, and impacts on society. Written with research and development scientists and engineers in mind, the material in this handbook provides a detailed description and an assessment of available and feasible technologies, environmental health and safety issues, governmental regulations, and issues and agendas for R&D. It also includes alternative energy networks for production, distribution, and consumption. What's New in This Edition: Contains several new chapters of emerging interest and updates various chapters throughout Includes coverage of coal gasification and liquefaction, hydrogen technology and safety, shale fuel by hydraulic fracturing, ethanol from lignocellulosics, biodiesel, algae fuels, and energy from waste products Covers statistics, current concerns, and future

trends A single-volume complete reference, the Handbook of Alternative Fuel Technologies, Second Edition contains relevant information on chemistry, technology, and novel approaches, as well as scientific foundations for further enhancements and breakthroughs. In addition to its purposes as a handbook for practicing scientists and engineers, it can also be used as a textbook or as a reference book on fuel science and engineering, energy and environment, chemical process design, and energy and environmental policy.

Engineering Thermofluids Mar 08 2022 Thermofluids, while a relatively modern term, is applied to the well-established field of thermal sciences, which is comprised of various intertwined disciplines. Thus mass, momentum, and heat transfer constitute the fundamentals of thermofluids. This book discusses thermofluids in the context of thermodynamics, single- and two-phase flow, as well as heat transfer associated with single- and two-phase flows. Traditionally, the field of thermal sciences is taught in universities by requiring students to study engineering thermodynamics, fluid mechanics, and heat transfer, in that order. In graduate school, these topics are discussed at more advanced levels. In recent years, however, there have been attempts to integrate these topics through a unified approach. This approach makes sense as thermal design of widely varied systems ranging from hair dryers to semiconductors to jet engines to nuclear power plants is based on the conservation equations of mass, momentum, angular momentum, energy, and the second law of thermodynamics. While integrating these topics has recently gained popularity, it is hardly a new approach. For example, Bird, Stewart, and

Lightfoot in Transport Phenomena, Rohsenow and Choi in Heat, Mass, and Momentum Transfer, El- Wakil, in Nuclear Heat Transport, and Todreas and Kazimi in Nuclear Systems have pursued a similar approach. These books, however, have been designed for advanced graduate level courses. More recently, undergraduate books using an integral approach are appearing.

Nuclear Systems Volume I May 10 2022 Nuclear power is in the midst of a generational change-with new reactor designs, plant subsystems, fuel concepts, and other information that must be explained and explored-and after the 2011 Japan disaster, nuclear reactor technologies are, of course, front and center in the public eye. Written by leading experts from MIT, Nuclear Systems Volume I:

Molten Salt Reactors and Thorium Energy Feb 13 2020

Molten Salt Reactors is a comprehensive reference on the status of molten salt reactor (MSR) research and thorium fuel utilization. There is growing awareness that nuclear energy is needed to complement intermittent energy sources and to avoid pollution from fossil fuels. Light water reactors are complex, expensive, and vulnerable to core melt, steam explosions, and hydrogen explosions, so better technology is needed. MSRs could operate safely at nearly atmospheric pressure and high temperature, yielding efficient electrical power generation, desalination, actinide incineration, hydrogen production, and other industrial heat applications. Coverage includes: Motivation -- why are we interested? Technical issues – reactor physics, thermal hydraulics, materials, environment, ... Generic designs -- thermal, fast, solid fuel, liquid fuel, ... Specific designs – aimed at

electrical power, actinide incineration, thorium utilization, ...
Worldwide activities in 23 countries
Conclusions
This book is a collaboration of 58 authors from 23 countries, written in cooperation with the International Thorium Molten Salt Forum. It can serve as a reference for engineers and scientists, and it can be used as a textbook for graduate students and advanced undergrads. Molten Salt Reactors is the only complete review of the technology currently available, making this an essential text for anyone reviewing the use of MSR and thorium fuel, including students, nuclear researchers, industrial engineers, and policy makers. Written in cooperation with the International Thorium Molten-Salt Forum
Covers MSR-specific issues, various reactor designs, and discusses issues such as the environmental impact, non-proliferation, and licensing
Includes case studies and examples from experts across the globe

Nuclear Energy Nov 16 2022
Nuclear Energy is one of the most popular texts ever published on basic nuclear physics, systems, and applications of nuclear energy. This newest edition continues the tradition of offering a holistic treatment of everything the undergraduate engineering student needs to know in a clear and accessible way. Presented is a comprehensive overview of radioactivity, radiation protection, nuclear reactors, waste disposal, and nuclear medicine. • New coverage on nuclear safety concerns following 9/11, including radiation and terrorism, nuclear plant security, and use of nuclear techniques to detect weapons materials • New facts on nuclear waste management, including the Yucca Mountain repository •

New developments in the use of nuclear-powered systems for generating cheap and abundant hydrogen from water using nuclear technology • New information on prospects for new nuclear power reactors and their applications for electricity and desalination • New end-of-chapter Exercises and Answers, lists of Internet resources, and updated references. • New instructor web site including Solutions to Exercises and PowerPoint slides • New student web site containing computer programs for use with Computer Exercises

Nuclear Energy Materials And Reactors - Volume II Aug 21 2020 Nuclear Energy Materials and Reactors is a component of Encyclopedia of Energy Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. Nuclear energy is a type of technology involving the controlled use of nuclear fission to release energy for work including propulsion, heat, and the generation of electricity. The theme on Nuclear Energy Materials and Reactors discusses: Fundamentals of Nuclear Energy; Nuclear Physics; Nuclear Interactions; Nuclear Reactor Theory; Nuclear Reactor Design; Nuclear Reactor Kinetics; Reactivity Changes; Nuclear Power Plants; Pressurized Water Reactors; Boiling Water Reactors; Pressurized Heavy Water Reactors; Heavy Water Light Water Reactors; Advanced Gas Cooled Reactors; Light Water Graphite Reactors; High Temperature Gas Cooled Reactors; Pebble Bed Modular Reactor; Radioactive Wastes, Origins, Classification and Management; Nuclear Reactor Overview and Reactor Cycles; The Nuclear Reactor Closed Cycle; Safety of Boiling Water Reactors; Supercritical

Water-Cooled Nuclear Reactors: Review and Status; The Gas-Turbine Modular Helium Reactor; Application of Risk Assessment to Nuclear Power Plants; Production and Recycling Resources for Nuclear Fission. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers.

Principles of Nuclear Rocket Propulsion Sep 02 2021

Principles of Nuclear Rocket Propulsion provides an understanding of the physical principles underlying the design and operation of nuclear fission-based rocket engines. While there are numerous texts available describing rocket engine theory and nuclear reactor theory, this is the first book available describing the integration of the two subject areas. Most of the book's emphasis is primarily on nuclear thermal rocket engines, wherein the energy of a nuclear reactor is used to heat a propellant to high temperatures and then expel it through a nozzle to produce thrust. Other concepts are also touched upon such as a section devoted to the nuclear pulse rocket concept wherein the force of externally detonated nuclear explosions is used to accelerate a spacecraft. Future crewed space missions beyond low earth orbit will almost certainly require propulsion systems with performance levels exceeding that of today's best chemical engines. A likely candidate for that propulsion system is the solid core Nuclear Thermal Rocket or NTR. Solid core NTR engines are expected to have performance levels which significantly exceed that achievable by any currently conceivable chemical engine. The challenge is in the engineering details

of the design which includes not only the thermal, fluid, and mechanical aspects always present in chemical rocket engine development, but also nuclear interactions and some unique materials restrictions. Sorts and organizes information on various types of nuclear thermal rocket engines into a coherent curriculum Includes a number of example problems to illustrate the concepts being presented Features a companion site with interactive calculators demonstrating how variations in the constituent parameters affect the physical process being described Includes 3D figures that may be scaled and rotated to better visualize the nature of the object under study

Engineering Thermofluids Dec 17 2022 Thermofluids, while a relatively modern term, is applied to the well-established field of thermal sciences, which is comprised of various intertwined disciplines. Thus mass, momentum, and heat transfer constitute the fundamentals of thermofluids. This book discusses thermofluids in the context of thermodynamics, single- and two-phase flow, as well as heat transfer associated with single- and two-phase flows. Traditionally, the field of thermal sciences is taught in universities by requiring students to study engineering thermodynamics, fluid mechanics, and heat transfer, in that order. In graduate school, these topics are discussed at more advanced levels. In recent years, however, there have been attempts to integrate these topics through a unified approach. This approach makes sense as thermal design of widely varied systems ranging from hair dryers to semiconductors to jet engines to nuclear power plants is based on the conservation equations of mass, momentum, angular

momentum, energy, and the second law of thermodynamics. While integrating these topics has recently gained popularity, it is hardly a new approach. For example, Bird, Stewart, and Lightfoot in *Transport Phenomena*, Rohsenow and Choi in *Heat, Mass, and Momentum Transfer*, El-Wakil, in *Nuclear Heat Transport*, and Todreas and Kazimi in *Nuclear Systems* have pursued a similar approach. These books, however, have been designed for advanced graduate level courses. More recently, undergraduate books using an integral approach are appearing.

Nuclear Fission Reactors Dec 05 2021 This book is intended to provide an introduction to the basic principles of nuclear fission reactors for advanced undergraduate or graduate students of physics and engineering. The presentation is also suitable for physicists or engineers who are entering the nuclear power field without previous experience with nuclear reactors. No background knowledge is required beyond that typically acquired in the first two years of an undergraduate program in physics or engineering. Throughout, the emphasis is on explaining why particular reactor systems have evolved in the way they have, without going into great detail about reactor physics or methods of design analysis, which are already covered in a number of excellent specialist texts. The first two chapters serve as an introduction to the basic physics of the atom and the nucleus and to nuclear fission and the nuclear chain reaction. Chapter 3 deals with the fundamentals of nuclear reactor theory, covering neutron slowing down and the spatial dependence of the neutron flux in the reactor, based on the solution of the diffusion equations. The chapter includes a major section on reactor

kinetics and control, including temperature and void coefficients and xenon poisoning effects in power reactors. Chapter 4 describes various aspects of fuel management and fuel cycles, while Chapter 5 considers materials problems for fuel and other constituents of the reactor. The processes of heat generation and removal are covered in Chapter 6.

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