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*Transactions of the American Nuclear Society* - American Nuclear Society 1993

**Fundamentals of Nuclear Science and Engineering Second Edition** - J. Kenneth Shultis 2007-11-01

Since the publication of the bestselling first edition, there have been numerous advances in the field of nuclear science. In medicine, accelerator based teletherapy and electron-beam therapy have become standard. New demands in national security have stimulated major advances in nuclear instrumentation. An ideal introduction to the fundamentals of nuclear science and engineering, this book presents the basic nuclear science needed to understand and quantify an extensive range of nuclear phenomena. New to the Second Edition— A chapter on radiation detection by Douglas McGregor Up-to-date coverage of radiation hazards, reactor designs, and medical applications Flexible organization of material that allows for quick reference This edition also takes an in-depth look at particle accelerators, nuclear fusion reactions and devices, and nuclear technology in medical diagnostics and treatment. In addition, the author discusses applications such as the direct conversion of nuclear energy into electricity. The breadth of coverage is unparalleled, ranging from the theory and design characteristics of nuclear reactors to the identification of biological risks associated with ionizing radiation. All topics are supplemented with extensive nuclear data compilations to perform a wealth of calculations. Providing extensive coverage of physics, nuclear science, and nuclear technology of all types, this up-to-date second edition of Fundamentals of Nuclear Science and Engineering is a key reference for any physicists or engineer.

[Energy Optimization in Process Systems](#) - Stanislaw Sieniutycz 2009-05-06

Despite the vast research on energy optimization and process integration, there has to date been no synthesis linking these together. This book fills the gap, presenting optimization and integration in energy and process engineering. The content is based on the current literature and includes novel approaches developed by the authors. Various thermal and chemical systems (heat and mass exchangers, thermal and water networks, energy converters, recovery units, solar collectors, and separators) are considered. Thermodynamics, kinetics and economics are used to formulate and solve problems with constraints on process rates, equipment size, environmental parameters, and costs. Comprehensive coverage of dynamic optimization of energy conversion systems and separation units is provided along with suitable computational algorithms for deterministic and stochastic optimization approaches based on: nonlinear programming, dynamic programming, variational calculus, Hamilton-Jacobi-Bellman theory, Pontryagin's maximum principles, and special methods of process integration. Integration of heat energy and process water within a total site is shown to be a significant factor reducing production costs, in particular costs of utilities for the chemical industry. This integration involves systematic design and optimization of heat exchangers and water networks (HEN and WN). After presenting basic, insight-based Pinch Technology, systematic, optimization-based sequential and simultaneous approaches to design HEN and WN are described. Special consideration is given to the HEN design problem targeting stage, in view of its importance at various levels of system design. Selected, advanced methods for HEN synthesis and retrofit are presented. For WN design a novel approach based on stochastic optimization is described that accounts for both grassroot and revamp design scenarios. Presents a unique synthesis of energy optimization and process integration that applies scientific information from thermodynamics, kinetics, and systems theory Discusses engineering applications including power generation, resource upgrading, radiation conversion and chemical transformation, in static and dynamic systems Clarifies how to identify thermal and chemical

constraints and incorporate them into optimization models and solutions

**Applied Mechanics Reviews** - 1972

*Molten Salt Reactors and Thorium Energy* - Thomas James Dolan 2017-06-08

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 MSRs 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 News* - 2009

*Fundamentals of Nuclear Science and Engineering Third Edition* - J. Kenneth Shultis 2016-11-30

Fundamentals of Nuclear Science and Engineering, Third Edition, presents the nuclear science concepts needed to understand and quantify the whole range of nuclear phenomena. Noted for its accessible level and approach, the Third Edition of this long-time bestselling textbook provides overviews of nuclear physics, nuclear power, medicine, propulsion, and radiation detection. Its flexible organization allows for use with Nuclear Engineering majors and those in other disciplines. The Third Edition features updated coverage of the newest nuclear reactor designs, fusion reactors, radiation health risks, and expanded discussion of basic reactor physics with added examples. A complete Solutions Manual and figure slides for classroom projection are available for instructors adopting the text.

**Hybrid Computer Solution of the Energy Equations in Conductive Porous Media** - William Marr 1969

**Nuclear Heat Transport** - Mohamed Mohamed El-Wakil 1978

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.

[The Physics of Nuclear Reactors](#) - Serge Marguet 2018-02-26

This comprehensive volume offers readers a progressive and highly detailed introduction to the complex

behavior of neutrons in general, and in the context of nuclear power generation. A compendium and handbook for nuclear engineers, a source of teaching material for academic lecturers as well as a graduate text for advanced students and other non-experts wishing to enter this field, it is based on the author's teaching and research experience and his recognized expertise in nuclear safety. After recapping a number of points in nuclear physics, placing the theoretical notions in their historical context, the book successively reveals the latest quantitative theories concerning:

- The slowing-down of neutrons in matter
- The charged particles and electromagnetic rays
- The calculation scheme, especially the simplification hypothesis
- The concept of criticality based on chain reactions
- The theory of homogeneous and heterogeneous reactors
- The problem of self-shielding
- The theory of the nuclear reflector, a subject largely ignored in literature
- The computational methods in transport and diffusion theories

Complemented by more than 400 bibliographical references, some of which are commented and annotated, and augmented by an appendix on the history of reactor physics at EDF (Electricité De France), this book is the most comprehensive and up-to-date introduction to and reference resource in neutronics and reactor theory.

*Nuclear Technology* - 1992

Nuclear Power Engineering - Mohamed Mohamed El-Wakil 1962

**Alternative Energy Sources** - Jamal T. Manassah 2013-10-22

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.

Alternative Energy Systems and Applications - B. K. Hodge 2017-05-08

The comprehensive guide to engineering alternative and renewable energy systems and applications—updated for the latest trends and technologies This book was designed to help engineers develop new solutions for the current energy economy. To that end it provides technical discussions, along with numerous real-world examples of virtually all existing alternative energy sources, applications, systems and system components. All chapters focus on first-order engineering calculations, and consider alternative uses of existing and renewable energy resources. Just as important, the author describes how to apply these concepts to the development of new energy solutions. Since the publication of the critically acclaimed first edition of this book, the alternative, renewable and sustainable energy industries have witnessed significant evolution and growth. Hydraulic fracturing, fossil fuel reserve increases, the increasing popularity of hybrid and all-electric vehicles, and the decreasing cost of solar power already have had a significant impact on energy usage patterns worldwide. Updated and revised to reflect those and other key developments, this new edition features expanded coverage of topics covered in the first edition, as well as entirely new chapters on hydraulic fracturing and fossil fuels, hybrid and all-electric vehicles, and more. Begins with a fascinating look at the changing face of global energy economy Features chapters devoted to virtually all sources of alternative energy and energy systems Offers technical discussions of hydropower, wind, passive solar and solar-thermal, photovoltaics, fuel cells, CHP systems,

geothermal, ocean energy, biomass, and nuclear Contains updated chapter review questions, homework problems, and a thoroughly revised solutions manual, available on the companion website While Alternative Energy Systems and Applications, Second Edition is an ideal textbook/reference for advanced undergraduate and graduate level engineering courses in energy-related subjects, it is also an indispensable professional resource for engineers and technicians working in areas related to the development of alternative/renewable energy systems.

Heat and Mass Transfer - Anthony Mills 2018-05-04

This complete reference book covers topics in heat and mass transfer, containing extensive information in the form of interesting and realistic examples, problems, charts, tables, illustrations, and more. Heat and Mass Transfer emphasizes practical processes and provides the resources necessary for performing accurate and efficient calculations. This excellent reference comes with a complete set of fully integrated software available for download at [crcpress.com](http://crcpress.com), consisting of 21 computer programs that facilitate calculations, using procedures developed in the text. Easy-to-follow instructions for software implementation make this a valuable tool for effective problem-solving.

Nuclear Power - Pavel Tsvetkov 2010-08-17

The world of the twenty first century is an energy consuming society. Due to increasing population and living standards, each year the world requires more energy and new efficient systems for delivering it. Furthermore, the new systems must be inherently safe and environmentally benign. These realities of today's world are among the reasons that lead to serious interest in deploying nuclear power as a sustainable energy source. Today's nuclear reactors are safe and highly efficient energy systems that offer electricity and a multitude of co-generation energy products ranging from potable water to heat for industrial applications. The goal of the book is to show the current state-of-the-art in the covered technical areas as well as to demonstrate how general engineering principles and methods can be applied to nuclear power systems.

**Nuclear Engineering Fundamentals** - Robert E. Masterson 2017-05-18

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.

**A Compendium of Computer Codes for the Safety Analysis of LMFBR's** - United States. Energy Research and Development Administration. Division of Reactor Research and Development. Safety Analysis Branch 1975

**Heat Transfer** - Anthony F. Mills 1992

Powerplant Technology - Mohamed Mohamed El-Wakil 1984

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.

Basic Health Physics - Joseph John Bevelacqua 2010-04-26

Designed to prepare candidates for the American Board of Health Physics Comprehensive examination (Part I) and other certification examinations, this monograph introduces professionals in the field to radiation protection principles and their practical application in routine and emergency situations. It features more than 650 worked examples illustrating concepts under discussion along with in-depth coverage of sources of radiation, standards and regulations, biological effects of ionizing radiation, instrumentation, external and internal dosimetry, counting statistics, monitoring and interpretations, operational health physics, transportation and waste, nuclear emergencies, and more. Reflecting for the first time the true scope of health physics at an introductory level, *Basic Health Physics: Problems and Solutions* gives readers the tools to properly evaluate challenging situations in all areas of radiation protection, including the medical, university, power reactor, fuel cycle, research reactor, environmental, non-ionizing radiation, and accelerator health physics.

**Proceedings** - 1967

Introduction to Nuclear Reactor Physics - Robert E. Masterson 2017-11-22

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.

INIS Atomindex - 1987

Contemporary Health Physics - Joseph John Bevelacqua 2009-03-09

This is the first text specifically designed to train potential health physicists to think and respond like professionals. Written by a former chairman of the American Board of Health Physics Comprehensive Panel of Examiners with more than 20 years of professional and academic experience in the field, it offers a balanced presentation of all the theoretical and practical issues essential for a full working knowledge of radiation exposure assessments. As the only book to cover the entire radiation protection field, it includes detailed coverage of the medical, university, reactor, fuel cycle, environmental and accelerator areas, while exploring key topics in radiation basics, external and internal dosimetry, the biological effects of ionizing radiation, and much more besides. Backed by more than 500 worked examples developed within the context of various scenarios and spanning the full spectrum of real-world challenges, it quickly instills in readers the professional acumen and practical skills they need to perform accurate radiation assessments in virtually any routine or emergency situation. The result is a valuable resource for upper-level students and anyone preparing to take the American Board of Health Physics Comprehensive Examination, as well as for professionals seeking to expand their scope and sharpen their skills.

**Proceedings of the First International Symposium on Water Desalination** - 1965

LSC Powerplant Technology - M. M. El-Wakil 2002-10-21

This text is designed for courses in powerplant technology, powerplant engineering, and energy conversion offered in departments of mechanical engineering and nuclear engineering. It is also suitable as a supplement to courses in energy analysis offered in mechanical or nuclear engineering departments or energy analysis programs. It covers fossil, nuclear and renewable-energy powerplants with equal emphasis, giving students a complete and detailed understanding of the entire spectrum of power generation systems.

Fundamentals of Nuclear Science and Engineering Second Edition - J. Kenneth Shultis 2007-09-07

Since the publication of the bestselling first edition, there have been numerous advances in the field of nuclear science. In medicine, accelerator based teletherapy and electron-beam therapy have become standard. New demands in national security have stimulated major advances in nuclear instrumentation. An ideal introduction to the fundamentals of nuclear science and engineering, this book presents the basic nuclear science needed to understand and quantify an extensive range of nuclear phenomena. New to the Second Edition— A chapter on radiation detection by Douglas McGregor Up-to-date coverage of radiation hazards, reactor designs, and medical applications Flexible organization of material that allows for quick reference This edition also takes an in-depth look at particle accelerators, nuclear fusion reactions and devices, and nuclear technology in medical diagnostics and treatment. In addition, the author discusses applications such as the direct conversion of nuclear energy into electricity. The breadth of coverage is unparalleled, ranging from the theory and design characteristics of nuclear reactors to the identification of biological risks associated with ionizing radiation. All topics are supplemented with extensive nuclear data compilations to perform a wealth of calculations. Providing extensive coverage of physics, nuclear science, and nuclear technology of all types, this up-to-date second edition of *Fundamentals of Nuclear Science and Engineering* is a key reference for any physicist or engineer.

Nuclear Science Abstracts - 1975-07

**Computing Qualitatively Correct Approximations of Balance Laws** - Laurent Gosse 2013-03-30

Substantial effort has been drawn for years onto the development of (possibly high-order) numerical techniques for the scalar homogeneous conservation law, an equation which is strongly dissipative in L1 thanks to shock wave formation. Such a dissipation property is generally lost when considering hyperbolic systems of conservation laws, or simply inhomogeneous scalar balance laws involving accretive or space-dependent source terms, because of complex wave interactions. An overall weaker dissipation can reveal intrinsic numerical weaknesses through specific nonlinear mechanisms: Hugoniot curves being deformed by local averaging steps in Godunov-type schemes, low-order errors propagating along expanding characteristics after having hit a discontinuity, exponential amplification of truncation errors in the presence of accretive source terms... This book aims at presenting rigorous derivations of different, sometimes called well-balanced, numerical schemes which succeed in reconciling high accuracy with a stronger robustness even in the aforementioned accretive contexts. It is divided into two parts: one dealing with hyperbolic systems of balance laws, such as arising from quasi-one dimensional nozzle flow computations, multiphase WKB approximation of linear Schrödinger equations, or gravitational Navier-Stokes systems. Stability results for viscosity solutions of onedimensional balance laws are sketched. The other being entirely devoted to the treatment of weakly nonlinear kinetic equations in the discrete ordinate approximation, such as the ones of radiative transfer, chemotaxis dynamics, semiconductor conduction, spray dynamics or linearized Boltzmann models. "Caseology" is one of the main techniques used in these derivations. Lagrangian techniques for filtration equations are evoked too. Two-dimensional methods are studied in the context of non-degenerate semiconductor models.

Nuclear Science and Engineering - 1973

Energy, the Environment, and Sustainability - Efstathios E. Michaelides 2018-04-27

Energy and the Environment explains in simple terms what the energy demand is at the present, what the environmental effects of energy use are, and what can be accomplished to alleviate the environmental effects of energy use and ensure adequate energy supply. Though technical in approach, the text uses simple explanations of engineering processes and systems and algebra-based math to be comprehensible to students in a range of disciplines. Schematic diagrams, quantitative examples, and numerous problems will help students make quantitative calculations. This will assist them in comprehending the complexity of the energy-environment balance, and to analyze and evaluate proposed solutions.

Books and Pamphlets, Including Serials and Contributions to Periodicals - Library of Congress. Copyright Office 1973

**Effect of Drag Reducing Additives on Simulated Transient Flow Boiling** - Rick J. Kohrt 1980



Light Scattering Reviews 2 - Alexander A. Kokhanovsky 2007-04-29

This book is to continue the Light Scattering Reviews series devoted to modern knowledge and milestones in both experimental and theoretical techniques related to light scattering and radiative transport problems. It gives a valuable picture of recent developments in the area of remote sensing and radiative transfer. The work has capabilities to further facilitate studies in light scattering media optics and be of importance for researchers across various scientific fields including astronomy, meteorology and geophysics.

Engineering Thermofluids - Mahmoud Massoud 2005-12-05

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 semiconductor chips 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 Reactor Thermal Hydraulics - Robert E. Masterson 2019-08-21

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

Modular High-temperature Gas-cooled Reactor Power Plant - Kurt Kugeler 2018-10-05

"Modular High-temperature Gas-cooled Reactor Power Plant" introduces the power plants driven by modular high temperature gas-cooled reactors (HTR), which are characterized by their inherent safety features and high output temperatures. HTRs have the potential to be adopted near demand side to supply both electricity and process heat, directly replacing conventional fossil fuels. The world is confronted with two dilemmas in the energy sector, namely climate change and energy supply security. HTRs have the potential to significantly alleviate these concerns. This book will provide readers with a thorough understanding of HTRs, their history, principles, and fields of application. The book is intended for researchers and engineers involved with nuclear engineering and energy technology.

**Thermal Hydraulic and Safety Analysis of the University of Wisconsin Nuclear Reactor** - Brian J. Vitiello 2008