

Openfoam Simulation For Electromagnetic Problems

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Annual Report 2019 of the Institute for Nuclear and Energy Technologies - Tromm, Walter
2021-03-31

The annual report of the Institute for Nuclear and Energy Technologies of KIT summarizes its research activities and provides some highlights of each working group, like thermal-hydraulic analyses for fusion reactors, accident analyses for light water reactors, and research on innovative energy technologies: liquid metal technologies for energy conversion, hydrogen technologies and geothermal power plants. The institute has been engaged in education and training in energy technologies.

Computational Gasdynamics - Culbert B. Laney 1998-06-13

Numerical methods are indispensable tools in the analysis of complex fluid flows. This book focuses on computational techniques for high-speed gas flows, especially gas flows containing shocks and other steep gradients. The book decomposes complicated numerical methods into simple modular parts, showing how each part fits and how each method relates to or differs from others. The text begins with a review of gasdynamics and computational techniques. Next come basic principles of computational gasdynamics. The last two parts cover basic techniques and advanced techniques. Senior and graduate level students, especially in aerospace engineering, as well as researchers and practising engineers, will find a wealth of invaluable information on high-speed gas flows in this text.

OpenFOAM Simulation for Electromagnetic Problems - 2010

Magnetohydrodynamic Flow in Ducts - Herman Branover 1978

The Finite Volume Method in Computational Fluid Dynamics - F. Moukalled 2015-08-13

This textbook explores both the theoretical foundation of the Finite Volume Method (FVM) and its applications in Computational Fluid Dynamics (CFD). Readers will discover a thorough explanation of the FVM numerics and algorithms used for the simulation of incompressible and compressible fluid flows, along with a detailed examination of the components needed for the development of a collocated unstructured pressure-based CFD solver. Two particular CFD codes are explored. The first is uFVM, a three-dimensional unstructured pressure-based finite volume academic CFD code, implemented within Matlab. The second is OpenFOAM®, an open source framework used in the development of a range of CFD programs for the simulation of industrial scale flow problems. With over 220 figures, numerous examples and more than one hundred exercise on FVM numerics, programming, and applications, this textbook is suitable for use in an introductory course on the FVM, in an advanced course on numerics, and as a reference for CFD programmers and researchers.

Time Domain Electromagnetics - Sadasiva M. Rao 1999-07-26

Time Domain Electromagnetics deals with a specific technique in electromagnetics within the general area of electrical engineering. This mathematical method has become a standard for a wide variety of applications for design and problem solving. This method of analysis in electromagnetics is directly related to advances in cellular and mobile communications technology, as well as traditional EM areas such as radar, antennas, and wave propagation. Most of the material is available in the research journals which is difficult for a non-specialist to locate, read, understand, and effectively use for the problem at hand. Only book currently available to practicing engineers and research scientists exclusively devoted to this subject Includes contributions by the world's leading experts in electromagnetics Presents the most popular methods used in time domain analysis are included at one place with thorough discussion of the methods in an easily understandable style In each chapter, many simple and practical examples are discussed thoroughly to illustrate the salient points of the material presented All chapters are written in a consistent style that allows the book to be of use for self-study by professionals as well as for use in a graduate-level course in electrical engineering

Magnetic Fluids - Elmars Blums 1997-01-01

Basics of Fluid Mechanics and Introduction to Computational Fluid Dynamics - Titus

Petrila 2006-06-14

The present book - through the topics and the problems approach - aims at filling a gap, a real need in our literature concerning CFD (Computational Fluid Dynamics). Our presentation results from a large documentation and focuses on reviewing the present day most important numerical and computational methods in CFD. Many theoreticians and experts in the field have expressed their interest in and need for such an enterprise. This was the motivation for carrying out our study and writing this book. It contains an important systematic collection of numerical working instruments in Fluid Dynamics. Our current approach to CFD started ten years ago when the University of Paris XI suggested a collaboration in the field of spectral methods for fluid dynamics. Soon after - preeminently

studying the numerical approaches to Navier-Stokes nonlinearities - we completed a number of research projects which we presented at the most important international conferences in the field, to gratifying appreciation. An important qualitative step in our work was provided by the development of a computational basis and by access to a number of expert softwares. This fact allowed us to generate effective working programs for most of the problems and examples presented in the book, an aspect which was not taken into account in most similar studies that have already appeared all over the world.

Ferrohydrodynamics - R. E. Rosensweig
2013-12-10

Clear, comprehensive treatment of behavior and dynamics of magnetic fluids explores electromagnetism and fields, magnetocaloric energy conversion, more. For graduate students and researchers in physics, engineering, and math.

Reduced Basis Methods for Partial Differential Equations - Alfio Quarteroni
2015-08-19

This book provides a basic introduction to reduced basis (RB) methods for problems involving the repeated solution of partial differential equations (PDEs) arising from engineering and applied sciences, such as PDEs depending on several parameters and PDE-constrained optimization. The book presents a general mathematical formulation of RB methods, analyzes their fundamental theoretical properties, discusses the related algorithmic and implementation aspects, and highlights their built-in algebraic and geometric structures. More specifically, the authors discuss alternative strategies for constructing accurate RB spaces using greedy algorithms and proper orthogonal decomposition techniques, investigate their approximation properties and analyze offline-online decomposition strategies aimed at the reduction of computational complexity. Furthermore, they carry out both a priori and a posteriori error analysis. The whole mathematical presentation is made more stimulating by the use of representative examples of applicative interest in the context of both linear and nonlinear PDEs. Moreover, the inclusion of many pseudocodes allows the reader to easily implement the algorithms illustrated throughout

the text. The book will be ideal for upper undergraduate students and, more generally, people interested in scientific computing. All these pseudocodes are in fact implemented in a MATLAB package that is freely available at <https://github.com/redbkit>

Formulas of Acoustics - F.P. Mechel

2013-06-29

This application-orientated collection of formulas has been written by applied scientists and industrial engineers for design professionals and students who work in engineering acoustics. It is subdivided into the most important fields of applied acoustics, each dealing with a well-defined type of problem. It provides easy and rapid access to profound and comprehensive information. In order to keep the text as concise as possible, the derivation of a formula is described as briefly as possible and the reader is referred to the original source. Besides the formulas, useful principles and computational procedures are given.

Mechanical Engineering for Sustainable Development: State-of-the-Art Research -

C.S.P. Rao 2019-01-04

This volume provides valuable insight into diverse topics related to mechanical engineering and presents state-of-the-art work on sustainable development being carried out throughout the world by budding researchers and scientists. Divided into three sections, the volume covers machine design, materials and manufacturing, and thermal engineering. It presents innovative research work on machine design that is of relevance to such varied fields as the automotive industry, agriculture, and human anatomy. The second section addresses materials characterization, an important tool in assessing proper materials for application-oriented jobs, and emerging unconventional machining processes that are important in design engineering for new products and tools. The section on thermal engineering broadly covers the use of viable alternate fuels, such as HHO, biodiesel, etc., with the objective of reducing the burden on petroleum reserves and the environment.

Asian and Pacific Coasts 2011 - Joseph Hun-Wei Lee 2011-11-24

This is a compilation of papers presented at the 6th International Conference on Asian and Pacific

Coasts (APAC2011) held on December 14-16, 2011 in Hong Kong, China. It contains more than 200 articles addressing a wide spectrum of issues, ranging from conventional coastal engineering problems (such as wave hydrodynamics and sediment transport) to issues of contemporary interest (such as tsunami, coastal development, climate change and seawater level rise, shoreline protection, marine energy, nearshore ecology, oil spill, etc.). Authors present their experiences in tackling these problems, by means of theoretical modeling, numerical simulation, laboratory and field observations, with an aim to advance fundamental understanding of the controlling mechanisms, as well as to develop solutions for practical designs. This volume serves to promote technological progress and activities, technical knowledge transfer and cooperation on an international scale. Contents: Beach Erosion and Sediment Transport Climate Change and Sea Level Rise Coastal Infrastructure Developments Hydrodynamics of Offshore Structures Lowland Development and Reclamation Marine Ecology and Environments Marine and Offshore Wind Energy Oil Spill and Environmental Hazards Port Works (Dredging, Seawall Design, etc.) Sea Water Intrusion Tsunami, Waves and Tides Wastewater Disposal Wetlands Readership: Scientists, engineers, researchers, and management professionals in the fields of coastal, ocean, port and marine engineering. Keywords: Coastal Engineering; Tsunami; Waves; Hydrodynamics; Marine Energy; Wetlands

Selected Papers from the 15th OpenFOAM Workshop - Eric G Paterson 2021-10-21

This Special Issue will publish selected papers from the 15th OpenFOAM Workshop, June 22-25, 2020 in Arlington, Virginia, USA. The workshop is hosted by the Crofton Department of Aerospace and Ocean Engineering at Virginia Tech. During this community driven event, conference presentations and poster sessions will be held and work in progress is gladly seen as well. In addition to the conference aspect, trainings on OpenFOAM technology and other related software tools are held mostly from users for users. This underlines one of the goals of the workshop: bringing users, developers and researchers together and providing a nurturing

ground for open discussions and future projects. The conference will cover the following main topics: - Aerodynamics; - Civil engineering; - Complex materials; - Compressible flows; - Fluid-structure interaction; - General CFD; - Heat and mass transfer; - Lagrangian methods; - Naval hydrodynamic; - Offshore and renewable energy; - Optimization and control; - Porous media; - Pre/post-processing; - Reacting flows; - Turbomachinery; - Turbulence modeling. Papers presented in this workshop and having enough quality can be further considered for publication in *Fluids*. The papers will be peer-reviewed for the validation of research results, developments, and applications.

Handbook of Thermal Science and Engineering - 2018-07-18

This Handbook provides researchers, faculty, design engineers in industrial R&D, and practicing engineers in the field concise treatments of advanced and more-recently established topics in thermal science and engineering, with an important emphasis on micro- and nanosystems, not covered in earlier references on applied thermal science, heat transfer or relevant aspects of mechanical/chemical engineering. Major sections address new developments in heat transfer, transport phenomena, single- and multiphase flows with energy transfer, thermal-bioengineering, thermal radiation, combined mode heat transfer, coupled heat and mass transfer, and energy systems. Energy transport at the macro-scale and micro/nano-scales is also included. The internationally recognized team of authors adopt a consistent and systematic approach and writing style, including ample cross reference among topics, offering readers a user-friendly knowledgebase greater than the sum of its parts, perfect for frequent consultation. The Handbook of Thermal Science and Engineering is ideal for academic and professional readers in the traditional and emerging areas of mechanical engineering, chemical engineering, aerospace engineering, bioengineering, electronics fabrication, energy, and manufacturing concerned with the influence thermal phenomena.

Numerical Models for Differential Problems - Alfio Quarteroni 2014-04-25

In this text, we introduce the basic concepts for

the numerical modelling of partial differential equations. We consider the classical elliptic, parabolic and hyperbolic linear equations, but also the diffusion, transport, and Navier-Stokes equations, as well as equations representing conservation laws, saddle-point problems and optimal control problems. Furthermore, we provide numerous physical examples which underline such equations. We then analyze numerical solution methods based on finite elements, finite differences, finite volumes, spectral methods and domain decomposition methods, and reduced basis methods. In particular, we discuss the algorithmic and computer implementation aspects and provide a number of easy-to-use programs. The text does not require any previous advanced mathematical knowledge of partial differential equations: the absolutely essential concepts are reported in a preliminary chapter. It is therefore suitable for students of bachelor and master courses in scientific disciplines, and recommendable to those researchers in the academic and extra-academic domain who want to approach this interesting branch of applied mathematics.

OpenFOAM® - J. Miguel Nóbrega 2019-01-24
This book contains selected papers of the 11th *OpenFOAM®* Workshop that was held in Guimarães, Portugal, June 26 - 30, 2016. The 11th *OpenFOAM®* Workshop had more than 140 technical/scientific presentations and 30 courses, and was attended by circa 300 individuals, representing 180 institutions and 30 countries, from all continents. The *OpenFOAM®* Workshop provided a forum for researchers, industrial users, software developers, consultants and academics working with *OpenFOAM®* technology. The central part of the Workshop was the two-day conference, where presentations and posters on industrial applications and academic research were shown. *OpenFOAM®* (Open Source Field Operation and Manipulation) is a free, open source computational toolbox that has a larger user base across most areas of engineering and science, from both commercial and academic organizations. As a technology, *OpenFOAM®* provides an extensive range of features to solve anything from complex fluid flows involving chemical reactions, turbulence and heat transfer, to solid dynamics and electromagnetics, among several others. Additionally, the *OpenFOAM*

technology offers complete freedom to customize and extend its functionalities.

TMS 2013 142nd Annual Meeting and Exhibition - The Minerals, Metals & Materials Society (TMS) 2013-02-22

Presenting papers from the 2013 annual meeting of The Minerals, Metals & Materials Society (TMS), this volume covers developments in all aspects of high temperature electrochemistry, from the fundamental to the empirical and from the theoretical to the applied.

Thermal Radiation Heat Transfer - John R. Howell 2015-09-18

Explore the Radiative Exchange between Surfaces Further expanding on the changes made to the fifth edition, Thermal Radiation Heat Transfer, 6th Edition continues to highlight the relevance of thermal radiative transfer and focus on concepts that develop the radiative transfer equation (RTE). The book explains the fundamentals of radiative transfer, introduces the energy and radiative transfer equations, covers a variety of approaches used to gauge radiative heat exchange between different surfaces and structures, and provides solution techniques for solving the RTE. What's New in the Sixth Edition This revised version updates information on properties of surfaces and of absorbing/emitting/scattering materials, radiative transfer among surfaces, and radiative transfer in participating media. It also enhances the chapter on near-field effects, addresses new applications that include enhanced solar cell performance and self-regulating surfaces for thermal control, and updates references. Comprised of 17 chapters, this text: Discusses the fundamental RTE and its simplified forms for different medium properties Presents an intuitive relationship between the RTE formulations and the configuration factor analyses Explores the historical development and the radiative behavior of a blackbody Defines the radiative properties of solid opaque surfaces Provides a detailed analysis and solution procedure for radiation exchange analysis Contains methods for determining the radiative flux divergence (the radiative source term in the energy equation) Thermal Radiation Heat Transfer, 6th Edition explores methods for solving the RTE to determine the local spectral intensity, radiative flux, and flux gradient. This book enables you to assess and calculate the

exchange of energy between objects that determine radiative transfer at different energy levels.

An Introduction to Computational Fluid Dynamics The Finite Volume Method, 2/e - Versteeg 2007

Modelling Diesel Combustion - P. A. Lakshminarayanan 2022-01-21

This book comprehensively discusses diesel combustion phenomena like ignition delay, fuel-air mixing, rate of heat release, and emissions of smoke, particulate and nitric oxide. It enables quantitative evaluation of these important phenomena and parameters. Most importantly, it attempts to model them with constants that are independent of engine types and hence they could be applied by the engineers and researchers for a general engine. This book emphasizes the importance of the spray at the wall in precisely describing the heat release and emissions for most of the engines on and off-road. It gives models for heat release and emissions. Every model is thoroughly validated by detailed experiments using a broad range of engines. The book describes an elegant quasi-one-dimensional model for heat release in diesel engines with single as well as multiple injections. The book describes how the two aspects, namely, fuel injection rate and the diameter of the combustion bowl in the piston, have enabled meeting advanced emission, noise, and performance standards. The book also discusses the topics of computational fluid dynamics encompassing RANS and LES models of turbulence. Given the contents, this book will be useful for students, researchers and professionals working in the area of vehicle engineering and engine technology. This book will also be a good professional book for practising engineers in the field of combustion engines and automotive engineering.

Emerging Nanotechnologies for Renewable Energy - Waqar Ahmed 2021-02-16

Emerging Nanotechnologies for Renewable Energy offers a detailed overview of the benefits and applications of nanotechnology in the renewable energy sector. The book highlights recent work carried out on the emerging role of nanotechnology in renewable energy applications, ranging from photovoltaics, to

battery technology and energy from waste. Written by international authors from both industry and academia, the book covers topics including scaling up from laboratory to industrial scale. It is a valuable resource for students at postgraduate and advanced undergraduate levels, researchers in industry and academia, technology leaders, and policy and decision-makers in the energy and engineering sectors. Offers insights into a wide range of nanoscale technologies for the generation, storage and transfer of energy Shows how nanotechnology is being used to create new, more environmentally friendly energy solutions Assesses the challenges involved in scaling up nanotechnology-based energy solutions to an industrial scale

Advances in Modeling and Simulation in Textile Engineering - Nicholus Tayari Akankwasa
2021-03-28

Advances in Modeling and Simulation in Textile Engineering: New Concepts, Methods, and Applications explains the advanced principles and techniques that can be used to solve textile engineering problems using numerical modeling and simulation. The book draws on innovative research and industry practice to explain methods for the modeling of all of these processes, helping readers apply computational power to more areas of textile engineering. Experimental results are presented and linked closely to processes and methods of implementation. Diverse concepts such as heat transfer, fluid dynamics, three-dimensional motion, and multi-phase flow are addressed. Finally, tools, theoretical principles, and numerical models are extensively covered. Textile engineering involves complex processes which are not easily expressed numerically or simulated, such as fiber motion simulation, yarn to fiber formation, melt spinning technology, optimization of yarn production, textile machinery design and optimization, and modeling of textile/fabric reinforcements. Provides new approaches and techniques to simulate a wide range of textile processes from geometry to manufacturing Includes coverage of detailed mathematical methods for textiles, including neural networks, genetic algorithms, and the finite element method Addresses modeling techniques for many different phenomena, including heat transfer, fluid

dynamics and multi-phase flow

Computational Fluid Dynamics: Principles and Applications - Jiri Blazek 2005-12-20

Computational Fluid Dynamics (CFD) is an important design tool in engineering and also a substantial research tool in various physical sciences as well as in biology. The objective of this book is to provide university students with a solid foundation for understanding the numerical methods employed in today's CFD and to familiarise them with modern CFD codes by hands-on experience. It is also intended for engineers and scientists starting to work in the field of CFD or for those who apply CFD codes. Due to the detailed index, the text can serve as a reference handbook too. Each chapter includes an extensive bibliography, which provides an excellent basis for further studies.

Iterative Methods for Linear and Nonlinear Equations - C. T. Kelley 1995-01-01

Linear and nonlinear systems of equations are the basis for many, if not most, of the models of phenomena in science and engineering, and their efficient numerical solution is critical to progress in these areas. This is the first book to be published on nonlinear equations since the mid-1980s. Although it stresses recent developments in this area, such as Newton-Krylov methods, considerable material on linear equations has been incorporated. This book focuses on a small number of methods and treats them in depth. The author provides a complete analysis of the conjugate gradient and generalized minimum residual iterations as well as recent advances including Newton-Krylov methods, incorporation of inexactness and noise into the analysis, new proofs and implementations of Broyden's method, and globalization of inexact Newton methods. Examples, methods, and algorithmic choices are based on applications to infinite dimensional problems such as partial differential equations and integral equations. The analysis and proof techniques are constructed with the infinite dimensional setting in mind and the computational examples and exercises are based on the MATLAB environment.

Single and Two-Phase Flows on Chemical and Biomedical Engineering - Ricardo Dias
2012-07-30

Single and two-phase flows are ubiquitous in

most natural process and engineering systems. Examples of systems or process include, packed bed reactors, either single phase or multiphase, absorber and adsorber separation columns, filter beds, plate heat exchangers, flow of viscoelastic fluids in polymer systems, or the enhanced recovery of oil, among others. In each case the flow plays a central role in determining the system or process behavior and performance. A better understanding of the underlying physical phenomena and the ability to describe the phenomena properly are both crucial to improving design, operation and control processes involving the flow of fluids, ensuring that they will be more efficient and cost effective. Expanding disciplines such as microfluidics and the simulation of complex flow physical systems, such as blood flow in physiological networks, also rely heavily on accurate predictions of fluid flow. Recent advances either in computational and experimental techniques are improving the existing knowledge of single and multiphase flows in engineering and physical systems of interest. This ebook is a review on the state-of-the-art and recent advances in critical areas of fluid mechanics and transport phenomena with respect to chemical and biomedical engineering applications.

Thermal and Nonthermal Encapsulation Methods - Magdalini Krokida 2017-09-27

Encapsulation is a topic of interest across a wide range of scientific and industrial areas, from pharmaceuticals to food and agriculture, for the protection and controlled release of various substances during transportation, storage, and consumption. Since encapsulated materials can be protected from external conditions, encapsulation enhances their stability and maintains their viability. This book offers a comprehensive review of conventional and modern methods for encapsulation. It covers various thermal and nonthermal encapsulation methods applied across a number of industries, including freeze drying, spray drying, spray chilling and spray cooling, electrospinning/electrospraying, osmotic dehydration, extrusion, air-suspension coating, pan coating, and vacuum drying. The book presents basic fundamentals, principles, and applications of each method, enabling the reader to gain extended knowledge. The choice of the

most suitable encapsulation technique is based on the raw materials, the required size, and the desirable characteristics of the final products.

Magnetofluidynamics in Channels and Containers - U. Müller 2013-03-09

The book deals with the theme of incompressible flows of electrically conducting fluids in hydraulic components. The main content of the book is a result of engineering research associated with the design of liquid metal cooling systems for fusion reactors. The book is well suited to serve as a guide for utilising magnetohydrodynamic means in other engineering disciplines such as in material processing, metallurgical engineering and power engineering.

The Analytical and Numerical Solution of Electric and Magnetic Fields - K. J. Binns 1993-01-04

Designed for accessibility to students, researchers and design and development workers, it discusses the full range of classical and modern methods for the solution of electric, magnetic, some thermal and other similar fields. It deals with 1, 2 and 3 space dimensions, with linear, non-linear and anisotropic media as well as static and "low"-frequency time variation. Numerous examples, detailing the physical significance of the mathematics and the practical considerations involved in implementing the solutions, make this a very hands-on working reference.

CFD Modeling of Complex Chemical Processes - Li Xi 2021-09-01

Computational fluid dynamics (CFD), which uses numerical analysis to predict and model complex flow behaviors and transport processes, has become a mainstream tool in engineering process research and development. Complex chemical processes often involve coupling between dynamics at vastly different length and time scales, as well as coupling of different physical models. The multiscale and multiphysics nature of those problems calls for delicate modeling approaches. This book showcases recent contributions in this field, from the development of modeling methodology to its application in supporting the design, development, and optimization of engineering processes.

Mathematical Modeling and Simulation - Kai Velten 2009-06-01

This concise and clear introduction to the topic requires only basic knowledge of calculus and linear algebra - all other concepts and ideas are developed in the course of the book. Lucidly written so as to appeal to undergraduates and practitioners alike, it enables readers to set up simple mathematical models on their own and to interpret their results and those of others critically. To achieve this, many examples have been chosen from various fields, such as biology, ecology, economics, medicine, agricultural, chemical, electrical, mechanical and process engineering, which are subsequently discussed in detail. Based on the author's modeling and simulation experience in science and engineering and as a consultant, the book answers such basic questions as: What is a mathematical model? What types of models do exist? Which model is appropriate for a particular problem? What are simulation, parameter estimation, and validation? The book relies exclusively upon open-source software which is available to everybody free of charge. The entire book software - including 3D CFD and structural mechanics simulation software - can be used based on a free CAELinux-Live-DVD that is available in the Internet (works on most machines and operating systems). *Innovative Mobile and Internet Services in Ubiquitous Computing* - Leonard Barolli 2020-06-09

This book presents the latest research findings, methods and development techniques, challenges and solutions concerning UPC from both theoretical and practical perspectives, with an emphasis on innovative, mobile and Internet services. With the proliferation of wireless technologies and electronic devices, there is a rapidly growing interest in Ubiquitous and Pervasive Computing (UPC), which makes it possible to create a human-oriented computing environment in which computer chips are embedded in everyday objects and interact with the physical world. Through UPC, people can go online even while moving around, thus enjoying nearly permanent access to their preferred services. Though it has the potential to revolutionize our lives, UPC also poses a number of new research challenges.

Fundamentals of Combustion Processes - Sara McAllister 2011-05-10
Fundamentals of Combustion Processes is

designed as a textbook for an upper-division undergraduate and graduate level combustion course in mechanical engineering. The authors focus on the fundamental theory of combustion and provide a simplified discussion of basic combustion parameters and processes such as thermodynamics, chemical kinetics, ignition, diffusion and pre-mixed flames. The text includes exploration of applications, example exercises, suggested homework problems and videos of laboratory demonstrations

The Finite-Difference Time-Domain Method for Electromagnetics with MATLAB® Simulations - Atef Z. Elsherbeni 2015-11-25

This book introduces the powerful Finite-Difference Time-Domain method to students and interested researchers and readers. An effective introduction is accomplished using a step-by-step process that builds competence and confidence in developing complete working codes for the design and analysis of various antennas and microwave devices. This book will serve graduate students, researchers, and those in industry and government who are using other electromagnetics tools and methods for the sake of performing independent numerical confirmation. No previous experience with finite-difference methods is assumed of readers.

Solving PDEs in Python - Hans Petter Langtangen 2017-03-21

This book offers a concise and gentle introduction to finite element programming in Python based on the popular FEniCS software library. Using a series of examples, including the Poisson equation, the equations of linear elasticity, the incompressible Navier-Stokes equations, and systems of nonlinear advection-diffusion-reaction equations, it guides readers through the essential steps to quickly solving a PDE in FEniCS, such as how to define a finite variational problem, how to set boundary conditions, how to solve linear and nonlinear systems, and how to visualize solutions and structure finite element Python programs. This book is open access under a CC BY license.

Process Intensification - David Reay 2013-06-05
Process Intensification: Engineering for Efficiency, Sustainability and Flexibility is the first book to provide a practical working guide to understanding process intensification (PI) and developing successful PI solutions and

applications in chemical process, civil, environmental, energy, pharmaceutical, biological, and biochemical systems. Process intensification is a chemical and process design approach that leads to substantially smaller, cleaner, safer, and more energy efficient process technology. It improves process flexibility, product quality, speed to market and inherent safety, with a reduced environmental footprint. This book represents a valuable resource for engineers working with leading-edge process technologies, and those involved research and development of chemical, process, environmental, pharmaceutical, and bioscience systems. No other reference covers both the technology and application of PI, addressing fundamentals, industry applications, and including a development and implementation guide Covers hot and high growth topics, including emission prevention, sustainable design, and pinch analysis World-class authors: Colin Ramshaw pioneered PI at ICI and is widely credited as the father of the technology *An Introduction to Magnetohydrodynamics* - P. A. Davidson 2001-03-05

This book is an introductory text on magnetohydrodynamics (MHD) - the study of the interaction of magnetic fields and conducting fluids.

RF Power Semiconductor Generator Application in Heating and Energy Utilization

- Satoshi Horikoshi 2020-03-26

This is a specialized book for researchers and technicians of universities and companies who are interested in the fundamentals of RF power semiconductors, their applications and market penetration. Looking around, we see that products using vacuum tube technology are disappearing. For example, branch tube TVs have changed to liquid crystal TVs, and fluorescent light have turned into LED. The switch from vacuum tube technology to semiconductor technology has progressed remarkably. At the same time, high-precision functionalization, miniaturization and energy saving have advanced. On the other hand, there is a magnetron which is a vacuum tube device for generating microwaves. However, even this vacuum tube technology has come to be replaced by RF power semiconductor technology. In the last few years the price of semiconductors

has dropped sharply and its application to microwave heating and energy fields will proceed. In some fields the transition from magnetron microwave oscillator to semiconductor microwave oscillator has already begun. From now on this development will progress remarkably. Although there are several technical books on electrical systems that explain RF power semiconductors, there are no books yet based on users' viewpoints on actual microwave heating and energy fields. In particular, none have been written about exact usage and practical cases, to answer questions such as "What are the advantages and disadvantages of RF power semiconductor oscillator?", "What kind of field can be used?" and the difficulty of the market and application. Based on these issues, this book explains the RF power semiconductors from the user's point of view by covering a very wide range of fields.

Practical Finite Element Analysis - Nitin S. Gokhale 2008

Highlights of the book: Discussion about all the fields of Computer Aided Engineering, Finite Element Analysis Sharing of worldwide experience by more than 10 working professionals Emphasis on Practical usage and minimum mathematics Simple language, more than 1000 colour images International quality printing on specially imported paper Why this book has been written ... FEA is gaining popularity day by day & is a sought after dream career for mechanical engineers. Enthusiastic engineers and managers who want to refresh or update the knowledge on FEA are encountered with volume of published books. Often professionals realize that they are not in touch with theoretical concepts as being pre-requisite and find it too mathematical and Hi-Fi. Many a times these books just end up being decoration in their book shelves ... All the authors of this book are from IITs & IISc and after joining the industry realized gap between university education and the practical FEA. Over the years they learned it via interaction with experts from international community, sharing experience with each other and hard route of trial & error method. The basic aim of this book is to share the knowledge & practices used in the industry with experienced and in particular beginners so as to reduce the learning curve & avoid

reinvention of the cycle. Emphasis is on simple language, practical usage, minimum mathematics & no pre-requisites. All basic concepts of engineering are included as & where it is required. It is hoped that this book would be helpful to beginners, experienced users,

managers, group leaders and as additional reading material for university courses.

Numerische Simulation von MHD-Stroemungen in inhomogenen und instationaeren Magnetfeldern -

Ehrhard, Sebastian 2016-10-28