

Introduction To Simulation Using Matlab Free

This is probably the first book that employs the technique of simulation experiments as a means of reinforcing the basic concepts of communication theory. Undergraduate students are generally exposed to a mathematically rigorous treatment of communications theory but seldom have the benefit of a practical-orientated approach employing modelling and simulation for a thorough assimilation of the subject. This book can supplement any standard textbook to cover this significant lacuna in the existing learning methodology. It uses MATLAB®, the language of the technical computing fraternity, for the purpose. The introductory chapters provide an overview of computer simulation and MATLAB programming concepts. Thereafter, communications concepts are presented in the traditional manner but followed up with appropriate simulations in MATLAB/Simulink®. Relevant MATLAB source code is given whenever it is used to illustrate a point. All the source code given in the text has been tested on MATLAB kernel version 7.10 (Release R2010a) and is provided in the accompanying CD. Showcases the latest trends in new virtual/augmented reality healthcare and medical applications and provides an overview of the economic, psychological, educational and organizational impacts of these new applications and how we work, teach, learn and provide care. With the current advances in technology innovation, the field of medicine and healthcare is rapidly expanding and, as a result, many different areas of human

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health diagnostics, treatment and care are emerging. Wireless technology is getting faster and 5G mobile technology allows the Internet of Medical Things (IoMT) to greatly improve patient care and more effectively prevent illness from developing. This book provides an overview and review of the current and anticipated changes in medicine and healthcare due to new technologies and faster communication between users and devices. The groundbreaking book presents state-of-the-art chapters on many subjects including: A review of the implications of Virtual Reality (VR) and Augmented Reality (AR) healthcare applications A review of current augmenting dental care An overview of typical human-computer interaction (HCI) that can help inform the development of user interface designs and novel ways to evaluate human behavior to responses in VR and other new technologies A review of telemedicine technologies Building empathy in young children using augmented reality AI technologies for mobile health of stroke monitoring & rehabilitation robotics control Mobile doctor brain AI App An artificial intelligence mobile cloud computing tool Development of a robotic teaching aid for disabled children Training system design of lower limb rehabilitation robot based on virtual reality

System Simulation Techniques with MATLAB and Simulink comprehensively explains how to use MATLAB and Simulink to perform dynamic systems simulation tasks for engineering and non-engineering applications. This book begins with covering the fundamentals of MATLAB programming and applications, and the solutions to

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different mathematical problems in simulation. The fundamentals of Simulink modelling and simulation are then presented, followed by coverage of intermediate level modelling skills and more advanced techniques in Simulink modelling and applications. Finally the modelling and simulation of engineering and non-engineering systems are presented. The areas covered include electrical, electronic systems, mechanical systems, pharmacokinetics systems, video and image processing systems and discrete event systems. Hardware-in-the-loop simulation and real-time application are also discussed. Key features: Progressive building of simulation skills using Simulink, from basics through to advanced levels, with illustrations and examples Wide coverage of simulation topics of applications from engineering to non-engineering systems Dedicated chapter on hardware-in-the-loop simulation and real-time control End of chapter exercises A companion website hosting a solution manual and powerpoint slides System Simulation Techniques with MATLAB and Simulink is a suitable textbook for senior undergraduate/postgraduate courses covering modelling and simulation, and is also an ideal reference for researchers and practitioners in industry.

Introduction to Modeling and Simulation with MATLAB® and Python CRC Press

A Gentle Introduction to Numerical Simulations with MATLAB/Octave

For Engineering and Information Systems

Physical Modeling in MATLAB

Simulation of Power System with Renewables

An Introduction to the Numerical Simulation of Stochastic Differential Equations Emerging Technologies for Health and Medicine

Step-by-step instructions enable chemical engineers to master key software programs and solve complex problems. Today, both students and professionals in chemical engineering must solve increasingly complex problems dealing with refineries, fuel cells, microreactors, and pharmaceutical plants, to name a few. With this book as their guide, readers learn to solve these problems using their computers and Excel, MATLAB, Aspen Plus, and COMSOL Multiphysics. Moreover, they learn how to check their solutions and validate their results to make sure they have solved the problems correctly. Now in its Second Edition, *Introduction to Chemical Engineering Computing* is based on the author's firsthand teaching experience. As a result, the emphasis is on problem solving. Simple introductions help readers become conversant with each program and then tackle a broad range of problems in chemical engineering, including: Equations of state, Chemical reaction equilibria, Mass balances with recycle streams, Thermodynamics and simulation of mass transfer equipment, Process simulation, Fluid flow in two and three dimensions. All the chapters contain clear instructions, figures, and examples to guide readers through all the programs and types of chemical engineering problems. Problems at the end of each chapter, ranging from simple to difficult, allow readers to gradually build their skills, whether they solve the problems themselves or in teams. In addition, the book's accompanying website lists the core principles learned from each problem, both from a chemical engineering and a computational perspective. Covering a broad range of disciplines and problems within chemical engineering, *Introduction to Chemical Engineering Computing* is recommended for both undergraduate and graduate students as well.

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as practicing engineers who want to know how to choose the right computer software program and tackle almost any chemical engineering problem.

Simulation of Power System with Renewables provides details on the modelling and efficient implementation of MATLAB, particularly with a renewable energy driven power system. The book presents a step-by-step approach to modelling implementation, including all major components used in current power systems operation, giving the reader the opportunity to learn how to gather models for conventional generators, wind farms, solar plants and FACTS control devices. Users will find this to be a central resource for modelling, building and simulating renewable power systems, including discussions on its limitations, assumptions on the model, and the implementation and analysis of the system. Presents worked examples and equations in each chapter that address system limitations and flexibility Provides step-by-step guidance for building and simulating models with required data Contains case studies on a number of devices, including FACTS, and renewable generation

This new book builds on the original classic textbook entitled: An Introduction to Computational Fluid Mechanics by C. Y. Chow which was originally published in 1979. In the decades that have passed since this book was published the field of computational fluid dynamics has seen a number of changes in both the sophistication of the algorithms used but also advances in the computer hardware and software available. This new book incorporates the latest algorithms in the solution techniques and supports this by using numerous examples of applications to a broad range of industries from mechanical and aerospace disciplines to civil and the biosciences. The computer programs are developed and available in MATLAB. In addition the core text provides up-to-date solution methods for the Navier-Stokes equations, including

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fractional step time-advancement, and pseudo-spectral methods. The computer codes at the following website: www.wiley.com/go/biringer

Although, the basic concept of a fuel cell is quite simple, creating new designs and optimizing their performance takes serious work and a mastery of several technical areas. PEM Fuel Cell Modeling and Simulation Using Matlab, provides design engineers and researchers with a valuable tool for understanding and overcoming barriers to designing and building the next generation of PEM Fuel Cells. With this book, engineers can test components and verify designs in the development phase, saving both time and money. Easy to read and understand, this book provides design and modelling tips for fuel cell components such as: modelling proton exchange structure, catalyst layers, gas diffusion, fuel distribution structures, fuel cell stacks and fuel cell plant. This book includes design advice and MATLAB and FEMLAB codes for Fuel Cell types such as: polymer electrolyte, direct methanol and solid oxide fuel cells. This book also includes types for one, two and three dimensional modeling and two-phase flow phenomena and microfluidics. *Modeling and design validation techniques *Covers most types of Fuel Cell including SOFC *MATLAB and FEMLAB modelling codes *Translates basic phenomena into mathematical equations

Communication Systems Modeling and Simulation using MATLAB and Simulink

An Introduction to Optimal Control Problems in Life Sciences and Economics

Modeling Discrete-Event Systems with GPenSIM

Advanced Modelling with the MATLAB Reservoir Simulation Toolbox

Practical MATLAB

Understanding LTE with MATLAB

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This book accomplishes two things simultaneously: it teaches you to use the latest version of the powerful MATLAB programming environment, and it teaches you core, transferrable programming skills that will make you feel at home with most procedural programming languages. MATLAB has been in existence for more than 30 years and is used by millions of engineers, scientists, and students worldwide, both for its depth and its easy usability. With dozens of specialized toolboxes available beyond the core MATLAB program, as well as its companion program Simulink for simulation and model-based design, MATLAB can serve as an invaluable aid throughout your career. Unlike many other MATLAB books, ours assumes no prior experience in computer programming. Using an approachable tone, we take you from the simplest variables through complex expressions, data visualization and curve fitting. Each chapter builds on the last, presenting a depth tutorial on a focused concept central to programming, using the MATLAB language, but applicable to countless other popular and in-demand languages such as C++, Java, JavaScript, R, and Python. We'll ask you to perform short exercises as you work through each chapter, followed by more end-to-end exercises and mental challenges at the chapter's end. As the complexity of the concepts increases, they present increasingly real-world engineering challenges to match. Once you've completed *An Engineer's Introduction to Programming with MATLAB 2018*, you will have a solid foundation in computer programming forms and concepts and a comfort with the

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MATLAB environment and programming language. We believe that you'll enjoy both gaining and having that knowledge, and that you'll be able to use it almost immediately with your other coursework.

Designed for undergraduate students in the general science, engineering, and mathematics community, *Introduction to the Simulation of Dynamics Using Simulink* shows how to use the powerful tool of Simulink to investigate and form intuition about the behavior of dynamical systems. Requiring no prior programming experience, it clearly explains how to transition from physical models described by mathematical equations directly to executable Simulink simulations. Teaches students how to build and explore the dynamics of systems Step by step, the author presents the basics of building a simulation in Simulink. He begins with finite difference equations and simple discrete models, such as annual population models, to introduce the concept of simulation. The text then covers ordinary differential equations, numerical integration algorithms, and time-step simulation. The final chapter offers overviews of some advanced topics, including the simulation of chaotic dynamics and partial differential equations. A semester undergraduate course on simulation Written in an informal, accessible style, this guide includes many diagrams and graphics as well as exercises embedded within the text. It also draws on numerous examples from the science, engineering, and technology fields. The book deepens students' understanding of simulated systems.

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prepares them for advanced and specialized studies in simulation.

This custom edition is published for Central Queensland University.

Apply MATLAB programming to the mathematical modeling of real-life problems from a wide range of topics. This pragmatic book shows you how to solve your programming problems, starting with a brief primer on MATLAB and the fundamentals of the MATLAB programming language. Then, you'll build fully working examples and computational models found in the financial, engineering, and scientific sectors. As part of this, you'll cover signal and image processing, as well as GUIs. After reading and using Practical MATLAB and its accompanying source code, you'll have the practical know-how and code to apply to your own MATLAB programming projects. What You Will Learn Discover the fundamentals of MATLAB and how to get started with it for problem solving Apply MATLAB to a variety of problems and case studies Carry out economic and financial modeling with MATLAB, including option pricing and compound interest Use MATLAB for simulation problems such as coin flips, dice rolling, random walks, and traffic flows Solve computational biology problems with MATLAB Implement signal processing with MATLAB, including currents, Fast Fourier Transforms (FFTs), and harmonic analysis Process images with filters and edge detection Build applications and GUIs Who This Book Is For People with some prior experience with programming MATLAB.

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Introduction to Mathematical Biology

Applied Computational Modelling with MATLAB (Custom Edition)

Electromagnetic Diffraction Modeling and Simulation with MATLAB

Modeling and Simulation with Simulink®

Programming for Computations - MATLAB/Octave

Introduction to Chemical Engineering Computing

Process Control: Modeling, Design, and Simulation is the first complete introduction to process control that fully integrates software tools-helping you master critical techniques hands-on, using MATLAB-based computer simulations. Author B. Wayne Bequette includes process control diagrams, dynamic modeling, feedback control, frequency response analysis techniques, control loop tuning, and start-to-finish chemical process control case studies.

This book offers a comprehensive introduction to intelligent control system design, using MATLAB simulation to verify typical intelligent controller designs. It also uses real-world case studies that present the results of intelligent controller implementations to illustrate the successful application of the theory. Addressing the need for systematic design approaches to intelligent control system design using neural network and fuzzy-based techniques, the book introduces the concrete design method and MATLAB simulation of intelligent control strategies; offers a catalog of implementable intelligent control design methods for engineering applications; provides advanced intelligent controller design methods and their stability analysis methods; and presents a sample simulation and Matlab program for each intelligent

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control algorithm. The main topics addressed are expert control, fuzzy logic control, adaptive fuzzy control, neural network control, adaptive neural control and intelligent optimization algorithms, providing several engineering application examples for each method.

The essential, intermediate and advanced topics of Simulink are covered in the book. The concept of multi-domain physical modeling concept and tools in Simulink are illustrated with examples for engineering systems and multimedia information. The combination of Simulink and numerical optimization methods provides new approaches for solving problems, where solutions are not known otherwise.

Modeling Discrete-Event Systems with GPenSIM describes the design and applications of General Purpose Petri Net Simulator (GPenSIM), which is a software tool for modeling, simulation, and performance analysis of discrete-event systems. The brief explains the principles of modelling discrete-event systems, as well as the design and applications of GPenSIM. It is based on the author's lectures that were given on "modeling, simulation, and performance analysis of discrete event systems". The brief uses GPenSIM to enable the efficient modeling of complex and large-scale discrete-event systems. GPenSIM, which is based on MATLAB®, is designed to allow easy integration of Petri net models with a vast number of toolboxes that are available on the MATLAB®. The book offers an approach for developing models that can interact with the external environment; this will help readers to solve problems in industrial diverse fields. These problems include: airport capacity evaluation for aviation authorities; finding bottlenecks in supply chains; scheduling drilling operations in the oil and gas industry;

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and optimal scheduling of jobs in grid computing. This brief is of interest to researchers working on the modeling, simulation and performance evaluation of discrete-event systems, as it shows them the design and applications of an efficient modeling package. Since the book also explains the basic principles of modeling discrete-event systems in a step-by-step manner, it is also of interest to final-year undergraduate and postgraduate students.

Modelling the Wireless Propagation Channel

From Mathematical Modeling to Simulation and Prototyping

Introduction to Linear Optimization and Extensions with MATLAB

With Modeling, Simulation, and Processing Projects

Introduction to the Simulation of Dynamics Using Simulink

Simulation of Dynamic Systems with MATLAB® and Simulink®

This book is based on a one semester course that the authors have been teaching for several years, and includes two sets of case studies. The first includes chemostat models, predator-prey interaction, competition among species, the spread of infectious diseases, and oscillations arising from bifurcations. In developing these topics, readers will also be introduced to the basic theory of ordinary differential equations, and how to work with MATLAB without having any prior programming experience. The second set of case studies were adapted from recent and current research papers to the level of the students. Topics have been selected based on public health interest. This includes the risk of atherosclerosis associated with high cholesterol levels, cancer and immune interactions, cancer therapy, and tuberculosis. Readers will experience how mathematical models and their numerical simulations can provide

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explanations that guide biological and biomedical research. Considered to be the undergraduate companion to the more advanced book "Mathematical Modeling of Biological Processes" (A. Friedman, C.-Y. Kao, Springer – 2014), this book is geared towards undergraduate students with little background in mathematics and no biological background. Filling the need for an introductory book on linear programming that discusses the important ways to mitigate parameter uncertainty, Introduction to Linear Optimization and Extensions with MATLAB provides a concrete and intuitive yet rigorous introduction to modern linear optimization. In addition to fundamental topics, the book discusses current I Combining control theory and modeling, this textbook introduces and builds on methods for simulating and tackling concrete problems in a variety of applied sciences. Emphasizing "learning by doing," the authors focus on examples and applications to real-world problems. An elementary presentation of advanced concepts, proofs to introduce new ideas, and carefully presented MATLAB® programs help foster an understanding of the basics, but also lead the way to new, independent research. With minimal prerequisites and exercises in each chapter, this work serves as an excellent textbook and reference for graduate and advanced undergraduate students, researchers, and practitioners in mathematics, physics, engineering, computer science, as well as biology, biotechnology, economics, and finance. Introduction to Mathematical Modeling and Computer Simulations is written as a textbook for readers who want to understand the main principles of Modeling and Simulations in settings that are important for the applications, without using the profound mathematical tools required by most advanced texts. It can be particularly useful for applied mathematicians and engineers who are just beginning their careers. The goal of this book is to outline Mathematical Modeling

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using simple mathematical descriptions, making it accessible for first- and second-year students.

For Ece

A simulation approach with MATLAB

Scientific and Engineering Applications

System Simulation Techniques with MATLAB and Simulink

Modeling and Simulation Using Matlab - Simulink

A practical tool for propagation channel modeling with MATLAB® simulations. Many books on wireless propagation channel provide a highly theoretical coverage, which for some interested readers, may be difficult to follow. This book takes a very practical approach by introducing the theory in each chapter first, and then carrying out simulations showing how exactly put the theory into practice. The resulting plots are analyzed and commented for clarity, and conclusions are drawn and explained from the obtained results. Key features include: A unique approach to propagation channel modeling with accompanying MATLAB® simulations to demonstrate the theory in practice Contains step by step commentary and analysis of the obtained simulation results in order to provide a comprehensive and

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structured learning tool Covers a wide range of topics including shadowing effects, coverage and interference, Multipath Narrowband channel, Multipath Wideband channel, propagation in micro and pico-cells, the land mobile satellite (LMS) channel, the directional Multipath channel and MIMO and propagation effects in fixed radio links (terrestrial and satellite) The book comes with an accompanying website that contains the MATLAB® simulations and allows readers to try them out themselves Well suited for lab-use, as reference and as a self-learning tool both for advanced students and professionals

Modeling the Wireless Propagation Channel: A simulation approach with MATLAB® will be best suited for postgraduate (Masters and PhD) students and practicing engineers in telecommunications and electrical engineering fields, who are seeking to familiarise themselves with the topic without too many formulas. The book will also be of interest to network engineers, system engineers and researchers

An introduction to technical details related to the PhysicalLayer of the LTE standard with MATLAB® The LTE (Long Term Evolution) and LTE-Advanced are among the latest mobile

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communications standards, designed to realize the dream of a truly global, fast, all-IP-based, secure broadband mobile access technology. This book examines the Physical Layer (PHY) of the LTE standards by incorporating three conceptual elements: an overview of the theory behind key enabling technologies; a concise discussion regarding standard specifications; and the MATLAB® algorithms needed to simulate the standard. The use of MATLAB®, a widely used technical computing language, is one of the distinguishing features of this book. Through a series of MATLAB® programs, the author explores each of the enabling technologies, pedagogically synthesizes an LTE PHY system model, and evaluates system performance at each stage. Following this step-by-step process, readers will achieve deeper understanding of LTE concepts and specifications through simulations. Key Features:

- Accessible, intuitive, and progressive; one of the few books to focus primarily on the modeling, simulation, and implementation of the LTE PHY standard
- Includes case studies and testbenches in MATLAB®, which build knowledge gradually and incrementally until a functional specification for the LTE PHY is attained
- Accompanying Web site includes all

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MATLAB® programs, together with PowerPoint slides and other illustrative examples Dr Houssem Zarrinkoub has served as a development manager and now as a senior product manager with MathWorks, based in Massachusetts, USA. Within his 12 years at MathWorks, he has been responsible for multiple signal processing and communications software tools. Prior to MathWorks, he was a research scientist in the Wireless Group at Nortel Networks, where he contributed to multiple standardization projects for 3G mobile technologies. He has been awarded multiple patents on topics related to computer simulations. He holds a BSc degree in Electrical Engineering from McGill University and MSc and PhD degrees in Telecommunications from the Institut National de la Recherche Scientifique, in Canada. <http://www.wiley.com/go/zarrinkoub>

Stochastic Simulation and Applications in Finance with MATLAB Programs explains the fundamentals of Monte Carlo simulation techniques, their use in the numerical resolution of stochastic differential equations and their current applications in finance. Building on an integrated approach, it provides a pedagogical treatment of the need-to-know materials in risk

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management and financial engineering. The book takes readers through the basic concepts, covering the most recent research and problems in the area, including: the quadratic re-sampling technique, the Least Squared Method, the dynamic programming and Stratified State Aggregation technique to price American options, the extreme value simulation technique to price exotic options and the retrieval of volatility method to estimate Greeks. The authors also present modern term structure of interest rate models and pricing swaptions with the BGM market model, and give a full explanation of corporate securities valuation and credit risk based on the structural approach of Merton. Case studies on financial guarantees illustrate how to implement the simulation techniques in pricing and hedging. NOTE TO READER: The CD has been converted to URL. Go to the following website www.wiley.com/go/huyhnstochastic which provides MATLAB programs for the practical examples and case studies, which will give the reader confidence in using and adapting specific ways to solve problems involving stochastic processes in finance. Continuous-system simulation is an increasingly important tool for optimizing the performance of real-world systems. The book

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presents an integrated treatment of continuous simulation with all the background and essential prerequisites in one setting. It features updated chapters and two new sections on Black Swan and the Stochastic Information Packet (SIP) and Stochastic Library Units with Relationships Preserved (SLURP) Standard. The new edition includes basic concepts, mathematical tools, and the common principles of various simulation models for different phenomena, as well as an abundance of case studies, real-world examples, homework problems, and equations to develop a practical understanding of concepts.

An Introduction to Reservoir Simulation Using MATLAB/GNU Octave
PEM Fuel Cell Modeling and Simulation Using Matlab
Introduction to RF Power Amplifier Design and Simulation
Introduction to Mathematical Modeling and Computer Simulations
Matlab

Modeling, Analysis, and Simulations

Presents advanced reservoir simulation methods used in the widely-used MRST open-source software for researchers, professionals, students.

Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB shows the reader how to exploit a fuller array of numerical methods for the

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analysis of complex scientific and engineering systems than is conventionally employed. The book is dedicated to numerical simulation of distributed parameter systems described by mixed systems of algebraic equations, ordinary differential equations (ODEs) and partial differential equations (PDEs). Special attention is paid to the numerical method of lines (MOL), a popular approach to the solution of time-dependent PDEs, which proceeds in two basic steps: spatial discretization and time integration. Besides conventional finite-difference and element techniques, more advanced spatial-approximation methods are examined in some detail, including nonoscillatory schemes and adaptive-grid approaches. A MOL toolbox has been developed within MATLAB®/OCTAVE/SCILAB. In addition to a set of spatial approximations and time integrators, this toolbox includes a collection of application examples, in specific areas, which can serve as templates for developing new programs. Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB provides a practical introduction to some advanced computational techniques for dynamic system simulation, supported by many worked examples in the text, and a collection of codes available for download from the book's page at www.springer.com. This text is suitable for self-study by practicing scientists and engineers and as a final-year undergraduate course or at the graduate level.

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This exciting new resource presents a comprehensive introduction to the fundamentals of diffraction of two-dimensional canonical structures, including wedge, strip, and triangular cylinder with different boundary conditions. Maxwell equations are discussed, along with wave equation and scattered, diffracted and fringe fields. Geometric optics, as well as the geometric theory of diffraction are explained. With MATLAB scripts included for several well-known electromagnetic diffraction problems, this book discusses diffraction fundamentals of two-dimensional structures with different boundary conditions and analytical numerical methods that are used to show diffraction. The book introduces fundamental concepts of electromagnetic problems, identities, and definitions for diffraction modeling. Basic coordinate systems, boundary conditions, wave equation, and Green's function problem are given. The scattered fields, diffracted fields, and fringe fields, radar cross section for diffraction modeling are presented. Behaviors of electromagnetic waves around the two-dimensional canonical wedge and canonical strip are also explored. Diffraction of trilateral cylinders and wedges with rounded edges is investigated as well as double tip diffraction using Finite Difference Time Domain and Method of Moments. A MATLAB based virtual tool, developed with graphical user interface (GUI), for the visualization of both fringe currents and fringe waves is included,

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using numerical FDTD and MoM algorithm and High-Frequency Asymptotics approaches.

This book presents computer programming as a key method for solving mathematical problems. There are two versions of the book, one for MATLAB and one for Python. The book was inspired by the Springer book TCSE 6: A Primer on Scientific Programming with Python (by Langtangen), but the style is more accessible and concise, in keeping with the needs of engineering students. The book outlines the shortest possible path from no previous experience with programming to a set of skills that allows the students to write simple programs for solving common mathematical problems with numerical methods in engineering and science courses. The emphasis is on generic algorithms, clean design of programs, use of functions, and automatic tests for verification.

Stochastic Simulation and Applications in Finance with MATLAB Programs
From Mathematical Models to Numerical Simulation with MATLAB®

Simulation and Optimization in Finance

Modeling with MATLAB, @Risk, or VBA

Process Control

Simulation of ODE/PDE Models with MATLAB®, OCTAVE and SCILAB

An introductory textbook for people who have not programmed before. Covers basic MATLAB programming with emphasis on modeling and simulation of physical systems.

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Introduction to Modeling and Simulation with MATLAB and Python is intended for students and professionals in science, social science, and engineering that wish to learn the principles of computer modeling, as well as basic programming skills. The book content focuses on meeting a set of basic modeling and simulation competencies that were developed as part of several National Science Foundation grants. Even though computer science students are much more expert programmers, they are not often given the opportunity to see how those skills are being applied to solve complex science and engineering problems and may also not be aware of the libraries used by scientists to create those models. The book interleaves chapters on modeling concepts and related exercises with programming concepts and exercises. The authors start with an introduction to modeling and its importance to current practices in the sciences and engineering. They introduce each of the programming environments and the syntax used to represent variables and compute mathematical equations and functions. As students gain more programming expertise, the authors return to modeling concepts, providing starting code for a variety of exercises where students add additional code to solve the problem and provide an analysis of the outcomes. In this way, the book builds both modeling and programming expertise with a "just-in-time" approach so that by the end of the book, students can take on relatively simple modeling example on their own. Each chapter is supplemented with references to additional reading, tutorials,

and exercises that guide students to additional help and allows them to practice both their programming and analytical modeling skills. In addition, each of the programming related chapters is divided into two parts – one for MATLAB and one for Python. In these chapters, the authors also refer to additional online tutorials that students can use if they are having difficulty with any of the topics. The book culminates with a set of final project exercise suggestions that incorporate both the modeling and programming skills provided in the rest of the volume. Those projects could be undertaken by individuals or small groups of students. The companion website at <http://www.intromodeling.com> provides updates to instructions when there are substantial changes in software versions, as well as electronic copies of exercises and the related code. The website also offers a space where people can suggest additional projects they are willing to share as well as comments on the existing projects and exercises throughout the book. Solutions and lecture notes will also be available for qualifying instructors.

Introduction to RF Power Amplifier Design and Simulation fills a gap in the existing literature by providing step-by-step guidance for the design of radio frequency (RF) power amplifiers, from analytical formulation to simulation, implementation, and measurement. Featuring numerous illustrations and examples of real-world engineering applications, this book: Gives an overview of intermodulation and elaborates on the difference between linear and nonlinear amplifiers Describes the

high-frequency model and transient characteristics of metal-oxide-semiconductor field-effect transistors Details active device modeling techniques for transistors and parasitic extraction methods for active devices Explores network and scattering parameters, resonators, matching networks, and tools such as the Smith chart Covers power-sensing devices including four-port directional couplers and new types of reflectometers Presents RF filter designs for power amplifiers as well as application examples of special filter types Demonstrates the use of computer-aided design (CAD) tools, implementing systematic design techniques Blending theory with practice, Introduction to RF Power Amplifier Design and Simulation supplies engineers, researchers, and RF/microwave engineering students with a valuable resource for the creation of efficient, better-performing, low-profile, high-power RF amplifiers.

Not only do modeling and simulation help provide a better understanding of how real-world systems function, they also enable us to predict system behavior before a system is actually built and analyze systems accurately under varying operating conditions. Modeling and Simulation of Systems Using MATLAB® and Simulink® provides comprehensive, state-of-the-art coverage of all the important aspects of modeling and simulating both physical and conceptual systems. Various real-life examples show how simulation plays a key role in understanding real-world systems. The author also explains how to effectively use MATLAB and Simulink

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software to successfully apply the modeling and simulation techniques presented. After introducing the underlying philosophy of systems, the book offers step-by-step procedures for modeling different types of systems using modeling techniques, such as the graph-theoretic approach, interpretive structural modeling, and system dynamics modeling. It then explores how simulation evolved from pre-computer days into the current science of today. The text also presents modern soft computing techniques, including artificial neural networks, fuzzy systems, and genetic algorithms, for modeling and simulating complex and nonlinear systems. The final chapter addresses discrete systems modeling. Preparing both undergraduate and graduate students for advanced modeling and simulation courses, this text helps them carry out effective simulation studies. In addition, graduate students should be able to comprehend and conduct simulation research after completing this book.

Intelligent Control Design and MATLAB Simulation

Introduction to Modeling and Simulation with MATLAB® and Python

Modeling, Design, and Simulation

Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0

Modeling and Simulation of Systems Using MATLAB and Simulink

An Introduction to Computational Fluid Mechanics by Example

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An introduction to the theory and practice of financial simulation and optimization In recent years, there has been a notable increase in the use of simulation and optimization methods in the financial industry. Applications include portfolio allocation, risk management, pricing, and capital budgeting under uncertainty. This accessible guide provides an introduction to the simulation and optimization techniques most widely used in finance, while at the same time offering background on the financial concepts in these applications. In addition, it clarifies difficult concepts in traditional models of uncertainty in finance, and teaches you how to build models with software. It does this by reviewing current simulation and optimization methodology-along with available software-and proceeds with portfolio risk management, modeling of random processes, pricing of financial derivatives, and real options applications. Contains a unique combination of finance theory and rigorous mathematical modeling emphasizing a hands-on approach through implementation with software Highlights not only classical applications, but also more recent developments, such as pricing of mortgage-backed securities Includes models and code in both spreadsheet-based software (@RISK, Solver, Evolver, VBA) and mathematical modeling software (MATLAB) Filled with in-depth insights and practical advice, Simulation and Optimization Modeling in Finance offers essential guidance on some of the most important topics in financial management.

This book offers a detailed guide to the design and simulation of basic control methods applied to microgrids in various operating modes, using MATLAB® Simulink® software. It includes discussions on the performance of each configuration, as well as the

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advantages and limitations of the droop control method. The content is organised didactically, with a level of mathematical and scientific rigour suitable for undergraduate and graduate programmes, as well as for industry professionals. The use of MATLAB® Simulink® software facilitates the learning process with regard to modelling and simulating power electronic converters at the interface of distributed energy resource (DER) systems. The book also features a wealth of illustrations, schematics, and simulation results. Given its scope, it will greatly benefit undergraduate and graduate students in the fields of electrical and electronics engineering, as well as professionals working in microgrid design and implementation.

This book provides a self-contained introduction to the simulation of flow and transport in porous media, written by a developer of numerical methods. The reader will learn how to implement reservoir simulation models and computational algorithms in a robust and efficient manner. The book contains a large number of numerical examples, all fully equipped with online code and data, allowing the reader to reproduce results, and use them as a starting point for their own work. All of the examples in the book are based on the MATLAB Reservoir Simulation Toolbox (MRST), an open-source toolbox popular in both academic institutions and the petroleum industry. The book can also be seen as a user guide to the MRST software. It will prove invaluable for researchers, professionals and advanced students using reservoir simulation methods. This title is also available as Open Access on Cambridge Core.

"Engineering Computations and Modeling in MATLAB/Simulink" provides a broad overview of The

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An Introduction

Modelling, Programming and Simulations

Engineering Computations and Modeling in MATLAB/Simulink

Vibration Simulation Using MATLAB and ANSYS

User Guide for the MATLAB Reservoir Simulation Toolbox (MRST)

Transfer function form, zpk , state space, modal, and state space modal forms. For someone learning dynamics for the first time or for engineers who use the tools infrequently, the options available for constructing and representing dynamic mechanical models can be daunting. It is important to find a way to put them all in perspective and have them available for quick reference. It is also important to have a strong understanding of modal analysis, from which the total response of a system can be constructed. Finally, it helps to know how to take the results of large dynamic finite element models and build small MATLAB® state space models. Vibration Simulation Using MATLAB and ANSYS answers all those needs. Using a three degree-of-freedom (DOF) system as a unifying theme, it presents all the methods in one book. Each chapter provides the background theory to support its example, each chapter contains both a closed form solution to the problem-shown in its entirety-and detailed MATLAB code for solving the problem. Bridging the gap

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between introductory vibration courses and the techniques used in actual practice. Vibration Simulation Using MATLAB and ANSYS builds the foundation that allows you to simulate your own real-life problems. Features Demonstrates how to solve real problems, covering the vibration of systems from single DOF to finite element models with thousands of DOF Illustrates the differences and similarities between different models by tracking a single example throughout the book Includes the complete, closed-form solution and the MATLAB code used to solve each problem Shows explicitly how to take the results of a realistic ANSYS finite element model and develop a small MATLAB state-space model Provides a solid grounding in how individual modes of vibration combine for overall system response Basic Tutorial on Simulation of Microgrids Control Using MATLAB® & Simulink® Software