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A MATLAB® Primer for Technical Programming for Materials Science and Engineering - Leonid Burstein 2020-02-06

A MATLAB® Primer for Technical Programming for Materials Science and Engineering draws on examples from the field, providing the latest information on this programming tool that is targeted towards materials science. The book enables non-programmers to master MATLAB® in order to solve problems in materials science, assuming only a modest mathematical background. In addition, the book introduces programming and technical concepts in a logical manner to help students use MATLAB® for subsequent projects. This title offers materials scientists who are non-programming specialists with a coherent and focused introduction to MATLAB®. Provides the necessary background, alongside examples drawn from the field, to allow materials scientists to effectively master MATLAB® Guides the reader through programming and technical concepts in a logical and coherent manner Promotes a thorough working familiarity with MATLAB® for materials scientists Gives the information needed to write efficient and compact programs to solve problems in materials science, tribology, mechanics of materials and other material-related disciplines
Machine Component Analysis with MATLAB

- Dan B. Marghitu 2019-03-15
Machine Design Analysis with MATLAB is a highly practical guide to the fundamental principles of machine design which covers the static and dynamic behavior of engineering structures and components. MATLAB has transformed the way calculations are made for engineering problems by computationally generating analytical calculations, as well as providing numerical calculations. Using step-by-step, real world example problems, this book demonstrates how you can use symbolic and numerical MATLAB as a tool to solve problems in machine design. This book provides a thorough, rigorous presentation of machine design, augmented with proven learning techniques which can be used by students and practicing engineers alike. Comprehensive coverage of the fundamental principles in machine design Uses symbolical and numerical MATLAB calculations to enhance understanding and reinforce learning Includes well-designed real-world problems and solutions
Fundamental Concepts of MATLAB Programming - Dr. Brijesh Parmar Bakariya, Dr. Kulwinder Singh 2020-09-03
Learn how to use MATLAB commands and functions in an efficient and effective manner Key Features a- Get familiar and work with the in-built functions in MATLAB a- Learn how to solve algebraic equations in MATLAB a- Explore various techniques for

plotting numerical data a- Learn how to preprocess data to ensure accurate, efficient, and meaningful analysis a- Learn how to issue commands to create variables and call functions Description MATLAB has been an essential platform for data computation. There are various types of technologies that are going on, but it requires a tool for data handling. MATLAB provides better computing power for a massive amount of data. This book will be your comprehensive guide to creating applications, simulation, computation measures. The book begins with an introduction MATLAB and quickly goes on to teach you the usage of MATLAB. After this, we will explore the various commands and essential concepts and topics about MATLAB. Moving forward, we'll explore importing and exporting data, handling data, and visualization of data through different ways to plot a graph. Towards the end, we will explore the basic algebraic functions used in MATLAB. What will you learn a- Learn how to build and run MATLAB statements a- Execute a block of code repeatedly using the Loop Control Statements a- Create a user-defined function by using MATLAB a- Create, Concatenate, and Expand the most basic MATLAB data structure; Matrix a- Understand how to plot a 2D and 3D graph Who this book is for This book is for everyone from the Engineering and Sciences background. It is also for PGDCA, B.Tech. B.E., BCA, BSc, M.Tech. /M.E., MCA, M.Com., MSc, Ph.D. other UG, and PG degree students. Table of Contents 1. Basics of MATLAB 2. Expressions and Basic Commands of MATLAB 3. Data Types, Variables and Operators 4. Decision Control Statements 5. Loops Control Statements 6. Vectors 7. Matrix 8. Arrays 9. Strings 10. Functions 11. Data Import and Export 12. Plotting a Graph 13. Graphics 14. Basic Algebra in MATLAB About the Authors Dr. Brijesh Bakariya is an Assistant Professor in the Department of CSE, IKGPTU, Jalandhar (Punjab). He has authored 01 book and published more than 15 research papers in the journals of international repute. Dr.

Kulwinder Singh Parmar is an Assistant Professor in the Department of Mathematical Sciences, IKGPTU, Jalandhar (Punjab). He has published more than 25 research papers in the journals of international repute.

Matlab - Modelling, Programming and Simulations - Emilson Pereira Leite 2010

Learning MATLAB - Walter Gander 2015-11-21

This comprehensive and stimulating introduction to Matlab, a computer language now widely used for technical computing, is based on an introductory course held at Qian Weichang College, Shanghai University, in the fall of 2014. Teaching and learning a substantial programming language aren't always straightforward tasks. Accordingly, this textbook is not meant to cover the whole range of this high-performance technical programming environment, but to motivate first- and second-year undergraduate students in mathematics and computer science to learn Matlab by studying representative problems, developing algorithms and programming them in Matlab. While several topics are taken from the field of scientific computing, the main emphasis is on programming. A wealth of examples are completely discussed and solved, allowing students to learn Matlab by doing: by solving problems, comparing approaches and assessing the proposed solutions.

Development of Innovative Drugs via Modeling with MATLAB - Ronald Gieschke 2013-11-27

The development of innovative drugs is becoming more difficult while relying on empirical approaches. This inspired all major pharmaceutical companies to pursue alternative model-based paradigms. The key question is: How to find innovative compounds and, subsequently, appropriate dosage regimens? Written from the industry perspective and based on many years of experience, this book offers: - Concepts for creation of drug-disease models, introduced and supplemented with extensive MATLAB

programs - Guidance for exploration and modification of these programs to enhance the understanding of key principles - Usage of differential equations to pharmacokinetic, pharmacodynamic and (patho-) physiologic problems thereby acknowledging their dynamic nature - A range of topics from single exponential decay to adaptive dosing, from single subject exploration to clinical trial simulation, and from empirical to mechanistic disease modeling. Students with an undergraduate mathematical background or equivalent education, interest in life sciences and skills in a high-level programming language such as MATLAB, are encouraged to engage in model-based pharmaceutical research and development.

System Simulation Techniques with MATLAB and Simulink - Dingyü Xue
2013-09-16

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 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, pharmacokinetic 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 realtime 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.

Statistics in MATLAB - MoonJung Cho
2014-12-15

Fulfilling the need for a practical user's guide, Statistics in MATLAB: A Primer provides an accessible introduction to the latest version of MATLAB and its extensive functionality for statistics. Assuming a basic knowledge of statistics and probability as well as a fundamental understanding of linear algebra concepts, this book: Covers capabilities

Computational Colour Science Using MATLAB - Stephen Westland
2004-06-25

Presenting a practical, problem-based approach to colour physics, this title describes the key issues encountered in modern colour engineering, including efficient representation of colour information, fourier analysis of reflectance spectra and advanced colorimetric computation. Emphasis is placed on the practical applications rather than the techniques themselves, with material structured around key topics, such as colour calibration of visual displays, computer recipe prediction and models for colour-appearance prediction. Each topic is carefully introduced at three levels to enhance student understanding. Firstly, theoretical ideas and background information are discussed, explanations of mathematical solutions then follow and finally practical solutions are presented using MATLAB. Includes a compendium of equations and numerical data required by the modern colour and imaging scientist. Numerous examples of solutions and algorithms for a wide-range of computational problems in colour science. Provides example scripts using the

MATLAB programming language. This text is a must-have for students taking courses in colour science, colour chemistry and colour physics as well as technicians and researchers working in the area.

Numerical Linear Algebra - Folkmar Bornemann 2018-01-29

This book offers an introduction to the algorithmic-numerical thinking using basic problems of linear algebra. By focusing on linear algebra, it ensures a stronger thematic coherence than is otherwise found in introductory lectures on numerics. The book highlights the usefulness of matrix partitioning compared to a component view, leading not only to a clearer notation and shorter algorithms, but also to significant runtime gains in modern computer architectures. The algorithms and accompanying numerical examples are given in the programming environment MATLAB, and additionally - in an appendix - in the future-oriented, freely accessible programming language Julia. This book is suitable for a two-hour lecture on numerical linear algebra from the second semester of a bachelor's degree in mathematics.

High Performance Control of AC Drives with Matlab/Simulink - Haitham Abu-Rub 2021-05-11

High Performance Control of AC Drives with Matlab®/Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry The Second Edition of High Performance Control of AC Drives with Matlab®/Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor drive systems. The book includes new material on medium voltage drives, covering state-of-the-art technologies and challenges in the industrial drive system, as well as their components, and control, current source inverter-based drives, PWM techniques for multilevel inverters, and low switching frequency modulation for voltage source inverters. This book covers three-phase and multiphase (more than three-phase) motor drives including their control and practical

problems faced in the field (e.g., adding LC filters in the output of a feeding converter), are considered. The new edition contains links to Matlab®/Simulink models and PowerPoint slides ideal for teaching and understanding the material contained within the book. Readers will also benefit from the inclusion of: A thorough introduction to high performance drives, including the challenges and requirements for electric drives and medium voltage industrial applications An exploration of mathematical and simulation models of AC machines, including DC motors and squirrel cage induction motors A treatment of pulse width modulation of power electronic DC-AC converter, including the classification of PWM schemes for voltage source and current source inverters Examinations of harmonic injection PWM and field-oriented control of AC machines Voltage source and current source inverter-fed drives and their control Modelling and control of multiphase motor drive system Supported with a companion website hosting online resources. Perfect for senior undergraduate, MSc and PhD students in power electronics and electric drives, High Performance Control of AC Drives with Matlab®/Simulink will also earn a place in the libraries of researchers working in the field of AC motor drives and power electronics engineers in industry.

Practical MATLAB - Irfan Turk 2019-10-29

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 section, 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 with GUIs Who This Book Is For People with some prior experience with programming and MATLAB.

Accelerating MATLAB Performance - Yair M. Altman 2014-12-11

The MATLAB® programming environment is often perceived as a platform suitable for prototyping and modeling but not for "serious" applications. One of the main complaints is that MATLAB is just too slow. *Accelerating MATLAB Performance* aims to correct this perception by describing multiple ways to greatly improve MATLAB program speed. Packed with thousands of helpful tips, it leaves no stone unturned, discussing every aspect of MATLAB. Ideal for novices and professionals alike, the book describes MATLAB performance in a scale and depth never before published. It takes a comprehensive approach to MATLAB performance, illustrating numerous ways to attain the desired speedup. The book covers MATLAB, CPU, and memory profiling and discusses various tradeoffs in performance tuning. It describes both the application of standard industry techniques in MATLAB, as well as methods that are specific to MATLAB such as using different data types or built-in functions. The book covers MATLAB vectorization, parallelization (implicit and explicit), optimization, memory management, chunking, and caching. It explains MATLAB's memory model and details how it can be leveraged. It describes

the use of GPU, MEX, FPGA, and other forms of compiled code, as well as techniques for speeding up deployed applications. It details specific tips for MATLAB GUI, graphics, and I/O. It also reviews a wide variety of utilities, libraries, and toolboxes that can help to improve performance. Sufficient information is provided to allow readers to immediately apply the suggestions to their own MATLAB programs. Extensive references are also included to allow those who wish to expand the treatment of a particular topic to do so easily. Supported by an active website, and numerous code examples, the book will help readers rapidly attain significant reductions in development costs and program run times.

Advanced Guide to MATLAB - S. N. Alam 2015-11-30

Provides an advanced-level guide to MATLAB. MATLAB integrates computation, visualization and programming in a very user-friendly and easy-to-use environment. This book is aimed at those who already know the basics of the language and would like to use MATLAB to solve advanced engineering problems. Included are a number of solved problems from all important areas of science and engineering.

Essentials of MATLAB Programming - Stephen J. Chapman 2016-10-14

Now readers can master the MATLAB language as they learn how to effectively solve typical problems with the concise, successful *ESSENTIALS OF MATLAB PROGRAMMING*, 3E. Author Stephen Chapman emphasizes problem-solving skills throughout the book as he teaches MATLAB as a technical programming language. Readers learn how to write clean, efficient, and well-documented programs, while the book simultaneously presents the many practical functions of MATLAB. The first seven chapters introduce programming and problem solving. The last two chapters address more advanced topics of additional data types and plot types, cell arrays, structures, and new MATLAB handle graphics to ensure readers have the skills they need. Important Notice: Media content

referenced within the product description or the product text may not be available in the ebook version.

Practical MATLAB Modeling with Simulink -

Sulaymon L. Eshkabilov 2020-04-07

Employ the essential and hands-on tools and functions of MATLAB's ordinary differential equation (ODE) and partial differential equation (PDE) packages, which are explained and demonstrated via interactive examples and case studies. This book contains dozens of simulations and solved problems via m-files/scripts and Simulink models which help you to learn programming and modeling of more difficult, complex problems that involve the use of ODEs and PDEs. You'll become efficient with many of the built-in tools and functions of MATLAB/Simulink while solving more complex engineering and scientific computing problems that require and use differential equations. Practical MATLAB Modeling with Simulink explains various practical issues of programming and modelling. After reading and using this book, you'll be proficient at using MATLAB and applying the source code from the book's examples as templates for your own projects in data science or engineering.

What You Will Learn Model complex problems using MATLAB and Simulink Gain the programming and modeling essentials of MATLAB using ODEs and PDEs Use numerical methods to solve 1st and 2nd order ODEs Solve stiff, higher order, coupled, and implicit ODEs Employ numerical methods to solve 1st and 2nd order linear PDEs Solve stiff, higher order, coupled, and implicit PDEs Who This Book Is For Engineers, programmers, data scientists, and students majoring in engineering, applied/industrial math, data science, and scientific computing. This book continues where Apress' Beginning MATLAB and Simulink leaves off.

Electronics and Circuit Analysis Using MATLAB - John Okyere Attia 2018-10-08

The use of MATLAB is ubiquitous in the scientific and engineering communities today, and justifiably so. Simple programming, rich graphic facilities, built-

in functions, and extensive toolboxes offer users the power and flexibility they need to solve the complex analytical problems inherent in modern technologies. The ability to use MATLAB effectively has become practically a prerequisite to success for engineering professionals. Like its best-selling predecessor, Electronics and Circuit Analysis Using MATLAB, Second Edition helps build that proficiency. It provides an easy, practical introduction to MATLAB and clearly demonstrates its use in solving a wide range of electronics and circuit analysis problems. This edition reflects recent MATLAB enhancements, includes new material, and provides even more examples and exercises. New in the Second Edition: Thorough revisions to the first three chapters that incorporate additional MATLAB functions and bring the material up to date with recent changes to MATLAB A new chapter on electronic data analysis Many more exercises and solved examples New sections added to the chapters on two-port networks, Fourier analysis, and semiconductor physics MATLAB m-files available for download Whether you are a student or professional engineer or technician, Electronics and Circuit Analysis Using MATLAB, Second Edition will serve you well. It offers not only an outstanding introduction to MATLAB, but also forms a guide to using MATLAB for your specific purposes: to explore the characteristics of semiconductor devices and to design and analyze electrical and electronic circuits and systems.

PEM Fuel Cell Modeling and Simulation Using Matlab - Colleen Spiegel 2011-08-29

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 *Optimal Networked Control Systems with MATLAB* - Jagannathan Sarangapani 2018-09-03

Optimal Networked Control Systems with MATLAB® discusses optimal controller design in discrete time for networked control systems (NCS). The authors apply several powerful modern control techniques in discrete time to the design of intelligent controllers for such NCS. Detailed derivations, rigorous stability proofs, computer simulation examples, and downloadable MATLAB® codes are included for each case. The book begins by providing background on NCS, networked imperfections, dynamical systems, stability theory, and stochastic optimal adaptive controllers in discrete time for linear and nonlinear systems. It lays the foundation for reinforcement learning-based optimal adaptive controller use for finite and infinite horizons. The text then: Introduces quantization effects for linear and nonlinear NCS, describing the design of stochastic adaptive controllers for a class of linear and nonlinear systems Presents two-player zero-sum game-theoretic formulation for linear systems in input-output form enclosed by a communication network Addresses the stochastic optimal control of nonlinear NCS by using neuro dynamic programming Explores stochastic optimal design for nonlinear two-player zero-sum games under

communication constraints Treats an event-sampled distributed NCS to minimize transmission of state and control signals within the feedback loop via the communication network Covers distributed joint optimal network scheduling and control design for wireless NCS, as well as the effect of network protocols on the wireless NCS controller design An ideal reference for graduate students, university researchers, and practicing engineers, Optimal Networked Control Systems with MATLAB® instills a solid understanding of neural network controllers and how to build them.

Microwave Integrated Circuit Components Design through MATLAB®

- S Raghavan 2019-11-11

MICROWAVE INTEGRATED CIRCUIT COMPONENTS DESIGN THROUGH MATLAB® This book teaches the student community microwave integrated circuit component design through MATLAB®, helping the reader to become conversant in using codes and, thereafter, commercial software for verification purposes only. Microwave circuit theory and its comparisons, transmission line networks, S-parameters, ABCD parameters, basic design parameters of planar transmission lines (striplines, microstrips, slot lines, coplanar waveguides, finlines), filter theory, Smith chart, inverted Smith chart, stability circles, noise figure circles and microwave components, are thoroughly explained in the book. The chapters are planned in such a way that readers get a thorough understanding to ensure expertise in design. Aimed at senior undergraduates, graduates and researchers in electrical engineering, electromagnetics, microwave circuit design and communications engineering, this book: • Explains basic tools for design and analysis of microwave circuits such as the Smith chart and network parameters • Gives the advantage of realizing the output without wiring the circuit by simulating through MATLAB code • Compares distributed theory with network theory • Includes microwave components, filters and amplifiers S.

Raghavan was a Senior Professor (HAG) in the Department of Electronics and Communication Engineering, National Institute of Technology (NIT), Trichy, India and has 39 years of teaching and research experience at the Institute. His interests include: microwave integrated circuits, RF MEMS, Bio MEMS, metamaterial, frequency selective surfaces (FSS), substrate integrated waveguides (SIW), biomedical engineering and microwave engineering. He has established state-of-the-art MICs and microwave research laboratories at NIT, Trichy with funding from the Indian government. He is a Fellow/Senior Member in more than 24 professional societies including: IEEE (MTT, EMBS, APS), IETE, IEI, CSI, TSI, ISSS, ILA and ISOI. He is twice a recipient of the Best Teacher Award, and has received the Life Time Achievement Award, Distinguished Professor of Microwave Integrated Circuit Award and Best Researcher Award.

[MATLAB Handbook with Applications to Mathematics, Science, Engineering, and Finance](#) - Jose Miguel David Baez-Lopez 2019-01-21

The purpose of this handbook is to allow users to learn and master the mathematics software package MATLAB®, as well as to serve as a quick reference to some of the most used instructions in the package. A unique feature of this handbook is that it can be used by the novice and by experienced users alike. For experienced users, it has four chapters with examples and applications in engineering, finance, physics, and optimization. Exercises are included, along with solutions available for the interested reader on the book's web page. These exercises are a complement for the interested reader who wishes to get a deeper understanding of MATLAB. Features Covers both MATLAB and introduction to Simulink Covers the use of GUIs in MATLAB and Simulink Offers downloadable examples and programs from the handbook's website Provides an introduction to object oriented programming using MATLAB Includes

applications from many areas Includes the realization of executable files for MATLAB programs and Simulink models

Physical Modeling in MATLAB - Allen Downey 2008-01-01

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

Applications of MATLAB in Science and Engineering - Tadeusz Michalowski 2011-09-09

The book consists of 24 chapters illustrating a wide range of areas where MATLAB tools are applied. These areas include mathematics, physics, chemistry and chemical engineering, mechanical engineering, biological (molecular biology) and medical sciences, communication and control systems, digital signal, image and video processing, system modeling and simulation. Many interesting problems have been included throughout the book, and its contents will be beneficial for students and professionals in wide areas of interest.

Introduction to Simulink with Engineering Applications - Steven T. Karris 2006

This text is an introduction to Simulink, a companion application to MATLAB. It is written for students at the undergraduate and graduate programs, as well as for the working professional. Although some previous knowledge of MATLAB would be helpful, it is not absolutely necessary; Appendix A of this text is an Introduction to MATLAB to enable the reader to begin learning both MATLAB and Simulink to perform graphical computations and programming. Chapters 2 through 18 describe the blocks of all Simulink libraries. Their application is illustrated with practical examples through Simulink models, some of which are supplemented with MATLAB functions, commands, and statements. Chapters 1 and 19 contain several Simulink models to illustrate various applied math and engineering applications. Appendix B is an introduction to difference equations as they apply to

discrete-time systems, and Appendix C introduces the reader to random generation procedures. This text supplements our Numerical Analysis with MATLAB and Spreadsheet Applications, ISBN 0-9709511-1-6. It is self-contained; the blocks of each library are described in an orderly fashion that is consistent with Simulink's documentation. This arrangement provides insight into how a model is used and how its parts interact with each another. Like MATLAB, Simulink can be used with both linear and nonlinear systems, which can be modeled in continuous time, sample time, or a hybrid of these. Examples are provided in this text. Most of the examples presented in this book can be implemented with the Student Versions of MATLAB and Simulink. A few may require the full versions of these outstanding packages, and can be skipped. Some add-ons, known as Toolboxes and Blocksets can be obtained from The MathWorks, Inc., 3 Apple Hill Drive, Natick, MA 01760-2098, USA, www.mathworks.com.

Exploratory Data Analysis with MATLAB

- Wendy L. Martinez 2017-08-07

Praise for the Second Edition: "The authors present an intuitive and easy-to-read book... accompanied by many examples, proposed exercises, good references, and comprehensive appendices that initiate the reader unfamiliar with MATLAB." —Adolfo Alvarez Pinto, International Statistical Review "Practitioners of EDA who use MATLAB will want a copy of this book. ... The authors have done a great service by bringing together so many EDA routines, but their main accomplishment in this dynamic text is providing the understanding and tools to do EDA. —David A Huckaby, MAA Reviews Exploratory Data Analysis (EDA) is an important part of the data analysis process. The methods presented in this text are ones that should be in the toolkit of every data scientist. As computational sophistication has increased and data sets have grown in size and complexity, EDA has become an even more important process for visualizing and

summarizing data before making assumptions to generate hypotheses and models. Exploratory Data Analysis with MATLAB, Third Edition presents EDA methods from a computational perspective and uses numerous examples and applications to show how the methods are used in practice. The authors use MATLAB code, pseudo-code, and algorithm descriptions to illustrate the concepts. The MATLAB code for examples, data sets, and the EDA Toolbox are available for download on the book's website. New to the Third Edition Random projections and estimating local intrinsic dimensionality Deep learning autoencoders and stochastic neighbor embedding Minimum spanning tree and additional cluster validity indices Kernel density estimation Plots for visualizing data distributions, such as beanplots and violin plots A chapter on visualizing categorical data

Fundamentals of Graphics Using

MATLAB - Ranjan Parekh 2019-11-26

This book introduces fundamental concepts and principles of 2D and 3D graphics and is written for undergraduate and postgraduate students of computer science, graphics, multimedia, and data science. It demonstrates the use of MATLAB® programming for solving problems related to graphics and discusses a variety of visualization tools to generate graphs and plots. The book covers important concepts like transformation, projection, surface generation, parametric representation, curve fitting, interpolation, vector representation, and texture mapping, all of which can be used in a wide variety of educational and research fields. Theoretical concepts are illustrated using a large number of practical examples and programming codes, which can be used to visualize and verify the results. Key Features □ Covers fundamental concepts and principles of 2D and 3D graphics □ Demonstrates the use of MATLAB® programming for solving problems on graphics □ Provides MATLAB® codes as answers to specific numerical problems □ Provides codes in a simple copy and

execute format for the novice learner □
Focuses on learning through visual representation with extensive use of graphs and plots □ Helps the reader gain in-depth knowledge about the subject matter through practical examples □ Contains review questions and practice problems with answers for self-evaluation

PSPICE and MATLAB for Electronics -

John Okyere Attia 2010-06-23

Used collectively, PSPICE and MATLAB are unsurpassed for circuit modeling and data analysis. PSPICE can perform DC, AC, transient, Fourier, temperature, and Monte Carlo analysis of electronic circuits with device models and subsystem subcircuits. MATLAB can then carry out calculations of device parameters, curve fitting, numerical integration, nume

Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB - Jamal T. Manassah 2017-12-19

Engineers around the world depend on MATLAB for its power, usability, and outstanding graphics capabilities. Yet too often, engineering students are either left on their own to acquire the background they need to use MATLAB, or they must learn the program concurrently within an advanced course. Both of these options delay students from solving realistic design problems, especially when they do not have a text focused on applications relevant to their field and written at the appropriate level of mathematics. Ideal for use as a short-course textbook and for self-study Elementary Mathematical and Computational Tools for Electrical and Computer Engineers Using MATLAB fills that gap. Accessible after just one semester of calculus, it introduces the many practical analytical and numerical tools that are essential to success both in future studies and in professional life. Sharply focused on the needs of the electrical and computer engineering communities, the text provides a wealth of relevant exercises and design problems. Changes in MATLAB's version 6.0 are included in a special addendum. The lack of skills in fundamental quantitative

tools can seriously impede progress in one's engineering studies or career. By working through this text, either in a lecture/lab environment or by themselves, readers will not only begin mastering MATLAB, but they will also hone their analytical and computational skills to a level that will help them to enjoy and succeed in subsequent electrical and computer engineering pursuits.

MATLAB Programming with Applications for Engineers - Stephen J. Chapman 2012-01-01

MATLAB PROGRAMMING WITH APPLICATIONS FOR ENGINEERS seeks to simultaneously teach MATLAB as a technical programming language while introducing the student to many of the practical functions that make solving problems in MATLAB so much easier than in other languages. The book provides a complete introduction to the fundamentals of good procedural programming. It aids students in developing good design habits that will serve them well in any other language that he or she may pick up later. Programming topics and examples are used as a jumping off point for exploring the rich set of highly optimized application functions that are built directly into MATLAB.

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Essential MATLAB for Scientists and Engineers - Brian D. Hahn 2002

"This completely revised new edition is based on the latest version of MATLAB. New chapters cover handle graphics, graphical user interfaces (GUIs), structures and cell arrays, and importing/exporting data. The chapter on numerical methods now includes a general GUI-driver ODE solver."--Jacket.

Modeling of Curves and Surfaces with MATLAB® - Vladimir Rovenski 2010-06-10

This text on geometry is devoted to various central geometrical topics including: graphs of functions, transformations, (non-)Euclidean geometries, curves and surfaces as well as their applications in a variety of

disciplines. This book presents elementary methods for analytical modeling and demonstrates the potential for symbolic computational tools to support the development of analytical solutions. The author systematically examines several powerful tools of MATLAB® including 2D and 3D animation of geometric images with shadows and colors and transformations using matrices. With over 150 stimulating exercises and problems, this text integrates traditional differential and non-Euclidean geometries with more current computer systems in a practical and user-friendly format. This text is an excellent classroom resource or self-study reference for undergraduate students in a variety of disciplines.

Programming and Engineering Computing with MATLAB 2019 - Huei-Huang Lee 2019-09

This book is designed for undergraduate students completely new to programming with MATLAB. Case studies and examples are used extensively throughout this book and are at the core of what makes this book so unique. The author believes that the best way to learn MATLAB is to study programs written by experienced programmers and that the quality of these example programs determines the quality of the book. The examples in this book are carefully designed to teach you MATLAB programming as well as to inspire within you your own problem solving potential. Most of the examples used in this book are designed to solve a whole class of problems, rather than a single, specific problem. A learn by doing teaching approach is used all through the book. You are guided to tackle a problem using MATLAB commands first and then the commands are explained line by line. This process of learning through hands on experience is one of the most efficient and pain-free ways of learning MATLAB. This approach, together with the extensive use of ordered textboxes, figures, and tables, greatly reduces the size of the book, while still providing you with a book that's comprehensive and easy to follow. The first chapter of this book introduces the

MATLAB programming environment and familiarizes you with MATLAB's core functionality. Chapters two through nine discuss basic MATLAB functionalities in a progressive and comprehensive way. The chapters start out simple and build in complexity as you advance through the book. Chapters ten through thirteen cover advanced topics that are particularly useful in college programs. Each chapter consists of sections, each covering a topic and providing one or more examples. Related MATLAB functions are organized at the end of a section. Additional exercise problems are provided at the end of chapters two through nine. Examples in each section are presented in a consistent way. An example is usually described first, followed by a MATLAB script. Any resulting text and graphics output (and in some cases inputs) that are produced from running a script are presented and discussed. Finally, the remainder of each section is devoted to explaining the purpose of the lines of the script.

Essential MATLAB and Octave - Jesus Rogel-Salazar 2014-11-06

Learn Two Popular Programming Languages in a Single Volume Widely used by scientists and engineers, well-established MATLAB® and open-source Octave are similar software programs providing excellent capabilities for data analysis, visualization, and more. By means of straightforward explanations and examples from different areas in mathematics, engineering, finance, and physics, Essential MATLAB and Octave explains how MATLAB and Octave are powerful tools applicable to a variety of problems. This text provides an introduction that reveals basic structures and syntax, demonstrates the use of functions and procedures, outlines availability in various platforms, and highlights the most important elements for both programs. Effectively Implement Models and Prototypes Using Computational Models This text requires no prior knowledge. Self-contained, it allows the reader to use the material whenever

needed rather than follow a particular order. Compatible with both languages, the book material incorporates commands and structures that allow the reader to gain a greater awareness of MATLAB and Octave, write their own code, and implement their scripts and programs within a variety of applicable fields. It is always made clear when particular examples apply only to MATLAB or only to Octave, allowing the book to be used flexibly depending on readers' requirements. Includes brief, simple code that works in both MATLAB and Octave Provides exercise sections at the end of each chapter Introduces framed examples and discussions with a scientific twist Exercises are provided at the end of each chapter Essential MATLAB and Octave offers an introductory course in MATLAB and Octave programming and is an authoritative resource for students in physics, mathematics, statistics, engineering, and any other subjects that require the use of computers to solve numerical problems.

MATLAB Recipes - Michael Paluszek
2015-11-23

Learn from state-of-the-art examples in robotics, motors, detection filters, chemical processes, aircraft, and spacecraft. This is a practical reference for industry engineers using MATLAB to solve everyday problems. With *MATLAB Recipes: A Problem-Solution Approach* you will review contemporary MATLAB coding including the latest language features and use MATLAB as a software development environment including code organization, GUI development, and algorithm design and testing. This book provides practical guidance for using MATLAB to build a body of code you can turn to time and again for solving technical problems in your line of work. Develop algorithms, test them, visualize the results, and pass the code along to others to create a functional code base for your firm.

Undocumented Secrets of MATLAB-Java Programming - Yair M. Altman 2011-12-05
For a variety of reasons, the MATLAB®-Java interface was never fully documented.

This is really quite unfortunate: Java is one of the most widely used programming languages, having many times the number of programmers and programming resources as MATLAB. Also unfortunate is the popular claim that while MATLAB is a fine programming platform for prototyping, it is not suitable for real-world, modern-looking applications. *Undocumented Secrets of MATLAB®-Java Programming* aims to correct this misconception. This book shows how using Java can significantly improve MATLAB program appearance and functionality, and that this can be done easily and even without any prior Java knowledge. Readers are led step-by-step from simple to complex customizations. Code snippets, screenshots, and numerous online references are provided to enable the utilization of this book as both a sequential tutorial and as a random-access reference suited for immediate use. Java-savvy readers will find it easy to tailor code samples for their particular needs; for Java newcomers, an introduction to Java and numerous online references are provided. This book demonstrates how The MATLAB programming environment relies on Java for numerous tasks, including networking, data-processing algorithms and graphical user-interface (GUI) We can use MATLAB for easy access to external Java functionality, either third-party or user-created Using Java, we can extensively customize the MATLAB environment and application GUI, enabling the creation of visually appealing and usable applications

Practical Design and Application of Model Predictive Control - Nassim Khaled 2018-05-04

Practical Design and Application of Model Predictive Control is a self-learning resource on how to design, tune and deploy an MPC using MATLAB® and Simulink®. This reference is one of the most detailed publications on how to design and tune MPC controllers. Examples presented range from double-Mass spring system, ship heading and speed control, robustness analysis through Monte-Carlo simulations, photovoltaic optimal control, and energy

management of power-split and air-handling control. Readers will also learn how to embed the designed MPC controller in a real-time platform such as Arduino®. The selected problems are nonlinear and challenging, and thus serve as an excellent experimental, dynamic system to show the reader the capability of MPC. The step-by-step solutions of the problems are thoroughly documented to allow the reader to easily replicate the results. Furthermore, the MATLAB® and Simulink® codes for the solutions are available for free download. Readers can connect with the authors through the dedicated website which includes additional free resources at www.practicalmpc.com. Illustrates how to design, tune and deploy MPC for projects in a quick manner Demonstrates a variety of applications that are solved using MATLAB® and Simulink® Bridges the gap in providing a number of realistic problems with very hands-on training Provides MATLAB® and Simulink® code solutions. This includes nonlinear plant models that the reader can use for other projects and research work Presents application problems with solutions to help reinforce the information learned

The Mathematics of Derivatives Securities with Applications in MATLAB - Mario Cerrato 2012-02-24

Quantitative Finance is expanding rapidly. One of the aspects of the recent financial crisis is that, given the complexity of financial products, the demand for people with high numeracy skills is likely to grow and this means more recognition will be given to Quantitative Finance in existing and new course structures worldwide. Evidence has suggested that many holders of complex financial securities before the financial crisis did not have in-house experts or rely on a third-party in order to assess the risk exposure of their investments. Therefore, this experience shows the need for better understanding of risk associate with complex financial securities in the future. The Mathematics of Derivative Securities with Applications in MATLAB provides readers with an

introduction to probability theory, stochastic calculus and stochastic processes, followed by discussion on the application of that knowledge to solve complex financial problems such as pricing and hedging exotic options, pricing American derivatives, pricing and hedging under stochastic volatility and an introduction to interest rates modelling. The book begins with an overview of MATLAB and the various components that will be used alongside it throughout the textbook. Following this, the first part of the book is an in depth introduction to Probability theory, Stochastic Processes and Ito Calculus and Ito Integral. This is essential to fully understand some of the mathematical concepts used in the following part of the book. The second part focuses on financial engineering and guides the reader through the fundamental theorem of asset pricing using the Black and Scholes Economy and Formula, Options Pricing through European and American style options, summaries of Exotic Options, Stochastic Volatility Models and Interest rate Modelling. Topics covered in this part are explained using MATLAB codes showing how the theoretical models are used practically. Authored from an academic's perspective, the book discusses complex analytical issues and intricate financial instruments in a way that it is accessible to postgraduate students with or without a previous background in probability theory and finance. It is written to be the ideal primary reference book or a perfect companion to other related works. The book uses clear and detailed mathematical explanation accompanied by examples involving real case scenarios throughout and provides MATLAB codes for a variety of topics.

Computational Partial Differential Equations Using MATLAB® - Jichun Li 2019-09-26

In this popular text for an Numerical Analysis course, the authors introduce several major methods of solving various partial differential equations (PDEs) including elliptic, parabolic, and hyperbolic

equations. It covers traditional techniques including the classic finite difference method, finite element method, and state-of-the-art numerical methods. The text uniquely emphasizes both theoretical numerical analysis and practical implementation of the algorithms in MATLAB. This new edition includes a new chapter, Finite Value Method, the presentation has been tightened, new exercises and applications are included, and the text refers now to the latest release of MATLAB. Key Selling Points: A successful textbook for an undergraduate text on numerical analysis or methods taught in mathematics and computer engineering. This course is taught in every university throughout the world with an engineering department or school. Competitive advantage broader numerical methods (including finite difference, finite element, meshless method, and finite volume method), provides the MATLAB source code for most popular PDEs with detailed explanation about the implementation and theoretical analysis. No other existing textbook in the market offers a good combination of theoretical depth and practical source codes.

GPU Programming in MATLAB - Nikolaos Ploskas 2016-08-25

GPU programming in MATLAB is intended for scientists, engineers, or students who develop or maintain applications in MATLAB and would like to accelerate their codes using GPU programming without losing the many benefits of MATLAB. The book starts with coverage of the Parallel Computing Toolbox and other MATLAB toolboxes for GPU computing, which allow applications to be ported straightforwardly onto GPUs without extensive knowledge of GPU programming. The next part covers built-in, GPU-enabled features of MATLAB, including options to leverage GPUs across multicore or different computer systems. Finally, advanced material includes CUDA code in MATLAB and optimizing existing GPU applications. Throughout the book, examples and source codes illustrate every concept so that readers can immediately

apply them to their own development. Provides in-depth, comprehensive coverage of GPUs with MATLAB, including the parallel computing toolbox and built-in features for other MATLAB toolboxes Explains how to accelerate computationally heavy applications in MATLAB without the need to re-write them in another language Presents case studies illustrating key concepts across multiple fields Includes source code, sample datasets, and lecture slides

MATLAB Primer, Eighth Edition - Timothy A. Davis 2010-08-18

Highlighting the new aspects of MATLAB® 7.10 and expanding on many existing features, MATLAB® Primer, Eighth Edition shows you how to solve problems in science, engineering, and mathematics. Now in its eighth edition, this popular primer continues to offer a hands-on, step-by-step introduction to using the powerful tools of MATLAB. New to the Eighth Edition A new chapter on object-oriented programming Discussion of the MATLAB File Exchange window, which provides direct access to over 10,000 submissions by MATLAB users Major changes to the MATLAB Editor, such as code folding and the integration of the Code Analyzer (M-Lint) into the Editor Explanation of more powerful Help tools, such as quick help popups for functions via the Function Browser The new bsxfun function A synopsis of each of the MATLAB Top 500 most frequently used functions, operators, and special characters The addition of several useful features, including sets, logical indexing, isequal, repmat, reshape, varargin, and varargout The book takes you through a series of simple examples that become progressively more complex. Starting with the core components of the MATLAB desktop, it demonstrates how to handle basic matrix operations and expressions in MATLAB. The text then introduces commonly used functions and explains how to write your own functions, before covering advanced features, such as object-oriented programming, calling other languages from MATLAB, and MATLAB

graphics. It also presents an in-depth look at the Symbolic Toolbox, which solves

problems analytically rather than numerically.