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

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problems concerning the design and realization of digital control algorithms for power electronics circuits using digital signal processing (DSP) methods. This book discusses signal processing, starting from analog signal acquisition, through conversion to digital form, methods of filtration and separation, and ending with pulse control of output power transistors. The book is focused on two applications for the considered methods of digital signal processing, a three-phase shunt active power filter and a digital class-D audio power amplifier. The book bridges the gap between power electronics and digital signal processing. Many control algorithms and circuits for power electronics in the current literature are described using analog transmittances. This may not always be acceptable, especially if half of the sampling frequencies and half of the power transistor switching frequencies are close to the band of interest. Therefore in this book, a digital circuit is treated as a digital circuit with its own peculiar characteristics, rather than an analog circuit. This helps to avoid errors and instability. This edition includes a new chapter dealing with selected problems of simulation of power electronics systems together with digital control circuits. The book includes numerous examples using MATLAB and PSIM programs. This book describes the role of magnetism in electrical engineering, starting from the most basic laws of physics, converted into simulation models such that electrical engineering students can learn by example and practice. The author demystifies a topic that many electrical engineers take for granted, providing readers

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the tools to be able to understand how any magnetic component works. He describes magnetic components like inductors and transformers in simple understandable language. Mathematical equations related to the basic laws of physics are described in detail along with the physical significance of the equations. Every application is supported by a simulation. All simulations are performed using free and open source software based on Python making the material in this book universally accessible.

Log-domain and translinear filters provide a competitive alternative to the challenges of ever increasing low-voltage, low-power and high frequency demands in the area of continuous-time filters. Since translinear filters are fundamentally large-signal linear, they are capable of realizing a large dynamic range in combination with excellent tunability characteristics. Large-signal linearity is achieved by exploiting the accurate exponential behavior of the bipolar transistor or the subthreshold MOS transistor. A generalization of the dynamic translinear principle exploiting the square law behavior of the MOS transistor is theoretically possible, but not practically relevant. Translinear and log-domain filters are based on the dynamic translinear principle, a generalization of the conventional (static) translinear principle. Besides their application for linear filters, dynamic translinear circuits can also be used for the realization of non-linear dynamic functions, such as oscillators, RMS-DC converters and phase-locked loops. Dynamic Translinear and Log-Domain Circuits: Analysis and Synthesis covers both the analysis and synthesis of

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translinear circuits. The theory is presented using one unifying framework for both static and dynamic translinear networks, which is based on a current-mode approach. General analysis methods are presented, including the large-signal and non-stationary analysis of noise. A well-structured synthesis method is described greatly enhancing the designability of log-domain and translinear circuits. Comparisons are made with respect to alternative analysis and synthesis methods presented in the literature. The theory is illustrated and verified by various examples and realizations. *Dynamic Translinear and Log-Domain Circuits: Analysis and Synthesis* is an excellent reference for researchers and circuit designers, and may be used as a text for advanced courses on the topic.

From Devices to Systems

An Introduction to Building and Breaking Ciphers

Hands-On Simulation Modeling with Python

Passive Circuit Analysis with LTspice®

Applications to Physical Systems

An Introduction to Computer Simulation Methods

This book is an in-depth description on how to design digital filters. The presentation is geared for practicing engineers, using open source computational tools, while incorporating fundamental signal processing theory. The author includes theory as-needed, with an emphasis on translating to practical application. The book describes tools in detail that can be used for filter design,

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along with the steps needed to automate the entire process. Breaks down signal processing theory into simple, understandable language for practicing engineers; Provides readers with a highly-practical introduction to digital filter design; Uses open source computational tools, while incorporating fundamental signal processing theory; Describes examples of digital systems in engineering and a description of how they are implemented in practice; Includes case studies where filter design is described in depth from inception to final implementation.

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

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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.

Learn how to develop your own applications to monitor or control instrumentation hardware. Whether you need to acquire data from a device or automate its functions, this practical book shows you how to use

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Python's rapid development capabilities to build interfaces that include everything from software to wiring. You get step-by-step instructions, clear examples, and hands-on tips for interfacing a PC to a variety of devices. Use the book's hardware survey to identify the interface type for your particular device, and then follow detailed examples to develop an interface with Python and C. Organized by interface type, data processing activities, and user interface implementations, this book is for anyone who works with instrumentation, robotics, data acquisition, or process control. Understand how to define the scope of an application and determine the algorithms necessary, and why it's important Learn how to use industry-standard interfaces such as RS-232, RS-485, and GPIB Create low-level extension modules in C to interface Python with a variety of hardware and test instruments Explore the console, curses, TkInter, and wxPython for graphical and text-based user interfaces Use open source software tools and libraries to reduce costs and avoid implementing functionality from scratch Deep Learning Models and its application: An overview with the help of R software Preface Deep learning models are

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widely used in different fields due to its capability to handle large and complex datasets and produce the desired results with more accuracy at a greater speed. In Deep learning models, features are selected automatically through the iterative process wherein the model learns the features by going deep into the dataset and selects the features to be modeled. In the traditional models the features of the dataset needs to be specified in advance. The Deep Learning algorithms are derived from Artificial Neural Network concepts and it is a part of broader Machine Learning Models. This book intends to provide an overview of Deep Learning models, its application in the areas of image recognition & classification, sentiment analysis, natural language processing, stock market prediction using R statistical software package, an open source software package. The book also includes an introduction to python software package which is also open source software for the benefit of the users. This books is a second book in series after the author's first book- Machine Learning: An Overview with the Help of R Software <https://www.amazon.com/dp/B07KQSN447> Editor International Journal of Statistics and Medical

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Informatics www.ijsmi.com/book.php

Introduction for Scientists and Engineers

Digital Filter Design using Python for

Power Engineering Applications

Programming for Computations -

MATLAB/Octave

Refactor your legacy code base

Dynamical Systems with Applications using

Python

System Design, Modeling, and Simulation

Using Ptolemy II

Getting the most out of Python to improve your codebase Key Features Save maintenance costs by learning to fix your legacy codebase Learn the principles and techniques of refactoring Apply microservices to your legacy systems by implementing practical techniques *Book Description* Python is currently used in many different areas such as software construction, systems administration, and data processing. In all of these areas, experienced professionals can find examples of inefficiency, problems, and other perils, as a result of bad code. After reading this book, readers will understand these problems, and more importantly, how to correct

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them. The book begins by describing the basic elements of writing clean code and how it plays an important role in Python programming. You will learn about writing efficient and readable code using the Python standard library and best practices for software design. You will learn to implement the SOLID principles in Python and use decorators to improve your code. The book delves more deeply into object oriented programming in Python and shows you how to use objects with descriptors and generators. It will also show you the design principles of software testing and how to resolve software problems by implementing design patterns in your code. In the final chapter we break down a monolithic application to a microservice one, starting from the code as the basis for a solid platform. By the end of the book, you will be proficient in applying industry approved coding practices to design clean, sustainable and readable Python code. What you will learn Set up tools to effectively work in a development environment Explore how the magic methods of Python can help us write

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better code Examine the traits of Python to create advanced object-oriented design Understand removal of duplicated code using decorators and descriptors Effectively refactor code with the help of unit tests Learn to implement the SOLID principles in Python Who this book is for This book will appeal to team leads, software architects and senior software engineers who would like to work on their legacy systems to save cost and improve efficiency. A strong understanding of Programming is assumed.

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

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simulation plays a key role in understanding real-world systems. The author also explains how to effectively use MATLAB and Simulink 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

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simulation research after completing this book.

This introduction to dynamical systems theory guides readers through theory via example and the graphical MATLAB interface; the SIMULINK® accessory is used to simulate real-world dynamical processes. Examples included are from mechanics, electrical circuits, economics, population dynamics, epidemiology, nonlinear optics, materials science and neural networks. The book contains over 330 illustrations, 300 examples, and exercises with solutions.

This book is concerned with circuit simulation using National Instruments Multisim. It focuses on the use and comprehension of the working techniques for electrical and electronic circuit simulation. The first chapters are devoted to basic circuit analysis. It starts by describing in detail how to perform a DC analysis using only resistors and independent and controlled sources. Then, it introduces capacitors and inductors to make a transient analysis. In the case of transient analysis, it is possible to

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have an initial condition either in the capacitor voltage or in the inductor current, or both. Fourier analysis is discussed in the context of transient analysis. Next, we make a treatment of AC analysis to simulate the frequency response of a circuit. Then, we introduce diodes, transistors, and circuits composed by them and perform DC, transient, and AC analyses. The book ends with simulation of digital circuits. A practical approach is followed through the chapters, using step-by-step examples to introduce new Multisim circuit elements, tools, analyses, and virtual instruments for measurement. The examples are clearly commented and illustrated. The different tools available on Multisim are used when appropriate so readers learn which analyses are available to them. This is part of the learning outcomes that should result after each set of end-of-chapter exercises is worked out. Table of Contents:
Introduction to Circuit Simulation /
Resistive Circuits / Time Domain
Analysis -- Transient Analysis /
Frequency Domain Analysis -- AC

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*Analysis / Semiconductor Devices /
Digital Circuits*

Simulation of Communication Systems

*A Primer on Scientific Programming with
Python*

Python in Neuroscience

*A Gentle Introduction to Numerical
Simulations with MATLAB/Octave*

*An Open-Source Simulator, Based on
Python™*

*Applied Stochastic Differential
Equations*

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.

This book brings together a selection of the best papers from the nineteenth edition of the Forum on specification and Design Languages Conference (FDL), which took

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place on September 14-16, 2016, in Bremen, Germany. FDL is a well-established international forum devoted to dissemination of research results, practical experiences and new ideas in the application of specification, design and verification languages to the design, modeling and verification of integrated circuits, complex hardware/software embedded systems, and mixed-technology systems.

This book is a definitive introduction to models of computation for the design of complex, heterogeneous systems. It has a particular focus on cyber-physical systems, which integrate computing, networking, and physical dynamics. The book captures more than twenty years of experience in the Ptolemy Project at UC Berkeley, which pioneered many design, modeling, and simulation techniques that are now in widespread use. All of the methods covered in the book are realized in the open source Ptolemy II modeling framework and are available for experimentation through links provided in the book. The book is suitable for engineers, scientists, researchers, and managers who wish to understand the rich possibilities offered by modern modeling techniques. The goal of the book is to equip the reader with a breadth of experience that will help in understanding the role that such techniques can play in design.

Provides an introduction to the Finite Difference Time Domain method and shows how Python code can be used to implement various simulations This book allows engineering students and practicing engineers to learn the finite-difference time-domain (FDTD) method and properly apply it toward their electromagnetic simulation

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projects. Each chapter contains a concise explanation of an essential concept and instruction on its implementation into computer code. Included projects increase in complexity, ranging from simulations in free space to propagation in dispersive media. This third edition utilizes the Python programming language, which is becoming the preferred computer language for the engineering and scientific community. Electromagnetic Simulation Using the FDTD Method with Python, Third Edition is written with the goal of enabling readers to learn the FDTD method in a manageable amount of time. Some basic applications of signal processing theory are explained to enhance the effectiveness of FDTD simulation. Topics covered in include one-dimensional simulation with the FDTD method, two-dimensional simulation, and three-dimensional simulation. The book also covers advanced Python features and deep regional hyperthermia treatment planning. Electromagnetic Simulation Using the FDTD Method with Python: Guides the reader from basic programs to complex, three-dimensional programs in a tutorial fashion Includes a rewritten fifth chapter that illustrates the most interesting applications in FDTD and the advanced graphics techniques of Python Covers peripheral topics pertinent to time-domain simulation, such as Z-transforms and the discrete Fourier transform Provides Python simulation programs on an accompanying website An ideal book for senior undergraduate engineering students studying FDTD, Electromagnetic Simulation Using the FDTD Method with Python will also benefit scientists and engineers interested in the subject.

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Circuit Analysis with Multisim

Integrated Power Devices and TCAD Simulation

Simulating Nonlinear Circuits with Python Power Electronics

Automated Data Acquisition and Control Systems

An Interactive Approach

From power electronics to power integrated circuits (PICs), smart power technologies, devices, and beyond, *Integrated Power Devices and TCAD Simulation* provides a complete picture of the power management and semiconductor industry. An essential reference for power device engineering students and professionals, the book not only describes the physics inside integrated power semiconductor devices such lateral double-diffused metal oxide semiconductor field-effect transistors (LDMOSFETs), lateral insulated-gate bipolar transistors (LIGBTs), and super junction LDMOSFETs but also delivers a simple introduction to power management systems.

Instead of abstract theoretical treatments and daunting equations, the text uses technology computer-aided design (TCAD) simulation examples to explain the design of integrated power semiconductor devices. It also explores next generation power devices such as gallium nitride power high electron mobility transistors (GaN power HEMTs). Including a virtual process flow for smart PIC technology as well as a hard-to-find technology development organization chart, *Integrated Power Devices and TCAD Simulation* gives students and junior engineers a head start in the field of power semiconductor devices while helping to fill the gap between power device engineering and power management systems.

This book provides readers with an in-depth discussion of circuit simulation, combining basic electrical engineering circuit theory with Python programming. It fills an information gap by describing the development of Python Power Electronics, an open-source software for simulating circuits, and demonstrating its use in a

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sample circuit. Unlike typical books on circuit theory that describe how circuits can be solved mathematically, followed by examples of simulating circuits using specific, commercial software, this book has a different approach and focus. The author begins by describing every aspect of the open-source software, in the context of non-linear power electronic circuits, as a foundation for aspiring or practicing engineers to embark on further development of open source software for different purposes. By demonstrating explicitly the operation of the software through algorithms, this book brings together the fields of electrical engineering and software technology. This book discusses in detail the Advanced SPICE Model for GaN HEMTs (ASM-HEMT), a new industry standard model for GaN-based power and RF circuit design. The author describes this new, standard model in detail, covering the different components of the ASM GaN model from fundamental derivations to the implementation in circuit simulation tools. The book also includes a detailed description of parameter extraction steps and model quality tests, which are critically important for effective use of this standard model in circuit simulation and product design. Coverage includes both radio-frequency (RF), and power electronics applications of this model. Practical issues related to measurement data and parameter extraction flow are also discussed, enabling readers easily to adopt this new model for design flow and simulation tools. Describes in detail a new industry standard for GaN-based power and RF circuit design; Includes discussion of practical problems and their solutions in GaN device modeling; Covers both radio-frequency (RF) and power electronics application of GaN technology; Describes modeling of both GaN RF and power devices. This book is open access under a CC BY 4.0 license. This easy-to-read book introduces the basics of solving partial differential equations by means of finite difference methods. Unlike many of the traditional academic works on the topic, this book was written for practitioners. Accordingly, it especially addresses: the construction of finite difference schemes, formulation and

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implementation of algorithms, verification of implementations, analyses of physical behavior as implied by the numerical solutions, and how to apply the methods and software to solve problems in the fields of physics and biology.

Real World Instrumentation with Python

A New Industry-Standard Compact Model for GaN-based Power and RF Circuit Design

Dynamic Translinear and Log-Domain Circuits

Modeling, Methodology and Techniques

Modeling and Simulation of Systems Using MATLAB and Simulink

A Gentle Introduction to Numerical Simulations with Python

From design and simulation through to testing and fabrication, this hands-on introduction to silicon photonics engineering equips students with everything they need to begin creating foundry-ready designs. In-depth discussion of real-world issues and fabrication challenges ensures that students are fully equipped for careers in industry. Step-by-step tutorials, straightforward examples, and illustrative source code fragments guide students through every aspect of the design process, providing a practical framework for developing and refining key skills. Offering industry-ready expertise, the text supports existing PDKs for CMOS UV-lithography foundry services (OpSIS, ePIXfab, imec, LETI, IME and CMC) and the development of new kits for proprietary processes and clean-room based research. Accompanied by additional online resources to support students, this is the perfect learning package for senior undergraduate and graduate students studying silicon photonics

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design, and academic and industrial researchers involved in the development and manufacture of new silicon photonics systems.

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.

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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.

Modeling and Simulation in Python teaches readers how to analyze real-world scenarios using the Python

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programming language, requiring no more than a background in high school math. Modeling and Simulation in Python is a thorough but easy-to-follow introduction to physical modeling—that is, the art of describing and simulating real-world systems.

Readers are guided through modeling things like world population growth, infectious disease, bungee jumping, baseball flight trajectories, celestial mechanics, and more while simultaneously developing a strong understanding of fundamental programming concepts like loops, vectors, and functions. Clear and concise, with a focus on learning by doing, the author spares the reader abstract, theoretical complexities and gets right to hands-on examples that show how to produce useful models and simulations.

Python is rapidly becoming the de facto standard language for systems integration. Python has a large user and developer-base external to the neuroscience community, and a vast module library that facilitates rapid and maintainable development of complex and intricate systems. In this Research Topic, we highlight recent efforts to develop Python modules for the domain of neuroscience software and neuroinformatics: - simulators and simulator interfaces - data collection and analysis - sharing, re-use, storage and databasing of models and data - stimulus generation - parameter search and optimization - visualization - VLSI hardware interfacing. Moreover, we seek to provide a representative overview of

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existing mature Python modules for neuroscience and neuroinformatics, to demonstrate a critical mass and show that Python is an appropriate choice of interpreter interface for future neuroscience software development.

Introduction to Modeling and Simulation with MATLAB® and Python

Electronics and Circuit Analysis Using MATLAB

Develop simulation models to get accurate results and enhance decision-making processes

Languages, Design Methods, and Tools for Electronic System Design

SPICE for Power Electronics and Electric Power

Finite Difference Computing with PDEs

Multisim is now the de facto standard for circuit simulation. It

is a SPICE-based circuit simulator which combines analog, discrete-time, and mixed-mode circuits. In addition, it is the

only simulator which incorporates microcontroller simulation in the same environment. It also includes a tool for printed

circuit board design. Advanced Circuit Simulation Using

Multisim Workbench is a companion book to Circuit Analysis

Using Multisim, published by Morgan & Claypool in 2011. This

new book covers advanced analyses and the creation of models and subcircuits. It also includes coverage of transmission lines,

the special elements which are used to connect components in PCBs and integrated circuits. Finally, it includes a description

of Ultiboard, the tool for PCB creation from a circuit

description in Multisim. Both books completely cover most of

the important features available for a successful circuit

simulation with Multisim. Table of Contents: Models and

Subcircuits / Transmission Lines / Other Types of Analyses /

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Simulating Microcontrollers / PCB Design With Ultiboard

This fully updated textbook provides complete coverage of electrical circuits and introduces students to the field of energy conversion technologies, analysis and design. Chapters are designed to equip students with necessary background material in such topics as devices, switching circuit analysis techniques, converter types, and methods of conversion. The book contains a large number of examples, exercises, and problems to help enforce the material presented in each chapter. A detailed discussion of resonant and softswitching dc-to-dc converters is included along with the addition of new chapters covering digital control, non-linear control, and micro-inverters for power electronics applications. Designed for senior undergraduate and graduate electrical engineering students, this book provides students with the ability to analyze and design power electronic circuits used in various industrial applications.

Enhance your simulation modeling skills by creating and analyzing digital prototypes of a physical model using Python programming with this comprehensive guide

Key Features

- Learn to create a digital prototype of a real model using hands-on examples
- Evaluate the performance and output of your prototype using simulation modeling techniques
- Understand various statistical and physical simulations to improve systems using Python

Book Description

Simulation modeling helps you to create digital prototypes of physical models to analyze how they work and predict their performance in the real world. With this comprehensive guide, you'll understand various computational statistical simulations using Python. Starting with the fundamentals of simulation modeling, you'll understand concepts such as randomness and explore data generating processes, resampling methods, and bootstrapping techniques. You'll then cover key algorithms such as Monte Carlo simulations and Markov decision

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processes, which are used to develop numerical simulation models, and discover how they can be used to solve real-world problems. As you advance, you'll develop simulation models to help you get accurate results and enhance decision-making processes. Using optimization techniques, you'll learn to modify the performance of a model to improve results and make optimal use of resources. The book will guide you in creating a digital prototype using practical use cases for financial engineering, prototyping project management to improve planning, and simulating physical phenomena using neural networks. By the end of this book, you'll have learned how to construct and deploy simulation models of your own to overcome real-world challenges. What you will learn

Gain an overview of the different types of simulation models
Get to grips with the concepts of randomness and data generation
process
Understand how to work with discrete and continuous distributions
Work with Monte Carlo simulations to calculate a definite integral
Find out how to simulate random walks using Markov chains
Obtain robust estimates of confidence intervals and standard errors of population parameters
Discover how to use optimization methods in real-life applications
Run efficient simulations to analyze real-world systems

Who this book is for
Hands-On Simulation Modeling with Python is for simulation developers and engineers, model designers, and anyone already familiar with the basic computational methods that are used to study the behavior of systems. This book will help you explore advanced simulation techniques such as Monte Carlo methods, statistical simulations, and much more using Python. Working knowledge of Python programming language is required.

Stochastic differential equations are differential equations whose solutions are stochastic processes. They exhibit appealing mathematical properties that are useful in modeling uncertainties and noisy phenomena in many disciplines. This book is motivated by applications of stochastic differential

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equations in target tracking and medical technology and, in particular, their use in methodologies such as filtering, smoothing, parameter estimation, and machine learning. It builds an intuitive hands-on understanding of what stochastic differential equations are all about, but also covers the essentials of It calculus, the central theorems in the field, and such approximation schemes as stochastic Runge-Kutta. Greater emphasis is given to solution methods than to analysis of theoretical properties of the equations. The book's practical approach assumes only prior understanding of ordinary differential equations. The numerous worked examples and end-of-chapter exercises include application-driven derivations and computational assignments. MATLAB/Octave source code is available for download, promoting hands-on work with the methods.

Analysis and Synthesis

A Modern Software Approach

Advanced SPICE Model for GaN HEMTs (ASM-HEMT)

Modeling and Simulation in Python

Modeling and Python Simulation of Magnetics for Power Electronics Applications

Cracking Codes with Python

The volume includes a set of selected papers extended and revised from the 2011 International Conference on Mechanical Engineering and Technology, held on London, UK, November 24-25, 2011. Mechanical engineering technology is the application of physical principles and current technological developments to the creation of useful machinery and operation design. Technologies such as solid models may be used as the basis for finite element analysis (FEA) and / or computational fluid dynamics (CFD) of the design.

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Through the application of computer-aided manufacturing (CAM), the models may also be used directly by software to create "instructions" for the manufacture of objects represented by the models, through computer numerically controlled (CNC) machining or other automated processes, without the need for intermediate drawings. This volume covers the subject areas of mechanical engineering and technology, and also covers interdisciplinary subject areas of computers, communications, control and automation. We hope that researchers, graduate students and other interested readers benefit scientifically from the book and also find it stimulating in the process.

This comprehensive volume reveals how, using basic principles of elementary circuit analysis along with familiar numerical methods, readers can build up sophisticated electronic simulation tools capable of analyzing large, complicated circuits. The book describes in clear language an especially broad range of uses to which circuit simulation principles may be put—from running general applications, to understand why SPICE works in some cases and not in others. This textbook provides a broad introduction to continuous and discrete dynamical systems. With its hands-on approach, the text leads the reader from basic theory to recently published research material in nonlinear ordinary differential equations, nonlinear optics, multifractals, neural networks, and binary

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oscillator computing. Dynamical Systems with Applications Using Python takes advantage of Python's extensive visualization, simulation, and algorithmic tools to study those topics in nonlinear dynamical systems through numerical algorithms and generated diagrams. After a tutorial introduction to Python, the first part of the book deals with continuous systems using differential equations, including both ordinary and delay differential equations. The second part of the book deals with discrete dynamical systems and progresses to the study of both continuous and discrete systems in contexts like chaos control and synchronization, neural networks, and binary oscillator computing. These later sections are useful reference material for undergraduate student projects. The book is rounded off with example coursework to challenge students' programming abilities and Python-based exam questions. This book will appeal to advanced undergraduate and graduate students, applied mathematicians, engineers, and researchers in a range of disciplines, such as biology, chemistry, computing, economics, and physics. Since it provides a survey of dynamical systems, a familiarity with linear algebra, real and complex analysis, calculus, and ordinary differential equations is necessary, and knowledge of a programming language like C or Java is beneficial but not essential.

Since the first edition of this book was published seven

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years ago, the field of modeling and simulation of communication systems has grown and matured in many ways, and the use of simulation as a day-to-day tool is now even more common practice. With the current interest in digital mobile communications, a primary area of application of modeling and simulation is now in wireless systems of a different flavor from the 'traditional' ones. This second edition represents a substantial revision of the first, partly to accommodate the new applications that have arisen. New chapters include material on modeling and simulation of nonlinear systems, with a complementary section on related measurement techniques, channel modeling and three new case studies; a consolidated set of problems is provided at the end of the book.

Digital Signal Processing in Power Electronics Control Circuits

Deep Learning Models explored with help of Python Programming

Mathematical Modeling and Simulation

Advanced Circuit Simulation Using Multisim Workbench

Selected Contributions from FDL 2016

Dynamical Systems with Applications using MATLAB®

Learn how to program in Python while making and breaking ciphers—algorithms used to create and send secret messages! After a crash course in Python

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programming basics, you'll learn to make, test, and hack programs that encrypt text with classical ciphers like the transposition cipher and Vigenère cipher. You'll begin with simple programs for the reverse and Caesar ciphers and then work your way up to public key cryptography, the type of encryption used to secure today's online transactions, including digital signatures, email, and Bitcoin. Each program includes the full code and a line-by-line explanation of how things work. By the end of the book, you'll have learned how to code in Python and you'll have the clever programs to prove it! You'll also learn how to:

- Combine loops, variables, and flow control statements into real working programs***
- Use dictionary files to instantly detect whether decrypted messages are valid English or gibberish***
- Create test programs to make sure that your code encrypts and decrypts correctly***
- Code (and hack!) a working example of the affine cipher, which uses modular arithmetic to encrypt a message***
- Break ciphers with techniques such as brute-force and frequency analysis***

There's no better way to learn to code than to play with real programs. Cracking Codes with Python makes the learning fun! This is the second book in the Deep Learning models series by the author. Deep learning models are widely used in different fields due to its capability to handle large and complex datasets and produce the desired results with more accuracy at a greater speed. In Deep learning models, features are selected automatically through the iterative process wherein the model learns the features by going deep into the dataset and selects the features to be modeled. In the traditional models the features of the dataset needs to be specified in advance. The Deep Learning algorithms are derived from Artificial Neural Network concepts and it is a part of broader

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Machine Learning Models. The book starts with the Introduction part which is adopted from Author's Deep Learning Models and its application: An overview with the help of R software book and move on to the Python's important data processing packages such Numpy, and Pandas. Book then explores the Deep Learning models with the help of packages such as Pytorch, Tensor Flow and Keras and their applications in image processing, stock market prediction, recommender systems and natural language processing. Editor International Journal of Statistics and Medical Informatics

www.ijsmi.com/book.php ISBN: 9798558877953 E-Books: <https://www.amazon.com/dp/B08MQTM1ZP> Paperbacks: <https://www.amazon.com/dp/B08MSQ3R8R>

The book serves as a first introduction to computer programming of scientific applications, using the high-level Python language. The exposition is example and problem-oriented, where the applications are taken from mathematics, numerical calculus, statistics, physics, biology and finance. The book teaches "Matlab-style" and procedural programming as well as object-oriented programming. High school mathematics is a required background and it is advantageous to study classical and numerical one-variable calculus in parallel with reading this book. Besides learning how to program computers, the reader will also learn how to solve mathematical problems, arising in various branches of science and engineering, with the aid of numerical methods and programming. By blending programming, mathematics and scientific applications, the book lays a solid foundation for practicing computational science. From the reviews: Langtangen ... does an excellent job of introducing programming as a set of skills in problem solving. He guides the reader into thinking properly

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about producing program logic and data structures for modeling real-world problems using objects and functions and embracing the object-oriented paradigm. ...

Summing Up: Highly recommended. F. H. Wild III, Choice, Vol. 47 (8), April 2010 Those of us who have learned scientific programming in Python ‘on the streets’ could be a little jealous of students who have the opportunity to take a course out of Langtangen’s Primer.” John D. Cook, The Mathematical Association of America, September 2011 This book goes through Python in particular, and programming in general, via tasks that scientists will likely perform. It contains valuable information for students new to scientific computing and would be the perfect bridge between an introduction to programming and an advanced course on numerical methods or computational science. Alex Small, IEEE, CiSE Vol. 14 (2), March /April 2012 “This fourth edition is a wonderful, inclusive textbook that covers pretty much everything one needs to know to go from zero to fairly sophisticated scientific programming in Python...” Joan Horvath, Computing Reviews, March 2015

Learn how analog circuit simulators work with these easy to use numerical recipes implemented in the popular Python programming environment. This book covers the fundamental aspects of common simulation analysis techniques and algorithms used in professional simulators today in a pedagogical way through simple examples. The book covers not just linear analyses but also nonlinear ones like steady state simulations. It is rich with examples and exercises and many figures to help illustrate the points. For the interested reader, the fundamental mathematical theorems governing the simulation implementations are covered in the appendices. Demonstrates circuit simulation algorithms

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through actual working code, enabling readers to build an intuitive understanding of what are the strengths and weaknesses with various methods Provides details of all common, modern circuit simulation methods in one source Provides Python code for simulations via download Includes transistor numerical modeling techniques, based on simplified transistor physics Provides detailed mathematics and ample references in appendices

An Open Source Guide

Electromagnetic Simulation Using the FDTD Method with Python

Clean Code in Python

Deep Learning Models and its application: An overview with the help of R software: Second in series (Machine Learning)

Numerical Recipes in Python

Instrumentation, Measurement, Circuits and Systems

To be accredited, a power electronics course should cover a significant amount of design content and include extensive use of computer-aided analysis with simulation tools such as SPICE. Based upon the authors' experience in designing such courses, SPICE for Power Electronics and Electric Power, Second Edition integrates a SPICE simulator with a po

This book shows readers how to learn analog electronics by simulating circuits. Readers will be enabled to master basic electric circuit analysis, as an essential component of their professional education. The author's approach

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enables readers to learn theory as needed, then immediately apply it to the simulation of circuits based on that theory, while using the resulting tables, graphs and waveforms to gain a deeper insight into the theory, as well as where theory and practice diverge!

Programming for Computations - Python
Electronic Circuit & System Simulation Methods (SRE)

Circuit Analysis and Design

Analog Circuit Simulators for Integrated Circuit Designers

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