

Power Electronics Circuits Devices Applications 4th Edition

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Power Electronics Circuits Devices Applications 4th Edition

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WERNER PRATT

Power Electronics for Renewable Energy Systems, Transportation and Industrial Applications Prentice Hall

For junior or senior undergraduate students in Electrical and Electronic Engineering. This text covers the basics of emerging areas in power electronics and a broad range of topics such as power switching devices, conversion methods, analysis and techniques, and applications. Its unique approach covers the characteristics of semiconductor devices first, then discusses the applications of these devices for power conversions. Four main applications are included: flexible ac transmissions (FACTS), static switches, power supplies, dc drives, and ac drives.

Power Electronics MDPI

Compiles current research into the analysis and design of power electronic converters for industrial applications and renewable energy systems, presenting modern and future applications of power electronics systems in the field of electrical vehicles With emphasis on the importance and long-term viability of Power Electronics for Renewable Energy this book brings together the state of the art knowledge and cutting-edge techniques in various stages of research. The topics included are not currently available for practicing professionals and aim to enable the reader to directly apply the knowledge gained to their designs. The book addresses the practical issues of current and future electric and plug-in hybrid electric vehicles (PHEVs), and focuses primarily on power electronics and motor drives based solutions for electric vehicle (EV) technologies. Propulsion system requirements and motor sizing for EVs is discussed, along with practical system sizing examples. Key EV battery technologies are explained as well as corresponding battery management issues. PHEV power system architectures and advanced power electronics intensive charging infrastructures for EVs and PHEVs are detailed. EV/PHEV interface with renewable energy is described, with practical examples. This book explores new topics for further research needed world-wide, and defines existing challenges, concerns, and selected problems that comply with international trends, standards, and programs for electric power conversion, distribution, and sustainable energy development. It will lead to the advancement of the current state-of-the art applications of power electronics for renewable energy, transportation, and industrial applications and will help add experience in the various industries and academia about the energy conversion technology and distributed energy sources. Combines state of the art global expertise to present the latest research on power electronics and its application in transportation, renewable energy and different industrial applications Offers an overview of existing technology and future trends, with discussion and analysis of different types of converters and control techniques (power converters, high performance power devices, power system, high performance control system and novel applications) Systematic explanation to provide researchers with enough background and understanding to go deeper in the topics covered in the book

Power Electronics : Devices and Circuits Pearson Higher Ed

Power Electronics Handbook: Components, Circuits and Applications is a compilation of materials that provides the theoretical information of component, circuits, and applications. The title is comprised of 14 chapters that are organized into three parts. The text first covers topics relevant to electronic components, such as thermal design, electromagnetic compatibility, and power semiconductor protection. Next, the book deals with circuitries, which include static switches, line control, and converters. The last part talks about power semiconductor circuit applications. The book will be of great use for students and practitioners of electronics related discipline, such as electronics engineering.

Power Electronics John Wiley & Sons

Power Electronics and Motor Drive Systems is designed to aid electrical engineers, researchers, and students to analyze and address common problems in state-of-the-art power electronics technologies. Author Stefanos Manias supplies a detailed discussion of the theory of power electronics circuits and electronic power conversion technology systems, with common problems and methods of analysis to critically evaluate results. These theories are reinforced by simulation examples using well-known and widely available software programs, including SPICE, PSIM, and MATLAB/SIMULINK. Manias expertly analyzes power electronic circuits with basic power semiconductor devices, as well as the new power electronic converters. He also clearly and comprehensively provides an analysis of modulation and output voltage, current control techniques, passive and active filtering,

and the characteristics and gating circuits of different power semiconductor switches, such as BJTs, IGBTs, MOSFETs, IGCTs, MCTs and GTOs. - Includes step-by-step analysis of power electronic systems - Reinforced by simulation examples using SPICE, PSIM, and MATLAB/SIMULINK - Provides 110 common problems and solutions in power electronics technologies

Power Electronics MDPI

The subject of power electronics is concerned with solid state devices for the control and conversion of electrical power. These silicon devices are designed mainly for switching the transfer current from one part of an electrical circuit to another. Power electronics has a wide range of applications from the small systems used in electrical appliances to very large systems for the supply and distribution of electricity. Although it can be difficult to completely define where the boundary lies between electronics and power electronics, this resource succeeds at breaking down the discipline. Containing the useful concepts and building blocks that go into making a power converter operate successfully, this book provides a description of the characteristics of different types of power semiconductor devices and their application to power converter circuits. Applications to power transmission, electric drives, and medical equipment are included to illustrate the wide range of power electronics in both small and high power circuits.

Power Electronics Oxford University Press, USA

Less expensive, lighter, and smaller than its electromechanical counterparts, power electronics lie at the very heart of controlling and converting electric energy, which in turn lies at the heart of making that energy useful. From household appliances to space-faring vehicles, the applications of power electronics are virtually limitless. Until now, however, the same could not be said for access to up-to-date reference books devoted to power electronics. Written by engineers for engineers, *The Power Electronics Handbook* covers the full range of relevant topics, from basic principles to cutting-edge applications. Compiled from contributions by an international panel of experts and full of illustrations, this is not a theoretical tome, but a practical and enlightening presentation of the usefulness and variety of technologies that encompass the field. For modern and emerging applications, power electronic devices and systems must be small, efficient, lightweight, controllable, reliable, and economical. *The Power Electronics Handbook* is your key to understanding those devices, incorporating them into controllable circuits, and implementing those systems into applications from virtually every area of electrical engineering.

Power Electronics John Wiley & Sons

For junior or senior undergraduate students in Electrical and Electronic Engineering. This text covers the basics of emerging areas in power electronics and a broad range of topics such as power switching devices, conversion methods, analysis and techniques, and applications. Its unique approach covers the characteristics of semiconductor devices first, then discusses the applications of these devices for power conversions. Four main applications are included: flexible ac transmissions (FACTS), static switches, power supplies, dc drives, and ac drives. The full text downloaded to your computer With eBooks you can: search for key concepts, words and phrases make highlights and notes as you study share your notes with friends eBooks are downloaded to your computer and accessible either offline through the Bookshelf (available as a free download), available online and also via the iPad and Android apps. Upon purchase, you'll gain instant access to this eBook. Time limit The eBooks products do not have an expiry date. You will continue to access your digital ebook products whilst you have your Bookshelf installed.

Power Electronics MDPI

The book provides an exhaustive coverage of various power electronic devices and other related topics in a student-friendly manner. The text is supported by a large number of examples and review exercises to test the understanding of fundamental concepts.

Power Electronics Handbook Institute of Electrical & Electronics Engineers(IEEE)

This comprehensive introduction to power semiconductor devices, their characteristics, and their ratings will take you step-by-step through the most important topics in the field. Highly applications-oriented, this course presents the student with six projects which offer the opportunity to simulate results on a computer using software such as SPICE or PSpice. This course is ideal for engineers, engineering managers, technicians, and anyone with an interest in the theory, analysis, design, or applications of power electronics circuits and systems.

Power Electronics New Age International

Yes, this is another book on power electronics but it is different.

Concise, simple and animated. Covering various basic principles with applications from domestic to industrial, the learner will have the feeling of this field. Basic principles are explained without the use of complex mathematics, and further understanding can be sought via dedicated computer animations. Consolidated with several experiments, it is very helpful for beginners and useful as a first practical course on power electronics for technical colleges and corporate in-house training.

Power Electronics and Motor Drive Systems Prentice Hall

This book covers power electronics, in depth, by presenting the basic principles and application details, which can be used both as a textbook and reference book. Introduces a new method to present power electronics converters called Power Blocks Geometry (PBG) Applicable for courses focusing on power electronics, power electronics converters, and advanced power converters Offers a comprehensive set of simulation results to help understand the circuits presented throughout the book *POWER ELECTRONICS: ESSENTIALS & APPLICATIONS (With CD)* John Wiley & Sons

For junior or senior undergraduate students in Electrical and Electronic Engineering. This text covers the basics of emerging areas in power electronics and a broad range of topics such as power switching devices, conversion methods, analysis and techniques, and applications. Its unique approach covers the characteristics of semiconductor devices first, then discusses the applications of these devices for power conversions. Four main applications are included: flexible ac transmissions (FACTS), static switches, power supplies, dc drives, and ac drives.

Power Electronics PHI Learning Pvt. Ltd.

Special Features: · Power semiconductor devices are viewed from the physics, circuit, modeling and thermal viewpoints for a better understanding of the devices. · AC-DC, DC-DC, DC-AC converters and magnetic devices are treated from both the conceptual and design perspectives. · A separate chapter is included that addresses the analysis and design of linear regulators. · A chapter is included to address the modeling methods to obtain dynamic models of power electronics systems. The method of bond graph is introduced for modeling power electronics systems. · The design of discrete domain controllers in both classical and state space approach are included which addresses the needs of power electronic systems. · Optimal and robust control design methods as applied to power electronics systems are addressed. · Discrete numerical algorithms for digital implementation with respect to power electronics systems are addressed in a separate chapter. · A separate chapter is devoted to the thermal aspects like heat sink sizing for power electronics systems. · Design integration by specifying and designing for reliability with power electronics system examples is another unique feature of this book. · The appendices include the following: · Derivation of the area product for a saturable-core transformer. · Representative list of commonly used core types and their physical parameters. · Representative list of commonly used wire gauges. · Laplace transforms and z-transforms of few time domain signals. · List of specifications for the induction motor used for controller design. · Description of all the object parameters for various electronic components from the reliability prediction viewpoint. Pedagogy includes: · 600+ illustrations and line diagrams. · 480+ descriptive questions. · 440+ objective questions. · 200+ unsolved problems. · 50+ explanatory examples and solved problems. Companion CD contains: · Reliability prediction toolbox. · Bond graph simulation toolbox. · Several circuit and design examples About The Book: This book on power electronics spans a wide knowledge base such as power devices, drives, circuit topologies, magnetics, system modeling, control configurations, digital processing, thermal and reliability aspects. The book has been broadly divided into two types of topics viz. (a) circuit-oriented aspects and (b) system-oriented aspects. The first seven chapters deal with circuit-oriented aspects of power electronics systems and the remaining chapters deal with system-oriented aspects like controls and reliability.

Power Electronics for Technology John Wiley & Sons

Power semiconductor devices are discussed in first chapter. SCR, GTO, LASCR, RCT, MCT, characteristics, rating turn-off and turn-on is presented. Power BJT, MOSFET, IGBT, driving circuits, protection and snubber circuits are also discussed. Commutation circuits and series and parallel operation are presented. Single and three phase controlled converters are given in second chapter. Half wave, full wave, midpoint, semiconverters, full converters, dual converters and effect of source inductance is also given. Operation with resistive and inductive load is discussed. Third chapter presents AC voltage controllers and cycloconverters. On-off control, phase control, triac based controllers are given. Cycloconverters and operations with inductive as well as resistive

load are discussed. Choppers are given in fourth chapter. Step down, step up, voltage, current and load commutated choppers are given. Classification is also discussed. Last chapter presents inverters. Half bridge, full bridge, quasi square wave, push-pull, thyristorized inverters with resistive and inductive loads are given. Switching techniques for PWM inverters are also given.

Practical Power Electronics McGraw-Hill Companies

Discusses the application of mathematical and engineering tools for modeling, simulation and control oriented for energy systems, power electronics and renewable energy This book builds on the background knowledge of electrical circuits, control of dc/dc converters and inverters, energy conversion and power electronics. The book shows readers how to apply computational methods for multi-domain simulation of energy systems and power electronics engineering problems. Each chapter has a brief introduction on the theoretical background, a description of the problems to be solved, and objectives to be achieved. Block diagrams, electrical circuits, mathematical analysis or computer code are covered. Each chapter concludes with discussions on what should be learned, suggestions for further studies and even some experimental work. Discusses the mathematical formulation of system equations for energy systems and power electronics aiming state-space and circuit oriented simulations Studies the interactions between MATLAB and Simulink models and functions with real-world implementation using microprocessors and microcontrollers Presents numerical integration techniques, transfer-function modeling, harmonic analysis and power quality performance assessment Examines existing software such as, MATLAB/Simulink, Power Systems Toolbox and PSIM to simulate power electronic circuits including the use of renewable energy sources such as wind and solar sources The simulation files are available for readers who register with the Google Group: power-electronics-interfacing-energy-conversion-systems@googlegroups.com. After your registration you will receive information in how to access the simulation files, the Google Group can also be used to communicate with other registered readers of this book.

Power Electronics Circuits Devices And Applications Academic Press

Power electronics technology is still an emerging technology, and it has found its way into many applications, from renewable energy generation (i.e., wind power and solar power) to electrical vehicles (EVs), biomedical devices, and small appliances, such as laptop chargers. In the near future, electrical energy will be provided and handled by power electronics and consumed

through power electronics; this not only will intensify the role of power electronics technology in power conversion processes, but also implies that power systems are undergoing a paradigm shift, from centralized distribution to distributed generation. Today, more than 1000 GW of renewable energy generation sources (photovoltaic (PV) and wind) have been installed, all of which are handled by power electronics technology. The main aim of this book is to highlight and address recent breakthroughs in the range of emerging applications in power electronics and in harmonic and electromagnetic interference (EMI) issues at device and system levels as discussed in robust and reliable power electronics technologies, including fault prognosis and diagnosis technique stability of grid-connected converters and smart control of power electronics in devices, microgrids, and at system levels.

Fundamentals of Power Electronics Elsevier

This Book Provides A Comprehensive And A Rigorous Analytical Treatment Of Static Power Converters Employing Mainly Thyristors. These Power Converters Include Phase Controlled Line Commutated Converters, Cycloconverters, A.C. Voltage Controllers, D.C. Choppers And Inverters. It Gives A Detailed Discussion Of The Devices Which Include Gtos And Mosfets. The Analysis In This Book Is Based On Circuit Approaches And Conclusions Are Aimed At Helping In The Design Of Converters. Some Important Features Of The Book Are: * In-Depth Coverage Of Solid State Power Converters * Extensive Comparative Analysis Of Power Converters With A View To Providing Design Criteria * Numerous Worked Examples, Practice Problems And Multiple Choice Questions For An In-Depth And Clear Understanding Of Concepts * Application Of Converters In The Speed Control Of Electric Motors Is Discussed In Detail This Book Would Serve As A Useful Text For Undergraduate And Graduate Courses In Power Electronics And Also As A Reference For Practicing Engineers Who Are Involved In The Design And Development Of The Power Electronic Converters.

Applications of Power Electronics Technical Publications

Power devices are key to modern power systems, performing functions such as inverting and changing voltages, buffering and switching. Following a device-centric approach, this book covers power electronic applications, semiconductor physics, materials science, application engineering, and key technologies such as MOSFET, IGBT and WBG.

Solutions Manual - Power Electronics Elsevier

The purpose of this book is to describe the theory of Digital Power Electronics and its applications. The authors apply digital control

theory to power electronics in a manner thoroughly different from the traditional, analog control scheme. In order to apply digital control theory to power electronics, the authors define a number of new parameters, including the energy factor, pumping energy, stored energy, time constant, and damping time constant. These parameters differ from traditional parameters such as the power factor, power transfer efficiency, ripple factor, and total harmonic distortion. These new parameters result in the definition of new mathematical modeling: • A zero-order-hold (ZOH) is used to simulate all AC/DC rectifiers. • A first-order-hold (FOH) is used to simulate all DC/AC inverters. • A second-order-hold (SOH) is used to simulate all DC/DC converters. • A first-order-hold (FOH) is used to simulate all AC/AC (AC/DC/AC) converters. Presents most up-to-date methods of analysis and control algorithms for developing power electronic converters and power switching circuits Provides an invaluable reference for engineers designing power converters, commercial power supplies, control systems for motor drives, active filters, etc. Presents methods of analysis not available in other books

Digital Power Electronics and Applications Elsevier

Market_Desc: · Electrical Engineering Students · Electrical Engineering Instructors · Power Electronics Engineers Special Features: · Easy to follow step-by-step in depth treatment of all the theory. · Computer simulation chapter describes the role of computer simulations in power electronics. Examples and problems based on Pspice and MATLAB are included. · Introductory chapter offers a review of basic electrical and magnetic circuit concepts. · A new CD-ROM contains the following: · Over 100 of new problems of varying degrees of difficulty for homework assignments and self-learning. · PSpice-based simulation examples, which illustrate basic concepts and help in design of converters. · A newly-developed magnetic component design program that demonstrates design trade-offs. · PowerPoint-based slides, which will improve the learning experience and the ease of using the book About The Book: The text includes cohesive presentation of power electronics fundamentals for applications and design in the power range of 500 kW or less. It describes a variety of practical and emerging power electronic converters made feasible by the new generation of power semiconductor devices. Topics included in this book are an expanded discussion of diode rectifiers and thyristor converters as well as chapters on heat sinks, magnetic components which present a step-by-step design approach and a computer simulation of power electronics which introduces numerical techniques and commonly used simulation packages such as PSpice, MATLAB and EMTp.