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Power electronics have varied applications such as in vehicular technology, active power filters, etc. This book is a valuable compilation of chapters on topics such as advanced power semiconductor devices; different types of power converters such as inverters; performance of electronic power converters; modeling, design and applications of power circuit components, etc. For all readers who are interested in power electronics converters, the researches and examples presented in this book will serve as an excellent guide to develop a comprehensive understanding.

With the continual increase in the global energy consumption, grows the demand on the power capacity, efficient production, distribution and utilization of the electrical energy generated. The role of power electronics in such contexts has been of great importance not only for the traditional power generator systems but also for the decentralized renewable energy generation, like solar and wind power. Several innovations can be observed in the field of power systems for renewable energy sources based on power electronics. Improvements can be identified regarding for example control techniques, semiconductor devices, electromagnetic components and also topologies. Such developments allow specific application requirements to be fulfilled with lower levels of losses and less material

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expenditure. In this thesis, power electronic topologies are analyzed with respect to the type of electrical isolation between the input and output, which may differ in three ways: galvanic, capacitive and electronic.

Among the above requirements, “galvanic isolation” is a major issue in photovoltaic applications, not only due to regulations concerning the grounding of PV modules but also because of compatibility requirements of new cell technologies. Within this framework, a theoretical and practical examination on new inverter topologies is investigated with electronic isolation method in order to meet the targeted future challenge aspects.

In many university curricula, the power electronics field has evolved beyond the status of comprising one or two special-topics courses. Often there are several courses dealing with the power electronics field, covering the topics of converters, motor drives, and power devices, with possibly additional advanced courses in these areas as well. There may also be more traditional power-area courses in energy conversion, machines, and power systems. In the breadth vs. depth tradeoff, it no longer makes sense for one textbook to attempt to cover all of these courses; indeed, each course should ideally employ a dedicated textbook. This text is intended for use in introductory power electronics courses on converters, taught at the senior or first-year graduate level. There is sufficient material for a one year course or, at a faster pace with some material omitted, for two quarters or one semester. The first class on converters has been called a way of enticing control and electronics students into the power area via the "back door". The

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power electronics field is quite broad, and includes fundamentals in the areas of • Converter circuits and electronics • Control systems • Magnetics • Power applications • Design-oriented analysis This wide variety of areas is one of the things which makes the field so interesting and appealing to newcomers. This breadth also makes teaching the field a challenging undertaking, because one cannot assume that all students enrolled in the class have solid prerequisite knowledge in so many areas.

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

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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 worldwide, 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.

Learn the latest advances in SiC (Silicon Carbide) technology from the leading experts in the field with this new cutting-edge resource. The book is your single source for in-depth information on both SiC device fabrication and system-level applications. This comprehensive reference begins with an examination of

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how SiC is grown and how defects in SiC growth can affect working devices. Key issues in selective doping of SiC via ion implantation are covered with special focus on implant conditions and electrical activation of implants. SiC applications discussed include chemical sensors, motor-control components, high-temperature gas sensors, and high-temperature electronics. By cutting through the arcane data and jargon surrounding the hype on SiC, this book gives an honest assessment of today's SiC technology and shows you how SiC can be adopted in developing tomorrow's applications.

Control of Power Electronic Converters and Systems examines the theory behind power electronic converter control, including operation, modeling and control of basic converters. The book explores how to manipulate components of power electronics converters and systems to produce a desired effect by controlling system variables. Advances in power electronics enable new applications to emerge and performance improvement in existing applications. These advances rely on control effectiveness, making it essential to apply appropriate control schemes to the converter and system to obtain the desired performance.

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

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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. This contributed volume is written by key specialists working in multidisciplinary fields in electrical engineering, linking control theory, power electronics, artificial neural networks, embedded controllers and signal processing. The authors of each chapter report the state of the art of the various topics addressed and present results of their own research, laboratory experiments and successful applications. The presented solutions concentrate on three main areas of interest: · motion control in complex electromechanical systems, including sensorless control; · fault diagnosis and fault tolerant control of electric drives; · new control algorithms for power electronics converters. The chapters and the complete book possess strong monograph attributes. Important practical and theoretical problems are deeply and accurately presented on the background of an exhaustive state-of the art review. Many results are completely new and were never published before. Well-known control methods

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like field oriented control (FOC) or direct torque control (DTC) are referred as a starting point for modifications or are used for comparison. Among numerous control theories used to solve particular problems are: nonlinear control, robust control, adaptive control, Lyapunov techniques, observer design, model predictive control, neural control, sliding mode control, signal filtration and processing, fault diagnosis, and fault tolerant control.

The DC/AC microgrid system is a crucial empowering technology for the integration of various types of renewable energy sources (RES) accompanied by a smart control approach to enhance the system reliability and efficiency. This book presents cutting-edge technology developments and recent investigations performed with the help of power electronics. Large-scale renewable energy integration presents challenges and issues for power grids. In particular, these issues include microgrid adaption to RES, AC machines, the new configuration of AC/DC converters, and electrification of domestic needs with optimal cost expenses from domestic standalone microgrids. Furthermore, this book elaborates cutting-edge developments in electric vehicle fast charging configuration, battery management, and control schemes with renewable energies through hardware-in-loop testing and validation for performance durability in real-time application. Overall, the book

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covers the diverse field of microgrids, allowing readers to adopt new technologies and prepare for future power demands with sustainable green engineering.

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. *

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Presents methods of analysis not available in other books.

This book is a technical publication for students, scholars and engineers in electrical engineering, focusing on the pulse-width-modulation (PWM) technologies in power electronics area. Based on an introduction of basic PWM principles this book analyzes three major challenges for PWM on system performance: power losses, voltage/current ripple and electromagnetic interference (EMI) noise, and the lack of utilization of control freedoms in conventional PWM technologies. Then, the model of PWM's impact on system performance is introduced, with the current ripple prediction method for voltage source converter as example. With the prediction model, two major advanced PWM methods are introduced: variable switching frequency PWM and phase-shift PWM, which can reduce the power losses and EMI for the system based on the prediction model. Furthermore, the advanced PWM can be applied in advanced topologies including multilevel converters and paralleled converters. With more control variables in the advanced topologies, performance of PWM can be further improved. Also, for the special problem for common-mode noise, this book introduces modified PWM method for reduction. Especially, the paralleled inverters with advanced PWM can achieve good performance for the common-mode noise reduction. Finally, the

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implementation of PWM technologies in hardware is introduced in the last part.

Power electronics, which is a rapidly growing area in terms of research and applications, uses modern electronics technology to convert electric power from one form to another, such as ac-dc, dc-dc, dc-ac, and ac-ac with a variable output magnitude and frequency. Power electronics has many applications in our every day life such as air-conditioners, electric cars, sub-way trains, motor drives, renewable energy sources and power supplies for computers. This book covers all aspects of switching devices, converter circuit topologies, control techniques, analytical methods and some examples of their applications. * 25% new content * Reorganized and revised into 8 sections comprising 43 chapters * Coverage of numerous applications, including uninterruptable power supplies and automotive electrical systems * New content in power generation and distribution, including solar power, fuel cells, wind turbines, and flexible transmission

Modern power electronic converters are involved in a very broad spectrum of applications: switched-mode power supplies, electrical-machine-motion-control, active power filters, distributed power generation, flexible AC transmission systems, renewable energy conversion systems and vehicular technology, among them. Power Electronics Converters Modeling and Control teaches the reader how to

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analyze and model the behavior of converters and so to improve their design and control. Dealing with a set of confirmed algorithms specifically developed for use with power converters, this text is in two parts: models and control methods. The first is a detailed exposition of the most usual power converter models: · switched and averaged models; · small/large-signal models; and · time/frequency models. The second focuses on three groups of control methods: · linear control approaches normally associated with power converters; · resonant controllers because of their significance in grid-connected applications; and · nonlinear control methods including feedback linearization, stabilizing, passivity-based, and variable-structure control. Extensive case-study illustration and end-of-chapter exercises reinforce the study material. Power Electronics Converters Modeling and Control addresses the needs of graduate students interested in power electronics, providing a balanced understanding of theoretical ideas coupled with pragmatic tools based on control engineering practice in the field. Academics teaching power electronics will find this an attractive course text and the practical points make the book useful for self tuition by engineers and other practitioners wishing to bring their knowledge up to date.

This thesis proposes new power converter topologies suitable for aircraft systems. It also

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proposes both AC-DC and DC-DC types of converters for different electrical loads to improve the performance these systems. To increase fuel efficiency and reduce environmental impacts, less efficient non-electrical aircraft systems are being replaced by electrical systems. However, more electrical systems requires more electrical power to be generated in the aircraft. The increased consumption of electrical power in both civil and military aircrafts has necessitated the use of more efficient electrical power conversion technologies. This book presents a comprehensive mathematical analysis and the design and digital simulation of the power converters. Subsequently it discusses the construction of the hardware prototypes of each converter and the experimental tests carried out to verify the benefits of the proposed solutions in comparison to the existing solutions.

"The emerging fuel cell (FC) technology is growing rapidly in its applications from small-scale portable electronics to large-scale power generation. This book gives students, engineers, and scientists a solid understanding of the FC dynamic modeling and controller design to adapt FCs to particular applications in distributed power generation." "The book begins with a fascinating introduction to the subject, including a brief history of the U.S. electric utility formation and restructuring. Next, it provides coverage of power deregulation and distributed

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generation (DG), DG types, fuel cell DGs, and the hydrogen economy. Modeling and Control of Fuel Cells is an excellent reference book for students and professionals in electrical, chemical, and mechanical engineering and scientists working in the FC area."--BOOK JACKET.

Because of the demand for higher efficiencies, smaller output ripple, and smaller converter size for modern power electronic systems, integrated power electronic converters could soon replace conventional switched-mode power supplies. Synthesized integrated converters and related digital control techniques address problems related to cost, space, flexibility, energy efficiency, and voltage regulation—the key factors in digital power management and implementation. Meeting the needs of professionals working in power electronics, as well as advanced engineering students, Integrated Power Electronic Converters and Digital Control explores the many benefits associated with integrated converters. This informative text details boost type, buck type, and buck-boost type integrated topologies, as well as other integrated structures. It discusses concepts behind their operation as well specific applications. Topics discussed include: Isolated DC-DC converters such as flyback, forward, push-pull, full-bridge, and half-bridge Power factor correction and its application Definition of the integrated switched-mode power

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supplies Steady-state analysis of the boost integrated flyback rectifier energy storage converter Dynamic analysis of the buck integrated forward converter Digital control based on the use of digital signal processors (DSPs) With innovations in digital control becoming ever more pervasive, system designers continue to introduce products that integrate digital power management and control integrated circuit solutions, both hybrid and pure digital. This detailed assessment of the latest advances in the field will help anyone working in power electronics and related industries stay ahead of the curve.

Power Electronics Design Handbook covers the basics of power electronics theory and components while emphasizing modern low-power components and applications. Coverage includes power semiconductors, converters, power supplies, batteries, protection systems, and power ICs. One of the unique features of the Power Electronics Design Handbook is the integration of component and system theory with practical applications, particularly energy-saving low-power applications. Many chapters also include a section that looks forward to future developments in that area. References for further information or more in-depth technical reading are also included. Nihal Kularatna is a principal research engineer with the Arthur C. Clarke Foundation in Sri Lanka. He is also the author of

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Modern Electronic Test and Measuring Instruments, published by the Institute of Electrical Engineers. Emphasizes low- and medium-power components Offers a unique mix of theory and practical application Provides a useful guide to further reading Based on the fundamentals of electromagnetics, this clear and concise text explains basic and applied principles of transformer and inductor design for power electronic applications. It details both the theory and practice of inductors and transformers employed to filter currents, store electromagnetic energy, provide physical isolation between circuits, and perform stepping up and down of DC and AC voltages. The authors present a broad range of applications from modern power conversion systems. They provide rigorous design guidelines based on a robust methodology for inductor and transformer design. They offer real design examples, informed by proven and working field examples. Key features include: emphasis on high frequency design, including optimisation of the winding layout and treatment of non-sinusoidal waveforms a chapter on planar magnetic with analytical models and descriptions of the processing technologies analysis of the role of variable inductors, and their applications for power factor correction and solar power unique coverage on the measurements of inductance and transformer capacitance, as well as tests for core losses at high frequency worked

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examples in MATLAB, end-of-chapter problems, and an accompanying website containing solutions, a full set of instructors' presentations, and copies of all the figures. Covering the basics of the magnetic components of power electronic converters, this book is a comprehensive reference for students and professional engineers dealing with specialised inductor and transformer design. It is especially useful for senior undergraduate and graduate students in electrical engineering and electrical energy systems, and engineers working with power supplies and energy conversion systems who want to update their knowledge on a field that has progressed considerably in recent years.

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

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

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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.

Electrical Engineering/Power and Energy
Engineering Power Electronic Converter Harmonics
Multipulse Methods for Clean Power "An excellent treatment of the subject." --Allan Ludbrook, Ludbrook & Associates "Pulls all the material together and presents it from the viewpoint of a long-time practitioner in the field . will be much appreciated by designers, the utilities, and users." --Thomas Barton, University of Calgary Stay on the cutting edge of

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applied power electronics for energy-saving systems with this invaluable guide to multipulse converters, power sources, and the IEEE Industry Standard 519. One of the foremost experts in the field and holder of 28 patents, Derek A. Paice brings you new circuit schematics and easy-to-follow methods for practical system analysis, using actual field test results. This book offers thorough coverage of:

- * Requirements, calculations, and standards for harmonics
- * Power source representation
- * Multipulse methods and transformers
- * Double-wound, auto-wound, interphase, and current-control transformers
- * Multiphase circuit performance
- * Practical applications
- * Useful formulas for analysis

Power Electronic Converter Harmonics will be indispensable to anyone looking for optimum concepts for power electronics design, including applications engineers, consultants, and manufacturers. Also of Interest from IEEE Press.

Printed Circuit Board Design Techniques for EMC Compliance Mark I. Montrose 1996 Hardcover 256 pp IEEE Order No. PC5595 ISBN 0-7803-1131-0

electromagnetic Compatibility in Power Electronics Laszlo Tihanyi 1995 Hardcover 416 pp IEEE Order No. PC3129 ISBN 0-7803-0416-0

Handbook of Electrical and Electronic Insulating Materials Second Edition W. Tillar Shugg, Shugg Enterprises, Inc. 1995 Hardcover 608 pp IEEE Order No. PC 3780 ISBN 0-7803-1030-6.

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A Hundred Solved Problems in Power Electronics presents a large collection of questions and their answers for someone who is interested in understanding the operation principle of power electronics converters. By creating a real engineering environment around the question, the goal of this book is to contribute on the development of a qualified electrical engineering workforce. By using engineering language and technical terminology (jargon), this book deals primarily with the challenge of designing power converters for specific applications. This includes, but is not limited to, personal computer power supply, regulated voltage source, and interconnection of renewable energy sources. Since engineering is the application of science to practical use, the link with a real world activity fills the gap between theory and practical application and increases the curiosity of the students. Before each question there is a short text explaining the purpose of that specific problem and how it is associated with real world conditions. The majority of the questions in this book follow a logical sequence, which is an attempt to demonstrate the step-by-step process of a power electronics converter design. Indeed, the purpose of this book is to present a more exciting type of question and show how the theory in power electronics is related to real world problems. Rather than just plugging in numbers for a given equation, this book shows

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practical examples on how to use scientific and technical knowledge to make, operate, and maintain complex systems. Although engineering is one of the professions that actually allows someone to build and create something that could eventually change the life of people (e.g., personal computer or satellite), there is sometimes a lack of motivation from the students in the classroom. It is quite clear that the students are comfortable with math, especially at the senior level. Therefore, the lack of motivation is not due to background deficiency. Instead, the discouragement increases when students do not correlate the subject taught with their future professional activities. Also, the way traditional lectures are set up--with theory presentation followed by examples where students just need to plug in the given data into specific equations--does not keep students' interest and attention. In fact, the moment of solving a specific problem, in a traditional way to teach, comes down to this question: what's the equation that I need to use to plug these given numbers? This is stimulated by the way the problems are designed. We hope that this book offers an alternative on how the students view and address the problems in power electronics. This book is a desirable didactic material to be employed as a reference book instead of a text book (from which the instructor prepares his/her lecture). Notice that the terminology used in A Hundred Solved

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Problems in Power Electronics is not necessarily the same as the one seen in either the text book or from the instructor lectures. This is actually a benefit for the students in electrical engineering since they will learn different terms for the same component or electrical element. Certainly this difference in nomenclature will be seen by the students as an advantage when they are reading technical datasheets and realize that manufacturers often use different terms for the same information. By dividing this book into five parts, the authors compile the solved problems into the following categories: 1) Converters with power diodes 2) SCR converters 3) Dc-dc converters 4) Dc-ac converters 5) Isolated dc-ac converters Such a book structure follows the same sequence of topics as most power electronics books in the technical literature, which simplifies the use of A Hundred Solved Questions in Power Electronics as a recommended book in parallel with other references.

Filling the need for a reference that explains the behavior of power electronic converters, this book provides information currently unavailable in similar texts on power electronics. Clearly organized into four parts, the first treats the dynamics and control of conventional converters, while the second part covers the dynamics and control of DC-DC converters in renewable energy applications, including an introduction to the sources as well as

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the design of current-fed converters applying duality-transformation methods. The third part treats the dynamics and control of three-phase rectifiers in voltage-sourced applications, and the final part looks at the dynamics and control of three-phase inverters in renewable-energy applications. With its future-oriented perspective and advanced, first-hand knowledge, this is a prime resource for researchers and practicing engineers needing a ready reference on the design and control of power electronic converters.

The first treatment of advanced knowledge of electrical sneak circuits and its analysis method in power electronics The work on sneak circuit and its analysis methods for power converters contributes to the reliability of power electronic systems worldwide. Most books in the subject concentrate on electronic systems, but this book is perhaps the first to examine power electronic systems. It describes the sneak circuit phenomena in power converters, introduces some SCA methods for power electronic systems and proposes how to eliminate and make use of sneak circuits. The book is divided into three separate sections. Firstly, the sneak circuit paths and sneak circuit operating conditions are discussed in different kinds of power converters, including resonant switched capacitor converters, basic DC–DC converters, soft–switching converters and Z–source converters; Secondly, the sneak circuit

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analysis guidelines for power converters based on generalized matrix, adjacency matrix and Boolean matrix are presented respectively; Thirdly, the sneak circuit elimination techniques are introduced and verified in several power converters, with applications of sneak circuits described in conclusion. Written by a lead author with extensive academic and industrial experience, the book provides a complete introduction and reference to students and professionals alike. Contents include: Fundamental Concepts, SCA of Resonant Switched Capacitor Converters, SC of DC–DC Converters, SC Analysis Method (including Boolean Matrix), and Applications of SC in Power Converters. Highlights the advanced research works in the sneak circuit analysis, by a leading author in the field Original in its treatment of power electronics converters; most other books concentrating on electronics systems, and aimed at both introductory and advanced levels Offers guidelines for industry professionals involved in the design of power electronic systems, enabling early detection of potential problems Essential reading for Graduate students in Electrical Engineering: Engineers and Researchers in Power Electronics

Offering step-by-step, in-depth coverage, the new Third Edition of Power Electronics: Converters, Applications, and Design provides a cohesive presentation of power electronics fundamentals for

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applications and design in the power range of 500 kW or less. The text describes a variety of practical and emerging power electronic converters made feasible by the new generation of power semiconductor devices. The new edition is now enhanced with a new CD-ROM, complete with PSpice-based examples, a new magnetics design program, and PowerPoint slides.

Control of Power Electronic Converters and Systems, Volume 3, explores emerging topics in the control of power electronics and converters, including the theory behind control, and the practical operation, modeling, and control of basic power system models. This book introduces the most important controller design methods, including both analog and digital procedures. This reference explains the dynamic characterization of terminal behavior for converters, as well as preserving the stability and power quality of modern power systems. Useful for engineers in emerging applications of power electronic converters and those combining control design methods into different applications in power electronics technology. Addressing controller interactions - in light of increasing renewable energy integration and related challenges with stability and power quality - is becoming more frequent in power converters and passive components. Discusses different applications and their control in integrated renewable energy systems Introduces the most

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important controller design methods, both in analog and digital Describes different important applications to be used in future industrial products Explains the dynamic characterization of terminal behavior for converters

Fundamentals of Power Electronics, Second Edition, is an up-to-date and authoritative text and reference book on power electronics. This new edition retains the original objective and philosophy of focusing on the fundamental principles, models, and technical requirements needed for designing practical power electronic systems while adding a wealth of new material. Improved features of this new edition include: A new chapter on input filters, showing how to design single and multiple section filters; Major revisions of material on averaged switch modeling, low-harmonic rectifiers, and the chapter on AC modeling of the discontinuous conduction mode; New material on soft switching, active-clamp snubbers, zero-voltage transition full-bridge converter, and auxiliary resonant commutated pole. Also, new sections on design of multiple-winding magnetic and resonant inverter design; Additional appendices on Computer Simulation of Converters using averaged switch modeling, and Middlebrook's Extra Element Theorem, including four tutorial examples; and Expanded treatment of current programmed control with complete results for basic converters, and much more. This edition includes

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many new examples, illustrations, and exercises to guide students and professionals through the intricacies of power electronics design.

Fundamentals of Power Electronics, Second Edition, is intended for use in introductory power electronics courses and related fields for both senior undergraduates and first-year graduate students interested in converter circuits and electronics, control systems, and magnetic and power systems.

It will also be an invaluable reference for professionals working in power electronics, power conversion, and analogue and digital electronics. Control of Power Electronic Converters and Systems examines the theory behind power electronic converter control, including operation, modeling and control of basic converters. The book explores how to manipulate components of power electronics converters and systems to produce a desired effect by controlling system variables. Advances in power electronics enable new applications to emerge and performance improvement in existing applications. These advances rely on control effectiveness, making it essential to apply appropriate control schemes to the converter and system to obtain the desired performance. Discusses different applications and their control Explains the most important controller design methods both in analog and digital Describes different important applications to be used in future industrial products Covers

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voltage source converters in significant detail
Demonstrates applications across a much broader context

In modern industries, electrical energy conversion systems consist of two main parts: electrical machines and power electronic converters. With global electricity use at an all-time high, uninterrupted operation of electrical power converters is essential. Reliability in Power Electronics and Electrical Machines: Industrial Applications and Performance Models provides an in-depth analysis of reliability in electrical energy converters as well as strategies for designing dependable power electronic converters and electrical machines.

Featuring a comprehensive discussion on the topics of reliability design and measurement, failure mechanisms, and specific issues pertaining to quality, efficiency, and durability, this timely reference source offers practical examples and research-based results for use by engineers, researchers, and advanced-level students.

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

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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.

In recent years fractional calculus has played an important role in various fields such as mechanics, electricity, chemistry, biology, economics, modeling, identification, control theory and signal processing. The scope of this book is to present the state of the art in the study of fractional systems and the application of fractional differentiation. Furthermore, the manufacture of nanowires is important for the design of nanosensors and the development of high-yield thin films is vital in procuring clean solar energy. This wide range of applications is of interest to engineers, physicists and mathematicians.

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

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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. Impedance Source Power Electronic Converters brings together state of the art knowledge and cutting edge techniques in various stages of research related to the ever more popular impedance source converters/inverters. Significant research efforts are underway to develop commercially viable and technically feasible, efficient and reliable power converters for renewable energy, electric transportation and for various industrial applications. This book provides a detailed understanding of the concepts, designs, controls, and application demonstrations of the impedance source converters/inverters. Key features:

- Comprehensive analysis of the impedance source converter/inverter topologies, including typical topologies and derived topologies. Fully explains the design and control techniques of impedance source converters/inverters, including hardware design and control parameter design for corresponding control methods. Presents the latest power conversion solutions that aim to advance the role of power electronics into industries and sustainable energy conversion systems. Compares impedance source converter/inverter applications in renewable energy power generation and electric vehicles as well as different industrial applications. Provides an overview of existing challenges, solutions and future trends. Supported by calculation examples, simulation

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models and results. Highly accessible, this is an invaluable resource for researchers, postgraduate/graduate students studying power electronics and its application in industry and renewable energy conversion as well as practising R&D engineers. Readers will be able to apply the presented material for the future design of the next generation of efficient power electronic converters/inverters.

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