

Power Electronics By M D Singh And K Khanchandani | 19ff2a4c324b22072b6962986d53cef8

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POWER ELECTRONICS: ESSENTIALS & APPLICATIONS (With CD)
Power Electronics
3D-PEIM
Recent Developments in Power Electronics
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Digital Control in Power Electronics
Power Electronics Technology
Power Electronics

Control in Power Electronics

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Advanced Power Electronics Converters

This book covers advancements of power electronic converters and their control techniques for grid integration of large-scale renewable energy sources and electrical vehicles. Major emphasis are on transformer-less direct grid integration, bidirectional power transfer, compensation of grid power quality issues, DC system protection and grounding, interaction in mixed AC/DC system, AC and DC system stability, magnetic design for high-frequency high power density systems with advanced soft magnetic materials, modelling and simulation of mixed AC/DC system, switching strategies for enhanced efficiency, and protection and reliability for sustainable grid integration. This book is an invaluable resource for professionals active in the field of renewable energy and power conversion.

Emerging Power Converters for Renewable Energy and Electric Vehicles

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 a 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.

Power Electronics and Motor Drives

Soldering in Electronics Assembly

With this revised edition we aim to present a text on Power Electronics for the UG level which will provide a comprehensive coverage of converters, choppers, inverters and motor drives. All this, with a rich pedagogy to support the conceptual understanding and integral use of PSpice.

Power Electronic Control of AC Motors

In this original book on model predictive control (MPC) for power electronics, the focus is put on high-power applications with multilevel converters operating at switching frequencies well below 1 kHz, such as medium-voltage drives and modular multi-level converters. Consisting of two main parts, the first offers a detailed review of three-phase power electronics, electrical machines, carrier-based pulse width modulation, optimized pulse patterns, state-of-the-art converter control methods and the principle of MPC. The second part is an in-depth treatment of MPC methods that fully exploit the performance potential of high-power converters. These control methods combine the fast control responses of deadbeat control with the optimal steady-state performance of optimized pulse patterns by resolving the antagonism between the two. MPC is expected to evolve into the control method of choice for power electronic systems operating at low pulse numbers with multiple coupled variables and tight operating constraints. Model Predictive Control of High Power Converters and Industrial Drives will enable the reader to learn how to increase the power capability of the converter, lower the current distortions, reduce the filter size, achieve very fast transient responses and ensure the reliable operation within safe operating area constraints. Targeted at power electronic practitioners working on control-related aspects as well as control engineers, the material is intuitively accessible, and the mathematical formulations are augmented by illustrations, simple examples and a book companion website featuring animations. Readers benefit from a concise and comprehensive treatment of MPC for industrial power electronics, enabling them to understand, implement and advance the field of high-performance MPC schemes.

Power Integrity

The authors were originally brought together to share research and applications through the international Danfoss Professor Programme at Aalborg University in Denmark. Personal

computers would be unwieldy and inefficient without power electronic dc supplies. Portable communication devices and computers would also be impractical. High-performance lighting systems, motor controls, and a wide range of industrial controls depend on power electronics. In the near future we can expect strong growth in automotive applications, dc power supplies for communication systems, portable applications, and high-end converters. We are approaching a time when all electrical energy will be processed and controlled through power electronics somewhere in the path from generation to end use. The most up-to-date information available is presented in the text. Written by a world renowned leader in the field.

Principles of Electric Machines and Power Electronics

Power Electronics

Power Converters for Electric Vehicles gives an overview, topology, design, and simulation of different types of converters used in electric vehicles (EV). It covers a wide range of topics ranging from the fundamentals of EV, Hybrid EV and its stepwise approach, simulation of the proposed converters for real-time applications and corresponding experimental results, performance improvement paradigms, and overall analysis. Drawing upon the need for novel converter topologies, this book provides the complete solution for the power converters for EV applications along with simulation exercises and experimental results. It explains the need for power electronics in the improvement of performance in EV. This book: Presents exclusive information on the power electronics of EV including traction drives. Provides step-by-step procedure for converter design. Discusses various topologies having different isolated and non-isolated converters. Describes control circuit design including renewable energy systems and electrical drives. Includes practical case studies incorporated with simulation and experimental results. Power Converters for Electric Vehicles will provide researchers and graduate students in Power Electronics, Electric Drives, Vehicle Engineering a useful resource for stimulating their efforts in this important field of the search for renewable technologies.

Power Electronics

This book presents the latest cutting-edge technology in high-power converters and medium voltage drives, and provides a complete analysis of various converter topologies, modulation techniques, practical drive configurations, and advanced control schemes. Supplemented with more than 250 illustrations, the author illustrates key concepts with simulations and experiments. Practical problems, along with accompanying solutions, are presented to help you tackle real-world issues.

Power Electronics and Variable Frequency Drives

Soft-Switching Technology for Three-phase Power Electronics Converters Discover foundational and advanced topics in soft-switching technology, including ZVS three-phase conversion. In Soft-Switching Technology for Three-phase Power Electronics Converters, an expert team of researchers delivers a comprehensive exploration of soft-switching three-phase converters for applications including renewable energy and distribution power systems, AC power sources, UPS, motor drives, battery chargers, and more. The authors begin with an introduction to the fundamentals of the technology, providing the basic knowledge necessary for readers to understand the following articles. The book goes on to discuss three-phase

rectifiers and three-phase grid inverters. It offers prototypes and experiments of each type of technology. Finally, the authors describe the impact of silicon carbide devices on soft-switching three-phase converters, studying the improvement in efficiency and power density created via the introduction of silicon carbide devices. Throughout, the authors put a special focus on a family of zero-voltage switching (ZVS) three-phase converters and related pulse width modulation (PWM) schemes. The book also includes: A thorough introduction to soft-switching techniques, including the classification of soft-switching for three phase converter topologies soft-switching types and a generic soft-switching pulse-width-modulation known as Edge-Aligned PWM A comprehensive exploration of classical soft-switching three-phase converters, including the switching of power semiconductor devices and DC and AC side resonance Practical discussions of ZVS space vector modulation for three-phase converters, including the three-phase converter commutation process In-depth examinations of three-phase rectifiers with compound active clamping circuits Perfect for researchers, scientists, professional engineers, and undergraduate and graduate students studying or working in power electronics Soft-Switching Technology for Three-phase Power Electronics Converters is also a must-read resource for research and development engineers involved with the design and development of power electronics.

Power Electronics

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:
 - o Derivation of the area product for a saturable-core transformer.
 - o Representative list of commonly used core types and their physical parameters.
 - o Representative list of commonly used wire gauges.
 - o Laplace transforms and z-transforms of few time domain signals.
 - o List of specifications for the induction motor used for controller design.
 - o Description of all the object parameters for various electronic components from the reliability prediction viewpoint.

Pedagogy includes:

- o 600+ illustrations and line diagrams.
- o 480+ descriptive questions.
- o 440+ objective questions.
- o 200+ unsolved problems.
- o 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.

Industrial Applications of Power Electronics

Semiconductor Power Devices

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

Design of Power Electronics Control Using VLSI Technology

Power Converters for Electric Vehicles

PROVEN TECHNIQUES FOR GENERATING HIGH-FIDELITY MEASUREMENTS Power Integrity: Measuring, Optimizing, and Troubleshooting Power Related Parameters in Electronics Systems provides field-tested techniques for producing high-fidelity measurement using the appropriate equipment. The book thoroughly discusses measurement guidelines, test instrument selection and use, connecting the equipment to the device being tested, and interpreting the acquired data. The latest electronics technologies and their impact on measurement are discussed. Detailed photographs, screenshots, schematics, and equations are included throughout this practical guide. Learn how to accurately measure: Impedance Stability Power supply rejection ratio (PSRR) Reverse transfer and crosstalk Step load response Ripple and noise Edges High-frequency impedance

Power Electronics Technology

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

Power electronics

Advances in Power Electronics and Instrumentation Engineering

Digital Control in Power Electronics presents students of electrical engineering a basic introduction to typical power converter control problems, their digital solutions, and the most

widespread digital control techniques. Although the presentation has been limited to a single converter topology (the half bridge voltage source inverter), the control topics represent a significant spectrum of the more frequently encountered digital control applications in power electronics. Authors Paolo Mattavelli and Simone Buso introduce the reader to basic control problems in power electronic circuits in order to illustrate widely applied digital solutions to these problems. They also aim to raise students' awareness of discrete time control theory, stimulating new developments in its application to power converters.

Model Predictive Control of High Power Converters and Industrial Drives

This book is the result of the extensive experience the authors gained through their year-long occupation at the Faculty of Electrical Engineering at the University of Banja Luka. Starting at the fundamental basics of electrical engineering, the book guides the reader into this field and covers all the relevant types of converters and regulators. Understanding is enhanced by the given examples, exercises and solutions. Thus this book can be used as a textbook for students, for self-study or as a reference book for professionals.

Soft-Switching Technology for Three-phase Power Electronics Converters

This book of selected readings is a compilation on the most important thought in the area of power electronics. Here, under one cover, Rashid has selected key papers from 78 of the most respected names in the industry.

Power Electronics

Electronic and Electrical Engineering

High-Power Converters and AC Drives

Mechatronics is today fast developing as an interdisciplinary branch of engineering. This book offers a comprehensive coverage of the design and application of mechatronic systems. It discusses in detail the construction, operation, features and applications of various components of mechatronic systems. The text, profusely illustrated with diagrams, emphasizes the readers' multidisciplinary skills and ability to design and maintain different mechatronic systems. Key Features : • Motivational assignments given at the end of each chapter and the Case Studies provided at the end of the book direct the readers to applications of mechatronics concepts in the real-world problems encountered in engineering practice. • Separate chapters are devoted to the advanced topics of Robotics and Microelectromechanical Systems (MEMS). • The text is supported by a fair number of photographs of mechatronic systems and their components. This student-friendly text is primarily intended for the students of undergraduate and diploma courses in mechanical, electronics, industrial, and mechatronics engineering. It will also be of immense use to practising engineers.

Power Electronics

Power Electronics is intended to be an introductory text in power electronics, primarily for the undergraduate electrical engineering student. The text is written for some flexibility in the or

of the topics. Much of the text includes computer simulation using PSpice as a supplement to analytical circuit solution techniques.

Power Electronics : Devices and Circuits

Electrical and Electronic Engineering provides a foundation for first year undergraduates and HND students in electrical and electronic engineering. It offers exceptional breadth of coverage and detail in a clear and accessible manner. Suitable for specialists and non-specialists, it makes no excessive demands on the reader's mathematical skills. The basics of circuit theory and analysis are covered at the outset, followed by discrete devices and integrated circuits. Electrical machines, power electronics and digital logic circuits are treated thoroughly in a central group of chapters. Coverage of the essentials of computer architecture and networks followed by a detailed chapter on microprocessors and microcontrollers. The importance of modern communications technology is reflected in the comprehensive group of chapters devoted to analogue, digital and optical fibre communications systems and telephony. Two concluding chapters deal with the important topic of electromagnetic compatibility and the basics of instrumentation and measurement that are essential for non-specialists. This fully revised third edition of this popular text uses a wealth of practical exercises and examples making it ideal as a teaching resource or a study tool.

Power Electronics Handbook

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Power Electronics and Motor Drives facilitates a necessary shift from low-power electronics to the high-power varieties used to control electromechanical systems and other industrial applications. This volume of the handbook: Focuses on special high-power semiconductor devices Describes various electrical machines and motors, their principles of operation, and their limitations Covers power conversion and the high-efficiency devices that perform the necessary switchover between AC and DC Explores very specialized electronic circuits for the efficient control of electric motors Details other applications of power electronics, aside from electric motors—including lighting, renewable energy conversion, and automotive electronics Addresses power electronics used in very-high-power electrical systems to transmit energy Other volumes in the set: Fundamentals of Industrial Electronics Control and Mechatronics Industrial Communication Systems Intelligent Systems

Power Electronics

Managers, engineers and technicians will use this book during industrial construction of electronics assemblies, whilst students can use the book to get a grasp of the variety of

methods available, together with a discussion of technical concerns. It includes over 200 illustrations, including a photographic guide to defects, and contains many line drawings, tables and flow charts to illustrate the subject of electronics assembly. Soldering in Electronics Assembly looks theoretically at everything needed in a detailed study, but in a practical manner. It examines the soldering processes in the light of electronic assembly type; solder; flux; and cleaning requirements. It has information on every available process, from the most basic hand soldering through to latest innovatory ones such as inert atmosphere wave soldering and zoned forced convection infra-red machines. The book provides a detailed analysis of solder and soldering action; purpose of flux and relevant flux types for any application; classification of assembly variants; assessment and maintenance of solderability. There is also a detailed analysis of soldering process defects and causes. In addition, Soldering in Electronics Assembly contains a new chapter on Ball Grid Array (BGA) technology. A practical guide for the industry covering all the main soldering processes currently in use Cleaning, faults, troubleshooting and standards are all major topics Considers safety and solder process quality assessment

Power Electronics and Motor Drives

In recent years, power electronics have been intensely contributing to the development and evolution of new structures for the processing of energy. They can be used in a wide range of applications ranging from power systems and electrical machines to electric vehicles and robotic arm drives. In conjunction with the evolution of microprocessors and advanced control theories, power electronics are playing an increasingly essential role in our society. Thus, in order to cope with the obstacles lying ahead, this book presents a collection of original studies and modeling methods which were developed and published in the field of electrical energy conditioning and control by using circuits and electronic devices, with an emphasis on power applications and industrial control. Researchers have contributed 19 selected and peer-reviewed papers covering a wide range of topics by addressing a wide variety of themes, such as motor drives, AC-DC and DC-DC converters, multilevel converters, varistors, and electromagnetic compatibility, among others. The overall result is a book that represents a cohesive collection of inter-/multidisciplinary works regarding the industrial applications of power electronics.

Power Electronic Control in Electrical Systems

Semiconductor power devices are the heart of power electronics. They determine the performance of power converters and allow topologies with high efficiency. Semiconductor properties, pn-junctions and the physical phenomena for understanding power devices are discussed in depth. Working principles of state-of-the-art power diodes, thyristors, MOSFETs and IGBTs are explained in detail, as well as key aspects of semiconductor device production technology. In practice, not only the semiconductor, but also the thermal and mechanical properties of packaging and interconnection technologies are essential to predict device behavior in circuits. Wear and aging mechanisms are identified and reliability analyses principles are developed. Unique information on destructive mechanisms, including typical failure pictures, allows assessment of the ruggedness of power devices. Also parasitic effects such as device induced electromagnetic interference problems, are addressed. The book concludes with modern power electronic system integration techniques and trends.

POWER ELECTRONICS: ESSENTIALS & APPLICATIONS (With CD)

This original contributed volume combines the individual expertise of eleven world-renowned professionals to provide comprehensive, authoritative coverage of state-of-the-art power electronics and AC drive technology. Featuring an extensive introductory chapter by power-electronics expert Bimal K. Bose and more than 400 figures, POWER ELECTRONICS AND VARIABLE FREQUENCY DRIVES covers each of the field's component disciplines and drives--all in one complete resource. Broad in scope and unique in its presentation, this volume belongs on the bookshelf of every industry engineer, professor, graduate student, and researcher involved in this fast-growing multidisciplinary field. It is an essential for teaching, research, development, and design.

Power Electronics

3D-PEIM

Recent Developments in Power Electronics

MECHATRONICS

*A practical guide to the control of reactive power systems *Ideal for postgraduate and professional courses *Covers the latest equipment and computer-aided analysis A definitive new guide to the control of active and reactive power, featuring the latest developments including FACTS Power Electronic Control in Electrical Systems offers a solid theoretical foundation for the electronic control of active and reactive power, providing an overview of the composition of electrical power networks; a basic description of the most popular power systems studies; and coverage of the roles of Flexible Alternating Current Transmission Systems (FACTS) and Custom Power equipment. Developments in power electronics have opened up new ways in which power control may be achieved not only in high-voltage transmission systems but also in low-voltage distribution systems, and the coverage of these developments makes this new book on active and reactive power control in electrical power systems essential reading for advanced students, engineers and academics alike. Within this book the fundamental concepts associated with the topic of power electronic control are covered alongside the latest equipment and devices, new application areas and associated computer-assisted methods.

2018 Second International Symposium on 3D Power Electronics Integration and Manufacturing (3D-PEIM).

Power Electronics and Motor Drives: Advances and Trends, Second Edition is the perfect resource to keep the electrical engineer up-to-speed on the latest advancements in technologies, equipment and applications. Carefully structured to include both traditional topics for entry-level and more advanced applications for the experienced engineer, this reference sheds light on the rapidly growing field of power electronic operations. New content covers converters, machine models and new control methods such as fuzzy logic and neural network control. This reference will help engineers further understand recent technologies and gain practical understanding with its inclusion of many industrial applications. Further supported by a glossary per chapter, this book gives engineers and researchers a critical reference to learn

from real-world examples and make future decisions on power electronic technology and applications. Provides many practical examples of industrial applications Updates on the newest electronic topics with content added on fuzzy logic and neural networks Presents information from an expert with decades of research and industrial experience

Digital Control in Power Electronics

A comprehensive, up-to-date and lucidly written book meeting with the long-felt need for a complete text for undergraduate and postgraduate courses. The book is mainly concerned with detailed analysis and design of converters, inverters and power control circuits using solid-state devices. It covers the various types of transformation of energy and discusses the circuit and equipment basic to most electronic devices in use today. With its wide coverage and detailed analysis, is an ideal text for undergraduate and postgraduate and students of electrical engineering and electronics. It would also be highly useful to practicing engineers in the field of power control.

Power Electronics Technology

Power Electronics

This book constitutes the refereed proceedings of the Second International Conference on Advances in Power Electronics and Instrumentation Engineering, PEIE 2011, held at Nagpur, India, in April 2011. The 9 revised full papers presented together with 4 short papers and 7 poster papers were carefully reviewed and selected from numerous submissions. The papers address current issues in the field of power electronics, communication engineering, instrumentation engineering, digital electronics, electrical power engineering, electrical machines, information technology, control systems, and the like.

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