Pulse Width Modulated Dc Dc Power Converters

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Origin of Power Converters Tsai-Fu Wu 2020-05-05 A comprehensive guide to approaches to decoding, synthesizing and modeling pulse width modulation (PWM) converters Origin of Power Converters explores the original converter and provides a systematic examination of the development and modeling of power converters based on decoding and synthesizing approaches. The authors—noted experts on the topic—present an introduction to the origins of the converter and detail the fundamentals related to power the converter's evolution. They cover a range of converter synthesis approaches, synthesis of multi-stage/multi-level converters, extension of hard-switching converters to soft-switching ones, and determination of switch-voltage stresses in the converters. In later chapters, this comprehensive resource reviews conventional two-port network theory and the state-space averaged (SSA) modeling approach, from which systematic modeling approaches are based on the graft switch technique. In addition, the book reviews the converter layer scheme and some fundamental circuit theories. This important book: • Contains a review of several typical transfer codes, such as step-down, step-up, step-up&down, and ± step-up&down • Describes the syntheses of pulse width modulation (PWM) converters such as voltage-fed z-source, current-fed z-source, quasi z-source, switched capacitor, and switched inductor converters • Presents two application examples based on previously proposed modeling approaches Written for academic researchers, graduate students, and seniors in power electronics, Origin of Power Converters provides a comprehensive understanding of the evolution of the converter and its applications.

MacBook For Dummies Mark L. Chambers 2009-02-25 Got a new MacBook, MacBook Air, or MacBook Pro? Want the scoop on Mac laptop basics, using Mac OS X Leopard, networking a laptop, or connecting your laptop to wireless devices? There's no better place to find what you need than MacBook For Dummies, 2nd Edition! With your Mac laptop, you can take your movies, music, documents, e-mail, and Internet wherever

the action is. MacBook For Dummies, 2nd Edition provides the lowdown on maintaining and upgrading your MacBook, customizing the Dock and desktop, traveling with a laptop, turning iPhoto into your portable darkroom, and much more. Learn to: Locate the battery compartment, iSight camera, ports, and "on" button Move your existing files from an older computer Use all the cool new features of Mac OS X Leopard Work with iTunes, iMovie, iPhoto, iDVD, and GarageBand, all packaged with your MacBook Identify the signs of a well-functioning laptop and check for trouble Set up your Mac for multiple users Explore the cool options available with a .Mac account and iDisk storage that lets you retrieve your files anywhere Manage your digital music, photos, and movies Use Bluetooth and get all your wireless devices communicating with each other And if you've been considering switching from a PC to a Mac, MacBook For Dummies, 2nd Edition guides you through the process and even shows you how to run Windows on your Mac laptop. If there's a MacBook in your future — or present — this is the book for you!

Soft Commutation Isolated DC–DC Converters Ivo Barbi 2018-08-27 This book describes the operation and analysis of soft-commutated isolated DC–DC converters used in the design of high efficiency and high power density equipment. It explains the basic principles behind first- and second-order circuits with power switches to enable readers to understand the importance of these converters in high efficiency and high power density power supply design for residential, commercial, industrial and medical use as well as in aerospace equipment. With each chapter featuring a different power converter topology, the book covers the most important resonant converters, including series resonant converters; resonant LLC converters; soft commutation pulse width modulation converters; zero voltage switching; and zero current switching. Each topic is presented with full analysis, a showcase of the power stages of the converters, exercises and their solutions as well as simulation results, which mainly focus on the commutation analysis and output characteristic. This book is a valuable source of information for professionals working in power electronics,

power conversion and design of high efficiency and high power density DC–DC converters and switch mode power supplies. The book also serves as a point of reference for engineers responsible for development projects and equipment in companies and research centers and a text for advanced students.

Power-Switching Converters Dorin O. Neacsu 2014-10-31 Power converters are at the heart of modern power electronics. From automotive power systems to propulsion for large ships, their use permeates through industrial, commercial, military, and aerospace applications of various scales. Having reached a point of saturation where we are unlikely to see many new and revolutionary technologies, industry no

Average Current-Mode Control of DC-DC Power Converters Marian K. Kazimierczuk 2022-03-17 AVERAGE CURRENT-MODE CONTROL OF DC-DC POWER CONVERTERS An authoritative one-stop guide to the analysis, design, development, and control of a variety of power converter systems Average Current-Mode Control of DC-DC Power Converters provides comprehensive and up-to-date information about average current-mode control (ACMC) of pulse-width modulated (PWM) dc-dc converters. This invaluable one-stop resource covers both fundamental and state-of-the-art techniques in average current-mode control of power electronic converters???featuring novel small-signal models of non-isolated and isolated converter topologies with joint and disjoint switching elements and coverage of frequency and time domain analysis of controlled circuits. The authors employ a systematic theoretical framework supported by step-by-step derivations, design procedures for measuring transfer functions, challenging end-of-chapter problems, easy-to-follow diagrams and illustrations, numerous examples for different power supply specifications, and practical tips for developing power-stage small-signal models using circuit-averaging techniques. The text addresses all essential aspects of modeling, design, analysis, and simulation of average current-mode control of power converter topologies, such as buck, boost, buck-boost, and flyback converters in operating continuous-conduction mode (CCM). Bridging the gap between fundamental modeling methods and their application in a variety of switched-mode power supplies, this book: Discusses the development of small-signal models and transfer functions related to the inner current and outer voltage loops Analyzes inner current loops with average current-mode control and describes their dynamic characteristics Presents dynamic properties of the poles and zeros, time-domain responses of the control circuits, and comparison of relevant modeling techniques Contains a detailed chapter on the analysis and design of control circuits in time-domain and frequency-domain Provides techniques required to produce professional MATLAB plots and schematics for circuit simulations, including example MATLAB codes for the complete design of PWM buck, boost, buck-boost, and flyback DC-DC converters Includes appendices with design equations for steady-state operation in CCM for power converters, parameters of commonly used power MOSFETs and diodes, SPICE models of

selected MOSFETs and diodes, simulation tools including introductions to SPICE, MATLAB, and SABER, and MATLAB codes for transfer functions and transient responses Average Current-Mode Control of DC-DC Power Converters is a must-have reference and guide for researchers, advanced graduate students, and instructors in the area of power electronics, and for practicing engineers and scientists specializing in advanced circuit modeling methods for various converters at different operating conditions.

Control Techniques for Power Converters with Integrated Circuit Wen-Wei Chen 2017-12-28 This book offers an overview of power electronic applications in the study of power integrated circuit (IC) design, collecting novel research ideas and insights into fast transient response to prevent the output voltage from dropping significantly at the undershoot. It also discusses techniques and training to save energy and increase load efficiency, as well as fast transient response and high efficiency, which are the most important factors for consumer products that implement power IC. Lastly, the book focuses on power electronics for system loop analysis and optimal compensation design to help users and engineers implement their applications. The book is a valuable resource for university researchers, power IC R&D engineers, application engineers and graduate students in power electronics who wish to learn about the power IC design principles, methods, system behavior, and applications in consumer products.

Advanced Power Electronics Converters Euzeli dos Santos 2014-11-10 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 Converter Circuits William Shepherd 2004-03-12 This text reveals all key components of rectification, inversion, cycloconversion, and conversion circuits. It authoritatively describes switching, voltage and current relationships, and converter properties, operation, control, and performance as utilized in most practical applications. Authored jointly by a veteran scholar and an accomplished res

Power Converters in Power Electronics 2020-06-12

Pulse Width Modulation for Power Converters D. Grahame Holmes 2003-10-03 * The first single volume resource for researchers in the field who previously had to depend on separate papers and conference records to attain a working knowledge of the subject. * Brings together the field's diverse approaches into an integrated and comprehensive theory of PWM

Power Electronic Converters Robert Bausiere 2013-06-29 This book is the third in a series of four devoted to

POWER ELECTRONIC CONVERTERS: The first of these concerns AC to DC conversion. The second concerns AC to AC conversion. This volume examines DC to DC conversion. The fourth is devoted to DC to AC conversion. Converters which carry out the DC-DC conversion operate by chopping the input voltage or current: they are called choppers or switch-mode power converters. Their operating frequency is not imposed by either the input or the output, both of which are at zero frequency. A frequency which is much greater than that of the industrial network can be chosen, provided that suitable configurations and semiconductor devices are used. This is the first difference compared to the rectifiers and AC-AC converters, analyzed in the previous volumes and which often operate at the industrial network frequency. The second difference concerns the commutation mode. Choppers operate in forced commutation. The beginning of an operating phase does not auto matically turn off the semiconductor devices which were conducting during the previous phase and which have to be brought to the blocking state. This turn-off must be carried out autonomously. These two differences - the higher frequency of commutations and, espe cially, the different mode of commutation -justify the first two chapters in this work: - Chapter 1 examines general notions concerning converters, supplies and loads, and more especially, how they can be characterized with regard to commutations.

Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters Alfeu Sguarezi 2022-01-21 Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters describes the application of model predictive control techniques with modulator and finite control sets to squirrel cage induction motor and in doubly-fed induction generators using field orientation control techniques as both current control and direct power control. Sections discuss induction machines, their key modulation techniques, introduce the utility of model predictive control, review core concepts of vector control, direct torque control, and direct power control alongside novel approaches of MPC. Mathematical modeling of cited systems, MPC theory, their applications, MPC design and simulation in MATLAB are also considered in-depth. The work concludes by addressing implementation considerations, including generator operation under voltage sags or distorted voltage and inverters connected to the grid operating under distorted voltage. Experimental results are presented in full. Adopts model predictive control design for optimized induction machines geared for complex grid dynamics Demonstrates how to simulate model predictive control using MATLAB and Simulink Presents information about hardware implementation to obtain experimental results Covers generator operation under voltage sags or distorted voltage

Resonant Power Converters Marian K. Kazimierczuk 2012-11-07 This book is devoted to resonant energy conversion in powerelectronics. It is a practical, systematic guide to the analysisand design of various dc-dc resonant inverters, high-frequencyrectifiers, and dc-dc resonant converters that are building blocksof many of today's high-frequency energy processors. Designed tofunction as both a superior senior-to-graduate level textbook forelectrical engineering courses and a valuable professionalreference for practicing engineers, it provides students andengineers with a solid grasp of existing high-frequency technology,while acquainting them with a number of easy-to-use tools for theanalysis and design of resonant power circuits. Resonant powerconversion technology is now a very hot area and in the center ofthe renewable energy and energy harvesting technologies.

Digital Control of High-Frequency Switched-Mode Power Converters Luca Corradini 2015-07-10

Power Electronics Issa Batarseh 2017-12-22 This fully updated textbook provides complete coverage of electrical circuits and introduces students to the field of energy conversion technologies, analysis and design. Chapters are designed to equip students with necessary background material in such topics as devices, switching circuit analysis techniques, converter types, and methods of conversion. The book contains a large number of examples, exercises, and problems to help enforce the material presented in each chapter. A detailed discussion of resonant and softswitching dc-to-dc converters is included along with the addition of new chapters covering digital control, non-linear control, and micro-inverters for power electronics applications. Designed for senior undergraduate and graduate electrical engineering students, this book provides students with the ability to analyze and design power electronic circuits used in various industrial applications.

Open and Closed-loop Performance of Voltage-mode-controlled Pulse-width-modulated Flyback and Buck-boost DC-DC Power Converters with an Integral-lead Controller for Continuous Conduction Mode Sonny T. Nguyen 1994

Power Electronic Converters Eric Monmasson 2013-03-04 A voltage converter changes the voltage of an electrical power source and is usually combined with other components to create a power supply. This title is devoted to the control of static converters, which deals with pulse-width modulation (PWM) techniques, and also discusses methods for current control. Various application cases are treated. The book is ideal for professionals in power engineering, power electronics, and electric drives industries, as well as practicing engineers, university professors, postdoctoral fellows, and graduate students.

New Topologies and Modulation Schemes for Soft-Switching Isolated DC–DC Converters Zhiqiang Guo 2019-09-20 This book presents a series of new topologies and modulation schemes for soft-switching in isolated DC–DC converters. Providing detailed analyses and design procedures for converters used in a broad range of applications, it offers a wealth of engineering insights for researchers and students in the field

of power electronics, as well as stimulating new ideas for future research.

Pulsewidth Modulated Dc-to-Dc Power Conversion Byungcho Choi 2021-10-19 Explore a fully updated reference for professional and student engineers working with pulsewidth modulated DC-to-DC power conversion The newly revised Second Edition of Pulsewidth Modulated DC-to-DC Power Conversion: Circuits, Dynamics, and Control Designs delivers a comprehensive exploration of pulsewidth modulated DC-to-DC converters for analysis and design as standalone converters and as an interconnected system. The book begins with discussions of the circuits, dynamics, and control of standalone PWM converters before moving on to examine the dynamic analysis and system design of DC power distribution systems. The distinguished authors balance theory with the practical aspects of DC-to-DC power conversion based on classical linear system theory. They include new information on the generalization of power stage modeling, the Nyquist criterion, and universal small-signal models for PWM DC-to-DC converters. The book also includes supplemental material, like a solutions manual, lecture slides, and PSpice source codes for over 250 PSpice programs for illustrative simulations. Readers will also benefit from the inclusion of: A thorough introduction to PWM DC-to-DC power conversion, power stage components, and buck converters An exploration of DC-to-DC power converter circuits, including boost converters, three basic converters, and flyback converters, Discussions of the modeling and dynamics of PWM converters, including power stage transfer functions and the dynamic performance of PWM DC-to-DC converters An examination of control schemes and converter performance, including closed-loop performance and feedback compensation Perfect for senior undergraduate students in departments of electrical engineering or electronics, Pulsewidth Modulated DC-to-DC Power Conversion will also earn a place in the libraries of graduate students and practitioners of power electronics or electrical energy conversions, as well as analog/digital circuit engineers.

Switching Power Converters Dorin O. Neacsu 2017-12-19 An examination of all of the multidisciplinary aspects of medium- and high-power converter systems, including basic power electronics, digital control and hardware, sensors, analog preprocessing of signals, protection devices and fault management, and pulse-width-modulation (PWM) algorithms, Switching Power Converters: Medium and High Power, Second Edition discusses the actual use of industrial technology and its related subassemblies and components, covering facets of implementation otherwise overlooked by theoretical textbooks. The updated Second Edition contains many new figures, as well as new and/or improved chapters on: Thermal management and reliability Intelligent power modules AC/DC and DC/AC current source converters Multilevel converters Use of IPM within a "network of switches" concept Power semiconductors Matrix converters Practical aspects in building power converters Providing the latest research and development information, along with numerous examples

of successful home appliance, aviation, naval, automotive electronics, industrial motor drive, and grid interface for renewable energy products, this edition highlights advancements in packaging technologies, tackles the advent of hybrid circuits able to incorporate control and power stages within the same package, and examines design for reliability from the system level perspective.

Recent Developments on Power Inverters Ali Saghafinia 2017-06-21 This book develops some methods and structures to improve the power inverters for different applications in a single-phase or three-phase output in recent years. The reduction of the switching devices and multilevel inverters as changing structure for the power inverters and PDM and PWM methods as changing control methods for the power inverter are studied in this book. Moreover, power inverters are developed to supply open-ended loads. Furthermore, the basic and advanced aspects of the electric drives that are control based are taught for induction motor (IM) based on power inverters suitable for both undergraduate and postgraduate levels. The main objective of this book is to provide the necessary background to improve and implement the high-performance inverters. Once the material in this book has been mastered, the reader will be able to apply these improvements in the power inverters to his or her problems for high-performance power inverters.

Fundamentals of Power Electronics Robert W. Erickson 2007-05-08 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 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.

Introduction to Modern Power Electronics Andrzej M. Trzynadlowski 2015-11-16 Provides comprehensive coverage of the basic principles and methods of electric power conversion and the latest developments in the field This book constitutes a comprehensive overview of the modern power electronics. Various semiconductor power switches are described, complementary components and systems are presented, and power electronic converters that process power for a variety of applications are explained in detail. This third edition updates all chapters, including new concepts in modern power electronics. New to this edition is extended coverage of matrix converters, multilevel inverters, and applications of the Z-source in cascaded power converters. The book is accompanied by a website hosting an instructor's manual, a PowerPoint presentation, and a set of PSpice files for simulation of a variety of power electronic converters. Introduction to Modern Power Electronics, Third Edition: Discusses power conversion types: ac-to-dc, ac-to-ac, dc-to-dc, and dc-to-ac Reviews advanced control methods used in today's power electronic converters Includes an extensive body of examples, exercises, computer assignments, and simulations Introduction to Modern Power Electronics, Third Edition is written for undergraduate and graduate engineering students interested in modern power electronics and renewable energy systems. The book can also serve as a reference tool for practicing electrical and industrial engineers.

Pulsewidth Modulated DC–to–DC Power Conversion Byungcho Choi 2013-07-30 This is the definitive reference for anyone involved in pulsewidth modulated DC-to-DC power conversion Pulsewidth Modulated DC-to-DC Power Conversion: Circuits, Dynamics, and Control Designs provides engineers, researchers, and students in the power electronics field with comprehensive and complete guidance to understanding pulsewidth modulated (PWM) DC-to-DC power converters. Presented in three parts, the book addresses the circuitry and operation of PWM DC-to-DC converters and their dynamic characteristics, along with in-depth discussions of control design of PWM DC-to-DC converters. Topics include: Basics of DC-to-DC power conversion DC-to-DC converter circuits Dynamic modeling Power stage dynamics Closed-loop performance Voltage mode control and feedback design Current mode control and compensation design Sampling effects of current mode control Featuring fully tested problems and simulation examples as well as downloadable lecture slides and ready-to-run PSpice programs, Pulsewidth Modulated DC-to-DC Power Conversion is an ideal reference book for professional engineers as well as graduate and undergraduate students.

Laboratory Manual for Pulse–Width Modulated DC–DC Power Converters Marian K. Kazimierczuk 2015-10-26 Designed to complement a range of power electronics study resources, this unique lab manual helps students to gain a deep understanding of the operation, modeling, analysis, design, and performance of pulse-width modulated (PWM) DC-DC power converters. Exercises focus on three essential areas of power electronics: open-loop power stages; small-signal modeling, design of feedback loops and PWM DC-DC converter control schemes; and semiconductor devices such as silicon, silicon carbide and gallium nitride. Meeting the standards required by industrial employers, the lab manual combines programming language with a simulation tool designed for proficiency in the theoretical and practical concepts. Students and instructors can choose from an extensive list of topics involving simulations on MATLAB, SABER, or SPICE-based platforms, enabling readers to gain the most out of the prelab, inlab, and postlab activities. The laboratory exercises have been taught and continuously improved for over 25 years by Marian K. Kazimierczuk thanks to constructive student feedback and valuable suggestions on possible workroom improvements. This up-to-date and informative teaching material is now available for the benefit of a wide audience. Key features: Includes complete designs to give students a quick overview of the converters, their characteristics, and fundamental analysis of operation. Compatible with any programming tool (MATLAB, Mathematica, or Maple) and any circuit simulation tool (PSpice, LTSpice, Synopsys SABER, PLECS, etc.). Quick design section enables students and instructors to verify their design methodology for instant simulations. Presents lab exercises based on the most recent advancements in power electronics, including multiple-output power converters, modeling, current- and voltage-mode control schemes, and power semiconductor devices. Provides comprehensive appendices to aid basic understanding of the fundamental circuits, programming and simulation tools. Contains a quick component selection list of power MOSFETs and diodes together with their ratings, important specifications and Spice models.

Sliding Mode Controllers for Power Electronic Converters Axaykumar Mehta 2018-12-13 This book proposes a proportional integral type sliding function, which does not facilitate the finite reaching and hence the responses of the load voltage results in an exponential steady state. To facilitate finite time reaching, it also presents the new Integral Sliding Mode Control with Finite Time Reaching (ISMCFTR). The book also extends the application of the proposed controller to another type of PEC, the DC-DC Boost converter, and also proposes the PI type sliding surface for the Zeta converter, which is non-inverting type Buck Boost converter. An important source of practical implementations, it presents practical implementations as simulation and experimental results to demonstrate the efficacy of the converter.

Pulse-Width Modulated DC-DC Power Converters Marian K. Kazimierczuk 2015-10-26 PWM DC-DC power converter technology underpins many energy conversion systems including renewable energy circuits, active power factor correctors, battery chargers, portable devices and LED drivers. Following the success of Pulse-Width Modulated DC-DC Power Converters this second edition has been thoroughly revised and expanded to

cover the latest challenges and advances in the field. Key features of 2nd edition: Four new chapters, detailing the latest advances in power conversion, focus on: small-signal model and dynamic characteristics of the buck converter in continuous conduction mode; voltage-mode control of buck converter; small-signal model and characteristics of the boost converter in the discontinuous conduction mode and electromagnetic compatibility EMC. Provides readers with a solid understanding of the principles of operation, synthesis, analysis and design of PWM power converters and semiconductor power devices, including wide band-gap power devices (SiC and GaN). Fully revised Solutions for all end-of-chapter problems available to instructors via the book companion website. Step-by-step derivation of closed-form design equations with illustrations. Fully revised figures based on real data. With improved end-of-chapter summaries of key concepts, review questions, problems and answers, biographies and case studies, this is an essential textbook for graduate and senior undergraduate students in electrical engineering. Its superior readability and clarity of explanations also makes it a key reference for practicing engineers and research scientists.

Soft-Switching PWM Full-Bridge Converters Xinbo Ruan 2014-04-03 Soft-switching PWM full-bridge converters have been widely usedin medium-to-high power dc-dc conversions for topologicalsimplicity, easy control and high efficiency. Early works onsoft-switching PWM full-bridge converter by many researchersincluded various topologies and modulation strategies. However, these works were scattered, and the relationship amongthese topologies and modulation strategies had not been revealed.This book intends to describe systematically the soft-switchingtechniques for pulse-width modulation (PWM) full-bridge converters,including the topologies, control and design, and it reveals therelationship among the various topologies and PWM strategiespreviously proposed by other researchers. The book not onlypresents theoretical analysis, but also gives many detailed designexamples of the converters.

High Performance Control of AC Drives with Matlab/Simulink Haitham Abu-Rub 2021-05-11 High Performance Control of AC Drives with Matlab®/Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry The Second Edition of High Performance Control of AC Drives with Matlab®/Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor drive systems. The book includes new material on medium voltage drives, covering state-of-the-art technologies and challenges in the industrial drive system, as well as their components, and control, current source inverter-based drives, PWM techniques for multilevel inverters, and low switching frequency modulation for voltage source inverters. This book covers three-phase and multiphase (more than three-phase) motor drives including their control and practical problems faced in the field (e.g., adding LC filters in the output of a feeding converter), are considered. The new edition contains

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

Dynamics and Control of DC-DC Converters Farzin Asadi 2018-03-08 DC-DC converters have many applications in the modern world. They provide the required power to the communication backbones, they are used in digital devices like laptops and cell phones, and they have widespread applications in electric cars, to just name a few. DC-DC converters require negative feedback to provide a suitable output voltage or current for the load. Obtaining a stable output voltage or current in presence of disturbances such as: input voltage changes and/or output load changes seems impossible without some form of control. This book tries to train the art of controller design for DC-DC converters. Chapter 1 introduces the DC-DC converters briefly. It is assumed that the reader has the basic knowledge of DC-DC converter (i.e., a basic course in power electronics). The reader learns the disadvantages of open loop control in Chapter 2. Simulation of DC-DC converters with the aid of Simulink® is discussed in this chapter as well. Extracting the dynamic models of DC-DC converters is studied in Chapter 3. We show how MATLAB® and a software named KUCA can be used to do the cumbersome and error-prone process of modeling automatically. Obtaining the transfer functions using PSIM® is studied as well. These days, softwares are an integral part of engineering sciences. Control engineering is not an exception by any means. Keeping this in mind, we design the controllers using MATLAB® in Chapter 4. Finally, references are provided at the end of each chapter to suggest more information for an interested reader. The intended audiences for this book are practice engineers and academians.

High-Frequency Isolated Bidirectional Dual Active Bridge DC–DC Converters with Wide Voltage Gain Deshang Sha 2018-05-17 Written by experts, this book is based on recent research findings in high-frequency isolated

bidirectional DC-DC converters with wide voltage range. It presents advanced power control methods and new isolated bidirectional DC-DC topologies to improve the performance of isolated bidirectional converters. Providing valuable insights, advanced methods and practical design guides on the DC-DC conversion that can be considered in applications such as microgrid, bidirectional EV chargers, and solid state transformers, it is a valuable resource for researchers, scientists, and engineers in the field of isolated bidirectional DC-DC converters.

Pulse Width Modulation In Power Electronics Isaak D Mayergoyz 2021-05-05 This book provides a theoretical discussion of pulse width modulation (PWM) in power electronic inverters. Pulse width modulation is widely used for the frequency control of speed of ac motors, the design of uninterruptible power supplies (UPS) as well as the integration of renewable energy sources into existing power grid systems. PWM technique is based on approximation of sinusoidal waveforms by sequences (trains) of rectangular pulses whose widths are properly modulated. This width-modulation results in the suppression of low order harmonics at the expense of amplification of high order harmonics which are suppressed by energy-storage elements in load circuits. The discussion covers various PWM techniques with a focus on the optimal time-domain PWM techniques proposed by the authors.

Three-phase AC-AC Power Converters Based on Matrix Converter Topology Paweł Szcześniak 2013-02-28 AC voltage frequency changes is one of the most important functions of solid state power converters. The most desirable features in frequency converters are the ability to generate load voltages with arbitrary amplitude and frequency, sinusoidal currents and voltages waveforms; the possibility of providing unity power factor for any load; and, finally, a simple and compact power circuit. Over the past decades, a number of different frequency converter topologies have appeared in the literature, but only the converters with either a voltage or current DC link are commonly used in industrial applications. Improvements in power semiconductor switches over recent years have resulted in the development of many structures of AC-AC converters without DC electric energy storage. Such converters are an alternative solution for frequently recommended systems with DC energy storage and are characterized by a lower price, smaller size and longer lifetime. Most of the these topologies are based on the structure of the matrix converter. Three-Phase AC-AC Power Converters Based On Matrix Converter Topology: Matrix-reactance frequency converters concept presents a review of power frequency converters, with special attention paid to converters without DC energy storage. Particular attention is paid to nine new converters named matrix-reactance frequency converters which have been developed by the author and the team of researchers from Institute of Electrical Engineering at the University of Zielona Góra. The topologies of the presented matrix-reactance frequency converters are based on a three-phase unipolar buck-boost matrix-reactance chopper with source or load switches arranged as in a matrix converter. This kind of approach makes it possible to obtain an output voltage greater than the input one (similar to that in a matrix-reactance chopper) and a frequency conversion (similar to that in a matrix converter). Written for researchers and Ph.D. students working in the field of power electronics converters and drive systems, Three-Phase AC-AC Power Converters Based On Matrix Converter Topology: Matrix-reactance frequency converters concept will also be valuable to power electronics converter designers and users; R&D centers; and readers needing industry solutions in variable speed drive systems, such as automation and aviation.

Power Electronics and Motor Drive Systems Stefanos Manias 2016-11-08 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

Pulse-width Modulated DC-DC Power Converters Marian K. Kazimierczuk 2014-03-31 Fully worked solutions with clear explanations The Pulse-width Modulated DC-DC Power Converters: Solutions Manual provides solutions to the practice problems in the text. Fully worked, each solution includes formulas and diagrams as necessary to help you understand the approach, and explanations clarify the reasoning behind the correct answer. The solutions are aligned chapter-by-chapter with the text, and provide useful guidance that can help you identify your level of comprehension. Designed to make your study time more productive, this solutions manual is an invaluable tool for anyone studying electricity and electrical engineering.

Advanced DC/DC Converters Fang Lin Luo 2003-09-29 DC/DC conversion techniques have undergone rapid development in recent decades. With the pioneering work of authors Fang Lin Luo and Hong Ye, DC/DC converters have now been sorted into their six generations, and by a rough count, over 500 different

topologies currently exist, with more being developed each year. Advanced DC/DC Converters offers a concise, practical presentation of DC/DC converters, summarizing the spectrum of conversion technologies and presenting many new ideas and more than 100 new topologies. The treatment begins with background material on DC/DC conversion and discussions on voltage lift and super-lift converters. It then proceeds through each generation, including the groundbreaking sixth generation--converters developed by the authors that can be cascaded for high voltage transfer gain. More than 320 figures, 60 tables, and 500 formulae allow you to more easily grasp the overall structure of advanced DC/DC converters, provide fast access to precise data, and help you quickly determine the values of your own circuit components. Nowhere else in the literature are DC/DC converters so logically sorted and systematically introduced. Nowhere else can you find detailed information on prototype topologies that represent a major contribution to modern power engineering.
High-Power Converters and AC Drives Bin Wu 2007-01-29 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.
DC—DC Converters for Future Renewable Energy Systems Neeraj Priyadarshi 2021-09-27 The book presents the analysis and control of numerous DC-DC converters widely used in several applications such as standalone, grid integration, and motor drives-based renewable energy systems. The book provides extensive simulation and practical analysis of recent and advanced DC-DC power converter topologies. This self-contained book contributes to DC-DC converters design, control techniques, and industrial as well as domestic applications of renewable energy systems. This volume will be useful for undergraduate/postgraduate students, energy planners, designers, system analysis, and system governors.
Pulse Width Modulated DC–DC Converters Keng Chih Wu 2012-12-06 For the first time in power electronics, this comprehensive treatment of switch-mode DC/DC converter designs addresses many analytical closed form equations such as duty cycle prediction, output regulation, output ripple, control loop-gain, and steady state time-domain waveform. Each of these equations are given various topologists and configurations, including forward, flyback, and boost converters. Pulse Width Modulated DC/DC Converters begins with a detailed approach to the quiescent operating locus of a power plant under open-loop. The reader is then led through other supporting circuits once again in the quiescent condition. These exercises result in the close-loop formulations of the subject system, providing designers with the ability to study the sensitivities of a system against disturbances. With the quiescent conditions well established, the book then guides the reader further into the territories of system stability where small signal behaviors are explored. Finally, some important large signal time-domain studies cap the treatment. Some distinctive features of this book include: *detailed coverage of dynamic close-loop converter simulations using only personal computer and modern mathematical software *Steady-state, time-domain analysis based on the concept of continuity of states Voltage-mode and current-mode control techniques and their differences of merits A detailed description on setting up different equations for DC/DC converters'simulation using only PC
Pulse Width Modulation for Power Converters D. Grahame Holmes 2003-10-03 * The first single volume resource for researchers in the field who previously had to depend on separate papers and conference records to attain a working knowledge of the subject. * Brings together the field's diverse approaches into an integrated and comprehensive theory of PWM