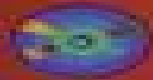
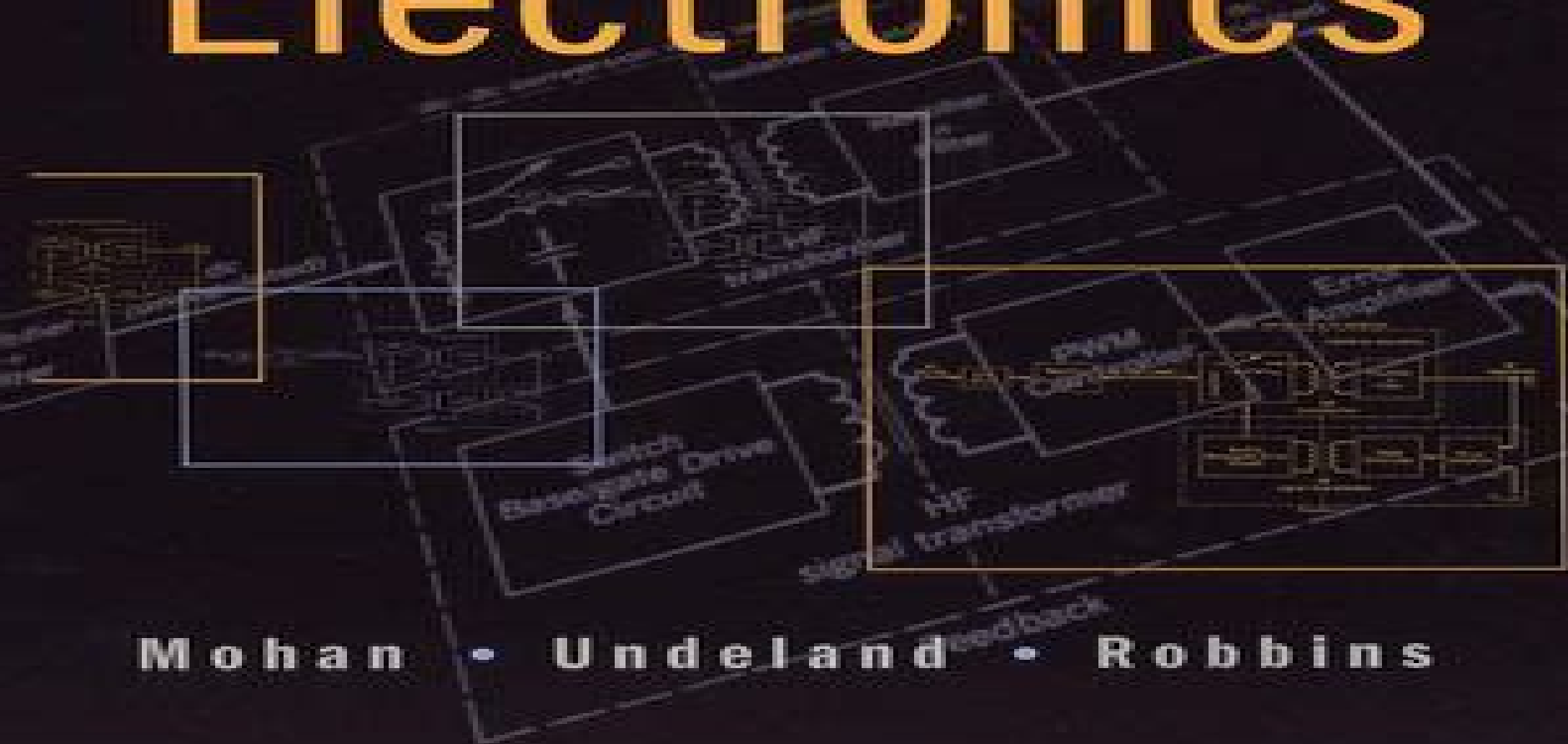


Media Enhanced Third Edition



Power Electronics

CONVERTERS,
APPLICATIONS,
AND DESIGN



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Power Electronics Converters Ned Mohan Third Edition

**Ned Mohan, Tore M. Undeland, William
P. Robbins**



Power Electronics Converters Ned Mohan Third Edition:

Power Electronics Ned Mohan, Tore M. Undeland, William P. Robbins, 2003 Market_Desc Electrical Engineering Students Electrical Engineering Instructors Power Electronics Engineers Special Features Easy to follow step by step in depth treatment of all the theory Computer simulation chapter describes the role of computer simulations in power electronics Examples and problems based on Pspice and MATLAB are included Introductory chapter offers a review of basic electrical and magnetic circuit concepts A new CD ROM contains the following Over 100 of new problems of varying degrees of difficulty for homework assignments and self learning PSpice based simulation examples which illustrate basic concepts and help in design of converters A newly developed magnetic component design program that demonstrates design trade offs PowerPoint based slides which will improve the learning experience and the ease of using the book About The Book The text includes cohesive presentation of power electronics fundamentals for applications and design in the power range of 500 kW or less It describes a variety of practical and emerging power electronic converters made feasible by the new generation of power semiconductor devices Topics included in this book are an expanded discussion of diode rectifiers and thyristor converters as well as chapters on heat sinks magnetic components which present a step by step design approach and a computer simulation of power electronics which introduces numerical techniques and commonly used simulation packages such as PSpice MATLAB and EMTAP

Power Electronics, A First Course Ned Mohan, Siddharth Raju, 2023-01-12 POWER ELECTRONICS A FIRST COURSE Enables students to understand power electronics systems as one course in an integrated electric energy systems curriculum Power Electronics A First Course provides instruction on fundamental concepts related to power electronics to undergraduate electrical engineering students beginning with an introductory chapter and moving on to discussing topics such as switching power poles switch mode dc dc converters and feedback controllers The authors also cover diode rectifiers power factor correction PFC circuits and switch mode dc power supplies Later chapters touch on soft switching in dc dc power converters voltage and current requirements imposed by various power applications dc and low frequency sinusoidal ac voltages thyristor converters and the utility applications of harnessing energy from renewable sources Power Electronics A First Course is the only textbook that is integrated with hardware experiments and simulation results The simulation files are available on a website associated with this textbook The hardware experiments will be available through a University of Minnesota startup at a low cost In Power Electronics A First Course readers can expect to find detailed information on Availability of various power semiconductor devices that are essential in power electronic systems plus their switching characteristics and various tradeoffs Common foundational unit of various converters and their operation plus fundamental concepts for feedback control illustrated by means of regulated dc dc converters Basic concepts associated with magnetic circuits to develop an understanding of inductors and transformers needed in power electronics Problems associated with hard switching and some of the practical circuits where this problem can be minimized with soft

switching Power Electronics A First Course is an ideal textbook for Junior Senior Undergraduate students in Electrical and Computer Engineering ECE It is also valuable to students outside of ECE such as those in more general engineering fields Basic understanding of electrical engineering concepts and control systems is a prerequisite **Power Electronics: Theory and Practicals** Lalit Chandra Saikia, 2025-06-01 Smart Cities: Power Electronics, Renewable Energy, and Internet of Things Ahteshamul Haque, Akhtar Kalam, Himanshu Sharma, 2024-02-15 This book discusses the integration of power electronics renewable energy and the Internet of Things IoT from the perspective of smart cities in a single volume The text will be helpful for senior undergraduate graduate students and academic researchers in diverse engineering fields including electrical electronics and communication and computers The book Covers the integration of power electronics energy harvesting and the IoT for smart city applications Discusses concepts of power electronics and the IoT in electric vehicles for smart cities Examines the integration of power electronics in renewable energy for smart cities Discusses important concepts of energy harvesting including solar energy harvesting maximum power point tracking MPPT controllers and switch mode power supplies SMPS Explores IoT connectivity technologies such as long term evolution LTE narrow band NB IoT long range LoRa Bluetooth and ZigBee IEEE Standard 802.15.4 for low data rate wireless personal communication applications The text provides the knowledge about applications technologies and standards of power electronics renewable energy and IoT for smart cities It will serve as an ideal reference text for senior undergraduate graduate students and academic researchers in the fields of electrical engineering electronics and communication engineering computer engineering civil engineering and environmental engineering **Basics of Electrical Machines** Prof. D. K. Palwalia, Dr. U. K. Kalla, Dr. R. K. Kumawat, 2025-01-01 **Electric Power Systems** Ned Mohan, 2012-01-18 Author Ned Mohan has been a leader in EES education and research for decades His three book series on Power Electronics focuses on three essential topics in the power sequence based on applications relevant to this age of sustainable energy such as wind turbines and hybrid electric vehicles The three topics include power electronics power systems and electric machines Key features in the first Edition build on Mohan's successful MNPERE texts his systems approach which puts dry technical detail in the context of applications and substantial pedagogical support including PPT's video clips animations clicker questions and a lab manual It follows a top down systems level approach to power electronics to highlight interrelationships between these sub fields It is intended to cover fundamental and practical design This book also follows a building block approach to power electronics that allows an in depth discussion of several important topics that are usually left Topics are carefully sequenced to maintain continuity and interest ELECTRIMACS 2022 Serge Pierfederici, Jean-Philippe Martin, 2023-06-13 This book collects a selection of papers presented at ELECTRIMACS 2021 the 14th international conference of the IMACS TC1 Committee held in Nancy France on 16th 19th May 2022 The conference papers deal with modelling simulation analysis control power management design optimization identification and diagnostics in electrical power engineering The main application fields include electric

machines and electromagnetic devices power electronics transportation systems smart grids renewable energy systems energy storage like batteries and supercapacitors fuel cells and wireless power transfer The contributions included in Volume 1 will be particularly focused on electrical engineering simulation aspects and innovative applications

Computation and Communication Technologies Senthil T. Kumar, Bala Mathivanan, 2016-04-11 This conference proceedings summarizes invited publications from the two IDES Institute of Doctors Engineers and Scientists International conferences both held in Bangalore India

Offshore Electrical Engineering Manual Geoff MacAngus-Gerrard, 2017-11-06 Offshore Electrical Engineering Manual Second Edition is for electrical engineers working on offshore projects who require detailed knowledge of an array of equipment and power distribution systems The book begins with coverage of different types of insulation hot spot temperatures temperature rise ambient air temperatures basis of machine ratings method of measurement of temperature rise by resistance measurement of ambient air temperature This is followed by coverage of AC generators automatic voltage regulators AC switchgear transformers and programmable electronic systems The emphasis throughout is on practical ready to apply techniques that yield immediate and cost effective benefits The majority of the systems covered in the book operate at a nominal voltage of 24 y dc and although it is not necessary for each of the systems to have separate battery and battery charger systems the grouping criteria require more detailed discussion The book also provides information on equipment such as dual chargers and batteries for certain vital systems switchgear tripping closing and engine start batteries which are dedicated to the equipment they supply In the case of engines which drive fire pumps duplicate charges and batteries are also required Packed with charts tables and diagrams this work is intended to be of interest to both technical readers and to general readers It covers electrical engineering in offshore situations with much of the information gained in the North Sea Some topics covered are offshore power requirements generator selection process drivers and starting requirements control and monitoring systems and cabling and equipment installation Discusses how to perform inspections of electrical and instrument systems on equipment using appropriate regulations and specifications Explains how to ensure electrical systems components are maintained and production is uninterrupted Demonstrates how to repair modify and install electrical instruments ensuring compliance with current regulations and specifications Covers specification management and technical evaluation of offshore electrical system design Features evaluation and optimization of electrical system options including DC AC selection and offshore cabling designs

Electrotechnical Systems Igor Korotyeyev, Valerii Zhuikov, Radoslaw Kasperek, 2018-10-03 Advances in mathematical methods computer technology and electrotechnical devices in particular continue to result in the creation of programs that are leading to increased labor productivity Mathematical and simulation programs and other programs that unite these two operations provide the ability to calculate transitional steady state processes stability conditions and harmonic composition and are often used to analyze processes in power electronic systems Electrotechnical Systems

Calculation and Analysis with Mathematica and PSpice explores the potential of two such programs Mathematica and ORCAD PSpice as they are used for analysis in various areas The authors discuss the formulation of problems and the steps in their solution They focus on the analysis of transient steady state processes and their stability in non stationary and nonlinear systems with DC and AC converters All problems are solved using Mathematica and program codes are presented The authors use ORCAD PSpice to compare the results obtained by employing Mathematica and to demonstrate the peculiarities associated with its use This book clearly and concisely illustrates represented expressions variables and functions and the general application of the mathematical pocket Mathematica 4 2 for the analysis of the electromagnetic processes in electrotechnical systems It will be a valuable addition to the library of anyone working with electrotechnical systems

On the perspectives of SiC MOSFETs in high-frequency and high-power isolated DC/DC converters Eial Awwad, Abdullah, 2020-08-11

Increasing demand for efficiency and power density pushes Si based devices to some of their inherent material limits including those related to temperature operation switching frequency and blocking voltage Recently SiC based power devices are promising candidates for high power and high frequency switching applications Today SiC MOSFETs are commercially available from several manufacturers Although technology affiliated with SiC MOSFETs is improving rapidly many challenges remain and some of them are investigated in this work The research work in this dissertation is divided into the three following parts Firstly the static and switching characteristics of the state of the art 1 2 kV planar and double trench SiC MOSFETs from two different manufacturers are evaluated The effects of different biasing voltages DC link voltages and temperatures are analysed The characterisation results show that the devices exhibit superior switching performances under different operating conditions Moreover several aspects of using the SiC MOSFET s body diode in a DC DC converter are investigated comparing the body diodes of planar and double trench devices Reverse recovery is evaluated in switching tests considering the case temperature switching rate forward current and applied voltage Based on the measurement results the junction temperature is estimated to guarantee safe operation A simple electro thermal model is proposed in order to estimate the maximum allowed switching frequency based on the thermal design of the SiC devices Using these results hard and soft switching converters are designed and devices are characterised as being in continuous operation at a very high switching frequency of 1 MHz Thereafter the SiC MOSFETs are operated in a continuous mode in a 10 kW 100 250 kHz buck converter comparing synchronous rectification the use of the body diode and the use of an external Schottky diode Further the parallel operation of the planar devices is considered Thus the paralleling of SiC MOSFETs is investigated before comparing the devices in continuous converter operation In this regard the impact of the most common mismatch parameters on the static and dynamic current sharing of the transistors is evaluated showing that paralleling of SiC MOSFETs is feasible Subsequently an analytical model of SiC MOSFETs for switching loss optimisation is proposed The analytical model exhibits relatively close agreement with measurement results under different test conditions

The proposed model tracks the oscillation effectively during both turn on and off transitions. This has been achieved by considering the influence of the most crucial parasitic elements in both power and gate loops. In the second part a comprehensive short circuit ruggedness evaluation focusing on different failure modes of the planar and double trench SiC devices is presented. The effects of different biasing voltages, DC link voltages and gate resistances are evaluated. Additionally the temperature dependence of the short circuit capability is evaluated and the associated failure modes are analysed. Subsequently the design and test of two different methods for overcurrent protection are proposed. The desaturation technique is applied to the SiC MOSFETs and compared to a second method that depends on the stray inductance of the devices. Finally the benefits of using SiC devices in continuous high frequency high power DC/DC converters is experimentally evaluated. In this regard a design optimisation of a high frequency transformer is introduced and the impact of different core materials, conductor designs and winding arrangements are evaluated. A ZVZCS Phase Shift Full Bridge unidirectional DC/DC converter is proposed using only the parasitic leakage inductance of the transformer. Experimental results for a 10 kW 100-250 kHz prototype indicate an efficiency of up to 98.1% for the whole converter. Furthermore an optimized control method is proposed to minimise the circulation current in the isolated bidirectional dual active bridge DC/DC converter based on a modified dual phase shift control method. This control method is also experimentally compared with traditional single phase shift control yielding a significant improvement in efficiency. The experimental results confirm the theoretical analysis and show that the proposed control can enhance the overall converter efficiency and expand the ZVZCS range.

Die steigende Nachfrage nach Effizienz und Leistungsdichte bringt SiC-basierte Leistungsbauteile an einige ihrer Materialgrenzen, die unter anderem mit der Temperaturbelastung, der Schaltfrequenz und der Blockierspannung in Zusammenhang stehen. In jüngster Zeit sind SiC-basierte Leistungsbaulemente vielversprechende Kandidaten für Hochleistungs- und Hochfrequenzanwendungen. Aktuell sind SiC MOSFETs von mehreren Herstellern im Handel erhältlich. Obwohl sich die Technologie der SiC MOSFETs rasch verbessert, werden viele Herausforderungen bestehen bleiben. Einige dieser Herausforderungen werden in dieser Arbeit untersucht. Die Untersuchungen in dieser Dissertation gliedern sich in die drei folgenden Teile: Im ersten Teil erfolgt die statische und die transiente Charakterisierung der aktuellen 1-2 kV Planar- und Doubletrench SiC MOSFETs verschiedener Hersteller. Die Auswirkungen unterschiedlicher Gatespannungen, Zwischenkreisspannungen und Temperaturen werden analysiert. Die Ergebnisse der Charakterisierung zeigen, dass die Bauteile berechnete Schalteleistungen unter verschiedenen Betriebsbedingungen aufweisen. Darüber hinaus wird der Einsatz der internen SiC Bodydioden in einem DC/DC-Wandler untersucht, wobei die Unterschiede zwischen Planar- und Doppeltrench-Bauteilen aufgezeigt werden. Das Reverse-Recovery-Verhalten wird unter Berücksichtigung der Junctiontemperatur, der Schaltgeschwindigkeit, des Durchlassstroms und der angelegten Spannung bewertet. Anhand der Messergebnisse wird die Sperrschichttemperatur geschätzt, damit ein sicherer Betrieb gewährleistet ist. Ein einfaches elektrothermisches Modell wird

vorgestellt um die maximal zulässige Schaltfrequenz auf der Grundlage des thermischen Designs der SiC Bauteile abzuschätzen. Anhand dieser Ergebnisse werden hart und weichschaltende Umrichter konzipiert und die Bauteile werden im Dauerbetrieb mit einer sehr hohen Schaltfrequenz von 1 MHz untersucht. Danach werden die SiC MOSFETs im Dauerbetrieb in einem 10 kW 100 250 kHz Tiefsetzsteller betrieben. Dabei wird die Synchrongleichrichtung, die Verwendung der internen Diode und die Verwendung einer externen Schottky Diode verglichen. Außerdem wird die Parallelisierung von SiC MOSFETs untersucht, bevor die Parallelschaltung der verschiedenen Bauelemente ebenso im kontinuierlichen Konverterbetrieb verglichen wird. Es wird der Einfluss der häufigsten Parametervariationen auf die statische und dynamische Stromaufteilung der Transistoren analysiert, was zeigt, dass eine Parallelisierung von SiC MOSFETs möglich ist. Anschließend wird ein analytisches Modell der SiC MOSFETs zur Schaltverlustoptimierung vorgeschlagen. Das analytische Modell zeigt eine relativ enge Übereinstimmung mit den Messergebnissen unter verschiedenen Testbedingungen. Das vorgeschlagene Modell bildet die Schwingungen sowohl beim Ein- als auch beim Ausschalten effektiv nach. Dies wurde durch die Berücksichtigung der wichtigsten parasitären Elemente in Strom- und Gatekreisen erreicht. Im zweiten Teil wird eine umfassende Bewertung der Kurzschlussfestigkeit mit Fokus auf verschiedene Ausfallmodi der planaren und double trench SiC Bauelemente vorgestellt. Die Auswirkungen unterschiedlicher Gatespannungen, Zwischenkreisspannungen und Gate Widerstände werden ausgewertet. Zusätzlich wird die temperaturabhängige Kurzschlussfestigkeit ausgewertet und die zugehörigen Fehlerfälle werden analysiert. Anschließend wird die Auslegung und Prüfung von zwei verschiedenen Verfahren zum berührungslosen Stromschutz evaluiert. Die Desaturation Technik wird auf SiC MOSFETs angewendet und mit einer zweiten Methode verglichen, welche die parasitäre Induktivität der Bauelemente nutzt. Schließlich wird der Nutzen des Einsatzes von SiC Bauteilen in kontinuierlichen Hochfrequenz-Hochleistungs-DC/DC Wandlern experimentell untersucht. In diesem Zusammenhang wird eine Designoptimierung eines Hochfrequenztransformators vorgestellt und der Einfluss verschiedener Kernmaterialien, Leiteraufbauten und Wicklungsanordnungen wird bewertet. Es wird ein unidirektionaler ZVZCS Vollbrücken-DC/DC Wandler vorgestellt, der nur die parasitäre Streuinduktivität des Transformators verwendet. Experimentelle Ergebnisse für einen 10 kW 100 250 kHz Prototyp zeigen einen Wirkungsgrad von bis zu 98,1% für den gesamten Umrichter. Abschließend wird ein optimiertes Regelverfahren verwendet, welches auf einem modifizierten Dual Phase Shift Regelverfahren basiert, um den Kreisstrom im isolierten bidirektionalen Dual-Aktiv-Bücken-DC/DC Wandler zu minimieren. Diese Regelmethode wird experimentell mit der herkömmlichen Single Phase Shift Regelung verglichen. Hierbei zeigt sich eine deutliche Effizienzsteigerung durch die neue Regelmethode. Die experimentellen Ergebnisse bestätigen die theoretische Analyse und zeigen, dass die vorgeschlagene Regelung den Gesamtwirkungsgrad des Umrichters erhöhen und den ZVZCS-Bereich erweitern kann.

PHOTOVOLTAIC SYSTEMS MUKERJEE, A. K., THAKUR, NIVEDITA, 2011-09-06 This book offers a comprehensive treatment of the fundamentals of solar cells and their use in the photovoltaic PV technology a major

constituent of renewable sources of energy It discusses the nature and measurement of solar radiation methods for characterization of solar cells and determination of their parameters The book describes the principle of operation of different types of inverters used in PV systems and also illustrates the design construction and performance of photovoltaic operated systems such as the solar lantern solar water pump solar inverter and a general solar power system Besides it explains the process of uploading of power generated by solar arrays to the power grid for onwards transmission to distant locations The economic aspects of the PV systems and their conventionally operated counterparts are also dealt with The design procedure given in the book enables the reader to configure the desired PV system without the help of high priced patented software The text is intended for a course on PV technologies undertaken by the undergraduate and postgraduate students of Electrical Engineering Energy Studies and Mechanical Engineering In addition the book would also be useful for teachers scientists engineers and professionals to quickly understand the fundamentals of photovoltaic technology

KEY FEATURES About one hundred figures fifty circuit diagrams and several design examples are given A large number of problems are given at the end of some chapters References are provided for further study and research

Power Electronics Issa Batarseh,Ahmad Harb,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

TEKNIK ELEKTRONIKA DAYA ASWARDI,MULDI YUHENDRI,DONI TRI PUTRA YANTO,2020-08-05 Buku ini membahas tentang teknik elektronika daya yang merupakan bagian dari keilmuan di bidang teknik elektro Di dalamnya meliputi komponen semikonduktor berbagai macam konverter daya serta sistem pengendali tegangan dan frekuensi Buku ini cocok bagi semua kalangan yang ingin mengetahui lebih lanjut tentang dinamika teknik elektronika daya

Electric Power Systems Alexandra von Meier,2024-09-04 Discover the technology for producing and delivering electricity in this easily accessible introduction to power systems Electric Power Systems underlie virtually every aspect of modern life In the face of an unprecedented transition from fossil fuels to clean energy it has never been more essential for engineers and other professionals from diverse disciplines to understand the electric grid and help chart its future Since its original publication Electric Power Systems has served as a uniquely accessible and qualitative introduction to the subject offering a foundational overview with an emphasis on key concepts and building physical intuition Now revised and updated to bring even greater rigor and

incorporate the latest technologies it remains an indispensable introduction to this vital subject Readers of the revised and expanded second edition of Electric Power Systems will also find End of chapter problems to facilitate and reinforce learning New discussions of subjects including load frequency control protection voltage stability and many others More quantitative treatment of topics such as voltage regulation power flow analysis generator and transformer modeling with numerical examples Entirely new chapters on generation and storage resources power electronics and the analysis of transmission lines Electric Power Systems is an ideal textbook for graduate and advanced undergraduate students in engineering as well as for a broad range of professionals such as computer and data scientists solar and wind energy manufacturers and installers energy storage providers economists policy makers legal and regulatory staff and activist organizations

Introduction to Microcontroller Programming for Power Electronics Control Applications Mattia Rossi, Nicola Toscani, Marco Mauri, Francesco Castelli Dezza, 2021-09-29 Microcontroller programming is not a trivial task Indeed it is necessary to set correctly the required peripherals by using programming languages like C or directly machine code Nevertheless MathWorks developed a model based workflow linked with an automatic code generation tool able to translate Simulink schemes into executable files This represents a rapid prototyping procedure and it can be applied to many microcontroller boards available on the market Among them this introductory book focuses on the C2000 LaunchPad™ family from Texas Instruments™ to provide the reader basic programming strategies implementation guidelines and hardware considerations for some power electronics based control applications Starting from simple examples such as turning on off on board LEDs Analog to Digital conversion waveform generation or how a Pulse Width Modulation peripheral should be managed the reader is guided through the settings of the specific MCU related Simulink blocks enabled for code translation Then the book proposes several control problems in terms of power management of RL and RLC loads e.g involving DC DC converters and closed loop control of DC motors The control schemes are investigated as well as the working principles of power converter topologies needed to drive the systems under investigation Finally a couple of exercises are proposed to check the reader's understanding while presenting a processor in the loop PIL technique to either emulate the dynamics of complex systems or testing computational performance Thus this book is oriented to graduate students of electrical and automation and control engineering pursuing a curriculum in power electronics and drives as well as to engineers and researchers who want to deepen their knowledge and acquire new competences in the design and implementations of control schemes aimed to the aforementioned application fields Indeed it is assumed that the reader is well acquainted with fundamentals of electrical machines and power electronics as well as with continuous time modeling strategies and linear control techniques In addition familiarity with sampled data discrete time system analysis and embedded design topics is a plus However even if these competences are helpful they are not essential since this book provides some basic knowledge even to whom is approaching these topics for the first time Key concepts are developed from scratch including a brief review of control theory

and modeling strategies for power electronic based systems **ASEE Prism** ,1994 **Electric Power Systems with Renewables** Ned Mohan,Swaroop Guggilam,2023-03-14

Electric Power Systems with Renewables Concise balanced and fundamentals based resource providing coverage of power system operation and planning including simulations using PSS E software Electric Power Systems with Renewables provides a comprehensive treatment of various topics related to power systems with an emphasis on renewable energy integration into power systems The updated use cases and methods in the book build upon the climate change science and renewables currently being integrated with the grid and the ability to manage resilience for electrifying transportation and related power systems as societies identify more ways to move towards a carbon free future Simulation examples and software support are provided by integrating the educational version of PSS E The newly revised edition includes new topics on the intelligent use of PSS E simulation software presents a short introduction to Python a widely used software in the power industry and provides new examples and back of the chapter homework problems to further aid in information retention Written by two highly qualified authors with significant experience in the field Electric Power Systems with Renewables also contains information on Electric energy and the environment covering hydro power fossil fuel based power plants nuclear power renewable energy and distributed generation DG Power flow in power system networks covers basic power flow equations the Newton Raphson procedure sensitivity analysis and a new remote bus voltage control concept Transformers and generators in power systems covering basic principles of operation a simplified model and per unit representation High voltage DC HVDC transmission systems current link and voltage link systems Associated with this textbook there is a website from which the simulation files can be downloaded for use in PSS E and Python It also contains short videos to simplify the use of these software This website will be regularly updated Electric Power Systems with Renewables serves as a highly useful textbook for both undergraduate and graduate students in Electrical and Computer Engineering ECE It is also an appropriate resource for students outside of ECE who have the prerequisites such as in mechanical civil and chemical engineering Practicing engineers will greatly benefit with its industry relevant approach to meet the present day needs *Analysis and Control of Electric Drives* Ned Mohan,Siddharth Raju,2020-08-27

A guide to drives essential to electric vehicles wind turbines and other motor driven systems Analysis and Control of Electric Drives is a practical and comprehensive text that offers a clear understanding of electric drives and their industrial applications in the real world including electric vehicles and wind turbines The authors noted experts on the topic review the basic knowledge needed to understand electric drives and include the pertinent material that examines DC and AC machines in steady state using a unique physics based approach The book also analyzes electric machine operation under dynamic conditions assisted by Space Vectors The book is filled with illustrative examples and includes information on electric machines with Interior Permanent Magnets To enhance learning the book contains end of chapter problems and all topics covered use computer simulations with MATLAB Simulink and Sciamble Workbench

software that is available free online for educational purposes This important book Explores additional topics such as electric machines with Interior Permanent Magnets Includes multiple examples and end of chapter homework problems Provides simulations made using MATLAB Simulink and Sciamble Workbench free software for educational purposes Contains helpful presentation slides and Solutions Manual for Instructors simulation files are available on the associated website for easy implementation A unique feature of this book is that the simulations in Sciamble Workbench software can seamlessly be used to control experiments in a hardware laboratory Written for undergraduate and graduate students Analysis and Control of Electric Drives is an essential guide to understanding electric vehicles wind turbines and increased efficiency of motor driven systems

Frequenzselektive Aktivfilterung von Stromoberschwingungen mit einer erweiterten modellbasierten Prädiktivregelung Martin Pieschel, 2010 Modellprädiktive Regelungen waren bisher aufgrund der erforderlichen hohen Rechenleistung in ihrem Anwendungsbereich auf Regelstrecken mit niedrigen Abtastraten beschränkt Durch die Verfügbarkeit schneller Rechenhardware wurde bereits ein Verfahren dieser Klasse von Reglern erfolgreich bei der feldorientierten Regelung von Asynchronmaschinen erprobt In dieser Arbeit wird der Einsatz einer modellbasierten Prädiktivregelung zur frequenzselektiven Aktivfilterung von Stromoberschwingungen untersucht Hierzu wird ein Wechsel von der bisher üblichen Regelung von Gleichgrossen zu einer Regelung mehrerer überlagerter Sinusschwingungen durch Hinzufügen von dynamischen Modellen der Führungsgrosse zu einer Prädiktivregelung mit einer Zustandsraumdarstellung durchgeführt Nach der erfolgreichen simulativen Untersuchung des Kompensationsverhaltens wurde zur Verifikation des Verfahrens im Labormassstab ein mehrstufiger Umrichter aus einer Reihenschaltung von zehn H-Brücken mit Spannungszwischenkreis als Stellglied für die Regelung aufgebaut Der Umrichter wurde über einen schwach gedämpften Saugkreis parallel zu verschiedenen Stromoberschwingungsquellen angeschlossen und bewies die Funktionstüchtigkeit der entwickelten Regelung

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