Epub free Power electronics converters and regulators 3rd edition (2023)

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 control of power electronic converters and systems volume 3 explores emerging topics in the control of power electronics and converters including the theory behind control and the practical operation modeling and control of basic power system models this book introduces the most important controller design methods including both analog and digital procedures this reference explains the dynamic characterization of terminal behavior for converters as well as preserving the stability and power quality of modern power systems useful for engineers in emerging applications of power electronic converters and those combining control design methods into different applications in power electronics technology addressing controller interactions in light of increasing renewable energy integration and related challenges with stability and power quality is becoming more frequent in power converters and passive components discusses different applications and their control in integrated renewable energy systems introduces the most important controller design methods both in analog and digital describes different important applications to be used in future industrial products explains the dynamic characterization of terminal behavior for converters control of power electronic converters and systems examines the theory behind power electronic converter control including operation modeling and control of basic converters the book explores how to manipulate components of power electronics converters and systems to produce a desired effect by controlling system variables advances in power electronics enable new applications to emerge and performance improvement in existing applications these advances rely on control effectiveness making it essential to apply appropriate control schemes to the converter and system to obtain the desired performance discusses different applications and their control explains the most important controller design methods both in analog and digital describes different important applications to be used in future industrial products covers voltage source converters in significant detail demonstrates applications across a much broader context 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 control of power electronic converters volume two gives the theory behind power electronic converter control and discusses the operation modelling and control of basic converters the main components of power electronics systems that produce a desired effect energy conversion robot motion etc by controlling system variables voltages and currents are thoroughly covered both small mobile phones computer power supplies and very large systems trains wind turbines high voltage power lines and their power ranges from the watt to the gigawatt are presented and explored users will find a focused resource on how to apply innovative control techniques for power converters and drives discusses different applications and their control explains the most important controller design methods both in analog and digital describes different but important applications that can be used in future industrial products covers voltage source converters in significant detail demonstrates applications across a much broader context because of the demand for higher efficiencies smaller output ripple and smaller converter size for modern power electronic systems integrated power electronic converters could soon replace conventional switched mode power supplies synthesized integrated converters and related digital control techniques address problems related to cost space flexibility energy efficiency and voltage regulation the key factors in digital power management and implementation meeting the needs of professionals working in power electronics as well as advanced engineering students integrated power electronic converters and digital control explores the many benefits associated with integrated converters this informative text details boost type buck type and buck boost type integrated topologies as well as other integrated structures it discusses concepts behind their operation as well specific applications topics discussed include isolated dc dc converters such as flyback forward push pull full bridge and half bridge power factor correction and its application definition of the integrated switched mode power supplies steady state analysis of the boost integrated flyback rectifier energy storage converter dynamic analysis of the buck integrated forward converter digital control based on the use of digital signal processors dsps with innovations in digital control becoming ever more pervasive system designers continue to introduce products that integrate digital power management and control integrated circuit solutions both hybrid and pure digital this detailed assessment of the latest advances in the field will help anyone working in power electronics and related industries stay ahead of the curve aimed at undergraduate students of electrical engineering this textbook focuses on the emerging power electronic converters made feasible by the new generation of power semiconductor devices it discusses a broad spectrum of power applications and examines converter design modern power electronic converters are involved in a very broad spectrum of applications switched mode power supplies electrical machine motion control active power filters distributed power generation flexible ac transmission systems renewable energy conversion systems and vehicular technology among them power electronics converters modeling and control teaches the reader how to analyze and model the behavior of converters and so to improve their design and control dealing with a set of confirmed algorithms specifically developed for use with power converters this text is in two parts models and control methods the first is a detailed exposition of the most usual power converter models switched and averaged models small large signal models and time frequency models the second focuses on three groups of control methods linear control approaches normally associated with power converters resonant controllers because of their significance in grid connected applications and nonlinear control methods including feedback linearization stabilizing passivity based and variable structure control extensive case study illustration and end of chapter exercises reinforce the study material power electronics converters modeling and control addresses the needs of graduate students interested in power electronics providing a balanced understanding of theoretical ideas coupled with pragmatic tools based on control engineering practice in the field academics teaching power electronics will find this an attractive course text and the practical points make the book useful for self tuition by engineers and other practitioners wishing to bring their knowledge up to date power electronics converters and their control for renewable energy applications provides information that helps to solve common challenges with power electronics converters including loss by switching heating of power switches management of switching time improvement of the quality of the signals delivered by power converters and improvement of the quality of energy produced by renewable energy sources this book is of interest to academics researchers and engineers in renewable energy power systems electrical engineering electronics and mechanical engineering includes important visual illustrations and imagery of concise circuit schematics and renewable energy applications features a templated approach for step by step implementation of the new mppt algorithm based on recent and intelligent techniques provides methods for optimal harnessing of energy from renewable energy sources and converter topology synthesis control of power electronic converters and systems volume four covers emerging topics in the control of power electronics and converters not covered in previous volumes including emerging power converter topologies storage systems battery chargers and the smart transformer this

UPDATED EDITION SPECIFICALLY FOCUSES ON EMERGING POWER CONVERTER TOPOLOGIES AND DISCUSSES VERY RECENT ADVANCES AND TOPICS WITH APPLICATIONS IN POWER ELECTRONICS AND FORMIDABLE PROBABLE DYNAMICS CHAPTERS INCLUDE MODELING OF POWER CONVERTERS AND THEIR CONTROL WITH SUPPORTIVE SIMULATIONS AND ADDITIONAL EXPERIMENTAL RESULTS ANYONE LOOKING FOR FUNDAMENTAL KNOWLEDGE REGARDING NEW TRENDS IN POWER ELECTRONICS BY APPLICATION AND ALSO READY TO USE MODELS AND METHODOLOGIES IN THEIR DESIGN CONTROL AND TESTING WILL FIND THIS THE NEXT INVALUABLE RESOURCE IN THIS HIGHLY REGARDED SERIES COMBINES ESSENTIAL CONTROL DESIGN METHODS AND TRENDS WITH DIFFERENT APPLICATIONS OF POWER CONVERTOR TOPOLOGIES INCLUDES GLOBAL PERSPECTIVES CASE STUDIES AND REAL EXAMPLES FROM DIFFERENT APPLICATIONS AND THEIR CONTROL FEATURES READY TO USE MODELS AND METHODOLOGIES IN POWER ELECTRONIC APPLICATION THEIR DESIGN CONTROL AND TESTING SNEAK CIRCUITS OF POWER ELECTRONIC CONVERTERS SNEAK CIRCUITS OF POWER ELECTRONIC CONVERTERS WORK ON SNEAK CIRCUITS AND RELATED ANALYSIS METHODS FOR POWER CONVERTERS CONTRIBUTES TO THE RELIABILITY OF POWER ELECTRONIC SYSTEMS WORLDWIDE MOST BOOKS ON THE SUBJECT FOCUS ON ELECTRONIC SYSTEMS THIS BOOK IS PERHAPS THE FIRST TO EXAMINE POWER ELECTRONIC SYSTEMS THE AUTHORS DESCRIBE SNEAK CIRCUIT PHENOMENA IN POWER CONVERTERS INTRODUCE SCA METHODS FOR POWER ELECTRONIC SYSTEMS AND PROPOSE HOW TO ELIMINATE AND MAKE USE OF SNEAK CIRCUITS THIS BOOK HIGHLIGHTS THE ADVANCED RESEARCH WORKS IN SNEAK CIRCUIT ANALYSIS BY A LEADING AUTHOR IN THE FIELD IS ORIGINAL IN ITS TREATMENT OF POWER ELECTRONICS CONVERTERS GOING BEYOND THE ELECTRONIC SYSTEM LEVEL IS SUITABLE FOR BOTH INTRODUCTORY AND ADVANCED LEVELS OFFERS GUIDELINES FOR INDUSTRY PROFESSIONALS INVOLVED IN THE DESIGN OF POWER ELECTRONIC SYSTEMS ENABLING EARLY DETECTION OF POTENTIAL PROBLEMS THIS BOOK IS GEARED FOR RESEARCHERS AND GRADUATE STUDENTS IN ELECTRICAL ENGINEERING AS WELL AS ENGINEERS AND RESEARCHERS IN POWER ELECTRONICS RESEARCHERS IN POWER ELECTRONICS RELIABILITY WILL ALSO FIND IT TO BE A HELPFUL RESOURCE PROVIDES A STEP BY STEP METHOD FOR THE DEVELOPMENT OF A VIRTUAL INTERACTIVE POWER ELECTRONICS LABORATORY THE BOOK IS SUITABLE FOR UNDERGRADUATES AND GRADUATES FOR THEIR LABORATORY COURSE AND PROJECTS IN POWER ELECTRONICS IT IS EQUALLY SUITABLE FOR PROFESSIONAL ENGINEERS IN THE POWER ELECTRONICS INDUSTRY THE READER WILL LEARN TO DEVELOP INTERACTIVE VIRTUAL POWER ELECTRONICS LABORATORY AND PERFORM SIMULATIONS OF THEIR OWN AS WELL AS ANY GIVEN POWER ELECTRONIC CONVERTER DESIGN USING SIMULINK WITH ADVANCED SYSTEM MODEL AND CIRCUIT COMPONENT LEVEL MODEL FEATURES EXAMPLES AND CASE STUDIES INCLUDED THROUGHOUT INTRODUCTORY SIMULATION OF POWER ELECTRONIC CONVERTERS IS PERFORMED USING EITHER PSIM OR MICROCAP SOFTWARE COVERS INTERACTIVE SYSTEM MODEL DEVELOPED FOR THREE PHASE DIODE CLAMPED THREE LEVEL INVERTER FLYING CAPACITOR THREE LEVEL INVERTER FIVE LEVEL CASCADED H BRIDGE INVERTER MULTICARRIER SINE PHASE SHIFT PWM AND MULTICARRIER SINE LEVEL SHIFT PWM SYSTEM MODELS OF POWER ELECTRONIC CONVERTERS ARE VERIFIED FOR PERFORMANCE USING INTERACTIVE CIRCUIT COMPONENT LEVEL MODELS DEVELOPED USING SIMSCAPE ELECTRICAL POWER SYSTEMS AND SPECIALIZED TECHNOLOGY BLOCK SET PRESENTS SOFTWARE IN THE LOOP OR PROCESSOR IN THE LOOP SIMULATION WITH A POWER ELECTRONIC CONVERTER EXAMPLES POWER ELECTRONIC SYSTEMS ARE INDISPENSABLE IN ADJUSTABLE SPEED DRIVES NATIONAL SMART POWER GRID ELECTRIC AND HYBRID CARS ELECTRIC LOCOMOTIVES AND SUBWAY TRAINS RENEWABLE ENERGY SOURCES AND DISTRIBUTED GENERATION AS A RESULT THE INTEREST IN POWER ELECTRONICS IS EXPANDING ALONG WITH THE NEED FOR A SOURCE OF STATE OF THE ART KNOWLEDGE WITH CHAPTERS WRITTEN BY SPECIALISTS IN THEIR FIELD THIS IMPORTANT BOOK IS A COMPREHENSIVE COMPENDIUM OF TOPICS RELATED TO RECENT ADVANCES IN POWER ELECTRONIC DEVICES CONVERTERS AND SYSTEMS IT WILL BE ESSENTIAL READING FOR PRACTICING ENGINEERS SPECIALIZING IN THE DEVELOPMENT AND APPLICATION OF POWER ELECTRONIC CONVERTERS AND SYSTEMS IT WILL ALSO BE OF VALUE TO GRADUATE STUDENTS SPECIALIZING IN POWER ELECTRONICS RENEWABLE ENERGY AND POWER SYSTEMS AND FOR POSTDOCS INVOLVED IN RELATED RESEARCH PROJECTS 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 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 IMPEDANCE SOURCE POWER ELECTRONIC CONVERTERS BRINGS TOGETHER STATE OF THE ART KNOWLEDGE AND CUTTING EDGE TECHNIQUES IN VARIOUS STAGES OF RESEARCH RELATED TO THE EVER MORE POPULAR IMPEDANCE SOURCE CONVERTERS INVERTERS SIGNIFICANT RESEARCH EFFORTS ARE UNDERWAY TO DEVELOP COMMERCIALLY VIABLE AND TECHNICALLY FEASIBLE EFFICIENT AND RELIABLE POWER CONVERTERS FOR RENEWABLE ENERGY ELECTRIC TRANSPORTATION AND FOR VARIOUS INDUSTRIAL APPLICATIONS THIS BOOK PROVIDES A DETAILED UNDERSTANDING OF THE CONCEPTS DESIGNS CONTROLS AND APPLICATION DEMONSTRATIONS OF THE IMPEDANCE SOURCE CONVERTERS INVERTERS KEY FEATURES COMPREHENSIVE ANALYSIS OF THE IMPEDANCE SOURCE CONVERTER INVERTER TOPOLOGIES INCLUDING TYPICAL TOPOLOGIES AND DERIVED TOPOLOGIES FULLY EXPLAINS THE DESIGN AND CONTROL TECHNIQUES OF IMPEDANCE SOURCE CONVERTERS INVERTERS INCLUDING HARDWARE DESIGN AND CONTROL PARAMETER DESIGN FOR CORRESPONDING CONTROL METHODS PRESENTS THE LATEST POWER CONVERSION SOLUTIONS THAT AIM TO ADVANCE THE ROLE OF POWER ELECTRONICS INTO INDUSTRIES AND SUSTAINABLE ENERGY CONVERSION SYSTEMS COMPARES IMPEDANCE SOURCE CONVERTER INVERTER APPLICATIONS IN RENEWABLE ENERGY POWER GENERATION AND ELECTRIC VEHICLES AS WELL AS DIFFERENT INDUSTRIAL APPLICATIONS PROVIDES AN OVERVIEW OF EXISTING CHALLENGES SOLUTIONS AND FUTURE TRENDS SUPPORTED BY CALCULATION EXAMPLES SIMULATION MODELS AND RESULTS HIGHLY ACCESSIBLE THIS IS AN INVALUABLE RESOURCE FOR RESEARCHERS POSTGRADUATE GRADUATE STUDENTS STUDYING POWER ELECTRONICS AND ITS APPLICATION IN INDUSTRY AND RENEWABLE ENERGY CONVERSION AS WELL AS PRACTISING R D ENGINEERS READERS WILL BE ABLE TO APPLY THE PRESENTED MATERIAL FOR THE FUTURE DESIGN OF THE NEXT GENERATION OF EFFICIENT POWER ELECTRONIC CONVERTERS INVERTERS THIS BOOK PROVIDES A COMPREHENSIVE OVERVIEW OF POWER ELECTRONIC CONVERTERS DC DC DC AC AC DC AND AC AC

CONVENTIONALLY USED IN INDUSTRIAL AND TRANSPORTATION APPLICATIONS SPECIFICALLY FOR THE SUPPLY OF ELECTRIC MACHINES WITH VARIABLE SPEED DROP OFF WINDOW FROM THE PERSPECTIVE OF DESIGN AND SIZING THIS BOOK PRESENTS THE DIFFERENT FUNCTIONS ENCOUNTERED IN A MODULAR WAY FOR POWER ELECTRONICS POWER CONVERTERS AND THEIR CONTROL DETAILS LESS TRADITIONAL TOPICS SUCH AS MATRIX CONVERTERS AND MULTILEVEL CONVERTERS THIS BOOK ALSO FEATURES A CASE STUDY DESIGN OF AN INDUSTRIAL CONTROLLER WHICH IS A SYNTHESIS EXCEPT THE AC AC DIRECT CONVERSION OF THE STUDY SUBJECTS INCLUDING SIZING ASSOCIATED PASSIVE COMPONENTS INTRODUCING ESSENTIAL NOTIONS IN POWER ELECTRONICS FROM BOTH THEORETICAL AND TECHNOLOGICAL PERSPECTIVES DETAILED CHAPTERS FOCUSING ON POWER SUPPLIES FOR ELECTRICAL MACHINERY INCLUDING A CASE STUDY OF FULL DIMENSIONING OF AN INDUSTRIAL VARIABLE SPEED DRIVE PRESENTED FROM A USER S PERSPECTIVE TO ENABLE YOU TO APPLY THE THEORY OF POWER ELECTRONICS TO PRACTICAL APPLICATIONS ADVANCED POWER ELECTRONIC CONVERTERS CONVERT CONTROL AND CONDITION ELECTRICITY POWER CONVERTERS REQUIRE CONTROL STRATEGIES FOR PERIODIC SIGNAL COMPENSATION TO ASSURE GOOD POWER QUALITY AND STABLE POWER SYSTEM OPERATION THIS COMPREHENSIVE TEXT PRESENTS THE MOST RECENT INTERNAL MODEL PRINCIPLE BASED PERIODIC CONTROL TECHNOLOGY WHICH OFFERS THE PERFECT PERIODIC CONTROL SOLUTION FOR POWER ELECTRONIC CONVERSION IT ALSO PROVIDES COMPLETE ANALYSIS AND SYNTHESIS METHODS FOR PERIODIC CONTROL SYSTEMS AND PLENTY OF PRACTICAL EXAMPLES TO DEMONSTRATE THE VALIDITY OF PROPOSED PERIODIC CONTROL TECHNOLOGY FOR POWER CONVERTERS IT PROPOSES A UNIFIED FRAMEWORK FOR HOUSING PERIODIC CONTROL SCHEMES FOR POWER CONVERTERS AND PROVIDES A GENERAL PROPORTIONAL INTEGRAL DERIVATIVE CONTROL SOLUTION TO PERIODIC SIGNAL COMPENSATION IN EXTENSIVE ENGINEERING APPLICATIONS PERIODIC CONTROL OF POWER ELECTRONIC CONVERTERS IS INTENDED FOR ENGINEERS RESEARCHERS AND STUDENTS IN THE FIELD OF POWER ELECTRONICS WHO ARE INTERESTED IN ADVANCED CONTROL OF POWER CONVERTERS AND CONTROL SPECIALISTS WHO LIKE TO EXPLORE NEW APPLICATIONS OF CONTROL THEORY SIMULATION OF POWER ELECTRONICS CONVERTERS USING PLECS IS A GUIDE TO SIMULATING A POWER ELECTRONICS CIRCUIT USING THE LATEST POWERFUL SOFTWARE FOR POWER ELECTRONICS CIRCUIT SIMULATION PURPOSES THIS BOOK ASSISTS ENGINEERS GAIN AN INCREASED UNDERSTANDING OF CIRCUIT OPERATION SO THEY CAN FOR A GIVEN SET OF SPECIFICATIONS CHOOSE A TOPOLOGY SELECT APPROPRIATE CIRCUIT COMPONENT TYPES AND VALUES ESTIMATE CIRCUIT PERFORMANCE AND COMPLETE THE DESIGN BY ENSURING THAT THE CIRCUIT PERFORMANCE WILL MEET SPECIFICATIONS EVEN WITH THE ANTICIPATED VARIATIONS IN OPERATING CONDITIONS AND CIRCUIT COMPONENT VALUES THIS BOOK COVERS THE FUNDAMENTALS OF POWER ELECTRONICS CONVERTER SIMULATION ALONG WITH AN ANALYSIS OF POWER ELECTRONICS CONVERTERS USING PLECS IT CONCLUDES WITH REAL WORLD SIMULATION EXAMPLES FOR APPLIED CONTENT MAKING THIS BOOK USEFUL FOR ALL THOSE IN THE ELECTRICAL AND ELECTRONIC ENGINEERING FIELD CONTAINS UNIQUE EXAMPLES ON THE SIMULATION OF POWER ELECTRONICS CONVERTERS USING PLECS INCLUDES EXPLANATIONS AND GUIDANCE ON ALL INCLUDED SIMULATIONS FOR RE DOING THE SIMULATIONS INCORPORATES ANALYSIS AND DESIGN FOR RAPIDLY CREATING POWER ELECTRONICS CIRCUITS WITH HIGH ACCURACY THIS BOOK IS A TECHNICAL PUBLICATION FOR STUDENTS SCHOLARS AND ENGINEERS IN ELECTRICAL ENGINEERING FOCUSING ON THE PULSE WIDTH MODULATION PWM TECHNOLOGIES IN POWER ELECTRONICS AREA BASED ON AN INTRODUCTION OF BASIC PWM PRINCIPLES THIS BOOK ANALYZES THREE MAJOR CHALLENGES FOR PWM ON SYSTEM PERFORMANCE POWER LOSSES VOLTAGE CURRENT RIPPLE AND ELECTROMAGNETIC INTERFERENCE EMI NOISE AND THE LACK OF UTILIZATION OF CONTROL FREEDOMS IN CONVENTIONAL PWM TECHNOLOGIES THEN THE MODEL OF PWM S IMPACT ON SYSTEM PERFORMANCE IS INTRODUCED WITH THE CURRENT RIPPLE PREDICTION METHOD FOR VOLTAGE SOURCE CONVERTER AS EXAMPLE WITH THE PREDICTION MODEL TWO MAJOR ADVANCED PWM METHODS ARE INTRODUCED VARIABLE SWITCHING FREQUENCY PWM AND PHASE SHIFT PWM WHICH CAN REDUCE THE POWER LOSSES AND EMI FOR THE SYSTEM BASED ON THE PREDICTION MODEL FURTHERMORE THE ADVANCED PWM CAN BE APPLIED IN ADVANCED TOPOLOGIES INCLUDING MULTILEVEL CONVERTERS AND PARALLELED CONVERTERS WITH MORE CONTROL VARIABLES IN THE ADVANCED TOPOLOGIES PERFORMANCE OF PWM CAN BE FURTHER IMPROVED ALSO FOR THE SPECIAL PROBLEM FOR COMMON MODE NOISE THIS BOOK INTRODUCES MODIFIED PWM METHOD FOR REDUCTION ESPECIALLY THE PARALLELED INVERTERS WITH ADVANCED PWM CAN ACHIEVE GOOD PERFORMANCE FOR THE COMMON MODE NOISE REDUCTION FINALLY THE IMPLEMENTATION OF PWM TECHNOLOGIES IN HARDWARE IS INTRODUCED IN THE LAST PART POWER ELECTRONICS IS A FIELD OF CONSTANT EVOLUTION POWER GRIDS ARE SEEING DEVELOPMENTS AND THE ELECTRIFICATION OF THE TRANSPORT SECTOR REQUIRES BETTER MOTOR DRIVES POWER ELECTRONICS PLAYS A KEY ROLE WITH NEW DEVICES SUCH AS WIDE BANDGAP DEVICES AND POWER CONVERTERS THAT CONVERT ALTERNATING CURRENT INTO DIRECT CURRENT AND VICE VERSA OR CHANGE THE VOLTAGE OR FREQUENCY FILLING THE NEED FOR A REFERENCE THAT EXPLAINS THE BEHAVIOR OF POWER ELECTRONIC CONVERTERS THIS BOOK PROVIDES INFORMATION CURRENTLY UNAVAILABLE IN SIMILAR TEXTS ON POWER ELECTRONICS CLEARLY ORGANIZED INTO FOUR PARTS THE FIRST TREATS THE DYNAMICS AND CONTROL OF CONVENTIONAL CONVERTERS WHILE THE SECOND PART COVERS THE DYNAMICS AND CONTROL OF DC DC CONVERTERS IN RENEWABLE ENERGY APPLICATIONS INCLUDING AN INTRODUCTION TO THE SOURCES AS WELL AS THE DESIGN OF CURRENT FED CONVERTERS APPLYING DUALITY TRANSFORMATION METHODS THE THIRD PART TREATS THE DYNAMICS AND CONTROL OF THREE PHASE RECTIFIERS IN VOLTAGE SOURCED APPLICATIONS AND THE FINAL PART LOOKS AT THE DYNAMICS AND CONTROL OF THREE PHASE INVERTERS IN RENEWABLE ENERGY APPLICATIONS WITH ITS FUTURE ORIENTED PERSPECTIVE AND ADVANCED FIRST HAND KNOWLEDGE THIS IS A PRIME RESOURCE FOR RESEARCHERS AND PRACTICING ENGINEERS NEEDING A READY REFERENCE ON THE DESIGN AND CONTROL OF POWER ELECTRONIC CONVERTERS A HANDS ON CASE STUDY BACKED REFERENCE OF CONTROL STRATEGIES FAULT CLASSIFICATION MECHANISMS AND RELIABILITY ANALYSIS METHODS FOR PV MODULES POWER ELECTRONIC CONVERTERS AND GRID CONNECTED PV SYSTEMS WRITTEN BY AN INTERNATIONAL TEAM OF RESEARCHERS WITH EXCELLENT BACKGROUNDS IN ACADEMIA AND INDUSTRY THE PURPOSE OF THIS BOOK IS TO DESCRIBE THE THEORY OF DIGITAL POWER ELECTRONICS AND ITS APPLICATIONS THE AUTHORS APPLY DIGITAL CONTROL THEORY TO POWER ELECTRONICS IN A MANNER THOROUGHLY DIFFERENT FROM THE TRADITIONAL ANALOG CONTROL SCHEME IN ORDER TO APPLY DIGITAL CONTROL THEORY TO POWER ELECTRONICS THE AUTHORS DEFINE A NUMBER OF NEW PARAMETERS INCLUDING THE ENERGY FACTOR PUMPING ENERGY STORED ENERGY TIME CONSTANT AND DAMPING TIME CONSTANT THESE PARAMETERS DIFFER FROM TRADITIONAL PARAMETERS SUCH AS THE POWER FACTOR POWER TRANSFER EFFICIENCY RIPPLE FACTOR AND TOTAL HARMONIC DISTORTION THESE NEW PARAMETERS RESULT IN THE DEFINITION OF NEW MATHEMATICAL MODELING A ZERO ORDER HOLD ZOH IS USED TO SIMULATE ALL AC DC RECTIFIERS A FIRST ORDER HOLD FOH IS USED TO SIMULATE ALL DC AC INVERTERS A SECOND ORDER HOLD SOH IS USED TO SIMULATE ALL DC DC CONVERTERS A FIRST ORDER HOLD FOH IS USED TO SIMULATE ALL AC AC AC DC AC CONVERTERS PRESENTS MOST UP TO DATE METHODS OF ANALYSIS AND CONTROL ALGORITHMS FOR DEVELOPING POWER ELECTRONIC CONVERTERS AND POWER SWITCHING CIRCUITS PROVIDES AN INVALUABLE REFERENCE FOR ENGINEERS DESIGNING POWER CONVERTERS COMMERCIAL POWER SUPPLIES CONTROL SYSTEMS FOR MOTOR DRIVES ACTIVE FILTERS ETC PRESENTS METHODS OF ANALYSIS NOT AVAILABLE IN OTHER BOOKS 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 POWER ELECTRONICS AND ENERGY CONVERSION SYSTEMS IS A DEFINITIVE FIVE VOLUME REFERENCE SPANNING CLASSICAL THEORY THROUGH PRACTICAL APPLICATIONS AND CONSOLIDATING THE LATEST ADVANCEMENTS IN ENERGY CONVERSION TECHNOLOGY COMPREHENSIVE YET HIGHLY ACCESSIBLE EACH VOLUME IS ORGANISED IN A BASIC TO SOPHISTICATED CRESCENDO PROVIDING A SINGLE SOURCE REFERENCE FOR UNDERGRADUATE AND GRADUATE STUDENTS RESEARCHERS AND DESIGNERS VOLUME 1 FUNDAMENTALS AND HARD SWITCHING

CONVERTERS INTRODUCES THE KEY CHALLENGES IN POWER ELECTRONICS FROM BASIC COMPONENTS TO OPERATION PRINCIPLES AND PRESENTS CLASSICAL HARD AND SOFT SWITCHING DC TO DC CONVERTERS RECTIFIERS AND INVERTERS AT A MORE ADVANCED LEVEL IT PROVIDES COMPREHENSIVE ANALYSIS OF DC AND AC MODELS COMPARING THE AVAILABLE APPROACHES FOR THEIR DERIVATION AND RESULTS A FULL TREATMENT OF DC TO DC HARD SWITCHING CONVERTERS IS GIVEN FROM FUNDAMENTALS TO MODERN INDUSTRIAL SOLUTIONS AND PRACTICAL ENGINEERING INSIGHT THE AUTHOR ELUCIDATES VARIOUS CONTRADICTIONS AND MISUNDERSTANDINGS IN THE LITERATURE FOR EXAMPLE IN THE TREATMENT OF THE DISCONTINUOUS CONDUCTION OPERATION OR IN DERIVING AC SMALL SIGNAL MODELS OF CONVERTERS OTHER KEY FEATURES CONSOLIDATES THE LATEST ADVANCEMENTS IN HARD SWITCHING CONVERTERS INCLUDING DISCONTINUOUS CAPACITOR VOLTAGE MODE AND THEIR USE IN POWER FACTOR CORRECTION APPLICATIONS INCLUDES FULLY WORKED DESIGN EXAMPLES EXERCISES AND CASE STUDIES WITH DISCUSSION OF THE PRACTICAL CONSEQUENCES OF EACH CHOICE MADE DURING THE DESIGN EXPLAINS ALL TOPICS IN DETAIL WITH STEP BY STEP DERIVATION OF FORMULAS APPROPRIATE FOR ENERGY CONVERSION COURSES END OF SECTION REVIEW OF THE LEARNED MATERIAL INCLUDES TOPICS TREATED IN RECENT JOURNAL CONFERENCE AND INDUSTRY APPLICATION COVERAGE ON SOLUTIONS THEORY AND PRACTICAL CONCERNS WITH EMPHASIS ON CLEAR EXPLANATION THE TEXT OFFERS BOTH A THOROUGH UNDERSTANDING OF DC TO DC CONVERTERS FOR UNDERGRADUATE AND GRADUATE STUDENTS IN POWER ELECTRONICS AND MORE DETAILED MATERIAL SUITABLE FOR RESEARCHERS DESIGNERS AND PRACTISING ENGINEERS WORKING ON THE DEVELOPMENT AND DESIGN OF POWER ELECTRONICS THIS IS AN ACCESSIBLE REFERENCE FOR ENGINEERING AND PROCUREMENT MANAGERS FROM INDUSTRIES SUCH AS CONSUMER ELECTRONICS INTEGRATED CIRCUITS AEROSPACE AND RENEWABLE ENERGY 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 G? RA 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 COMPUTERS PLAY AN IMPORTANT ROLE IN THE ANALYZING AND DESIGNING OF MODERN DC DC POWER CONVERTERS THIS BOOK SHOWS HOW THE WIDELY USED ANALYSIS TECHNIQUES OF AVERAGING AND LINEARIZATION CAN BE APPLIED TO DC DC CONVERTERS WITH THE AID OF COMPUTERS OBTAINED DYNAMICAL EQUATIONS MAY THEN BE USED FOR CONTROL DESIGN THE BOOK IS COMPOSED OF TWO CHAPTERS CHAPTER 1 FOCUSES ON THE EXTRACTION OF CONTROL TO OUTPUT TRANSFER FUNCTION A SECOND ORDER CONVERTER A BUCK CONVERTER AND A FOURTH ORDER CONVERTER A ZETA CONVERTER ARE STUDIED AS ILLUSTRATIVE EXAMPLES IN THIS CHAPTER BOTH READY TO USE SOFTWARE PACKAGES SUCH AS PLECS AND MATLAB PROGRAMMING ARE USED THROUGHT THIS CHAPTER THE INPUT OUTPUT CHARACTERISTICS OF DC DC CONVERTERS ARE THE OBJECT OF CONSIDERATIONS IN CHAPTER 2 CALCULATION OF INPUT OUTPUT IMPEDANCE IS DONE WITH THE AID OF MATLAB PROGRAMMING IN THIS CHAPTER THE BUCK BUCK BOOST AND BOOST CONVERTER ARE THE MOST POPULAR TYPES OF DC DC CONVERTERS AND USED AS ILLUSTRATIVE EXAMPLES IN THIS CHAPTER THIS BOOK CAN BE A GOOD REFERENCE FOR RESEARCHERS INVOLVED IN DC DC CONVERTERS DYNAMICS AND CONTROL MODELING AND CONTROL OF POWER ELECTRONICS CONVERTER SYSTEMS FOR POWER QUALITY IMPROVEMENTS PROVIDES GROUNDED THEORY FOR THE MODELING ANALYSIS AND CONTROL OF DIFFERENT CONVERTER TOPOLOGIES THAT IMPROVE THE POWER QUALITY OF MAINS INTENDED FOR RESEARCHERS AND PRACTITIONERS WORKING IN THE FIELD TOPICS INCLUDE MODELING EQUATIONS AND THE STATE OF RESEARCH TO IMPROVE POWER QUALITY CONVERTERS BY PRESENTING CONTROL METHODS FOR DIFFERENT CONVERTER TOPOLOGIES AND ASPECTS RELATED TO MULTI LEVEL INVERTERS AND SPECIFIC ANALYSIS RELATED TO THE AC INTERFACE OF DRIVES THE BOOK HELPS USERS BY PUTTING A PARTICULAR EMPHASIS ON DIFFERENT CONTROL ALGORITHMS THAT ENHANCE KNOWLEDGE AND RESEARCH WORK PRESENT IN DEPTH COVERAGE OF MODELING AND CONTROL METHODS FOR DIFFERENT CONVERTER TOPOLOGY INCLUDES A PARTICULAR EMPHASIS ON DIFFERENT CONTROL ALGORITHMS TO GIVE READERS AN EASIER UNDERSTANDING PROVIDES A RESULTS AND DISCUSSION CHAPTER AND MATLAB SIMULATION TO SUPPORT WORKED EXAMPLES AND REAL LIFE APPLICATION SCENARIOS DESIGN OF THREE PHASE AC POWER ELECTRONICS CONVERTERS COMPREHENSIVE RESOURCE ON DESIGN OF POWER ELECTRONICS CONVERTERS FOR THREE PHASE AC APPLICATIONS DESIGN OF THREE PHASE AC POWER ELECTRONICS CONVERTERS CONTAINS A SYSTEMATIC DISCUSSION OF THE THREE PHASE AC CONVERTER DESIGN CONSIDERING VARIOUS ELECTRICAL THERMAL AND MECHANICAL SUBSYSTEMS AND FUNCTIONS FOCUSING ON ESTABLISHING CONVERTER COMPONENTS AND SUBSYSTEMS MODELS NEEDED FOR THE DESIGN THE TEXT DEMONSTRATES EXAMPLE DESIGNS FOR THESE SUBSYSTEMS AND FOR THE WHOLE THREE PHASE AC CONVERTERS CONSIDERING INTERACTIONS AMONG SUBSYSTEMS THE DESIGN METHODS APPLY TO DIFFERENT APPLICATIONS AND TOPOLOGIES THE TEXT PRESENTS THE BASICS OF THE THREE PHASE AC CONVERTER ITS DESIGN AND THE GOAL AND ORGANIZATION OF THE BOOK FOCUSING ON THE CHARACTERISTICS AND MODELS IMPORTANT TO THE CONVERTER DESIGN FOR COMPONENTS COMMONLY USED IN THREE PHASE AC CONVERTERS THE AUTHORS PRESENT THE DESIGN OF SUBSYSTEMS INCLUDING PASSIVE RECTIFIERS INVERTERS AND ACTIVE RECTIFIERS ELECTROMAGNETIC INTERFERENCE EMI FILTERS THERMAL MANAGEMENT SYSTEM CONTROL AND AUXILIARIES MECHANICAL SYSTEM AND APPLICATION CONSIDERATIONS AND DISCUSS DESIGN OPTIMIZATION WHICH PRESENTS METHODOLOGY TO ACHIEVE OPTIMAL DESIGN RESULTS FOR THREE PHASE AC CONVERTERS SPECIFIC SAMPLE TOPICS COVERED IN DESIGN OF THREE PHASE AC POWER ELECTRONICS CONVERTERS INCLUDE MODELS AND CHARACTERISTICS FOR DEVICES MOST COMMONLY USED IN THREE PHASE CONVERTERS INCLUDING CONVENTIONAL SI DEVICES AND EMERGING SIC AND GAN DEVICES MODELS AND SELECTION OF VARIOUS CAPACITORS CHARACTERISTICS AND DESIGN OF MAGNETICS USING DIFFERENT TYPES OF MAGNETIC CORES WITH A FOCUS ON INDUCTORS OPTIMAL THREE PHASE AC CONVERTER DESIGN INCLUDING DESIGN AND SELECTION OF DEVICES AC LINE INDUCTORS DC BUS CAPACITORS EMI FILTERS HEATSINKS AND CONTROL THE DESIGN CONSIDERS BOTH STEADY STATE AND TRANSIENT CONDITIONS LOAD AND SOURCE IMPACT CONVERTER DESIGN SUCH AS MOTORS AND GRID CONDITION IMPACTS FOR RESEARCHERS AND GRADUATE STUDENTS IN POWER ELECTRONICS ALONG WITH PRACTICING ENGINEERS WORKING IN THE AREA OF THREE PHASE AC CONVERTERS DESIGN OF THREE PHASE AC POWER ELECTRONICS CONVERTERS SERVES AS AN ESSENTIAL RESOURCE FOR THE SUBJECT AND MAY BE USED AS A TEXTBOOK OR INDUSTRY REFERENCE THIS BOOK EXAMINES A NUMBER OF TOPICS MAINLY IN CONNECTION WITH ADVANCES IN SEMICONDUCTOR DEVICES AND MAGNETIC MATERIALS AND DEVELOPMENTS IN MEDIUM AND LARGE SCALE RENEWABLE POWER PLANT TECHNOLOGIES GRID INTEGRATION TECHNIQUES AND NEW CONVERTER TOPOLOGIES INCLUDING ADVANCED DIGITAL CONTROL SYSTEMS FOR MEDIUM VOLTAGE NETWORKS THE BOOK S INDIVIDUAL CHAPTERS PROVIDE AN EXTENSIVE COMPILATION OF FUNDAMENTAL THEORIES AND IN DEPTH INFORMATION ON CURRENT RESEARCH AND DEVELOPMENT TRENDS WHILE ALSO EXPLORING NEW APPROACHES TO OVERCOMING SOME CRITICAL LIMITATIONS OF CONVENTIONAL GRID INTEGRATION TECHNOLOGIES ITS MAIN OBJECTIVE IS TO PRESENT THE DESIGN AND IMPLEMENTATION PROCESSES FOR MEDIUM VOLTAGE CONVERTERS ALLOWING THE DIRECT GRID INTEGRATION OF RENEWABLE POWER PLANTS WITHOUT THE NEED FOR STEP UP TRANSFORMERS 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 POWER ELECTRONIC CONVERTERS FOR SOLAR PHOTOVOLTAIC SYSTEMS PROVIDES DESIGN AND IMPLEMENTATION PROCEDURES FOR POWER ELECTRONIC CONVERTERS AND ADVANCED CONTROLLERS TO IMPROVE STANDALONE AND GRID ENVIRONMENT SOLAR PHOTOVOLTAICS PERFORMANCE SECTIONS COVER PERFORMANCE AND IMPROVEMENT OF SOLAR PHOTOVOLTAICS UNDER VARIOUS CONDITIONS WITH THE AID OF INTELLIGENT CONTROLLERS ALLOWING READERS TO BETTER UNDERSTAND THE NUANCES OF POWER ELECTRONIC CONVERTERS FOR RENEWABLE ENERGY SYSTEMS WITH ALGORITHM DEVELOPMENT AND REAL TIME IMPLEMENTATION PROCEDURES THIS REFERENCE IS USEFUL FOR THOSE INTERESTED IN POWER ELECTRONICS FOR PERFORMANCE IMPROVEMENT IN DISTRIBUTED ENERGY RESOURCES DESIGN OF ADVANCED CONTROLLERS AND MEASUREMENT OF CRITICAL PARAMETERS SURROUNDING RENEWABLE ENERGY SYSTEMS BY PROVIDING A COMPLETE SOLUTION FOR PERFORMANCE IMPROVEMENT IN SOLAR PV WITH NOVEL CONTROL TECHNIQUES THIS BOOK WILL APPEAL TO RESEARCHERS AND ENGINEERS WORKING IN POWER ELECTRONIC CONVERTERS RENEWABLE ENERGY AND POWER QUALITY INCLUDES SIMULATION STUDIES AND PHOTOVOLTAIC PERFORMANCE ANALYSIS USES CASE STUDIES AS A REFERENCE FOR DESIGN AND RESEARCH COVERS DIFFERENT VARIETIES OF POWER CONVERTERS FROM FUNDAMENTALS TO IMPLEMENTATION AFTER NEARLY A DECADE OF SUCCESS OWING TO ITS THOROUGH COVERAGE ABUNDANCE OF PROBLEMS AND EXAMPLES AND PRACTICAL USE OF SIMULATION AND DESIGN POWER SWITCHING CONVERTERS ENTERS ITS SECOND EDITION WITH NEW AND UPDATED MATERIAL ENTIRELY NEW DESIGN CASE STUDIES AND EXPANDED FIGURES EQUATIONS AND HOMEWORK PROBLEMS THIS TEXTBOOK IS IDEAL FOR SENIOR UNDERGRADUATE OR GRADUATE COURSES IN POWER ELECTRONIC CONVERTERS REQUIRING ONLY SYSTEMS ANALYSIS AND BASIC ELECTRONICS COURSES THE ONLY TEXT OF SUCH DETAIL TO ALSO INCLUDE THE USE OF PSPICE AND STEP BY STEP DESIGNS AND SIMULATIONS POWER SWITCHING CONVERTERS SECOND EDITION COVERS BASIC TOPOLOGIES BASIC CONTROL TECHNIQUES AND CLOSED LOOP CONTROL AND STABILITY IT ALSO INCLUDES TWO NEW CHAPTERS ON INTERLEAVED CONVERTERS AND SWITCHED CAPACITOR CONVERTERS AND THE AUTHORS HAVE ADDED DISCRETE TIME MODELING TO THE DYNAMIC ANALYSIS OF SWITCHING CONVERTERS THE FINAL TWO CHAPTERS ARE DEDICATED TO SIMULATION AND COMPLETE DESIGN EXAMPLES RESPECTIVELY PSPICE EXAMPLES AND MATLAB SCRIPTS ARE AVAILABLE FOR DOWNLOAD FROM THE CRC SITE THESE ARE USEFUL FOR THE SIMULATION OF STUDENTS DESIGNS CLASS SLIDES ARE ALSO AVAILABLE ON THE INTERNET INSTRUCTORS WILL APPRECIATE THE BREADTH AND DEPTH OF THE MATERIAL MORE THAN ENOUGH TO ADAPT INTO A CUSTOMIZED SYLLABUS STUDENTS WILL SIMILARLY BENEFIT FROM THE MORE THAN 440 FIGURES AND OVER 1000 EQUATIONS AMPLE HOMEWORK PROBLEMS AND CASE STUDIES PRESENTED IN THIS BOOK 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 THIS CONTRIBUTED VOLUME IS WRITTEN BY KEY SPECIALISTS WORKING IN MULTIDISCIPLINARY FIELDS IN ELECTRICAL ENGINEERING LINKING CONTROL THEORY POWER ELECTRONICS ARTIFICIAL NEURAL NETWORKS EMBEDDED CONTROLLERS AND SIGNAL PROCESSING THE AUTHORS OF EACH CHAPTER REPORT THE STATE OF THE ART OF THE VARIOUS TOPICS ADDRESSED AND PRESENT RESULTS OF THEIR OWN RESEARCH LABORATORY EXPERIMENTS AND SUCCESSFUL APPLICATIONS THE PRESENTED SOLUTIONS CONCENTRATE ON THREE MAIN AREAS OF INTEREST MOTION CONTROL IN COMPLEX ELECTROMECHANICAL SYSTEMS INCLUDING SENSORLESS CONTROL FAULT DIAGNOSIS AND FAULT TOLERANT CONTROL OF ELECTRIC DRIVES NEW CONTROL ALGORITHMS FOR POWER ELECTRONICS CONVERTERS THE CHAPTERS AND THE COMPLETE BOOK POSSESS STRONG MONOGRAPH ATTRIBUTES IMPORTANT PRACTICAL AND THEORETICAL PROBLEMS ARE DEEPLY AND ACCURATELY PRESENTED ON THE BACKGROUND OF AN EXHAUSTIVE STATE OF THE ART REVIEW MANY RESULTS ARE COMPLETELY NEW AND WERE NEVER PUBLISHED BEFORE WELL KNOWN CONTROL METHODS LIKE FIELD ORIENTED CONTROL FOC OR DIRECT TORQUE CONTROL DTC ARE REFERRED AS A STARTING POINT FOR MODIFICATIONS OR ARE USED FOR COMPARISON AMONG NUMEROUS CONTROL THEORIES USED TO SOLVE PARTICULAR PROBLEMS ARE NONLINEAR CONTROL ROBUST CONTROL ADAPTIVE CONTROL LYAPUNOV TECHNIQUES OBSERVER DESIGN MODEL PREDICTIVE CONTROL NEURAL CONTROL SLIDING MODE CONTROL SIGNAL FILTRATION AND PROCESSING FAULT DIAGNOSIS AND FAULT TOLERANT CONTROL A CONCISE THOROUGH INTRODUCTION TO MODERN POWER ELECTRONICS THIS COMPREHENSIVE OVERVIEW OF THE MODERN TOOLS AND TECHNIQUES OF ELECTRIC POWER CONVERSION COVERS THE FUNDAMENTALS OF POWER ELECTRONICS UNLIKE OTHER TEXTBOOKS ON THE SUBJECT WHICH OFTEN INCLUDE A GREAT DEAL OF EXTRANEOUS INFORMATION INTRODUCTION TO MODERN POWER ELECTRONICS PRESENTS ESSENTIAL MATERIAL THAT CAN BE COVERED EASILY IN A ONE SEMESTER COURSE THIS STREAMLINED TEXT EXAMINES LOW MEDIUM AND HIGH POWER CONVERSION ISSUES AND THE ELECTRONIC CONVERTERS THAT PROCESS POWER FOR A VARIETY OF APPLICATIONS FOLLOWING RECENT TRENDS IN POWER ELECTRONICS TECHNOLOGY GREATER STRESS IS PLACED ON PULSE WIDTH MODULATED PWM CONVERTERS THAN IN ANY OTHER TEXTBOOK MODERN POWER ELECTRONIC CONVERTERS SUCH AS THE RESONANT DC LINK AND MULTILEVEL INVERTERS OR MATRIX CONVERTERS ARE THOROUGHLY COVERED SPECIAL FEATURES INCLUDE COMPREHENSIVE EASY TO UNDERSTAND COVERAGE OF THE PRINCIPLES AND METHODS OF ELECTRIC POWER CONVERSION USING A HYPOTHETICAL GENERIC POWER CONVERTER DESCRIPTIONS OF VARIOUS TYPES OF SEMICONDUCTOR POWER SWITCHES AND COMPLEMENTARY COMPONENTS AND SYSTEMS FOR POWER ELECTRONIC CONVERTERS IN DEPTH DISCUSSIONS OF ALL POWER CONVERSION TYPES AC TO DC AC TO AC DC TO DC AND DC TO AC SEPARATE CHAPTER ON SWITCHING POWER SUPPLIES A COMPANION SET OF 48 PSPICE CIRCUIT FILES AVAILABLE ON THE INTERNET CONSTITUTES A VIRTUAL LABORATORY OF POWER ELECTRONICS THIS VALUABLE TEACHING TOOL CONTAINS MODELS OF MOST OF THE POWER ELECTRONIC CONVERTERS AND TECHNIQUES COVERED IN THE BOOK IT GIVES STUDENTS THE OPPORTUNITY TO TINKER WITH CONVERTERS AND SEE HOW THEY ACTUALLY WORK IDEAL FOR ELECTRICAL ENGINEERING STUDENTS AT THE SENIOR UNDERGRADUATE LEVEL INTRODUCTION TO MODERN POWER ELECTRONICS IS ALSO A HANDY REFERENCE TOOL FOR ADVANCED STUDENTS AND PRACTICING ENGINEERS POWER ELECTRONICS IS A FIELD OF CONSTANT EVOLUTION POWER GRIDS ARE SEEING DEVELOPMENTS AND THE ELECTRIFICATION OF THE TRANSPORT SECTOR REQUIRES BETTER MOTOR DRIVES POWER ELECTRONICS PLAYS A KEY ROLE WITH NEW DEVICES SUCH AS WIDE BANDGAP DEVICES AND POWER CONVERTERS THAT CONVERT ALTERNATING CURRENT INTO DIRECT CURRENT AND VICE VERSA OR CHANGE THE VOLTAGE OR FREQUENCY THIS EXPANDED 2ND EDITION OF POWER ELECTRONIC CONVERTERS AND SYSTEMS OFFERS AN UPDATE IN TWO VOLUMES WITH A SYSTEMATIC REVISION OF ALL CHAPTERS PLUS SOME ALL NEW CHAPTERS AN OVERVIEW OF MODERN POWER ELECTRONIC CONVERTERS AND SYSTEMS IS PROVIDED AND THEIR APPLICATIONS EXPLORED DEVICES COVERED INCLUDE SEMICONDUCTOR SWITCHES VARIOUS CONVERTERS SWITCHING POWER SUPPLIES AND SMART POWER ELECTRONIC MODULES APPLICATIONS ENCOMPASS DIFFERENT MOTOR AND INDUCTION MOTOR DRIVES RENEWABLE ENERGY DISTRIBUTION AND MICROGRIDS AUTOMOTIVE AND SHIPBOARD POWER SYSTEMS AND WIRELESS POWER TRANSFER AS WELL AS ADVANCED CONTROL IN VOLUME ONE CHAPTERS COVER SEMICONDUCTOR POWER DEVICES MULTILEVEL AND MULTI INPUT CONVERTERS MODULAR MULTILEVEL CASCADE AND MATRIX CONVERTERS SOFT SWITCHING SOURCE POWER AND DC DC CONVERTERS SMART POWER ELECTRONICS MOTOR DRIVES SWITCHED RELUCTANCE MACHINES RELIABILITY IN POWER ELECTRONICS AND HARDWARE IN THE LOOP IN VOLUME TWO CHAPTERS COVER

WIND AND PV ENERGY PRINCIPLES CHARGING AND BATTERY MANAGEMENT DC DC SWITCHED CAPACITOR CONVERTERS BATTERIES SHIPBOARD POWER SYSTEMS ADVANCED CONTROL AND POWER FILTER CONTROL MORE ELECTRIC AIRCRAFT FAULT RIDE THROUGH STRATEGIES FOR GRID CONNECTED PV SUPPORT FUNCTIONS AND GRID FORMING CONTROL BOTH VOLUMES OFF KEY INSIGHTS AND UP TO DATE INFORMATION FOR RESEARCHERS AND PRACTISING ENGINEERS WORKING IN POWER ELECTRONICS CONVERTERS AND MACHINE DRIVES WIND AND PV ENERGY

Advanced Power Electronics Converters *2014-11-24*

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

Control of Power Electronic Converters and Systems *2021-04-01*

control of power electronic converters and systems volume 3 explores emerging topics in the control of power electronics and converters including the theory behind control and the practical operation modeling and control of basic power system models this book introduces the most important controller design methods including both analog and digital procedures this reference explains the dynamic characterization of terminal behavior for converters as well as preserving the stability and power quality of modern power systems useful for engineers in emerging applications of power electronic converters and those combining control design methods into different applications in power electronics technology addressing controller interactions in light of increasing renewable energy integration and related challenges with stability and power quality is becoming more frequent in power converters and passive components discusses different applications and their control in integrated renewable energy systems introduces the most important controller design methods both in analog and digital describes different important applications to be used in future industrial products explains the dynamic characterization of terminal behavior for converters

Control of Power Electronic Converters and Systems *2018-01-25*

control of power electronic converters and systems examines the theory behind power electronic converter control including operation modeling and control of basic converters the book explores how to manipulate components of power electronics converters and systems to produce a desired effect by controlling system variables advances in power electronics enable new applications to emerge and performance improvement in existing applications these advances rely on control effectiveness making it essential to apply appropriate control schemes to the converter and system to obtain the desired performance discusses different applications and their control explains the most important controller design methods both in analog and digital describes different important applications to be used in future industrial products covers voltage source converters in significant detail demonstrates applications across a much broader context

Power Electronics *2014-11-26*

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

Control of Power Electronic Converters and Systems *2018-04-27*

control of power electronic converters volume two gives the theory behind power electronic converter control and discusses the operation modelling and control of basic converters the main components of power electronics systems that produce a desired effect energy conversion robot motion etc by controlling system variables voltages and currents are thoroughly covered both small mobile phones computer power supplies and very large systems trains wind turbines high voltage power lines and their power ranges from the watt to the gigawatt are presented and explored users will find a focused resource on how to apply innovative control techniques for power converters and drives discusses different applications and their control explains the most important controller design methods both in analog and digital describes different but important applications that can be used in future industrial products covers voltage source converters in significant detail demonstrates applications across a much broader context

Integrated Power Electronic Converters and Digital Control *2017-12-19*

because of the demand for higher efficiencies smaller output ripple and smaller converter size for modern power electronic systems integrated power electronic converters could soon replace conventional switched mode power supplies synthesized integrated converters and related digital control techniques address problems related to cost space flexibility energy efficiency and voltage regulation the key factors in digital power management and implementation meeting the needs of professionals working in power electronics as well as advanced engineering students integrated power electronic converters and digital control explores the many benefits

ASSOCIATED WITH INTEGRATED CONVERTERS THIS INFORMATIVE TEXT DETAILS BOOST TYPE BUCK TYPE AND BUCK BOOST TYPE INTEGRATED TOPOLOGIES AS WELL AS OTHER INTEGRATED STRUCTURES IT DISCUSSES CONCEPTS BEHIND THEIR OPERATION AS WELL SPECIFIC APPLICATIONS TOPICS DISCUSSED INCLUDE ISOLATED DC DC CONVERTERS SUCH AS FLYBACK FORWARD PUSH PULL FULL BRIDGE AND HALF BRIDGE POWER FACTOR CORRECTION AND ITS APPLICATION DEFINITION OF THE INTEGRATED SWITCHED MODE POWER SUPPLIES STEADY STATE ANALYSIS OF THE BOOST INTEGRATED FLYBACK RECTIFIER ENERGY STORAGE CONVERTER DYNAMIC ANALYSIS OF THE BUCK INTEGRATED FORWARD CONVERTER DIGITAL CONTROL BASED ON THE USE OF DIGITAL SIGNAL PROCESSORS DSPS WITH INNOVATIONS IN DIGITAL CONTROL BECOMING EVER MORE PERVASIVE SYSTEM DESIGNERS CONTINUE TO INTRODUCE PRODUCTS THAT INTEGRATE DIGITAL POWER MANAGEMENT AND CONTROL INTEGRATED CIRCUIT SOLUTIONS BOTH HYBRID AND PURE DIGITAL THIS DETAILED ASSESSMENT OF THE LATEST ADVANCES IN THE FIELD WILL HELP ANYONE WORKING IN POWER ELECTRONICS AND RELATED INDUSTRIES STAY AHEAD OF THE CURVE

Power Electronics 1989-06-14

AIMED AT UNDERGRADUATE STUDENTS OF ELECTRICAL ENGINEERING THIS TEXTBOOK FOCUSES ON THE EMERGING POWER ELECTRONIC CONVERTERS MADE FEASIBLE BY THE NEW GENERATION OF POWER SEMICONDUCTOR DEVICES IT DISCUSSES A BROAD SPECTRUM OF POWER APPLICATIONS AND EXAMINES CONVERTER DESIGN

Power Electronic Converters Modeling and Control *2013-11-12*

MODERN POWER ELECTRONIC CONVERTERS ARE INVOLVED IN A VERY BROAD SPECTRUM OF APPLICATIONS SWITCHED MODE POWER SUPPLIES ELECTRICAL MACHINE MOTION CONTROL ACTIVE POWER FILTERS DISTRIBUTED POWER GENERATION FLEXIBLE AC TRANSMISSION SYSTEMS RENEWABLE ENERGY CONVERSION SYSTEMS AND VEHICULAR TECHNOLOGY AMONG THEM POWER ELECTRONICS CONVERTERS MODELING AND CONTROL TEACHES THE READER HOW TO ANALYZE AND MODEL THE BEHAVIOR OF CONVERTERS AND SO TO IMPROVE THEIR DESIGN AND CONTROL DEALING WITH A SET OF CONFIRMED ALGORITHMS SPECIFICALLY DEVELOPED FOR USE WITH POWER CONVERTERS THIS TEXT IS IN TWO PARTS MODELS AND CONTROL METHODS THE FIRST IS A DETAILED EXPOSITION OF THE MOST USUAL POWER CONVERTER MODELS SWITCHED AND AVERAGED MODELS SMALL LARGE SIGNAL MODELS AND TIME FREQUENCY MODELS THE SECOND FOCUSES ON THREE GROUPS OF CONTROL METHODS LINEAR CONTROL APPROACHES NORMALLY ASSOCIATED WITH POWER CONVERTERS RESONANT CONTROLLERS BECAUSE OF THEIR SIGNIFICANCE IN GRID CONNECTED APPLICATIONS AND NONLINEAR CONTROL METHODS INCLUDING FEEDBACK LINEARIZATION STABILIZING PASSIVITY BASED AND VARIABLE STRUCTURE CONTROL EXTENSIVE CASE STUDY ILLUSTRATION AND END OF CHAPTER EXERCISES REINFORCE THE STUDY MATERIAL POWER ELECTRONICS CONVERTERS MODELING AND CONTROL ADDRESSES THE NEEDS OF GRADUATE STUDENTS INTERESTED IN POWER ELECTRONICS PROVIDING A BALANCED UNDERSTANDING OF THEORETICAL IDEAS COUPLED WITH PRAGMATIC TOOLS BASED ON CONTROL ENGINEERING PRACTICE IN THE FIELD ACADEMICS TEACHING POWER ELECTRONICS WILL FIND THIS AN ATTRACTIVE COURSE TEXT AND THE PRACTICAL POINTS MAKE THE BOOK USEFUL FOR SELF TUITION BY ENGINEERS AND OTHER PRACTITIONERS WISHING TO BRING THEIR KNOWLEDGE UP TO DATE

Power Electronics Converters and their Control for Renewable Energy Applications *2023-06-21*

POWER ELECTRONICS CONVERTERS AND THEIR CONTROL FOR RENEWABLE ENERGY APPLICATIONS PROVIDES INFORMATION THAT HELPS TO SOLVE COMMON CHALLENGES WITH POWER ELECTRONICS CONVERTERS INCLUDING LOSS BY SWITCHING HEATING OF POWER SWITCHES MANAGEMENT OF SWITCHING TIME IMPROVEMENT OF THE QUALITY OF THE SIGNALS DELIVERED BY POWER CONVERTERS AND IMPROVEMENT OF THE QUALITY OF ENERGY PRODUCED BY RENEWABLE ENERGY SOURCES THIS BOOK IS OF INTEREST TO ACADEMICS RESEARCHERS AND ENGINEERS IN RENEWABLE ENERGY POWER SYSTEMS ELECTRICAL ENGINEERING ELECTRONICS AND MECHANICAL ENGINEERING INCLUDES IMPORTANT VISUAL ILLUSTRATIONS AND IMAGERY OF CONCISE CIRCUIT SCHEMATICS AND RENEWABLE ENERGY APPLICATIONS FEATURES A TEMPLATED APPROACH FOR STEP BY STEP IMPLEMENTATION OF THE NEW MPPT ALGORITHM BASED ON RECENT AND INTELLIGENT TECHNIQUES PROVIDES METHODS FOR OPTIMAL HARNESSING OF ENERGY FROM RENEWABLE ENERGY SOURCES AND CONVERTER TOPOLOGY SYNTHESIS

Control of Power Electronic Converters and Systems: Volume 4 *2024-02-24*

CONTROL OF POWER ELECTRONIC CONVERTERS AND SYSTEMS VOLUME FOUR COVERS EMERGING TOPICS IN THE CONTROL OF POWER ELECTRONICS AND CONVERTERS NOT COVERED IN PREVIOUS VOLUMES INCLUDING EMERGING POWER CONVERTER TOPOLOGIES STORAGE SYSTEMS BATTERY CHARGERS AND THE SMART TRANSFORMER THIS UPDATED EDITION SPECIFICALLY FOCUSES ON EMERGING POWER CONVERTER TOPOLOGIES AND DISCUSSES VERY RECENT ADVANCES AND TOPICS WITH APPLICATIONS IN POWER ELECTRONICS AND FORMIDABLE PROBABLE DYNAMICS CHAPTERS INCLUDE MODELING OF POWER CONVERTERS AND THEIR CONTROL WITH SUPPORTIVE SIMULATIONS AND ADDITIONAL EXPERIMENTAL RESULTS ANYONE LOOKING FOR FUNDAMENTAL KNOWLEDGE REGARDING NEW TRENDS IN POWER ELECTRONICS BY APPLICATION AND ALSO READY TO USE MODELS AND METHODOLOGIES IN THEIR DESIGN CONTROL AND TESTING WILL FIND THIS THE NEXT INVALUABLE RESOURCE IN THIS HIGHLY REGARDED SERIES COMBINES ESSENTIAL CONTROL DESIGN METHODS AND TRENDS WITH DIFFERENT APPLICATIONS OF POWER CONVERTOR TOPOLOGIES INCLUDES GLOBAL PERSPECTIVES CASE STUDIES AND REAL EXAMPLES FROM DIFFERENT APPLICATIONS AND THEIR CONTROL FEATURES READY TO USE MODELS AND METHODOLOGIES IN POWER ELECTRONIC APPLICATION THEIR DESIGN CONTROL AND TESTING

Sneak Circuits of Power Electronic Converters *2015-02-09*

SNEAK CIRCUITS OF POWER ELECTRONIC CONVERTERS SNEAK CIRCUITS OF POWER ELECTRONIC CONVERTERS WORK ON SNEAK CIRCUITS AND RELATED ANALYSIS METHODS FOR POWER CONVERTERS CONTRIBUTES TO THE RELIABILITY OF POWER ELECTRONIC SYSTEMS WORLDWIDE MOST BOOKS ON THE SUBJECT FOCUS ON ELECTRONIC SYSTEMS THIS BOOK IS PERHAPS THE FIRST TO EXAMINE POWER ELECTRONIC SYSTEMS THE AUTHORS DESCRIBE SNEAK CIRCUIT PHENOMENA IN POWER CONVERTERS INTRODUCE SCA

METHODS FOR POWER ELECTRONIC SYSTEMS AND PROPOSE HOW TO ELIMINATE AND MAKE USE OF SNEAK CIRCUITS THIS BOOK HIGHLIGHTS THE ADVANCED RESEARCH WORKS IN SNEAK CIRCUIT ANALYSIS BY A LEADING AUTHOR IN THE FIELD IS ORIGINAL IN ITS TREATMENT OF POWER ELECTRONICS CONVERTERS GOING BEYOND THE ELECTRONIC SYSTEM LEVEL IS SUITABLE FOR BOTH INTRODUCTORY AND ADVANCED LEVELS OFFERS GUIDELINES FOR INDUSTRY PROFESSIONALS INVOLVED IN THE DESIGN OF POWER ELECTRONIC SYSTEMS ENABLING EARLY DETECTION OF POTENTIAL PROBLEMS THIS BOOK IS GEARED FOR RESEARCHERS AND GRADUATE STUDENTS IN ELECTRICAL ENGINEERING AS WELL AS ENGINEERS AND RESEARCHERS IN POWER ELECTRONICS RESEARCHERS IN POWER ELECTRONICS RELIABILITY WILL ALSO FIND IT TO BE A HELPFUL RESOURCE

Power Electronic Converters 2018-03-09

PROVIDES A STEP BY STEP METHOD FOR THE DEVELOPMENT OF A VIRTUAL INTERACTIVE POWER ELECTRONICS LABORATORY THE BOOK IS SUITABLE FOR UNDERGRADUATES AND GRADUATES FOR THEIR LABORATORY COURSE AND PROJECTS IN POWER ELECTRONICS IT IS EQUALLY SUITABLE FOR PROFESSIONAL ENGINEERS IN THE POWER ELECTRONICS INDUSTRY THE READER WILL LEARN TO DEVELOP INTERACTIVE VIRTUAL POWER ELECTRONICS LABORATORY AND PERFORM SIMULATIONS OF THEIR OWN AS WELL AS ANY GIVEN POWER ELECTRONIC CONVERTER DESIGN USING SIMULINK WITH ADVANCED SYSTEM MODEL AND CIRCUIT COMPONENT LEVEL MODEL FEATURES EXAMPLES AND CASE STUDIES INCLUDED THROUGHOUT INTRODUCTORY SIMULATION OF POWER ELECTRONIC CONVERTERS IS PERFORMED USING EITHER PSIM OR MICROCAP SOFTWARE COVERS INTERACTIVE SYSTEM MODEL DEVELOPED FOR THREE PHASE DIODE CLAMPED THREE LEVEL INVERTER FLYING CAPACITOR THREE LEVEL INVERTER FIVE LEVEL CASCADED H BRIDGE INVERTER MULTICARRIER SINE PHASE SHIFT PWM AND MULTICARRIER SINE LEVEL SHIFT PWM SYSTEM MODELS OF POWER ELECTRONIC CONVERTERS ARE VERIFIED FOR PERFORMANCE USING INTERACTIVE CIRCUIT COMPONENT LEVEL MODELS DEVELOPED USING SIMSCAPE ELECTRICAL POWER SYSTEMS AND SPECIALIZED TECHNOLOGY BLOCK SET PRESENTS SOFTWARE IN THE LOOP OR PROCESSOR IN THE LOOP SIMULATION WITH A POWER ELECTRONIC CONVERTER EXAMPLES

Power Electronic Converters and Systems 2015-12-11

POWER ELECTRONIC SYSTEMS ARE INDISPENSABLE IN ADJUSTABLE SPEED DRIVES NATIONAL SMART POWER GRID ELECTRIC AND HYBRID CARS ELECTRIC LOCOMOTIVES AND SUBWAY TRAINS RENEWABLE ENERGY SOURCES AND DISTRIBUTED GENERATION AS A RESULT THE INTEREST IN POWER ELECTRONICS IS EXPANDING ALONG WITH THE NEED FOR A SOURCE OF STATE OF THE ART KNOWLEDGE WITH CHAPTERS WRITTEN BY SPECIALISTS IN THEIR FIELD THIS IMPORTANT BOOK IS A COMPREHENSIVE COMPENDIUM OF TOPICS RELATED TO RECENT ADVANCES IN POWER ELECTRONIC DEVICES CONVERTERS AND SYSTEMS IT WILL BE ESSENTIAL READING FOR PRACTICING ENGINEERS SPECIALIZING IN THE DEVELOPMENT AND APPLICATION OF POWER ELECTRONIC CONVERTERS AND SYSTEMS IT WILL ALSO BE OF VALUE TO GRADUATE STUDENTS SPECIALIZING IN POWER ELECTRONICS RENEWABLE ENERGY AND POWER SYSTEMS AND FOR POSTDOCS INVOLVED IN RELATED RESEARCH PROJECTS

Soft-Switching Technology for Three-phase Power Electronics Converters 2021-12-09

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

Dynamics and Control of DC-DC Converters 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

Impedance Source Power Electronic Converters *2016-08-22*

IMPEDANCE SOURCE POWER ELECTRONIC CONVERTERS BRINGS TOGETHER STATE OF THE ART KNOWLEDGE AND CUTTING EDGE TECHNIQUES IN VARIOUS STAGES OF RESEARCH RELATED TO THE EVER MORE POPULAR IMPEDANCE SOURCE CONVERTERS INVERTERS SIGNIFICANT RESEARCH EFFORTS ARE UNDERWAY TO DEVELOP COMMERCIALLY VIABLE AND TECHNICALLY FEASIBLE EFFICIENT AND RELIABLE POWER CONVERTERS FOR RENEWABLE ENERGY ELECTRIC TRANSPORTATION AND FOR VARIOUS INDUSTRIAL APPLICATIONS THIS BOOK PROVIDES A DETAILED UNDERSTANDING OF THE CONCEPTS DESIGNS CONTROLS AND APPLICATION DEMONSTRATIONS OF THE IMPEDANCE SOURCE CONVERTERS INVERTERS KEY FEATURES COMPREHENSIVE ANALYSIS OF THE IMPEDANCE SOURCE CONVERTER INVERTER TOPOLOGIES INCLUDING TYPICAL TOPOLOGIES AND DERIVED TOPOLOGIES FULLY EXPLAINS THE DESIGN AND CONTROL TECHNIQUES OF IMPEDANCE SOURCE CONVERTERS INVERTERS INCLUDING HARDWARE DESIGN AND CONTROL PARAMETER DESIGN FOR CORRESPONDING CONTROL METHODS PRESENTS THE LATEST POWER CONVERSION SOLUTIONS THAT AIM TO ADVANCE THE ROLE OF POWER ELECTRONICS INTO INDUSTRIES AND SUSTAINABLE ENERGY CONVERSION SYSTEMS COMPARES IMPEDANCE SOURCE CONVERTER INVERTER APPLICATIONS IN RENEWABLE ENERGY POWER GENERATION AND ELECTRIC VEHICLES AS WELL AS DIFFERENT INDUSTRIAL APPLICATIONS PROVIDES AN OVERVIEW OF EXISTING CHALLENGES SOLUTIONS AND FUTURE TRENDS SUPPORTED BY CALCULATION EXAMPLES SIMULATION MODELS AND RESULTS HIGHLY ACCESSIBLE THIS IS AN INVALUABLE RESOURCE FOR RESEARCHERS POSTGRADUATE GRADUATE STUDENTS STUDYING POWER ELECTRONICS AND ITS APPLICATION IN INDUSTRY AND RENEWABLE ENERGY CONVERSION AS WELL AS PRACTISING R D ENGINEERS READERS WILL BE ABLE TO APPLY THE PRESENTED MATERIAL FOR THE FUTURE DESIGN OF THE NEXT GENERATION OF EFFICIENT POWER ELECTRONIC CONVERTERS INVERTERS

Power Electronics Applied to Industrial Systems and Transports, Volume 2 *2015-05-11*

THIS BOOK PROVIDES A COMPREHENSIVE OVERVIEW OF POWER ELECTRONIC CONVERTERS DC DC DC AC AC DC AND AC AC CONVENTIONALLY USED IN INDUSTRIAL AND TRANSPORTATION APPLICATIONS SPECIFICALLY FOR THE SUPPLY OF ELECTRIC MACHINES WITH VARIABLE SPEED DROP OFF WINDOW FROM THE PERSPECTIVE OF DESIGN AND SIZING THIS BOOK PRESENTS THE DIFFERENT FUNCTIONS ENCOUNTERED IN A MODULAR WAY FOR POWER ELECTRONICS POWER CONVERTERS AND THEIR CONTROL DETAILS LESS TRADITIONAL TOPICS SUCH AS MATRIX CONVERTERS AND MULTILEVEL CONVERTERS THIS BOOK ALSO FEATURES A CASE STUDY DESIGN OF AN INDUSTRIAL CONTROLLER WHICH IS A SYNTHESIS EXCEPT THE AC AC DIRECT CONVERSION OF THE STUDY SUBJECTS INCLUDING SIZING ASSOCIATED PASSIVE COMPONENTS INTRODUCING ESSENTIAL NOTIONS IN POWER ELECTRONICS FROM BOTH THEORETICAL AND TECHNOLOGICAL PERSPECTIVES DETAILED CHAPTERS FOCUSING ON POWER SUPPLIES FOR ELECTRICAL MACHINERY INCLUDING A CASE STUDY OF FULL DIMENSIONING OF AN INDUSTRIAL VARIABLE SPEED DRIVE PRESENTED FROM A USER S PERSPECTIVE TO ENABLE YOU TO APPLY THE THEORY OF POWER ELECTRONICS TO PRACTICAL APPLICATIONS

Periodic Control of Power Electronic Converters *2016-11-23*

ADVANCED POWER ELECTRONIC CONVERTERS CONVERT CONTROL AND CONDITION ELECTRICITY POWER CONVERTERS REQUIRE CONTROL STRATEGIES FOR PERIODIC SIGNAL COMPENSATION TO ASSURE GOOD POWER QUALITY AND STABLE POWER SYSTEM OPERATION THIS COMPREHENSIVE TEXT PRESENTS THE MOST RECENT INTERNAL MODEL PRINCIPLE BASED PERIODIC CONTROL TECHNOLOGY WHICH OFFERS THE PERFECT PERIODIC CONTROL SOLUTION FOR POWER ELECTRONIC CONVERSION IT ALSO PROVIDES COMPLETE ANALYSIS AND SYNTHESIS METHODS FOR PERIODIC CONTROL SYSTEMS AND PLENTY OF PRACTICAL EXAMPLES TO DEMONSTRATE THE VALIDITY OF PROPOSED PERIODIC CONTROL TECHNOLOGY FOR POWER CONVERTERS IT PROPOSES A UNIFIED FRAMEWORK FOR HOUSING PERIODIC CONTROL SCHEMES FOR POWER CONVERTERS AND PROVIDES A GENERAL PROPORTIONAL INTEGRAL DERIVATIVE CONTROL SOLUTION TO PERIODIC SIGNAL COMPENSATION IN EXTENSIVE ENGINEERING APPLICATIONS PERIODIC CONTROL OF POWER ELECTRONIC CONVERTERS IS INTENDED FOR ENGINEERS RESEARCHERS AND STUDENTS IN THE FIELD OF POWER ELECTRONICS WHO ARE INTERESTED IN ADVANCED CONTROL OF POWER CONVERTERS AND CONTROL SPECIALISTS WHO LIKE TO EXPLORE NEW APPLICATIONS OF CONTROL THEORY

Simulation of Power Electronics Converters Using PLECS® 2019-11-12

SIMULATION OF POWER ELECTRONICS CONVERTERS USING PLECS IS A GUIDE TO SIMULATING A POWER ELECTRONICS CIRCUIT USING THE LATEST POWERFUL SOFTWARE FOR POWER ELECTRONICS CIRCUIT SIMULATION PURPOSES THIS BOOK ASSISTS ENGINEERS GAIN AN INCREASED UNDERSTANDING OF CIRCUIT OPERATION SO THEY CAN FOR A GIVEN SET OF SPECIFICATIONS CHOOSE A TOPOLOGY SELECT APPROPRIATE CIRCUIT COMPONENT TYPES AND VALUES ESTIMATE CIRCUIT PERFORMANCE AND COMPLETE THE DESIGN BY ENSURING THAT THE CIRCUIT PERFORMANCE WILL MEET SPECIFICATIONS EVEN WITH THE ANTICIPATED VARIATIONS IN OPERATING CONDITIONS AND CIRCUIT COMPONENT VALUES THIS BOOK COVERS THE FUNDAMENTALS OF POWER ELECTRONICS CONVERTER SIMULATION ALONG WITH AN ANALYSIS OF POWER ELECTRONICS CONVERTERS USING PLECS IT CONCLUDES WITH REAL WORLD SIMULATION EXAMPLES FOR APPLIED CONTENT MAKING THIS BOOK USEFUL FOR ALL THOSE IN THE ELECTRICAL AND ELECTRONIC ENGINEERING FIELD CONTAINS UNIQUE EXAMPLES ON THE SIMULATION OF POWER ELECTRONICS CONVERTERS USING PLECS INCLUDES EXPLANATIONS AND GUIDANCE ON ALL INCLUDED SIMULATIONS FOR RE DOING THE SIMULATIONS INCORPORATES ANALYSIS AND DESIGN FOR RAPIDLY CREATING POWER ELECTRONICS CIRCUITS WITH HIGH ACCURACY

Advanced Pulse-Width-Modulation: With Freedom to Optimize Power Electronics Converters *2021-01-20*

this book is a technical publication for students scholars and engineers in electrical engineering focusing on the pulse width modulation pwm technologies in power electronics area based on an introduction of basic pwm principles this book analyzes three major challenges for pwm on system performance power losses voltage current ripple and electromagnetic interference emi noise and the lack of utilization of control freedoms in conventional pwm technologies then the model of pwm s impact on system performance is introduced with the current ripple prediction method for voltage source converter as example with the prediction model two major advanced pwm methods are introduced variable switching frequency pwm and phase shift pwm which can reduce the power losses and emi for the system based on the prediction model furthermore the advanced pwm can be applied in advanced topologies including multilevel converters and paralleled converters with more control variables in the advanced topologies performance of pwm can be further improved also for the special problem for common mode noise this book introduces modified pwm method for reduction especially the paralleled inverters with advanced pwm can achieve good performance for the common mode noise reduction finally the implementation of pwm technologies in hardware is introduced in the last part

Power Electronic Converters and Systems *2024-06*

power electronics is a field of constant evolution power grids are seeing developments and the electrification of the transport sector requires better motor drives power electronics plays a key role with new devices such as wide bandgap devices and power converters that convert alternating current into direct current and vice versa or change the voltage or frequency

Power Electronic Converters *2017-12-26*

filling the need for a reference that explains the behavior of power electronic converters this book provides information currently unavailable in similar texts on power electronics clearly organized into four parts the first treats the dynamics and control of conventional converters while the second part covers the dynamics and control of dc dc converters in renewable energy applications including an introduction to the sources as well as the design of current fed converters applying duality transformation methods the third part treats the dynamics and control of three phase rectifiers in voltage sourced applications and the final part looks at the dynamics and control of three phase inverters in renewable energy applications with its future oriented perspective and advanced first hand knowledge this is a prime resource for researchers and practicing engineers needing a ready reference on the design and control of power electronic converters

Reliability of Power Electronics Converters for Solar Photovoltaic Applications 2021-09-06

a hands on case study backed reference of control strategies fault classification mechanisms and reliability analysis methods for pv modules power electronic converters and grid connected pv systems written by an international team of researchers with excellent backgrounds in academia and industry

Digital Power Electronics and Applications *2010-07-20*

the purpose of this book is to describe the theory of digital power electronics and its applications the authors apply digital control theory to power electronics in a manner thoroughly different from the traditional analog control scheme in order to apply digital control theory to power electronics the authors define a number of new parameters including the energy factor pumping energy stored energy time constant and damping time constant these parameters differ from traditional parameters such as the power factor power transfer efficiency ripple factor and total harmonic distortion these new parameters result in the definition of new mathematical modeling a zero order hold zoh is used to simulate all ac dc rectifiers a first order hold foh is used to simulate all dc ac inverters a second order hold soh is used to simulate all dc dc converters a first order hold foh is used to simulate all ac ac ac dc ac converters presents most up to date methods of analysis and control algorithms for developing power electronic converters and power switching circuits provides an invaluable reference for engineers designing power converters commercial power supplies control systems for motor drives active filters etc presents methods of analysis not available in other books

Fundamentals of Power Electronics *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

Power Electronics and Energy Conversion Systems, Fundamentals and Hard-switching Converters *2013-04-02*

POWER ELECTRONICS AND ENERGY CONVERSION SYSTEMS IS A DEFINITIVE FIVE VOLUME REFERENCE SPANNING CLASSICAL THEORY THROUGH PRACTICAL APPLICATIONS AND CONSOLIDATING THE LATEST ADVANCEMENTS IN ENERGY CONVERSION TECHNOLOGY COMPREHENSIVE YET HIGHLY ACCESSIBLE EACH VOLUME IS ORGANISED IN A BASIC TO SOPHISTICATED CRESCENDO PROVIDING A SINGLE SOURCE REFERENCE FOR UNDERGRADUATE AND GRADUATE STUDENTS RESEARCHERS AND DESIGNERS VOLUME 1 FUNDAMENTALS AND HARD SWITCHING CONVERTERS INTRODUCES THE KEY CHALLENGES IN POWER ELECTRONICS FROM BASIC COMPONENTS TO OPERATION PRINCIPLES AND PRESENTS CLASSICAL HARD AND SOFT SWITCHING DC TO DC CONVERTERS RECTIFIERS AND INVERTERS AT A MORE ADVANCED LEVEL IT PROVIDES COMPREHENSIVE ANALYSIS OF DC AND AC MODELS COMPARING THE AVAILABLE APPROACHES FOR THEIR DERIVATION AND RESULTS A FULL TREATMENT OF DC TO DC HARD SWITCHING CONVERTERS IS GIVEN FROM FUNDAMENTALS TO MODERN INDUSTRIAL SOLUTIONS AND PRACTICAL ENGINEERING INSIGHT THE AUTHOR ELUCIDATES VARIOUS CONTRADICTIONS AND MISUNDERSTANDINGS IN THE LITERATURE FOR EXAMPLE IN THE TREATMENT OF THE DISCONTINUOUS CONDUCTION OPERATION OR IN DERIVING AC SMALL SIGNAL MODELS OF CONVERTERS OTHER KEY FEATURES CONSOLIDATES THE LATEST ADVANCEMENTS IN HARD SWITCHING CONVERTERS INCLUDING DISCONTINUOUS CAPACITOR VOLTAGE MODE AND THEIR USE IN POWER FACTOR CORRECTION APPLICATIONS INCLUDES FULLY WORKED DESIGN EXAMPLES EXERCISES AND CASE STUDIES WITH DISCUSSION OF THE PRACTICAL CONSEQUENCES OF EACH CHOICE MADE DURING THE DESIGN EXPLAINS ALL TOPICS IN DETAIL WITH STEP BY STEP DERIVATION OF FORMULAS APPROPRIATE FOR ENERGY CONVERSION COURSES END OF SECTION REVIEW OF THE LEARNED MATERIAL INCLUDES TOPICS TREATED IN RECENT JOURNAL CONFERENCE AND INDUSTRY APPLICATION COVERAGE ON SOLUTIONS THEORY AND PRACTICAL CONCERNS WITH EMPHASIS ON CLEAR EXPLANATION THE TEXT OFFERS BOTH A THOROUGH UNDERSTANDING OF DC TO DC CONVERTERS FOR UNDERGRADUATE AND GRADUATE STUDENTS IN POWER ELECTRONICS AND MORE DETAILED MATERIAL SUITABLE FOR RESEARCHERS DESIGNERS AND PRACTISING ENGINEERS WORKING ON THE DEVELOPMENT AND DESIGN OF POWER ELECTRONICS THIS IS AN ACCESSIBLE REFERENCE FOR ENGINEERING AND PROCUREMENT MANAGERS FROM INDUSTRIES SUCH AS CONSUMER ELECTRONICS INTEGRATED CIRCUITS AEROSPACE AND RENEWABLE ENERGY

Power Electronic Converters *1987*

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 G? RA 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

Three-phase AC-AC Power Converters Based on Matrix Converter Topology *2013-02-28*

COMPUTERS PLAY AN IMPORTANT ROLE IN THE ANALYZING AND DESIGNING OF MODERN DC DC POWER CONVERTERS THIS BOOK SHOWS HOW THE WIDELY USED ANALYSIS TECHNIQUES OF AVERAGING AND LINEARIZATION CAN BE APPLIED TO DC DC CONVERTERS WITH THE AID OF COMPUTERS OBTAINED DYNAMICAL EQUATIONS MAY THEN BE USED FOR CONTROL DESIGN THE BOOK IS COMPOSED OF TWO CHAPTERS CHAPTER 1 FOCUSES ON THE EXTRACTION OF CONTROL TO OUTPUT TRANSFER FUNCTION A SECOND ORDER CONVERTER A BUCK CONVERTER AND A FOURTH ORDER CONVERTER A ZETA CONVERTER ARE STUDIED AS ILLUSTRATIVE EXAMPLES IN THIS CHAPTER BOTH READY TO USE SOFTWARE PACKAGES SUCH AS PLECS AND MATLAB PROGRAMMING ARE USED THROUGHT THIS CHAPTER THE INPUT OUTPUT CHARACTERISTICS OF DC DC CONVERTERS ARE THE OBJECT OF CONSIDERATIONS IN CHAPTER 2 CALCULATION OF INPUT OUTPUT IMPEDANCE IS DONE WITH THE AID OF MATLAB PROGRAMMING IN THIS CHAPTER THE BUCK BUCK BOOST AND BOOST CONVERTER ARE THE MOST POPULAR TYPES OF DC DC CONVERTERS AND USED AS ILLUSTRATIVE EXAMPLES IN THIS CHAPTER THIS BOOK CAN BE A GOOD REFERENCE FOR RESEARCHERS INVOLVED IN DC DC CONVERTERS DYNAMICS AND CONTROL

Computer Techniques for Dynamic Modeling of DC-DC Power Converters *2018-08-28*

modeling and control of power electronics converter systems for power quality improvements provides grounded theory for the modeling analysis and control of different converter topologies that improve the power quality of mains intended for researchers and practitioners working in the field topics include modeling equations and the state of research to improve power quality converters by presenting control methods for different converter topologies and aspects related to multi level inverters and specific analysis related to the ac interface of drives the book helps users by putting a particular emphasis on different control algorithms that enhance knowledge and research work present in depth coverage of modeling and control methods for different converter topology includes a particular emphasis on different control algorithms to give readers an easier understanding provides a results and discussion chapter and matlab simulation to support worked examples and real life application scenarios

Modeling and Control of Power Electronics Converter System for Power Quality Improvements *2018-08-17*

design of three phase ac power electronics converters comprehensive resource on design of power electronics converters for three phase ac applications design of three phase ac power electronics converters contains a systematic discussion of the three phase ac converter design considering various electrical thermal and mechanical subsystems and functions focusing on establishing converter components and subsystems models needed for the design the text demonstrates example designs for these subsystems and for the whole three phase ac converters considering interactions among subsystems the design methods apply to different applications and topologies the text presents the basics of the three phase ac converter its design and the goal and organization of the book focusing on the characteristics and models important to the converter design for components commonly used in three phase ac converters the authors present the design of subsystems including passive rectifiers inverters and active rectifiers electromagnetic interference emi filters thermal management system control and auxiliaries mechanical system and application considerations and discuss design optimization which presents methodology to achieve optimal design results for three phase ac converters specific sample topics covered in design of three phase ac power electronics converters include models and characteristics for devices most commonly used in three phase converters including conventional si devices and emerging sic and gan devices models and selection of various capacitors characteristics and design of magnetics using different types of magnetic cores with a focus on inductors optimal three phase ac converter design including design and selection of devices ac line inductors dc bus capacitors emi filters heatsinks and control the design considers both steady state and transient conditions load and source impact converter design such as motors and grid condition impacts for researchers and graduate students in power electronics along with practicing engineers working in the area of three phase ac converters design of three phase ac power electronics converters serves as an essential resource for the subject and may be used as a textbook or industry reference

Design of Three-phase AC Power Electronics Converters *2023-11-30*

this book examines a number of topics mainly in connection with advances in semiconductor devices and magnetic materials and developments in medium and large scale renewable power plant technologies grid integration techniques and new converter topologies including advanced digital control systems for medium voltage networks the book s individual chapters provide an extensive compilation of fundamental theories and in depth information on current research and development trends while also exploring new approaches to overcoming some critical limitations of conventional grid integration technologies its main objective is to present the design and implementation processes for medium voltage converters allowing the direct grid integration of renewable power plants without the need for step up transformers

Power Converters for Medium Voltage Networks *2014-09-15*

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

Power Electronic Converters *2013-06-29*

power electronic converters for solar photovoltaic systems provides design and implementation procedures for power electronic converters and advanced controllers to improve standalone and grid environment solar photovoltaics performance sections cover performance and improvement of solar photovoltaics under various conditions with the aid of intelligent controllers allowing readers to better understand the nuances of

POWER ELECTRONIC CONVERTERS FOR RENEWABLE ENERGY SYSTEMS WITH ALGORITHM DEVELOPMENT AND REAL TIME IMPLEMENTATION PROCEDURES THIS REFERENCE IS USEFUL FOR THOSE INTERESTED IN POWER ELECTRONICS FOR PERFORMANCE IMPROVEMENT IN DISTRIBUTED ENERGY RESOURCES DESIGN OF ADVANCED CONTROLLERS AND MEASUREMENT OF CRITICAL PARAMETERS SURROUNDING RENEWABLE ENERGY SYSTEMS BY PROVIDING A COMPLETE SOLUTION FOR PERFORMANCE IMPROVEMENT IN SOLAR PV WITH NOVEL CONTROL TECHNIQUES THIS BOOK WILL APPEAL TO RESEARCHERS AND ENGINEERS WORKING IN POWER ELECTRONIC CONVERTERS RENEWABLE ENERGY AND POWER QUALITY INCLUDES SIMULATION STUDIES AND PHOTOVOLTAIC PERFORMANCE ANALYSIS USES CASE STUDIES AS A REFERENCE FOR DESIGN AND RESEARCH COVERS DIFFERENT VARIETIES OF POWER CONVERTERS FROM FUNDAMENTALS TO IMPLEMENTATION

Power Electronic Converters for Solar Photovoltaic Systems *2020-11-01*

AFTER NEARLY A DECADE OF SUCCESS OWING TO ITS THOROUGH COVERAGE ABUNDANCE OF PROBLEMS AND EXAMPLES AND PRACTICAL USE OF SIMULATION AND DESIGN POWER SWITCHING CONVERTERS ENTERS ITS SECOND EDITION WITH NEW AND UPDATED MATERIAL ENTIRELY NEW DESIGN CASE STUDIES AND EXPANDED FIGURES EQUATIONS AND HOMEWORK PROBLEMS THIS TEXTBOOK IS IDEAL FOR SENIOR UNDERGRADUATE OR GRADUATE COURSES IN POWER ELECTRONIC CONVERTERS REQUIRING ONLY SYSTEMS ANALYSIS AND BASIC ELECTRONICS COURSES THE ONLY TEXT OF SUCH DETAIL TO ALSO INCLUDE THE USE OF PSPICE AND STEP BY STEP DESIGNS AND SIMULATIONS POWER SWITCHING CONVERTERS SECOND EDITION COVERS BASIC TOPOLOGIES BASIC CONTROL TECHNIQUES AND CLOSED LOOP CONTROL AND STABILITY IT ALSO INCLUDES TWO NEW CHAPTERS ON INTERLEAVED CONVERTERS AND SWITCHED CAPACITOR CONVERTERS AND THE AUTHORS HAVE ADDED DISCRETE TIME MODELING TO THE DYNAMIC ANALYSIS OF SWITCHING CONVERTERS THE FINAL TWO CHAPTERS ARE DEDICATED TO SIMULATION AND COMPLETE DESIGN EXAMPLES RESPECTIVELY PSPICE EXAMPLES AND MATLAB SCRIPTS ARE AVAILABLE FOR DOWNLOAD FROM THE CRC SITE THESE ARE USEFUL FOR THE SIMULATION OF STUDENTS DESIGNS CLASS SLIDES ARE ALSO AVAILABLE ON THE INTERNET INSTRUCTORS WILL APPRECIATE THE BREADTH AND DEPTH OF THE MATERIAL MORE THAN ENOUGH TO ADAPT INTO A CUSTOMIZED SYLLABUS STUDENTS WILL SIMILARLY BENEFIT FROM THE MORE THAN 440 FIGURES AND OVER 1000 EQUATIONS AMPLE HOMEWORK PROBLEMS AND CASE STUDIES PRESENTED IN THIS BOOK

Power-Switching Converters, Second Edition *2005-03-17*

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

Power Electronics *2015-01-31*

THIS CONTRIBUTED VOLUME IS WRITTEN BY KEY SPECIALISTS WORKING IN MULTIDISCIPLINARY FIELDS IN ELECTRICAL ENGINEERING LINKING CONTROL THEORY POWER ELECTRONICS ARTIFICIAL NEURAL NETWORKS EMBEDDED CONTROLLERS AND SIGNAL PROCESSING THE AUTHORS OF EACH CHAPTER REPORT THE STATE OF THE ART OF THE VARIOUS TOPICS ADDRESSED AND PRESENT RESULTS OF THEIR OWN RESEARCH LABORATORY EXPERIMENTS AND SUCCESSFUL APPLICATIONS THE PRESENTED SOLUTIONS CONCENTRATE ON THREE MAIN AREAS OF INTEREST MOTION CONTROL IN COMPLEX ELECTROMECHANICAL SYSTEMS INCLUDING SENSORLESS CONTROL FAULT DIAGNOSIS AND FAULT TOLERANT CONTROL OF ELECTRIC DRIVES NEW CONTROL ALGORITHMS FOR POWER ELECTRONICS CONVERTERS THE CHAPTERS AND THE COMPLETE BOOK POSSESS STRONG MONOGRAPH ATTRIBUTES IMPORTANT PRACTICAL AND THEORETICAL PROBLEMS ARE DEEPLY AND ACCURATELY PRESENTED ON THE BACKGROUND OF AN EXHAUSTIVE STATE OF THE ART REVIEW MANY RESULTS ARE COMPLETELY NEW AND WERE NEVER PUBLISHED BEFORE WELL KNOWN CONTROL METHODS LIKE FIELD ORIENTED CONTROL FOC OR DIRECT TORQUE CONTROL DTC ARE REFERRED AS A STARTING POINT FOR MODIFICATIONS OR ARE USED FOR COMPARISON AMONG NUMEROUS CONTROL THEORIES USED TO SOLVE PARTICULAR PROBLEMS ARE NONLINEAR CONTROL ROBUST CONTROL ADAPTIVE CONTROL LYAPUNOV TECHNIQUES OBSERVER DESIGN MODEL PREDICTIVE CONTROL NEURAL CONTROL SLIDING MODE CONTROL SIGNAL FILTRATION AND PROCESSING FAULT DIAGNOSIS AND FAULT TOLERANT CONTROL

Introduction to Modern Power Electronics *2015-10-19*

A CONCISE THOROUGH INTRODUCTION TO MODERN POWER ELECTRONICS THIS COMPREHENSIVE OVERVIEW OF THE MODERN TOOLS AND TECHNIQUES OF ELECTRIC POWER CONVERSION COVERS THE FUNDAMENTALS OF POWER ELECTRONICS UNLIKE OTHER TEXTBOOKS ON THE SUBJECT WHICH OFTEN INCLUDE A GREAT DEAL OF EXTRANEOUS INFORMATION INTRODUCTION TO MODERN POWER ELECTRONICS PRESENTS ESSENTIAL MATERIAL THAT CAN BE COVERED EASILY IN A ONE SEMESTER COURSE THIS STREAMLINED TEXT EXAMINES LOW MEDIUM AND HIGH POWER CONVERSION ISSUES AND THE ELECTRONIC CONVERTERS THAT PROCESS POWER FOR A VARIETY OF APPLICATIONS FOLLOWING RECENT TRENDS IN POWER ELECTRONICS TECHNOLOGY GREATER STRESS IS PLACED ON PULSE WIDTH MODULATED PWM CONVERTERS THAN IN ANY OTHER TEXTBOOK MODERN POWER ELECTRONIC CONVERTERS SUCH AS THE RESONANT DC LINK AND MULTILEVEL INVERTERS OR MATRIX CONVERTERS ARE THOROUGHLY COVERED SPECIAL FEATURES INCLUDE COMPREHENSIVE EASY TO UNDERSTAND COVERAGE OF THE PRINCIPLES AND METHODS OF ELECTRIC POWER CONVERSION USING A HYPOTHETICAL GENERIC POWER CONVERTER DESCRIPTIONS OF VARIOUS TYPES OF SEMICONDUCTOR POWER SWITCHES AND COMPLEMENTARY COMPONENTS AND SYSTEMS FOR POWER ELECTRONIC CONVERTERS IN DEPTH DISCUSSIONS OF ALL POWER CONVERSION TYPES AC TO DC AC TO AC DC TO DC AND DC TO AC SEPARATE CHAPTER ON

switching power supplies a companion set of 48 pspice circuit files available on the internet constitutes a virtual laboratory of power electronics this valuable teaching tool contains models of most of the power electronic converters and techniques covered in the book it gives students the opportunity to tinker with converters and see how they actually work ideal for electrical engineering students at the senior undergraduate level introduction to modern power electronics is also a handy reference tool for advanced students and practicing engineers

Advanced Control of Electrical Drives and Power Electronic Converters *2016-09-30*

power electronics is a field of constant evolution power grids are seeing developments and the electrification of the transport sector requires better motor drives power electronics plays a key role with new devices such as wide bandgap devices and power converters that convert alternating current into direct current and vice versa or change the voltage or frequency this expanded 2nd edition of power electronic converters and systems offers an update in two volumes with a systematic revision of all chapters plus some all new chapters an overview of modern power electronic converters and systems is provided and their applications explored devices covered include semiconductor switches various converters switching power supplies and smart power electronic modules applications encompass different motor and induction motor drives renewable energy distribution and microgrids automotive and shipboard power systems and wireless power transfer as well as advanced control in volume one chapters cover semiconductor power devices multilevel and multi input converters modular multilevel cascade and matrix converters soft switching source power and dc dc converters smart power electronics motor drives switched reluctance machines reliability in power electronics and hardware in the loop in volume two chapters cover wind and pv energy principles charging and battery management dc dc switched capacitor converters batteries shipboard power systems advanced control and power filter control more electric aircraft fault ride through strategies for grid connected pv support functions and grid forming control both volumes off key insights and up to date information for researchers and practising engineers working in power electronics converters and machine drives wind and pv energy

Introduction to Modern Power Electronics 1998-04-29

Power Electronic Converters and Systems *2024-05-28*

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