The Parallel Resonant Converter

Study and Control of a Phase-controlled Series-parallel Resonant Converter and a Phase-controlled Series-parallel Resonant InverterConstant-frequency Parallel-resonant ConverterResonant DC/DC ConvertersPower Electronics HandbookThe Electrical Engineering Handbook, Second Edition Advanced DC/DC Converters DC-DC Converter TopologiesPower-Switching Converters, Second EditionAnalysis of a Series Parallel Resonant ConverterDynamic Analysis of the Parallel Resonant ConverterSynchronous and Resonant DC/DC Conversion Technology, Energy Factor, and Mathematical ModelingPower-Switching ConvertersResonant Power ConvertersFundamentals of Power ElectronicsModern Power Converters for Renewable Energy ApplicationsCurrentsource Parallel-resonant ConverterThe Electronics HandbookPower Electronics for Electric Vehicles and Energy StorageHandbook of Distributed GenerationPower Electronics Carlos Vi

olo Monzoncillo Yuan Chin Yung-Lin Lin Muhammad H. Rashid Richard C. Dorf Fang Lin Luo Gerry Moschopoulos Simon Ang Norjulia Mohamad Nordin Adan F. Hernandez Fang Lin Luo Simon Ang Marian K. Kazimierczuk Erickson Natarajan Balasubramanian Muthu Selvan Abdulkarim Ajil Abdulkarim Jerry C. Whitaker Dharavath Kishan Ramesh Bansal EduGorilla Prep Experts Study and Control of a Phase-controlled Series-parallel Resonant Converter and a Phase-controlled Series-parallel Resonant Inverter Constant-frequency Parallel-resonant Converter Resonant DC/DC Converters Power Electronics Handbook The Electrical Engineering Handbook, Second Edition Advanced DC/DC Converters DC-DC Converter Topologies Power-Switching Converters, Second Edition Analysis of a Series Parallel Resonant Converter Dynamic Analysis of the Parallel Resonant Converter Synchronous and Resonant DC/DC Conversion Technology, Energy Factor, and Mathematical Modeling Power-Switching Converters Resonant Power Converters Fundamentals of Power Electronics Modern Power Converters for Renewable Energy Applications Current-source Parallel-resonant Converter The Electronics Handbook Power Electronics for Electric Vehicles and Energy Storage Handbook of Distributed Generation Power Electronics Carlos Vi

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anglos resonant converters have been widely used for some few decades because of their inherit soft switching characteristic their fast transient response their low losses

compared to the pwm based hard switching converters and thus their capability to work at higher frequencies modeling resonant converters and designing its control is however a challenge due to the high order systems that could be obtained in this kind of circuits this thesis is aimed to analyze and design the closed loop control of a phase controlled series parallel resonant converter pc sprc that was designed and built some years ago in the dissertation of a phd student in the polytechnic school of brooklyn that nowadays belongs to nyu also a phase controlled series parallel resonant inverter pc spri is designed in parallel in a joint work so its stability and control are studied and designed as well both the pc sprc and pc spri closed loops are simulated and their controls are implemented in the same dsp having a stable output of 300v dc for the first one and 200vp ac for the second one these outputs are connected to a 1 100 and 1 50 transformers respectively so a 30kv dc with a 10kvp ac coupled signal is obtained if both transformer secondaries are serially connected the building process of the pc spri resonant tank and control board that includes the switching drivers and other devices is detailed the high voltage obtained output is applicable to electrostatic precipitators its operation is based on the electrostatic attraction of the dust particles in polluted air using a high dc signal with a coupled high voltage sinusoid so the operation point of the system is designed based on this application the results of the controlled pc sprc and pc spri are presented here avoiding the transformer connection as a security measure but using an equivalent load

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

in 1993 the first edition of the electrical engineering handbook set a new standard for breadth and depth of coverage in an engineering reference work now this classic has been substantially revised and updated to include the latest information on all the important topics in electrical engineering today every electrical engineer should have an opportunity to expand his expertise with this definitive guide in a single volume this handbook provides a complete reference to answer the questions encountered by practicing engineers in industry government or academia this well organized book is divided into 12 major sections that encompass the entire field of electrical engineering

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including circuits signal processing electronics electromagnetics electrical effects and devices and energy and the emerging trends in the fields of communications digital devices computer engineering systems and biomedical engineering a compendium of physical chemical material and mathematical data completes this comprehensive resource every major topic is thoroughly covered and every important concept is defined described and illustrated conceptually challenging but carefully explained articles are equally valuable to the practicing engineer researchers and students a distinguished advisory board and contributors including many of the leading authors professors and researchers in the field today assist noted author and professor richard dorf in offering complete coverage of this rapidly expanding field no other single volume available today offers this combination of broad coverage and depth of exploration of the topics the electrical engineering handbook will be an invaluable resource for electrical engineers for years to come

dc dc conversion techniques have undergone rapid development in recent decades with the pioneering work of authors fang lin luo and hong ye dc dc converters have now been sorted into their six generations and by a rough count over 800 different topologies currently exist with more being developed each year advanced dc dc converters second edition offers a concise practical presentation of dc dc converters summarizes the spectrum of conversion technologies and presents new ideas and more than 200 new topologies beginning with background material on dc dc conversion the book later discusses both voltage lift and super lift converters it then proceeds through each generation including the groundbreaking sixth generation converters developed by the authors that can be cascaded for high voltage transfer gain this new edition updates every chapter and offers three new chapters the introduction of the super lift technique is an outstanding achievement in dc dc conversion technology and the ultra lift technique and hybrid split capacitor inductor applied in super lift luo converters are introduced in chapters 7 and 8 in chapter 9 the authors have theoretically defined a new concept energy factor ef researched the relations between ef and the mathematical modelling for power dc dc converters and demonstrated the modeling method for two converters more than 320 figures 60 tables and 500 formulae allow the reader to more easily grasp the overall structure of advanced dc dc converters provide fast access to precise data and help them to quickly determine the values of their own circuit components

dc dc converter topologies a comprehensive look at dc dc converters and advanced power converter topologies for all skills levels as it can be rare for source voltage to meet the requirements of a direct current dc load dc dc converters are essential to access service dc dc power converters employ power semiconductor devices like mosfets and igbts as switches and passive elements such as capacitors inductors and transformers to alter the voltage provided by a dc source into the necessary dc

voltage as is required by a dc load this source can be a battery solar panels fuel cells or a dc bus voltage fed by rectified ac utility voltage as the many components of dc dc converters can be differently arranged into circuit structures called topologies there are as many possible circuit topologies as there are possible combinations of circuit elements focusing on dc dc switch mode power converters ranging from 50 w to 10kw dc dc converter topologies provides a survey of all converter topology types within this power range general principles are described for each topology type using a representative converter as an example variations that can be found that differ from the example are then examined with a helpful discussion of comparisons when relevant a broad range of topics is covered within the book from simple low power converters to complex high power converters and everywhere in between dc dc converter topologies readers will also find a detailed discussion of four key dc dc converter topologies description of isolated two switch pulse width modulated pwm topologies including push pull half bridge and interleaved converters an exploration of high gain converters such as coupled inductors voltage multipliers and switched capacitor converters this book provides the tools so that a non expert will be equipped to deal with the vast array of dc dc converters that presently exist as such dc dc converter topologies is a useful reference for electrical engineers professors and graduate students studying in the field

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

numbers alone are enough to describe the importance of dc dc converters in modern power engineering there are more than 500 recognized topologies with more added

each year in their groundbreaking book advanced dc dc converters expert researchers luo and ye organized these technologies into six generations and illustrated their principles and operation through examples of over 100 original topologies in chapters carefully drawn from that work synchronous and resonant dc dc conversion technology energy factor and mathematical modeling provides a focused concise overview of synchronous and multiple element resonant power converters this reference carefully examines the topologies of more than 50 synchronous and resonant converters by illustrating the design of several prototypes developed by the authors using more than 100 diagrams as illustration the book supplies insight into the fundamental concepts design and applications of the fifth synchronous and sixth multiple element resonant converters as well as dc power sources and control circuits the authors also discuss emi emc problems and include a new chapter that introduces the new concept of energy factor ef and its importance in mathematical modeling as well as analyzing the transient process and impulse response of dc dc converters synchronous and resonant dc dc conversion technology energy factor and mathematical modeling supplies a quick and accessible guide for anyone in need of specialized information on synchronous and resonant dc dc converter technologies

significantly expanded and updated with extensive revisions new material and a new chapter on emerging applications of switching converters power switching converters third edition offers the same trusted accessible and comprehensive information as its bestselling predecessors similar to the two previous editions this book can be used for a

this book is devoted to resonant energy conversion in power electronics it is a practical systematic guide to the analysis and design of various dc dc resonant inverters high frequency rectifiers and dc dc resonant converters that are building blocks of many of today s high frequency energy processors designed to function as both a superior senior to graduate level textbook for electrical engineering courses and a valuable professional reference for practicing engineers it provides students and engineers with a solid grasp of existing high frequency technology while acquainting them with a number of easy to use tools for the analysis and design of resonant power circuits resonant power conversion technology is now a very hot area and in the center of the renewable energy and energy harvesting technologies

in many university curricula the power electronics field has evolved beyond the status of comprising one or two special topics courses often there are several courses dealing with the power electronics field covering the topics of converters motor drives and power devices with possibly additional advanced courses in these areas as well there may also be more traditional power area courses in energy conversion machines and power systems in the breadth vs depth tradeoff it no longer makes sense for one

textbook to attempt to cover all of these courses indeed each course should ideally employ a dedicated textbook this text is intended for use in introductory power electronics courses on converters taught at the senior or first year graduate level there is sufficient material for a one year course or at a faster pace with some material omitted for two quarters or one semester the first class on converters has been called a way of enticing control and electronics students into the power area via the back door the power electronics field is quite broad and includes fundamentals in the areas of converter circuits and electronics control systems magnetics power applications design oriented analysis this wide variety of areas is one of the things which makes the field so interesting and appealing to newcomers this breadth also makes teaching the field a challenging undertaking because one cannot assume that all students enrolled in the class have solid prerequisite knowledge in so many areas

as the world transitions toward sustainable energy solutions power converters have become indispensable in enabling the efficient integration and operation of renewable energy systems modern power converters for renewable energy applications modeling analysis design and control offers a comprehensive guide to the modeling analysis design and control of these critical technologies tailored for solar photo voltaic wind energy and energy storage applications this book delves into the unique challenges and requirements of power converters with detailed coverage of dc dc dc ac and multilevel converter technologies readers will gain insights into advanced control strategies for ensuring system stability and reliability under varying conditions bridging theory and practice this book is packed with case studies simulation examples and design methodologies to help readers transition from conceptual understanding to practical implementation using industry standard tools readers can analyze converter performance optimize designs and address real world challenges in renewable energy systems key topics include grid synchronization power quality improvement and compliance with international standards equipping readers to handle the complexities of modern power grids this book also explores the integration of energy storage systems emphasizing their role in stabilizing renewable outputs and enhancing system flexibility ideal for researchers engineers and students this book provides the expertise needed to excel in power electronics for renewables whether advancing research driving innovation or solving practical challenges modern power converters for renewable energy applications modeling analysis design and control is the definitive resource for mastering the technologies shaping the future of sustainable energy

during the ten years since the appearance of the groundbreaking bestselling first edition of the electronics handbook the field has grown and changed tremendously with a focus on fundamental theory and practical applications the first edition guided novice and veteran engineers along the cutting edge in the design production installation operation and maintenance of electronic devices and systems completely

updated and expanded to reflect recent advances this second edition continues the tradition the electronics handbook second edition provides a comprehensive reference to the key concepts models and equations necessary to analyze design and predict the behavior of complex electrical devices circuits instruments and systems with 23 sections that encompass the entire electronics field from classical devices and circuits to emerging technologies and applications the electronics handbook second edition not only covers the engineering aspects but also includes sections on reliability safety and engineering management the book features an individual table of contents at the beginning of each chapter which enables engineers from industry government and academia to navigate easily to the vital information they need this is truly the most comprehensive easy to use reference on electronics available

this text will help readers to gain knowledge about designing power electronic converters and their control for electric vehicles it discusses the ways in which power from electric vehicle batteries is transferred to an electric motor the technology used for charging electric vehicle batteries and energy storage the text covers case studies and real life examples related to electric vehicles the book discusses the latest advances and developments in the field of electric vehicles examines the challenges associated with the integration of renewable energy sources with electric vehicles highlights basic understanding of the charging infrastructure for electric vehicles covers concepts including the reliability of power converters in electric vehicles and battery management systems this book discusses the challenges emerging technologies and recent development of power electronics for electric vehicles it will serve as an ideal reference text for graduate students and academic researchers in the fields of electrical engineering electronics and communication engineering environmental engineering automotive engineering and computer science

this book features extensive coverage of all distributed energy generation technologies highlighting the technical environmental and economic aspects of distributed resource integration such as line loss reduction protection control storage power electronics reliability improvement and voltage profile optimization it explains how electric power system planners developers operators designers regulators and policy makers can derive many benefits with increased penetration of distributed generation units into smart distribution networks it further demonstrates how to best realize these benefits via skillful integration of distributed energy sources based upon an understanding of the characteristics of loads and network configuration

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