Controller Design For Buck Converter Step By Step Approach

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

the Zeta converter, which is non-inverting type Buck Boost converter. An important source of practical implementations, it presents practical implementations as simulation and experimental results to demonstrate the efficacy of the converter.

Photovoltaic Power System - Weidong Xiao 2017-05-05 Photovoltaic Power System: Modelling, Design and Control is an essential reference with a practical approach to photovoltaic (PV) power system analysis and control. It systematically guides readers through PV system design, modelling, simulation, maximum power point tracking and control techniques making this invaluable resource to students and professionals progressing from different levels in PV power engineering. The development of this book follows the author's 15-year experience as an electrical engineer in the PV engineering sector and as an educator in academia. It provides the background knowledge of PV power system but will also

inform research direction. Key features: Details modern converter topologies and a step-by-step modelling approach to simulate and control a complete PV power system. Introduces industrial standards, regulations, and electric codes for safety practice and research direction. Covers new classification of PV power systems in terms of the level of maximum power point tracking. Contains practical examples in designing grid-tied and standalone PV power systems. Matlab codes and Simulink models featured on a Wiley hosted book companion website.

Trends in Communication Technologies and Engineering Science - He Huang 2009-04-20 Comprised of research articles written for a major international conference, this book covers the state-of-the-art in communication systems and engineering science. Topics covered include network management, wireless networks, electronics, and

many others.

Modeling Uncertainties in DC-DC Converters with MATLAB® and PLECS® - Farzin Asadi 2018-11-12
Modeling is the process of formulating a mathematical description of the system. A model, no matter how detailed, is never a completely accurate representation of a real physical system. A mathematical model is always just an approximation of the true, physical reality of the system dynamics. Uncertainty refers to the differences or errors between model and real systems and whatever methodology is used to present these errors will be called an uncertainty model. Successful robust control-system design would depend on, to a certain extent, an appropriate description of the perturbation considered. Modeling the uncertainties in the switch mode DC-DC converters is an important step in designing robust controllers. This book studies different techniques which can be used to extract the uncertain model of DC-DC converters. Once the uncertain model is extracted, robust control techniques such as ??∞ and μ synthesis can be used to design the robust controller. The book is composed of two case studies. The first one is a buck converter and the second one is a Zeta converter. MATLAB® programming is used extensively throughout the book. Some sections use PLECS® as well. This book is intended to be guide for both academicians and practicing engineers.

Advances of Science and Technology - Mulugeta Admasu Delele 2021
This two-volume set constitutes the refereed post-conference proceedings of the 8th International Conference on Advancement of Science and Technology, ICAST 2020, which took place in Bahir Dar, Ethiopia, in October 2020. The 74 revised full papers were carefully reviewed and selected from more than 200 submissions of which 157 were sent out for peer review. The papers present economic and technologic developments in

modern societies in 6 tracks: Chemical, food and bio-process engineering; Electrical and computer engineering; IT, computer science and software engineering; Civil, water resources, and environmental engineering; Mechanical and industrial engineering; Material science and engineering.

Methodologies For The Conception, Design And Application Of Soft Computing - Proceedings Of The 5th International Conference On Soft Computing And Information/intelligent Systems (In 2 Volumes) - Matsumoto Gen 1998-08-25

Intelligent Control in Energy Systems - Anastasios Dounis 2019-08-26 The editors of this Special Issue titled "Intelligent Control in Energy Systems" have attempted to create a book containing original technical articles addressing various elements of intelligent control in energy systems. In response to our call for papers, we received 60 submissions. Of those submissions, 27 were published and 33 were rejected. In this book, we offer the 27 accepted technical articles as well as one editorial. Authors from 15 countries (China, Netherlands, Spain, Tunisia, United Sates of America, Korea, Brazil, Egypt, Denmark, Indonesia, Oman, Canada, Algeria, Mexico, and the Czech Republic) elaborate on several aspects of intelligent control in energy systems. The book covers a broad range of topics including fuzzy PID in automotive fuel cell and MPPT tracking, neural networks for fuel cell control and dynamic optimization of energy management, adaptive control on power systems, hierarchical Petri Nets in microgrid management, model predictive control for electric vehicle battery and frequency regulation in HVAC systems, deep learning for power consumption forecasting, decision trees for wind systems, risk analysis for demand side management, finite state automata for HVAC

control, robust μ-synthesis for microgrids, and neuro-fuzzy systems in energy storage. Fundamentals of Power Electronics - Robert W. Erickson 2007-05-08 Fundamentals of Power Electronics, Second Edition, is an up-to-date and authoritative text and reference book on power electronics. This new edition retains the original objective and philosophy of focusing on the fundamental principles, models, and technical requirements needed for designing practical power electronic systems while adding a wealth of new material. Improved features of this new edition include: A new chapter on input filters, showing how to design single and multiple section filters; Major revisions of material on averaged switch modeling, low-harmonic rectifiers, and the chapter on AC modeling of the discontinuous conduction mode; New material on soft switching, active-clamp snubbers, zero-voltage transition full-bridge converter, and auxiliary resonant commutated pole. Also, new sections on design of multiple-winding magnetic and resonant inverter design; Additional appendices on Computer Simulation of Converters using averaged switch modeling, and Middlebrook's Extra Element Theorem, including four tutorial examples; and Expanded treatment of current programmed control with complete results for basic converters, and much more. This edition includes many new examples, illustrations, and exercises to guide students and professionals through the intricacies of power electronics design. Fundamentals of Power Electronics, Second Edition, is intended for use in introductory power electronics courses and related fields for both senior undergraduates and first-year graduate students interested in converter circuits and electronics, control systems, and magnetic and power systems. It will also be an invaluable reference for professionals working in power electronics, power conversion,

and analogue and digital electronics.

Modern Fuzzy Control Systems and Its Applications - S. Ramakrishnan 2017-08-30 Control systems play an important role in engineering. Fuzzy logic is the natural choice for designing control applications and is the most popular and appropriate for the control of home and industrial appliances. Academic and industrial experts are constantly researching and proposing innovative and effective fuzzy control systems. This book is an edited volume and has 21 innovative chapters arranged into five sections covering applications of fuzzy control systems in energy and power systems, navigation systems, imaging, and industrial engineering. Overall, this book provides a rich set of modern fuzzy control systems and their applications and will be a useful resource for the graduate students, researchers, and practicing engineers in the field of electrical engineering.

Emerging Power Converters for Renewable Energy and Electric Vehicles - Md Rabiul Islam 2021-05-12 This book covers advancements of power electronic converters and their control techniques for grid integration of large-scale renewable energy sources and electrical vehicles. Major emphasis are on transformer-less direct grid integration, bidirectional power transfer, compensation of grid power quality issues, DC system protection and grounding, interaction in mixed AC/DC system, AC and DC system stability, magnetic design for high-frequency high power density systems with advanced soft magnetic materials, modelling and simulation of mixed AC/DC system, switching strategies for enhanced efficiency, and protection and reliability for sustainable grid integration. This book is an invaluable resource for professionals active in the field of renewable energy and power conversion.

Advanced Control Methodologies For Power

Converter Systems - Wensheng Luo 2022-02-16
This book aims to present some advanced control methodologies for power converters. Power electronic converters have become indispensable devices for plenty of industrial applications over the last decades. Composed by controllable power switches, they can be controlled by effective strategies to achieve desirable transient response and steady-state performance, to ensure the stability, reliability and safety of the system. The most popular control strategy of power converters is the linear proportional–integral–derivative series control which is adopted as industry standard. However, when there exist parameter changes, nonlinearities and load disturbances in the system, the performance of the controller will be significantly degraded. To overcome this problem, many advanced control methodologies and techniques have been developed to improve the converter performance. This book presents the research work on some advanced control methodologies for several types of power converters, including three-phase two-level AC/DC power converter, three-phase NPC AC/DC power converter, and DC/DC buck converter. The effectiveness and advantage of the proposed control strategies are verified via simulations and experiments. The content of this book can be divided into two parts. The first part focuses on disturbance observer-based control methods for power converters under investigation. The second part investigates intelligent control methods. These methodologies provide a framework for controller design, observer design, stability and performance analysis for the considered power converter systems.
Fundamentals of Power Electronics - Robert W. Erickson 2020
Fundamentals of Power Electronics, Third 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: new material on switching loss mechanisms and their modeling; wide bandgap semiconductor devices; a more rigorous treatment of averaging; explanation of the Nyquist stability criterion; incorporation of the Tan and Middlebrook model for current programmed control; a new chapter on digital control of switching converters; major new chapters on advanced techniques of design-oriented analysis including feedback and extra-element theorems; average current control; new material on input filter design; new treatment of averaged switch modeling, simulation, and indirect power; and sampling effects in DCM, CPM, and digital control. Fundamentals of Power Electronics, Third 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 analog and digital electronics. Includes an increased number of end of chapter problems; Updated and reorganized, including three completely new chapters; Includes key principles and a rigorous treatment of topics.
Fundamentals and Source Characteristics of Renewable Energy Systems - Radian Belu 2019-09-10 This textbook is intended for an audience with little or no power engineering or renewable energy background. The book covers electric energy from alternative energy

sources, including solar, wind, water, hydropower, geothermal, and ocean energy. Core issues discussed include wind and solar resource estimates and analysis, solar thermal systems, solar collectors, photovoltaics, wind turbines, geothermal energy, energy small hydropower, wave, tide and ocean energy, and characteristics of energy conversion, control, and electrical aspects. This is one of the most comprehensive textbooks for students, engineers, and professionals who study renewable energy. There are several questions and problems, presented with increasing difficulty, most of which focus on practical applications. The materials and problems are drawn from the author's extensive experience in renewable energy analysis, assessment, design, control, and the power electronics of wind and solar energy conversion systems. Each section of the book contains several solved examples, as well as practical and advanced discussions, that instill critical thinking and apply to industrial applications. The book is divided into eight chapters and covers the most important aspects of renewable energy sources and technologies.
Technologies for Sustainable Development - Alka Mahajan 2020-09-01
This volume contains a selection of papers presented at the 7th Nirma University International Conference on Engineering 'NUiCONE 2019'. This conference followed the successful organization of four national conferences and six international conferences in previous years. The main theme of the conference was "Technologies for Sustainable Development", which is in line with the "SUSTAINABLE DEVELOPMENT GOAL" established by the United Nations. The conference was organized with many inter-disciplinary technical themes encompassing a broad range of disciplines and enabling researchers, academicians and practitioners to choose between ideas and themes. Besides, NUiCONE-2019 has

also presented an exciting new set of events to engage practicing engineers, technologists and technopreneurs from industry through special knowledge sharing sessions involving applied technical papers based on case-study applications, white-papers, panel discussions, innovations and technology products. This proceedings will definitely provide a platform to proliferate new findings among researchers. Advances in Transportation Engineering Emerging Trends in Water Resources and Environmental Engineering Construction Technology and Management Concrete and Structural Engineering Futuristic Power System Control of Power Electronics Converters, Drives and E-mobility Advanced Electrical Machines and Smart Apparatus Chemical Process Development and Design Technologies and Green Environment Sustainable Manufacturing Processes Design and Analysis of Machine and Mechanism Energy Conservation and Management Advances in Networking Technologies Machine Intelligence / Computational Intelligence Autonomic Computing Control and Automation Electronic Communications Electronics Circuits and System Design Signal Processing

Intelligent Energy Management Technologies - Mohammad Shorif Uddin 2020-12-01
This book is a collection of best selected high-quality research papers presented at the International Conference on Advances in Energy Management (ICAEM 2019) organized by the Department of Electrical Engineering, Jodhpur Institute of Engineering & Technology (JIET), Jodhpur, India, during 20–21 December 2019. The book discusses intelligent energy management technologies which are cost effective compared to the high cost of fossil fuels. This book also explains why these systems have beneficial impact on environmental, economic

and political issues of the world. The book is immensely useful for research scholars, academicians, R&D institutions, practicing engineers and managers from industry.

Proceedings of the IEEE International Conference on Industrial Technology (ICIT ...). - 2002

Advances in Smart Grid Technology - Pierluigi Siano 2020-09-22
This book comprises the select proceedings of the International Conference on Power Engineering Computing and Control (PECCON) 2019. This volume focuses on the different renewable energy sources which are integrated in a smart grid and their operation both in the grid connected mode and islanded mode. The contents highlight the role of power converters in the smart grid environment, battery management, electric vehicular technology and electric charging station as a load for the power network. This book can be useful for beginners, researchers as well as professionals interested in the area of smart grid technology.

Emerging Trends in Electrical, Communications and Information Technologies - Kapila Rohan Attele 2016-11-12
This book includes the original, peer-reviewed research from the 2nd International Conference on Emerging Trends in Electrical, Communication and Information Technologies (ICECIT 2015), held in December, 2015 at Srinivasa Ramanujan Institute of Technology, Ananthapuramu, Andhra Pradesh, India. It covers the latest research trends or developments in areas of Electrical Engineering, Electronic and Communication Engineering, and Computer Science and Information.
Smart and Innovative Trends in Next Generation Computing Technologies - Pushpak Bhattacharyya 2018-06-08
The two-volume set CCIS 827 and 828 constitutes the thoroughly refereed

proceedings of the Third International Conference on Next Generation Computing Technologies, NGCT 2017, held in Dehradun, India, in October 2017. The 135 full papers presented were carefully reviewed and selected from 948 submissions. There were organized in topical sections named: Smart and Innovative Trends in Communication Protocols and Standards; Smart and Innovative Trends in Computational Intelligence and Data Science; Smart and Innovative Trends in Image Processing and Machine Vision; Smart Innovative Trends in Natural Language Processing for Indian Languages; Smart Innovative Trends in Security and Privacy.

Communications in Microgrids - Peter Xiaoping Liu 2020-03-19
This book presents some latest treatments of several specific, but fundamental problems about the data communication and control of smart microgrids. It provides readers some valuable insights into advanced control and communication of microgrids. With the help of mathematical tools, graduate students will benefit with a deep understanding of microgrids and explore some new research directions. In the meantime, this book gives various pictures and flowcharts to show how to address some challenges in microgrids. In addition, it provides solutions to serval specific technical problems, which might be helpful as references for the R&D staff about power systems in utilities and industry. Specifically, the book introduces the applications of advanced control methods such as sliding mode control and model predictive control for microgrids. After getting in-depth understanding of these advanced control methods, the readers are able to design their own improved controllers for not only microgrids, but also for other real-world power plants. Besides, the readers will also learn how to design distributed transaction mechanisms for power market based on the cutting edge

blockchain technology.

Sixth International Conference on Intelligent Computing and Applications - Subhransu Sekhar Dash 2021-07-27 This book presents the peer-reviewed proceedings of the Sixth International Conference on Intelligent Computing and Applications (ICICA 2020), held at Government College of Engineering, Keonjhar, Odisha, India, during December 22–24, 2020. The book includes the latest research on advanced computational methodologies such as neural networks, fuzzy systems, evolutionary algorithms, hybrid intelligent systems, uncertain reasoning techniques, and other machine learning methods and their applications to decision-making and problem-solving in mobile and wireless communication networks.

Digital Control of High-Frequency Switched-Mode Power Converters - Luca Corradini 2015-06-09 This book is focused on the fundamental aspects of analysis, modeling and design of digital control loops around high-frequency switched-mode power converters in a systematic and rigorous manner Comprehensive treatment of digital control theory for power converters Verilog and VHDL sample codes are provided Enables readers to successfully analyze, model, design, and implement voltage, current, or multi-loop digital feedback loops around switched-mode power converters Practical examples are used throughout the book to illustrate applications of the techniques developed Matlab examples are also provided

Modeling, Operation, and Analysis of DC Grids - Alejandro Garces 2021-07-01 Modeling, Operation, and Analysis of DC Grids presents a unified vision of direct current grids with their core analysis techniques, uniting power electronics, power systems, and multiple scales of applications. Part one presents high power applications such as HVDC transmission for wind energy, faults and protections in HVDC lines, stability analysis and inertia emulation.

The second part addresses current applications in low voltage such as microgrids, power trains and aircraft applications. All chapters are self-contained with numerical and experimental analysis. Provides a unified, coherent presentation of DC grid analysis based on modern research in power systems, power electronics, microgrids and MT-HVDC transmission Covers multiple scales of applications in one location, addressing DC grids in electric vehicles, microgrids, DC distribution, multi-terminal HVDC transmission and supergrids Supported by a unified set of MATLAB and Simulink test systems designed for application scenarios

Systems Thinking Approach for Social Problems - Vivek Vijay 2015-01-05
The book is a collection of peer-reviewed scientific papers submitted by active researchers in the 37th National System Conference (NSC 2013). NSC is an annual event of the Systems Society of India (SSI), primarily oriented to strengthen the systems movement and its applications for the welfare of humanity. A galaxy of academicians, professionals, scientists, statesman and researchers from different parts of the country and abroad are invited to attend the conference. The book presents research articles in the areas of system's modelling, complex network modelling, cyber security, sustainable systems design, health care systems, socio-economic systems, and clean and green technologies. The book can be used as a tool for further research.

Computer-Controlled Systems - Karl Johan Åström 2011-01-01
This volume's focus on the design of computer controlled systems features computational tools that can be applied directly and are explained with simple paper-and-pencil calculations. The use of computational tools is balanced by strong emphasis on control system principles and ideas. Extensive pedagogical aids include worked examples,

MATLAB macros, and a solutions manual.

Integration of Renewable Energy Sources with Smart Grid - M. Kathiresh 2021-09-08 INTEGRATION OF RENEWABLE ENERGY SOURCES WITH SMART GRID Provides comprehensive coverage of renewable energy and its integration with smart grid technologies. This book starts with an overview of renewable energy technologies, smart grid technologies, and energy storage systems and covers the details of renewable energy integration with smart grid and the corresponding controls. It also provides an enhanced perspective on the power scenario in developing countries. The requirement of the integration of smart grid along with the energy storage systems is deeply discussed to acknowledge the importance of sustainable development of a smart city. The methodologies are made quite possible with highly efficient power convertor topologies and intelligent control schemes.

These control schemes are capable of providing better control with the help of machine intelligence techniques and artificial intelligence. The book also addresses modern power convertor topologies and the corresponding control schemes for renewable energy integration with smart grid. The design and analysis of power converters that are used for the grid integration of solar PV along with simulation and experimental results are illustrated. The protection aspects of the microgrid with power electronic configurations for wind energy systems are elucidated. The book also discusses the challenges and mitigation measure in renewable energy integration with smart grid. Audience The core audience is hardware and software engineers working on renewable energy integration related projects, microgrids, smart grids and computing algorithms for converter and inverter circuits. Researchers and students in electrical,

electronics and computer engineering will also benefit reading the book.

Innovation and Research - A Driving Force for Socio-Econo-Technological Development - Marcelo Zambrano Vizuete 2022-08-01 This book presents the proceedings of the 2nd International Congress on Innovation and Research—A Driving Force for Socio-Econo-Technological Development (CI3 2021). CI3 was held on September 1–3, 2021. It was organized by the Instituto Tecnológico Superior Rumiñahui and GDEON, in co-organization with Higher Institutes: Bolivariano de Tecnología, Central Técnico, Espíritu Santo, José Chiriboga Grijalva, ISMAC, Policía Nacional del Ecuador Vida Nueva; and sponsored by the Universidad Nacional Mayor de San Marcos (Peru), Universidade Federal de Goiás (Brazil) and City University of New York (United States). CI3 aims to disseminate the research project results that are being carried out in different Higher Education Institutions, research centers, and the business sector.
Pulse-width Modulated DC-DC Power Converters - Marian K. Kazimierczuk 2014-03-31 Fully worked solutions with clear explanations The Pulse-width Modulated DC-DC Power Converters: Solutions Manual provides solutions to the practice problems in the text. Fully worked, each solution includes formulas and diagrams as necessary to help you understand the approach, and explanations clarify the reasoning behind the correct answer. The solutions are aligned chapter-by-chapter with the text, and provide useful guidance that can help you identify your level of comprehension. Designed to make your study time more productive, this solutions manual is an invaluable tool for anyone studying electricity and electrical engineering.
Control Design Techniques in Power Electronics Devices - Hebertt J. Sira-Ramirez 2006-09-07 This book deals specifically

with control theories relevant to the design of control units for switched power electronics devices, for the most part represented by DC–DC converters and supplies, by rectifiers of different kinds and by inverters with varying topologies. The theoretical methods for designing controllers in linear and nonlinear systems are accompanied by multiple case studies and examples showing their application in the emerging field of power electronics.

Control of Power Electronic Converters and Systems - Frede Blaabjerg 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 *Analog Circuit Design Volume Three* - Bob Dobkin 2014-11-29 Design Note Collection, the third book in the Analog Circuit Design series, is a comprehensive volume of applied circuit design solutions, providing elegant and practical design techniques. Design Notes in this volume are focused circuit explanations, easily applied in your own designs. This book includes an extensive power management section, covering

switching regulator design, linear regulator design, microprocessor power design, battery management, powering LED lighting, automotive and industrial power design. Other sections span a range of analog design topics, including data conversion, data acquisition, communications interface design, operational amplifier design techniques, filter design, and wireless, RF, communications and network design. Whatever your application -industrial, medical, security, embedded systems, instrumentation, automotive, communications infrastructure, satellite and radar, computers or networking; this book will provide practical design techniques, developed by experts for tackling the challenges of power management, data conversion, signal conditioning and wireless/RF analog circuit design. A rich collection of applied analog circuit design solutions for use in your own designs. Each Design Note is presented in a concise, two-page format, making it easy to read and assimilate.
Contributions from the leading lights in analog design, including Bob Dobkin, Jim Williams, George Erdi and Carl Nelson, among others. Extensive sections covering power management, data conversion, signal conditioning, and wireless/RF.

Power Sources and Supplies: World Class Designs - Marty Brown 2011-04-08
Newnes has worked with Marty Brown, a leader in the field of power design to select the very best design-specific material from the Newnes portfolio. Marty selected material for its timelessness, its relevance to current power supply design needs, and its real-world approach to design issues. Special attention is given to switching power supplies and their design issues, including component selection, minimization of EMI, toroid selection, and breadboarding of designs. Emphasis is also placed on design strategies for power supplies, including case histories and design examples.

This is a book that belongs on the workbench of every power supply designer! *Marty Brown, author and power supply design consultant, has personally selected all content for its relevance and usefulness *Covers best design practices for switching power supplies and power converters *Emphasis is on pragmatic solutions to commonly encountered design problems and tasks

Power Electronics, A First Course - Ned Mohan 2022-12-07
POWER ELECTRONICS A FIRST COURSE Enables students to understand power electronics systems, as one course, in an integrated electric energy systems curriculum Power Electronics A First Course provides instruction on fundamental concepts related to power electronics to undergraduate electrical engineering students, beginning with an introductory chapter and moving on to discussing topics such as switching power-poles, switch-mode dc-dc converters, and feedback controllers. The authors also cover diode rectifiers, power-factor-correction (PFC) circuits, and switch-mode dc power supplies. Later chapters touch on soft-switching in dc-dc power converters, voltage and current requirements imposed by various power applications, dc and low-frequency sinusoidal ac voltages, thyristor converters, and the utility applications of harnessing energy from renewable sources. Power Electronics A First Course is the only textbook that is integrated with hardware experiments and simulation results. The simulation files are available on a website associated with this textbook. The hardware experiments will be available through a University of Minnesota startup at a low cost. In Power Electronics A First Course, readers can expect to find detailed information on: Availability of various power semiconductor devices that are essential in power electronic systems, plus their switching characteristics

and various tradeoffs Common foundational unit of various converters and their operation, plus fundamental concepts for feedback control, illustrated by means of regulated dc-dc converters Basic concepts associated with magnetic circuits, to develop an understanding of inductors and transformers needed in power electronics Problems associated with hard switching, and some of the practical circuits where this problem can be minimized with soft-switching Power Electronics A First Course is an ideal textbook for Junior/Senior-Undergraduate students in Electrical and Computer Engineering (ECE). It is also valuable to students outside of ECE, such as those in more general engineering fields. Basic understanding of electrical engineering concepts and control systems is a prerequisite.

Power Electronics Step-by-Step: Design, Modeling, Simulation, and Control - Weidong Xiao 2021-02-05 Explore the latest power electronics principles, practices, and applications This electrical engineering guide offers comprehensive coverage of design, modeling, simulation, and control for power electronics. The book describes real-world applications for the technology and features case studies worked out in both MATLAB and Simulink. Presented in an accessible style, Power Electronics Step-by-Step: Design, Modeling, Simulation, and Control focuses on the latest technologies, such as DC-based systems, and emphasizes the averaging technique for both simulation and modeling. You will get photos, diagrams, flowcharts, graphs, equations, and tables that illustrate each topic. Circuit components Non-isolated DC/DC conversion Power analysis DC to single-phase AC conversion Single-phase AC to DC conversion Galvanic isolated DC/DC conversion Power conversion for three-phase AC Bidirectional power conversion Averaging model for simulation

Dynamic modeling of DC/DC converters Regulation of voltage and current
Robust Control of DC-DC Converters - Farzin Asadi 2022-05-31
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 the presence of disturbances like input voltage changes and/or output load changes seems impossible without some form of control. This book shows how simple controllers such as Proportional-Integral (PI) can turn into a robust controller by correct selection of its parameters. Kharitonov's theorem is an important tool toward this end. This book consist of two parts. The first part shows how one can obtain the interval plant model of a DC-DC converter. The second part introduces the Kharitonov's theorem. Kharitonov's theorem is an analysis tool rather than a design tool. Some case studies show how it can be used as a design tool. The prerequisite for reading this book is a first course on feedback control theory and power electronics.

Optimization, Learning Algorithms and Applications
- Ana I. Pereira 2021-12-02
This book constitutes selected and revised papers presented at the First International Conference on Optimization, Learning Algorithms and Applications, OL2A 2021, held in Bragança, Portugal, in July 2021. Due to the COVID-19 pandemic the conference was held online. The 39 full papers and 13 short papers were thoroughly reviewed and selected from 134 submissions. They are organized in the topical sections on optimization theory; robotics; measurements with the internet of things; optimization in control systems design; deep learning; data visualization and virtual reality; health informatics; data analysis; trends in engineering education.

Power Electronics Handbook - Muhammad H. Rashid 2011-01-13
Power electronics, which is a

rapidly growing area in terms of research and applications, uses modern electronics technology to convert electric power from one form to another, such as ac-dc, dc-dc, dc-ac, and ac-ac with a variable output magnitude and frequency. It 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. Designed to appeal to a new generation of engineering professionals, Power Electronics Handbook, 3rd Edition features four new chapters covering renewable energy, energy transmission, energy storage, as well as an introduction to Distributed and Cogeneration (DCG) technology, including gas turbines, gensets, microturbines, wind turbines, variable speed generators, photovoltaics and fuel cells, has been gaining momentum for quite some time now.smart grid technology. With this book readers should be able to provide technical design leadership on assigned power electronics design projects and lead the design from the concept to production involving significant scope and complexity. Contains 45 chapters covering all aspects of power electronics and its applications Three new chapters now including coverage Energy Sources, Energy Storage and Electric Power Transmission Contributions from more than fifty leading experts spanning twelve different countries *Renewable Energy and Climate Change* - Dipankar Deb 2019-09-03
This book gathers selected papers presented at the First International Conference on Renewable Energy and Climate Change (REC 2019), which was held at the Institute of Infrastructure Technology Research and Management (IITRAM) from 1 to 2 February

2019. The topics covered include renewable (green) energy and sources including wind power, hydropower, solar energy, biomass, biofuel, geothermal energy, wave energy, tidal energy, hydrogen & fuel cells, energy storage, new trends and technologies for renewable energies, policies and strategies for renewable energies, smart grids, batteries, and e-mobility, control techniques for renewable energies, hybrid renewable energies, renewable energy research and applications for industries, applications of renewable energies in electrical vehicles and other allied areas, artificial intelligence and machine learning studies for renewable energies, renewable energy systems in smart cities, climate change mitigation, carbon trading, carbon capture and utilization, and carbon dioxide refrigeration systems.

Sliding Mode Control of Switching Power Converters - Siew-Chong Tan 2018-09-03 Sliding Mode Control of Switching Power Converters: Techniques and Implementation is perhaps the first in-depth account of how sliding mode controllers can be practically engineered to optimize control of power converters. A complete understanding of this process is timely and necessary, as the electronics industry moves toward the use of renewable energy sources and widely varying loads that can be adequately supported only by power converters using nonlinear controllers. Of the various advanced control methods used to handle the complex requirements of power conversion systems, sliding mode control (SMC) has been most widely investigated and proved to be a more feasible alternative than fuzzy and adaptive control for existing and future power converters. Bridging the gap between power electronics and control theory, this book employs a top-down instructional approach to discuss traditional and modern SMC techniques. Covering everything from equations to analog

implantation, it: Provides a comprehensive general overview of SMC principles and methods Offers advanced readers a systematic exposition of the mathematical machineries and design principles relevant to construction of SMC, then introduces newer approaches Demonstrates the practical implementation and supporting design rules of SMC, based on analog circuits Promotes an appreciation of general nonlinear control by presenting it from a practical perspective and using familiar engineering terminology With specialized coverage of modeling and implementation that is useful to students and professionals in electrical and electronic engineering, this book clarifies SMC principles and their application to power converters. Making the material equally accessible to all readers, whether their background is in analog circuit design, power electronics, or control engineering, the authors—experienced researchers in their own right—elegantly and practically relate theory, application, and mathematical concepts and models to corresponding industrial targets.

Design and Control of Power Converters 2019 - Manuel Arias 2021-07-02
In this book, 20 papers focused on different fields of power electronics are gathered. Approximately half of the papers are focused on different control issues and techniques, ranging from the computer-aided design of digital compensators to more specific approaches such as fuzzy or sliding control techniques. The rest of the papers are focused on the design of novel topologies. The fields in which these controls and topologies are applied are varied: MMCs, photovoltaic systems, supercapacitors and traction systems, LEDs, wireless power transfer, etc.