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PID and Predictive Control of Electrical Drives and Power Converters using MATLAB

/ Simulink - Liuping Wang 2015-03-02

A timely introduction to current research on PID and predictive control by one of the leading

authors on the subject PID and Predictive Control of Electric Drives and Power Supplies using MATLAB/Simulink examines the classical control system strategies, such as PID control, feed-forward control and cascade control, which

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are widely used in current practice. The authors share their experiences in actual design and implementation of the control systems on laboratory test-beds, taking the reader from the fundamentals through to more sophisticated design and analysis. The book contains sections on closed-loop performance analysis in both frequency domain and time domain, presented to help the designer in selection of controller parameters and validation of the control system. Continuous-time model predictive control systems are designed for the drives and power supplies, and operational constraints are imposed in the design. Discrete-time model predictive control systems are designed based on the discretization of the physical models, which will appeal to readers who are more familiar with sampled-data control system. Soft sensors and observers will be discussed for low cost implementation. Resonant control of the electric drives and power supply will be discussed to deal with the problems of bias in

sensors and unbalanced three phase AC currents. Brings together both classical control systems and predictive control systems in a logical style from introductory through to advanced levels Demonstrates how simulation and experimental results are used to support theoretical analysis and the proposed design algorithms MATLAB and Simulink tutorials are given in each chapter to show the readers how to take the theory to applications. Includes MATLAB and Simulink software using xPC Target for teaching purposes A companion website is available Researchers and industrial engineers; and graduate students on electrical engineering courses will find this a valuable resource.

Power Electronics and Motor Drives - Bogdan M. Wilamowski 2018-10-03

The Industrial Electronics Handbook, Second Edition combines traditional and newer, more specialized knowledge that will help industrial electronics engineers develop practical solutions

for the design and implementation of high-power applications. Embracing the broad technological scope of the field, this collection explores fundamental areas, including analog and digital circuits, electronics, electromagnetic machines, signal processing, and industrial control and communications systems. It also facilitates the use of intelligent systems—such as neural networks, fuzzy systems, and evolutionary methods—in terms of a hierarchical structure that makes factory control and supervision more efficient by addressing the needs of all production components. Enhancing its value, this fully updated collection presents research and global trends as published in the IEEE Transactions on Industrial Electronics Journal, one of the largest and most respected publications in the field. Power Electronics and Motor Drives facilitates a necessary shift from low-power electronics to the high-power varieties used to control electromechanical systems and other industrial applications. This

volume of the handbook: Focuses on special high-power semiconductor devices Describes various electrical machines and motors, their principles of operation, and their limitations Covers power conversion and the high-efficiency devices that perform the necessary switchover between AC and DC Explores very specialized electronic circuits for the efficient control of electric motors Details other applications of power electronics, aside from electric motors—including lighting, renewable energy conversion, and automotive electronics Addresses power electronics used in very-high-power electrical systems to transmit energy Other volumes in the set: Fundamentals of Industrial Electronics Control and Mechatronics Industrial Communication Systems Intelligent Systems

Recent Advances in Power Electronics and Drives - Shailendra Kumar 2022-05-26

This book contains select proceedings of EPREC-2021 with a focus on power electronics

and drives. The book includes original research and case studies that present recent developments in power electronics focusing on power inverters and converters. The book also consists of research work on electrical drives, regulated power supplies, operation of FACTS & HVDC, etc. The book will be a valuable reference guide for beginners, researchers, and professionals interested in the advancements of power electronics and drives.

Electric Motor Drives - Ramu Krishnan 2001
Electronic Control of Machines develops a systematic approach to motor drives. This book places emphasis on practice through the use of extensive modeling, simulation and analysis to help readers better understand the subject. Detailed industrial applications help readers relate theory to practice. KEY TOPICS: This extensive book cover numerous topics including: system level analysis, design and integration of the motor drives; and modeling and analysis of electrical machines and drive systems. MARKET:

For readers with an interest in electric drives and power electronics.

High Performance Control of AC Drives with Matlab/Simulink - Haitham Abu-Rub
2021-04-06

High Performance Control of AC Drives with Matlab®/Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry The Second Edition of High Performance Control of AC Drives with Matlab®/Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor drive systems. The book includes new material on medium voltage drives, covering state-of-the-art technologies and challenges in the industrial drive system, as well as their components, and control, current source inverter-based drives, PWM techniques for multilevel inverters, and low switching frequency modulation for voltage source inverters. This book covers three-phase and

multiphase (more than three-phase) motor drives including their control and practical problems faced in the field (e.g., adding LC filters in the output of a feeding converter), are considered. The new edition contains links to Matlab®/Simulink models and PowerPoint slides ideal for teaching and understanding the material contained within the book. Readers will also benefit from the inclusion of: A thorough introduction to high performance drives, including the challenges and requirements for electric drives and medium voltage industrial applications An exploration of mathematical and simulation models of AC machines, including DC motors and squirrel cage induction motors A treatment of pulse width modulation of power electronic DC-AC converter, including the classification of PWM schemes for voltage source and current source inverters Examinations of harmonic injection PWM and field-oriented control of AC machines Voltage source and current source inverter-fed drives

and their control Modelling and control of multiphase motor drive system Supported with a companion website hosting online resources. Perfect for senior undergraduate, MSc and PhD students in power electronics and electric drives, High Performance Control of AC Drives with Matlab®/Simulink will also earn a place in the libraries of researchers working in the field of AC motor drives and power electronics engineers in industry.

Computing and Simulation for Engineers - Ziya Uddin 2022-06-29

This book presents the reader with comprehensive insight into various kinds of mathematical modeling and numerical computation for problems arising in several branches of engineering, such as mechanical engineering, computer science engineering, electrical engineering, electronics and communication engineering, and civil engineering. The book: • Discusses topics related to clean and green energy production

and storage • Bridges the gap between core theory and costly industrial experiments • Covers advanced biomechanics and nanodrug delivery topics • Explores diversified applications of mathematical techniques to solve practical engineering problems The text in this book emphasizes mathematical treatment of soft computing, image and signal processing, fluid flows in various geometries, biomechanics, biological modeling, a mathematical description of the solar cell, analytical and numerical treatment of problems in fracture mechanics, and antenna design modeling. It also discusses the numerical computations of biomechanics problems and problems arising in cryptography. The text further covers optimization techniques that are useful for real-world problems. This material is primarily written for graduate students and academic researchers in a number of engineering fields, including electrical, electronics and communication, industrial, manufacturing, mechanical, computer science,

and mathematics.

Fundamentals of Electrical Drives - G. K. Dubey
2002-05

Encouraged by the response to the first edition and to keep pace with recent developments, *Fundamentals of Electrical Drives, Second Edition* incorporates greater details on semiconductor controlled drives, includes coverage of permanent magnet AC motor drives and switched reluctance motor drives, and highlights new trends in drive technology. Contents were chosen to satisfy the changing needs of the industry and provide the appropriate coverage of modern and conventional drives. With the large number of examples, problems, and solutions provided, *Fundamentals of Electrical Drives, Second Edition* will continue to be a useful reference for practicing engineers and for those preparing for Engineering Service Examinations.

Advances in Automation, Signal Processing, Instrumentation, and Control - Venkata Lakshmi Narayana Komanapalli 2021-03-04

This book presents the select proceedings of the International Conference on Automation, Signal Processing, Instrumentation and Control (i-CASIC) 2020. The book mainly focuses on emerging technologies in electrical systems, IoT-based instrumentation, advanced industrial automation, and advanced image and signal processing. It also includes studies on the analysis, design and implementation of instrumentation systems, and high-accuracy and energy-efficient controllers. The contents of this book will be useful for beginners, researchers as well as professionals interested in instrumentation and control, and other allied fields.

Intelligent Computing in Engineering -

Vijender Kumar Solanki 2020-04-09

This book comprises select papers from the international conference on Research in Intelligent and Computing in Engineering (RICE 2019) held at Hanoi University of Industry, Hanoi, Vietnam. The volume focuses on current

research on various computing models such as centralized, distributed, cluster, grid and cloud. The contents cover recent advances in wireless sensor networks, mobile ad hoc networks, internet of things, machine learning, grid and cloud computing, and their various applications. The book will help researchers as well as professionals to gain insight into the rapidly evolving fields of internet computing and data mining.

Experimental and Computational Investigations in Engineering -

Nenad Mitrovic 2020-09-04

This proceedings book is a collection of high-quality peer-reviewed research papers presented at the International Conference of Experimental and Numerical Investigations and New Technologies (CNNTech2020) held at Zlatibor, Serbia, from 29th June to 2nd July 2020. The book discusses a wide variety of industrial, engineering and scientific applications of the engineering techniques. Researchers from

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academia and industry present their original work and exchange ideas, experiences, information, techniques, applications and innovations in the field of mechanical engineering, materials science, chemical and process engineering, experimental techniques, numerical methods and new technologies.

Electric Machines and Drives - Ned Mohan
2011-12-13

This book is part of a three-book series. Ned Mohan has been a leader in EES education and research for decades, as author of the best-selling text/reference Power Electronics. This book emphasizes applications of electric machines and drives that are essential for wind turbines and electric and hybrid-electric vehicles. The approach taken is unique in the following respects: A systems approach, where Electric Machines are covered in the context of the overall drives with applications that students can appreciate and get enthusiastic about; A fundamental and physics-based approach that

not only teaches the analysis of electric machines and drives, but also prepares students for learning how to control them in a graduate level course; Use of the space-vector-theory that is made easy to understand. They are introduced in this book in such a way that students can appreciate their physical basis; A unique way to describe induction machines that clearly shows how they go from the motoring-mode to the generating-mode, for example in wind and electric vehicle applications, and how they ought to be controlled for the most efficient operation.

Switched Reluctance Motor Drives - Berker Bilgin
2019-04-29

Electric motors are the largest consumer of electric energy and they play a critical role in the growing market for electrification. Due to their simple construction, switched reluctance motors (SRMs) are exceptionally attractive for the industry to respond to the increasing demand for high-efficiency, high-performance, and low-cost electric motors with a more secure

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supply chain. Switched Reluctance Motor Drives: Fundamentals to Applications is a comprehensive textbook covering the major aspects of switched reluctance motor drives. It provides an overview of the use of electric motors in the industrial, residential, commercial, and transportation sectors. It explains the theory behind the operation of switched reluctance motors and provides models to analyze them. The book extensively concentrates on the fundamentals and applications of SRM design and covers various design details, such as materials, mechanical construction, and controls. Acoustic noise and vibration is the most well-known issue in switched reluctance motors, but this can be reduced significantly through a multidisciplinary approach. These methodologies are explained in two chapters of the book. The first covers the fundamentals of acoustic noise and vibration so readers have the necessary tools to analyze the problems and explains the surface waves, spring-mass models, forcing

harmonics, and mode shapes that are utilized in modeling and analyzing acoustic noise and vibration. The second applies these fundamentals to switched reluctance motors and provides examples for determining the sources of any acoustic noise in switched reluctance motors. In the final chapter two SRM designs are presented and proposed as replacements for permanent magnet machines in a residential HVAC application and a hybrid-electric propulsion application. It also shows a high-power and compact converter design for SRM drives. Features: Comprehensive coverage of switched reluctance motor drives from fundamental principles to design, operation, and applications A specific chapter on electric motor usage in industrial, residential, commercial, and transportation applications to address the benefits of switched reluctance machines Two chapters address acoustic noise and vibration in detail Numerous illustrations and practical examples on the design, modeling, and analysis

of switched reluctance motor drives Examples of switched reluctance motor and drive design

Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters - Alfeu Sgarezi 2022-01-21

Model Predictive Control for Doubly-Fed Induction Generators and Three-Phase Power Converters describes the application of model predictive control techniques with modulator and finite control sets to squirrel cage induction motor and in doubly-fed induction generators using field orientation control techniques as both current control and direct power control. Sections discuss induction machines, their key modulation techniques, introduce the utility of model predictive control, review core concepts of vector control, direct torque control, and direct power control alongside novel approaches of MPC. Mathematical modeling of cited systems, MPC theory, their applications, MPC design and simulation in MATLAB are also considered in-depth. The work concludes by

addressing implementation considerations, including generator operation under voltage sags or distorted voltage and inverters connected to the grid operating under distorted voltage. Experimental results are presented in full. Adopts model predictive control design for optimized induction machines geared for complex grid dynamics Demonstrates how to simulate model predictive control using MATLAB and Simulink Presents information about hardware implementation to obtain experimental results Covers generator operation under voltage sags or distorted voltage

Modeling and Analysis with Induction Generators - M. Godoy Simões 2014-12-11

Now in its Third Edition, Alternative Energy Systems: Design and Analysis with Induction Generators has been renamed Modeling and Analysis with Induction Generators to convey the book's primary objective-to present the fundamentals of and latest advances in the modeling and analysis of induction generators.

New to the Third Edition Revised equations
Electric Drives - Vedam Subrahmanyam 1997-06

Active Electrical Distribution Network -
Sanjeevikumar Padmanaban 2022-07-01
Active Electrical Distribution Network: Issues,
Solution Techniques and Applications is a
comprehensive reference that addresses the
issues and opportunities across one of the most
overlooked sectors of the electrical industry,
electrical distribution. The book begins with an
introduction to electrical distribution networks,
and then explores both present and future
developments in the areas of smart grids,
electric vehicles, micro grids, demand side
response and active distribution networks. The
ongoing transition of energy systems is also
covered, providing recommendations for a
higher penetration of renewable energy,
utilization of new equipment and new network
configurations, as well as development of new
design and operation methods, and applications

of new incentives and business models. The book
closes with a section on optimizing operational
issues, featuring guidance on optimal expansion
planning of distribution systems in smart grids
and optimization of photovoltaic (PV) systems.
Active Electrical Distribution Network is an ideal
reference for all those interested in the
modeling, analysis, control, operation and
planning techniques that are key to addressing
the knowledge and information needs of the
engineering and research audience. Includes
different techniques under DSR concepts and
solutions to address home area management
system problems Features various smart
reactive power compensation techniques used
for reactive power support Discusses different
smart technologies implemented globally to
improve the performance of the active
distribution network

Permanent Magnet Synchronous and Brushless
DC Motor Drives - Ramu Krishnan 2017-12-19
Despite two decades of massive strides in

research and development on control strategies and their subsequent implementation, most books on permanent magnet motor drives still focus primarily on motor design, providing only elementary coverage of control and converters. Addressing that gap with information that has largely been disseminated only in journals and at conferences, *Permanent Magnet Synchronous and Brushless DC Motor Drives* is a long-awaited comprehensive overview of power electronic converters for permanent magnet synchronous machines and control strategies for variable-speed operation. It introduces machines, power devices, inverters, and control, and addresses modeling, implementation, control strategies, and flux weakening operations, as well as parameter sensitivity, and rotor position sensorless control. Suitable for both industrial and academic audiences, this book also covers the simulation, low cost inverter topologies, and commutation torque ripple of PM brushless DC motor drives. Simulation of the motor drives

system is illustrated with MATLAB® codes in the text. This book is divided into three parts—fundamentals of PM synchronous and brushless dc machines, power devices, inverters; PM synchronous motor drives, and brushless dc motor drives. With regard to the power electronics associated with these drive systems, the author: Explores use of the standard three-phase bridge inverter for driving the machine, power factor correction, and inverter control Introduces space vector modulation step by step and contrasts with PWM Details dead time effects in the inverter, and its compensation Discusses new power converter topologies being considered for low-cost drive systems in PM brushless DC motor drives This reference is dedicated exclusively to PM ac machines, with a timely emphasis on control and standard, and low-cost converter topologies. Widely used for teaching at the doctoral level and for industrial audiences both in the U.S. and abroad, it will be a welcome addition to any engineer's library.

Control of Induction Motors - Andrzej Trzynadlowski 2001

This is a reference source for practising engineers specializing in electric power engineering and industrial electronics. It begins with the basic dynamic models of induction motors and progresses to low- and high-performance drive systems.

Handbook of Automotive Power Electronics and Motor Drives - Ali Emadi 2017-12-19

Initially, the only electric loads encountered in an automobile were for lighting and the starter motor. Today, demands on performance, safety, emissions, comfort, convenience, entertainment, and communications have seen the working-in of seemingly innumerable advanced electronic devices. Consequently, vehicle electric systems require larger capacities and more complex configurations to deal with these demands. Covering applications in conventional, hybrid-electric, and electric vehicles, the Handbook of Automotive Power Electronics and Motor Drives

provides a comprehensive reference for automotive electrical systems. This authoritative handbook features contributions from an outstanding international panel of experts from industry and academia, highlighting existing and emerging technologies. Divided into five parts, the Handbook of Automotive Power Electronics and Motor Drives offers an overview of automotive power systems, discusses semiconductor devices, sensors, and other components, explains different power electronic converters, examines electric machines and associated drives, and details various advanced electrical loads as well as battery technology for automobile applications. As we seek to answer the call for safer, more efficient, and lower-emission vehicles from regulators and consumer insistence on better performance, comfort, and entertainment, the technologies outlined in this book are vital for engineering advanced vehicles that will satisfy these criteria.

Mechatronic Systems and Process Automation -

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Patrick O.J. Kaltjob 2018-03-09

The book discusses the concept of process automation and mechatronic system design, while offering a unified approach and methodology for the modeling, analysis, automation and control, networking, monitoring, and sensing of various machines and processes from single electrical-driven machines to large-scale industrial process operations. This step-by-step guide covers design applications from various engineering disciplines (mechanical, chemical, electrical, computer, biomedical) through real-life mechatronics problems and industrial automation case studies with topics such as manufacturing, power grid, cement production, wind generator, oil refining, incubator, etc. Provides step-by-step procedures for the modeling, analysis, control and automation, networking, monitoring, and sensing of single electrical-driven machines to large-scale industrial process operations. Presents model-based theory and practice

guidelines for mechatronics system and process automation design. Includes worked examples in every chapter and numerous end-of-chapter real-life exercises, problems, and case studies.

Electric Motors and Drives - Austin Hughes
2013-10-22

Written for non-specialist users of electric motors and drives, this book explains how electric drives work and compares the performance of the main systems, with many examples of applications. The author's approach - using a minimum of mathematics - has made this book equally popular as an outline for professionals and an introductory student text. * First edition (1990) has sold over 6000 copies. Drives and Controls on the first edition: 'This book is very readable, up-to-date and should be extremely useful to both users and o.e.m. designers. I unhesitatingly recommend it to any busy engineer who needs to make informed judgements about selecting the right drive system.' New features of the second edition: *

New section on the cycloconverter drive. * More on switched reluctance motor drives. * More on vector-controlled induction motor drives. * More on power switching devices. * New 'question and answer' sections on common problems and misconceptions. * Updating throughout. Electric Motors and Drives is for non-specialist users of electric motors and drives. It fills the gap between specialist textbooks (which are pitched at a level which is too academic for the average user) and the more prosaic 'handbooks' which are filled with useful detail but provide little opportunity for the development of any real insight or understanding. The book explores most of the widely-used modern types of motor and drive, including conventional and brushless d.c., induction motors (mains and inverter-fed), stepping motors, synchronous motors (mains and converter-fed) and reluctance motors.

Advanced Technologies, Systems, and Applications IV -Proceedings of the International Symposium on Innovative and Interdisciplinary

Applications of Advanced Technologies (IAT 2019) - Samir Avdaković 2019-07-12

This book presents the scientific outcomes of the conference 11th Days of Bosnian-Herzegovinian American Academy of Arts and Sciences, held in Sarajevo, Bosnia and Herzegovina, June 20-23, 2019. Including innovative applications of advanced technologies, it offers a uniquely comprehensive, multidisciplinary and interdisciplinary overview of the latest developments in a broad range of technologies and methodologies, viewed through the prism of computing, networking, information technology, robotics, complex systems, communications, energy, mechanical engineering, economics and medicine, among others.

High Performance AC Drives - Mukhtar Ahmad 2010-09-08

Variable speed is one of the important requirements in most of the electric drives. Earlier dc motors were the only drives that were used in industries requiring - eration over a wide

range of speed with step less variation, or requiring fine accuracy of speed control. Such drives are known as high performance drives. AC - tors because of being highly coupled non-linear devices can not provide fast dynamic response with normal controls. However, recently, because of ready availability of power electronic devices, and digital signal processors ac motors are beginning to be used for high performance drives. Field oriented control or vector control has made a fundamental change with regard to dynamic performance of ac machines. Vector control makes it possible to control induction or synchronous motor in a manner similar to control scheme used for the separately - cited dc motor. Recent advances in artificial intelligence techniques have also contributed in the improvement in performance of electric drives. This book presents a comprehensive view of high performance ac drives. It may be considered as both a text book for graduate students and as an up-to-date

monograph. It may also be used by R & D professionals involved in the improvement of performance of drives in the industries. The book will also be beneficial to the researchers pursuing work on sensorless and direct torque control of electric drives as up-to date references in these topics are provided.

Swarm, Evolutionary, and Memetic

Computing - Bijaya Ketan Panigrahi 2016-11-30

This volume constitutes the thoroughly refereed post-conference proceedings of the 6th International Conference on Swarm, Evolutionary, and Memetic Computing, SEMCCO 2015, held in Hyderabad, India, in December 2015. The 23 full papers presented in this volume were carefully reviewed and selected from 40 submissions for inclusion in the proceedings. The papers cover a wide range of topics in swarm, evolutionary, memetic and other intelligent computing algorithms and their real world applications in problems selected from diverse domains of science and

engineering.

Switched Reluctance Motor Drives - R. Krishnan
2017-12-19

The switched reluctance machine (SRM) is the least expensive electrical machine to produce, yet one of the most reliable. As such, research has blossomed during the last decade, and the SRM and variable drive systems using SRMs are receiving considerable attention from industry. Because they require a power electronic converter and controller to function, however, successful realization of an SRM variable drive system demands an understanding of the converter and controller subsystems and their integration with the machine. *Switched Reluctance Motor Drives* provides that understanding. It presents a unified view of the machine and its drive system from all of its system and subsystem aspects. With a careful balance of theory and implementation, the author develops the analysis and design of SRMs from first principles, introduces a wide variety of

power converters available for driving the SRM, and systematically presents both low- and high-performance controllers. The book includes an in-depth study of acoustic noise and its minimization along with application examples that include comparisons between ac and dc drives and SRM drive. The result is the first book that provides a state-of-the-art knowledge of SRMs, power converters, and their use with both sensor-based and sensorless controllers. *Switched Reluctance Motor Drives* enables both students and engineers to learn all aspects of SRM drive systems and appreciate the interdependence of the various subsystems in performance optimization.

Planning of Hybrid Renewable Energy Systems, Electric Vehicles and Microgrid -
Aashish Kumar Bohre 2022

This book focuses on various challenges, solutions, and emerging technologies in the operation, control, design, optimization, and protection of microgrids in the presence of

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hybrid renewable energy sources and electric vehicles. This book provides an insight into the potential applications and recent development of different types of renewable energy systems including AC/DC microgrids, RES integration issues with the grid, electric vehicle technology, etc. The book serves as an interdisciplinary platform for the audience working in the focused area to access information related to energy management, modeling, and control. It covers fundamental knowledge, design, mathematical modeling, applications, and practical issues with sufficient design problems and case studies with detailed planning aspects. This book will serve as a guide for researchers, academicians, practicing engineers, professionals, and scientists, as well as for graduate and postgraduate students working in the area of various applications of RES, Electric Vehicles, and AC/DC Microgrid. .

Mobile Communication and Power Engineering -
Vinu V Das 2013-01-17

This book comprises the refereed proceedings of the International Conference, AIM/CCPE 2012, held in Bangalore, India, in April 2012. The papers presented were carefully reviewed and selected from numerous submissions and focus on the various aspects of research and development activities in computer science, information technology, computational engineering, mobile communication, control and instrumentation, communication system, power electronics and power engineering.

Advanced Electrical Drives - Rik W. De Doncker 2020-08-21

This book provides a unique approach to derive model-based torque controllers for all types of Lorentz force machines, i.e. DC, synchronous and induction machines. The rotating transformer model forms the basis for the generalized modeling approach of rotating field machines, which leads to the development of universal field-oriented control algorithms. Contrary to this, direct torque control

algorithms, using observer-based methods, are developed for switched reluctance machines. Tutorials are included at the end of each chapter, and the reader is encouraged to execute these tutorials in order to gain familiarity with the dynamic behavior of drive systems. This updated edition uses PLECS® simulation and vector processing tools that were specifically adopted for the purpose of these hands-on tutorials. Hence, Advanced Electrical Drives encourages “learning by doing” and the experienced drive specialist may find the simulation tools useful to design high-performance torque controllers. Although it is a powerful reference in its own right, when used in conjunction with the companion texts Fundamentals of Electrical Drives and Applied Control of Electrical Drives, this book provides a uniquely comprehensive reference set that takes readers all the way from understanding the basics of how electrical drives work, to deep familiarity with advanced features and models,

to a mastery of applying the concepts to actual hardware in practice. Teaches readers to perform insightful analysis of AC electrical machines and drives; Introduces new modeling methods and modern control techniques for switched reluctance drives; Updated to use PLECS® simulation tools for modeling electrical drives, including new and more experimental results; Numerous tutorials at end of each chapter to learn by doing, step-by-step; Includes extra material featuring “build and play” lab modules, for lectures and self-study.

Power Electronics and Motor Drives - Bimal K. Bose 2020-11-13

Power Electronics and Motor Drives: Advances and Trends, Second Edition is the perfect resource to keep the electrical engineer up-to-speed on the latest advancements in technologies, equipment and applications. Carefully structured to include both traditional topics for entry-level and more advanced applications for the experienced engineer, this

reference sheds light on the rapidly growing field of power electronic operations. New content covers converters, machine models and new control methods such as fuzzy logic and neural network control. This reference will help engineers further understand recent technologies and gain practical understanding with its inclusion of many industrial applications. Further supported by a glossary per chapter, this book gives engineers and researchers a critical reference to learn from real-world examples and make future decisions on power electronic technology and applications. Provides many practical examples of industrial applications Updates on the newest electronic topics with content added on fuzzy logic and neural networks Presents information from an expert with decades of research and industrial experience

Switched Reluctance Motor Drives - R. Krishnan
2017-12-19

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least expensive electrical machine to produce, yet one of the most reliable. As such, research has blossomed during the last decade, and the SRM and variable drive systems using SRMs are receiving considerable attention from industry. Because they require a power electronic converter and controller to function, however, successful realization of an SRM variable drive system demands an understanding of the converter and controller subsystems and their integration with the machine. *Switched Reluctance Motor Drives* provides that understanding. It presents a unified view of the machine and its drive system from all of its system and subsystem aspects. With a careful balance of theory and implementation, the author develops the analysis and design of SRMs from first principles, introduces a wide variety of power converters available for driving the SRM, and systematically presents both low- and high-performance controllers. The book includes an in-depth study of acoustic noise and its

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minimization along with application examples that include comparisons between ac and dc drives and SRM drive. The result is the first book that provides a state-of-the-art knowledge of SRMs, power converters, and their use with both sensor-based and sensorless controllers. Switched Reluctance Motor Drives enables both students and engineers to learn all aspects of SRM drive systems and appreciate the interdependence of the various subsystems in performance optimization.

Electric Vehicle Machines and Drives - K. T. Chau 2015-08-24

A timely comprehensive reference consolidates the research and development of electric vehicle machines and drives for electric and hybrid propulsions • Focuses on electric vehicle machines and drives • Covers the major technologies in the area including fundamental concepts and applications • Emphasis the design criteria, performance analyses and application examples or potentials of various motor drives

and machine systems • Accompanying website includes the simulation models and outcomes as supplementary material

Induction Motor Control Design - Riccardo Marino 2010-08-20

This book provides the most important steps and concerns in the design of estimation and control algorithms for induction motors. A single notation and modern nonlinear control terminology is used to make the book accessible, although a more theoretical control viewpoint is also given. Focusing on the induction motor with, the concepts of stability and nonlinear control theory given in appendices, this book covers: speed sensorless control; design of adaptive observers and parameter estimators; a discussion of nonlinear adaptive controls containing parameter estimation algorithms; and comparative simulations of different control algorithms. The book sets out basic assumptions, structural properties, modelling, state feedback control and estimation algorithms, then moves to

more complex output feedback control algorithms, based on stator current measurements, and modelling for speed sensorless control. The induction motor exhibits many typical and unavoidable nonlinear features.

Green Technology for Smart City and Society - Renu Sharma 2020-11-30

This book includes selected papers from the International Conference on Green Technology for Smart City and Society (GTSCS 2020), organized by the Institute of Technical Education and Research, Siksha 'O' Anusandhan University, Bhubaneswar, India, during 13-14 August 2020. The book covers topics such as machine learning, artificial intelligence, deep learning, optimization algorithm, IoT, signal processing, etc. The book is helpful for researchers working in the discipline of Electrical, Electronics and Computer Science. The researchers working in the allied domain of communication and control will also find the

book useful as it deals with the latest methodologies and applications.

Advances in Parallel Computing Algorithms, Tools and Paradigms - D.J. Hemanth
2022-11-23

Recent developments in parallel computing for various fields of application are providing improved solutions for handling data. These newer, innovative ideas offer the technical support necessary to enhance intellectual decisions, while also dealing more efficiently with the huge volumes of data currently involved. This book presents the proceedings of ICAPTA 2022, the International Conference on Advances in Parallel Computing Technologies and Applications, hosted as a virtual conference from Bangalore, India, on 27 and 28 January 2022. The aim of the conference was to provide a forum for the sharing of knowledge about various aspects of parallel computing in communications systems and networking, including cloud and virtualization solutions,

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management technologies and vertical application areas. The conference also provided a premier platform for scientists, researchers, practitioners and academicians to present and discuss their most recent innovations, trends and concerns, as well as the practical challenges encountered in this field. More than 300 submissions were received for the conference, from which the 91 full-length papers presented here were accepted after review by a panel of subject experts. Topics covered include parallel computing in communication, machine learning intelligence for parallel computing and parallel computing for software services in theoretical and practical aspects. Providing an overview of recent developments in the field, the book will be of interest to all those whose work involves the use of parallel computing technologies.

Modelling and Control of Switched Reluctance Machines - Rui Araújo 2020-09-09

Today, switched reluctance machines (SRMs) play an increasingly important role in various

sectors due to advantages such as robustness, simplicity of construction, low cost, insensitivity to high temperatures, and high fault tolerance. They are frequently used in fields such as aeronautics, electric and hybrid vehicles, and wind power generation. This book is a comprehensive resource on the design, modeling, and control of SRMs with methods that demonstrate their good performance as motors and generators.

[Electric Machines for Smart Grids Applications](#) - Adel El-Shahat 2018-12-12

In this book, highly qualified scientists present their recent research motivated by the importance of electric machines. It addresses advanced studies for high-speed electrical machine design, mechanical design of rotors with surface-mounted permanent magnets, design of motor drive for brushless DC motor, single-phase motors for household applications, battery electric propulsion systems for competition racing applications, robust

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diagnosis by observer using the bond graph approach, a DC motor simulator based on virtual instrumentation, start-up of a PID fuzzy logic embedded control system for the speed of a DC motor using LabVIEW, advanced control of the permanent magnet synchronous motor and optimization of fuzzy logic controllers by particle swarm optimization to increase the lifetime in power electronic stages.

Applied Electromechanical Devices and Machines for Electric Mobility Solutions - Adel El-Shahat 2020-03-25

In this book, highly qualified multidisciplinary scientists present their recent research that has been motivated by the significance of applied electromechanical devices and machines for electric mobility solutions. It addresses advanced applications and innovative case studies for electromechanical parameter identification, modeling, and testing of; permanent-magnet synchronous machine drives; investigation on internal short circuit

identifications; induction machine simulation; CMOS active inductor applications; low-cost wide-speed operation generators; hybrid electric vehicle fuel consumption; control technologies for high-efficient applications; mechanical and electrical design calculations; torque control of a DC motor with a state-space estimation; and 2D-layered nanomaterials for energy harvesting. This book is essential reading for students, researchers, and professionals interested in applied electromechanical devices and machines for electric mobility solutions.

Electric Machines and Drives - Shaahin Filizadeh 2013-02-20

Electric machines have a ubiquitous presence in our modern daily lives, from the generators that supply electricity to motors of all sizes that power countless applications. Providing a balanced treatment of the subject, *Electric Machines and Drives: Principles, Control, Modeling, and Simulation* takes a ground-up approach that emphasizes fundamental

principles. The author carefully deploys physical insight, mathematical rigor, and computer simulation to clearly and effectively present electric machines and drive systems. Detailing the fundamental principles that govern electric machines and drives systems, this book:

Describes the laws of induction and interaction and demonstrates their fundamental roles with numerous examples
Explores dc machines and their principles of operation
Discusses a simple dynamic model used to develop speed and torque control strategies
Presents modeling, steady state based drives, and high-performance drives for induction machines, highlighting the underlying physics of the machine
Includes coverage of modeling and high performance control of permanent magnet synchronous machines
Highlights the elements of power electronics used in electric drive systems
Examines simulation-based optimal design and numerical simulation of dynamical systems
Suitable for a one semester class at the senior

undergraduate or a graduate level, the text supplies simulation cases that can be used as a base and can be supplemented through simulation assignments and small projects. It includes end-of-chapter problems designed to pick up on the points presented in chapters and develop them further or introduce additional aspects. The book provides an understanding of the fundamental laws of physics upon which electric machines operate, allowing students to master the mathematical skills that their modeling and analysis requires.

Cognitive Informatics and Soft Computing - Pradeep Kumar Mallick 2018-08-11

The book presents new approaches and methods for solving real-world problems. It offers, in particular, exploratory research that describes novel approaches in the fields of Cognitive Informatics, Cognitive Computing, Computational Intelligence, Advanced Computing, Hybrid Intelligent Models and Applications. New algorithms and methods in a

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variety of fields are also presented, together with solution-based approaches. The topics addressed include various theoretical aspects and applications of Computer Science, Artificial Intelligence, Cybernetics, Automation Control Theory and Software Engineering.

High Performance Control of AC Drives with Matlab / Simulink Models - Haitham Abu-Rub
2012-04-13

A comprehensive guide to understanding AC machines with exhaustive simulation models to practice design and control. Nearly seventy percent of the electricity generated worldwide is used by electrical motors. Worldwide, huge research efforts are being made to develop commercially viable three- and multi-phase motor drive systems that are economically and technically feasible. Focusing on the most popular AC machines used in industry - induction machine and permanent magnet synchronous machine - this book illustrates advanced control techniques and topologies in

practice and recently deployed. Examples are drawn from important techniques including Vector Control, Direct Torque Control, Nonlinear Control, Predictive Control, multi-phase drives and multilevel inverters. Key features include: systematic coverage of the advanced concepts of AC motor drives with and without output filter; discussion on the modelling, analysis and control of three- and multi-phase AC machine drives, including the recently developed multi-phase-phase drive system and double fed induction machine; description of model predictive control applied to power converters and AC drives, illustrated together with their simulation models; end-of-chapter questions, with answers and PowerPoint slides available on the companion website

www.wiley.com/go/aburub_control This book integrates a diverse range of topics into one useful volume, including most the latest developments. It provides an effective guideline for students and professionals on many vital

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electric drives aspects. It is an advanced textbook for final year undergraduate and graduate students, and researchers in power

electronics, electric drives and motor control. It is also a handy tool for specialists and practicing engineers wanting to develop and verify their own algorithms and techniques.