Principles And Applications Control Electric Machines

#electric machine control #motor control systems #power electronics applications #industrial automation control #electrical drives principles

Explore the fundamental principles and diverse real-world applications of controlling electric machines. This content covers essential theories, advanced techniques, and practical implementations crucial for optimizing performance, efficiency, and reliability across various industrial and commercial sectors utilizing motors, generators, and other electrical apparatus.

Electric Machines

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.

Electric Machines and Drives

This Second Edition extensively covers advanced issues/subjects in electric machines, starting from principles, to applications and case studies with ample graphical (numerical) results. This textbook is

intended for second (and third) semester courses covering topics such as modeling of transients, control principles, electromagnetic and thermal finite element analysis, and optimal design (dimensioning). Notable recent knowledge with strong industrialization potential has been added to this edition, such as: Orthogonal models of multiphase a.c. machines Thermal Finite Element Analysis of (FEA) electric machines FEA–based–only optimal design of a PM motor case study Line start synchronizing premium efficiency PM induction machines Induction machines (three and single phase), synchronous machines with DC excitation, with PM-excitation, and with magnetically salient rotor and a linear Pm oscillatory motor are all investigated in terms of transients, electromagnetic FEM analysis and control principles. Case studies, numerical examples, and lots of discussion of FEM results for PMSM and IM are included throughout the book. The optimal design is treated in detail using Hooke–Jeeves and GA algorithms with case comparison studies in dedicated chapters for IM and PMSM. Numerous computer simulation programs in MATLAB® and Simulink® are available online that illustrate performance characteristics present in the chapters, and the FEM and optimal design case studies (and codes) may be used as homework to facilitate a deeper understanding of fundamental issues.

Electric Machines

This second edition extensively covers advanced issues/subjects in electric machines, starting from principles, to applications and case studies with ample graphical (numerical) results. This textbook is intended for second (and third) semester course, treating topics such as modeling of transients, control principles, electromagnetic and thermal finite element Analysis and optimal design (dimensioning)

Electric Machines

This volume provides an introduction to all important aspects of electric machines, including DC, induction and synchronous machines. The text also addresses modern techniques of control, power electronics and applications. The exposition builds from first principles, making the book accessible to a wide audience, and a large number of problems and worked examples are included.

Electric Machines

An accessible introduction to all important aspects of electric machines, covering dc, induction, and synchronous machines. Also addresses modern techniques of control, power electronics, and applications. Exposition builds from first principles, making this book accessible to a wide audience. Contains a large number of problems and worked examples.

Principles of Electric Machines and Power Electronics

This comprehensive text examines existing and emerging electrical drive technologies. The authors clearly define the most basic electrical drive concepts and go on to explain the most important details while maintaining a solid connection to the theory and design of the associated electrical machines. Also including links to a number of industrial applications, the authors take their investigation of electrical drives beyond theory to examine a number of practical aspects of electrical drive control and application. Key features: * Provides a comprehensive summary of all aspects of controlled-speed electrical drive technology including control and operation. * Handling of electrical drives is solidly linked to the theory and design of the associated electrical machines. Added insight into problems and functions are illustrated with clearly understandable figures. * Offers an understanding of the main phenomena associated with electrical machine drives. * Considers the problem of bearing currents and voltage stresses of an electrical drive. * Includes up-to-date theory and design guidelines, taking into account the most recent advances. This book’s rigorous coverage of theoretical principles and techniques makes for an excellent introduction to controlled-speed electrical drive technologies for Electrical Engineering MSc or PhD students studying electrical drives. It also serves as an excellent reference for practicing electrical engineers looking to carry out design, analyses, and development of controlled-speed electrical drives.

Principles of Electric Machines and Power Electronics

Designed to serve as a textbook for a single semester undergraduate course on electromechanical energy conversion devices or electric machines, ELECTRIC MACHINES strikes a balance between theoretical coverage, easy explanations, and practical applications, presenting real world applications of concepts without compromising on the rigor or the continuity of the text. The book provides excellent

readability, in a conversational style, combined with invaluable industry insight. The accompanying website provides problems solved in MATLAB, SPICE simulations, manufacturing data, as well as additional problems for students and instructors.

Electrical Machine Drives Control

An accessible introduction to all important aspects of electric machines, covering dc, induction, and synchronous machines. Also addresses modern techniques of control, power electronics, and applications. Exposition builds from first principles, making this book accessible to a wide audience. Contains a large number of problems and worked examples.

Electric Machines

Very Good,No Highlights or Markup,all pages are intact.

Principles of Electric Machines and Power Electronics

Principles of Electric Machines and Power Electronics, Third Edition combines the traditional areas of electric machinery with the latest in modern control and power electronics. Multi-machine systems, brushless motors, and switched reluctance motors are covered, as well as constant flux and constant current operation of induction motors. Additional material is included on new solid state devices such as Insulated Gate Bipolar Transistors and MOS-Controlled Thyristors.

Principles of Electric Machines with Power Electronic Applications

The two major broad applications of electrical energy are information processing and energy processing. Hence, it is no wonder that electric machines have occupied a large and revered space in the field of electrical engineering. Such an important topic requires a careful approach, and Charles A. Gross' Electric Machines offers the most balanced, application-oriented, and modern perspective on electromagnetic machines available. Written in a style that is both accessible and authoritative, this book explores all aspects of electromagnetic-mechanical (EM) machines. Rather than viewing the EM machine in isolation, the author treats the machine as part of an integrated system of source, controller, motor, and load. The discussion progresses systematically through basic machine physics and principles of operation to real-world applications and relevant control issues for each type of machine presented. Coverage ranges from DC, induction, and synchronous machines to specialized machines such as transformers, translational machines, and microelectromechanical systems (MEMS). Stimulating example applications include electric vehicles, wind energy, and vertical transportation. Numerous example problems illustrate and reinforce the concepts discussed. Along with appendices filled with unit conversions and background material, Electric Machines is a succinct, in-depth, and complete guide to understanding electric machines for novel applications.

Principles of Electric Machines and Power Electronics

Intended for courses in electrical machinery in which engineering practice is emphasized, this text provides coverage of AC and DC machines and stresses industry requirements and the NEMA standards of professional engineers. Traditional theories and concepts of mechanical force are also discussed.

Electric Machines

A self-contained, comprehensive and unified treatment of electrical machines, including consideration of their control characteristics in both conventional and semiconductor switched circuits. This new edition has been expanded and updated to include material which reflects current thinking and practice. All references have been updated to conform to the latest national (BS) and international (IEC) recommendations and a new appendix has been added which deals more fully with the theory of permanent-magnets, recognising the growing importance of permanent-magnet machines. The text is so arranged that selections can be made from it to give a short course for non-specialists, while the book as a whole will prepare students for more advanced studies in power systems, control systems, electrical machine design and general industrial applications. Includes numerous worked examples and tutorial problems with answers.

Electric Machines

This book focuses on the electromagnetic and thermal modeling and analysis of electrical machines, especially canned electrical machines for hydraulic pump applications. It addresses both the principles and engineering practice, with more weight placed on mathematical modeling and theoretical analysis. This is achieved by providing in-depth studies on a number of major topics such as: can shield effect analysis, machine geometry optimization, control analysis, thermal and electromagnetic network models, magneto motive force modeling, and spatial magnetic field modeling. For the can shield effect analysis, several cases are studied in detail, including classical canned induction machines, as well as state-of-the-art canned permanent magnet machines and switched reluctance machines. The comprehensive and systematic treatment of the can effect for canned electrical machines is one of the major features of this book, which is particularly suited for readers who are interested in learning about electrical machines, especially for hydraulic pumping, deep-sea exploration, mining and the nuclear power industry. The book offers a valuable resource for researchers, engineers, and graduate students in the fields of electrical machines, magnetic and thermal engineering, etc.

Electrical Machines and Transformers

The Field Orientation Principle (FOP) constitutes a fundamental concept behind the modern technology of high-performance, vector-controlled drive systems with AC motors. The recent intense interest in these systems has been spawned by the widespread transition from DC to AC drives in industry. Induction motors, industry's traditional workhorses, are particularly well suited for FOP-based vector control. The Field Orientation Principle in Control of Induction Motors presents the FOP in a simple, easy-to-understand framework based on the space-vector dynamic model of the induction machine. Relationships between the classic phasor equivalent circuits of the motor and their vector counterparts are highlighted. A step-by-step derivation of dynamic equations of the motor provides a formal background for explanation of the basic approaches to vector control. In addition, the author presents scalar control methods for low-performance drives as an intermediate stage between uncontrolled and high-performance drives. The reader will also find a full chapter devoted to power inverters, which constitute an important component of adjustable speed AC drive systems, and a review of associated issues such as observers of motor variables, parameter estimation, adaptive tuning, and principles of the position and speed control of field-oriented induction motors. With a wealth of numerical examples and computer simulations illustrating the ideas and techniques discussed and an extensive bibliography, The Field Orientation Principle in Control of Induction Motors is a practical resource and valuable reference for researchers and students interested in motor control, power and industrial electronics, and control theory.

Electrical Machines & their Applications

The type of control system used for electrical machines depends on the use (nature of the load, operating states, etc.) to which the machine will be put. The precise type of use determines the control laws which apply. Mechanics are also very important because they affect performance. Another factor of essential importance in industrial applications is operating safety. Finally, the problem of how to control a number of different machines, whose interactions and outputs must be coordinated, is addressed and solutions are presented. These and other issues are addressed here by a range of expert contributors, each of whom are specialists in their particular field. This book is primarily aimed at those involved in complex systems design, but engineers in a range of related fields such as electrical engineering, instrumentation and control, and industrial engineering, will also find this a useful source of information.

Analysis and Mathematical Models of Canned Electrical Machine Drives

Electrical machine is a device that can convert either mechanical energy to electrical energy (generator) or electrical energy to mechanical energy (motor). Since any given electrical machine can convert power in either direction, any machine can be used as either a generator or a motor. The electric machines (EMs) for high-performance electrical power-generation systems (EPGSs) play a significant role, such as in the modern aerospace and military industries. Electrical drives play an important role as electromechanical energy converters a wide range of applications, for example machine tools in manufacturing industries, photocopies, CD player, electric windows in the car, prosthetic hands and other medical devices; some are obvious other not so, until the they fail. It is critically important that the correct drive is matched to the application with due regard to its requirements. With the recent developments in power semiconductors and microprocessors with signal processing capabilities, the technology of the modern drive system has changed dramatically in recent years.Electric Machines

And Power Systems brings together innovative trends and practices related to the broad field of electromechanics, electric machines, and power systems. It illustrates the induced enormous energy saving potential, by using high-efficiency motors. Furthermore, the most important barriers to larger high-efficiency motors utilization are identified, and some incentives recommendations are given to overcome identified impediments. The subject offers a practical approach to electric machines, featuring explanations of fundamental principles, examples of real-world applications, and attention to the fine details of design and operation. It also focuses on modern control methods of induction-machine drives, such as vector and direct torque control. The book also addresses sensorless control techniques, modulation strategies, parameter identification, artificial intelligence, operation under harsh or failure conditions, and modelling of electric or magnetic quantities in electric machines.

The Field Orientation Principle in Control of Induction Motors

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

Electric Machines

This text provides a basic treatment of modern electric machine analysis that gives readers the necessary background for comprehending the traditional applications and operating characteristics of electric machines—as well as their emerging applications in modern power systems and electric drives, such as those used in hybrid and electric vehicles. Through the appropriate use of reference frame theory, Electromagnetic Motion Devices, Second Edition introduces readers to field-oriented control of induction machines, constant-torque, and constant-power control of dc, permanent-magnet ac machines, and brushless dc machines. It also discusses steady-state and transient performance in addition to their applications. Electromagnetic Motion Devices, Second Edition presents: The derivations of all machine models, starting with a common first-principle approach (based upon Ohm's, Faraday's, Ampere's, and Newton's/Euler's laws) A generalized two-phase approach to reference frame theory that can be applied to the ac machines featured in the book The influences of the current and voltage constraints in the torque-versus-speed profile of electric machines operated with an electric drive Complete with slides, videos, animations, problems & solutions Thoroughly classroom tested and complete with a supplementary solutions manual and video library, Electromagnetic Motion Devices, Second Edition is an invaluable book for anyone interested in modern machine theory and applications. If you would like access to the solutions manual and video library, please send an email to: ieeeproposals@wiley.com.

Control Methods for Electrical Machines

This book brings together in a single volume the theory, construction, design, control electronics, and in-depth analysis of several non-traditional machines such as stepper motors, switched reluctance motors, permanent magnet DC machines, brushless DC machines, and linear induction machines. These machines are finding ever-increasing applications, typically in position control systems, robotics

and mechatronics, electric vehicles, and high speed transportation. A particular feature of this book is that it does not stop at the basic principles of these complex machines but goes on to cover recent developments and current research, making it useful for senior graduate students and research scholars in the field of electrical machines and drives.

Electrical Machinery

Electric energy is arguably a key agent for our material prosperity. With the notable exception of photovoltaic generators, electric generators are exclusively used to produce electric energy from mechanical energy. More than 60% of all electric energy is used in electric motors for useful mechanical work in various industries. This book presents the modeling, performance, design, and control of reluctance synchronous and flux-modulation machines developed for higher efficiency and lower cost. It covers one- and three-phase reluctance synchronous motors in line-start applications and various reluctance flux-modulation motors in pulse width modulation converter-fed variable speed drives. FEATURES Presents basic and up-to-date knowledge about the topologies, modeling, performance, design, and control of reluctance synchronous machines. Includes information on recently introduced reluctance flux-modulation electric machines (switched- flux, flux-reversal, Vernier, transverse flux, claw pole, magnetic-geared dual-rotor, brushless doubly fed, etc.). Features numerous examples and case studies throughout. Provides a comprehensive overview of all reluctance electric machines.

Electric Machines and Power Systems

Modeling and High Performance Control of Electric Machines introduces you to both the modeling and control of electric machines. The direct current (DC) machine and the alternating current (AC) machines (induction, PM synchronous, and BLDC) are all covered in detail. The author emphasizes control techniques used for high-performance applications, specifically ones that require both rapid and precise control of position, speed, or torque. You'll discover how to derive mathematical models of the machines, and how the resulting models can be used to design control algorithms that achieve high performance. Graduate students studying power and control as well as practicing engineers in industry will find this a highly readable text on the operation, modeling, and control of electric machines. An Instructor's Manual presenting detailed solutions to all the problems in the book is available from the Wiley editorial department. An Instructor Support FTP site is also available.

Power Electronics and Motor Drives

Traditionally, electrical machines are classi?ed into d. c. commutator (brushed) machines, induction (asynchronous) machines and synchronous machines. These three types of electrical machines are still regarded in many academic curricula as fundamental types, despite that d. c. brushed machines (except small machines) have been gradually abandoned and PM brushless machines (PMBM) and switched reluctance machines (SRM) have been in mass p- duction and use for at least two decades. Recently, new topologies of high torque density motors, high speed motors, integrated motor drives and special motors have been developed. Progress in electric machines technology is stimulated by new materials, new areas of applications, impact of power electronics, need for energy saving and new technological challenges. The development of electric machines in the next few years will mostly be stimulated by computer hardware, residential and public applications and transportation systems (land, sea and air). At many Universities teaching and research strategy oriented towards el- trical machinery is not up to date and has not been changed in some co- tries almost since the end of the WWII.
In spite of many excellent academic research achievements, the academia–industry collaboration and technology transfer are underestimated or, quite often, neglected. Underestimation of the role of industry, unfamiliarity with new trends and restraint from technology transfer results, with time, in lack of external ?nancial support and drastic - cline in the number of students interested in Power Electrical Engineering.

Electromechanical Motion Devices

Switched reluctance motors have steadily increased in commercial importance since their introduction in the early 1980's, while their technology - especially of their electronic control - has made great progress. Their unique characteristics introduce a delicate balance, in which the copper and iron are diminished in quantity, complexity and cost, in favour of a greater reliance on sophistication in the controller. Thus mastery of the control is the key challenge in the application of these machines. This book is intended for engineer's in industry and in the large research community in electrical machines

and drives. It introduces the techniques for controlling switched reluctance machines, starting from first principles and building up to the most advanced forms of sensorless control. It covers the recent advances in electronic control and includes aspects of motion control, automation, acoustic noise reduction and energy efficiency. Covers the recent changes in control technology Includes up-to-date equipment and methods Contains applications and case studies

Special Electric Machines

A guide to drives essential to electric vehicles, wind turbines, and other motor-driven systems Analysis and Control of Electric Drives is a practical and comprehensive text that offers a clear understanding of electric drives and their industrial applications in the real-world including electric vehicles and wind turbines. The authors—noted experts on the topic—review the basic knowledge needed to understand electric drives and include the pertinent material that examines DC and AC machines in steady state using a unique physics-based approach. The book also analyzes electric machine operation under dynamic conditions, assisted by Space Vectors. The book is filled with illustrative examples and includes information on electric machines with Interior Permanent Magnets. To enhance learning, the book contains end-of-chapter problems and all topics covered use computer simulations with MATLAB Simulink® and Sciamble® Workbench software that is available free online for educational purposes. This important book: Explores additional topics such as electric machines with Interior Permanent Magnets Includes multiple examples and end-of-chapter homework problems Provides simulations made using MATLAB Simulink® and Sciamble® Workbench, free software for educational purposes Contains helpful presentation slides and Solutions Manual for Instructors; simulation files are available on the associated website for easy implementation A unique feature of this book is that the simulations in Sciamble® Workbench software can seamlessly be used to control experiments in a hardware laboratory Written for undergraduate and graduate students, Analysis and Control of Electric Drives is an essential guide to understanding electric vehicles, wind turbines, and increased efficiency of motor-driven systems.

Reluctance Electric Machines

Unlike some other reproductions of classic texts (1) We have not used OCR(Optical Character Recognition), as this leads to bad quality books with introduced typos. (2) In books where there are images such as portraits, maps, sketches etc We have endeavoured to keep the quality of these images, so they represent accurately the original artefact. Although occasionally there may be certain imperfections with these old texts, we feel they deserve to be made available for future generations to enjoy.

Modeling and High Performance Control of Electric Machines

This comprehensive, up-to-date introduction to Electrical Machines is designed to meet the needs of undergraduate electrical engineering students. It presents the essential principles of rotating machines and transformers. The emphasis is on the performance, though the book also introduces the salient features of electrical machine design. The book provides accessible, student-friendly coverage of dc machines, transformers, three-phase induction motor, single-phase induction motor, fractional horsepower motors, and synchronous machines. The clear writing style of the book enhanced by illustrative figures and simplified explanations of the fundamentals, makes it an ideal text for gaining a thorough understanding of the subject of electrical machines. Key Features Include: •Detailed coverage of the construction of electrical machines. •Lucid explanations of the principles of operation of electrical machines. •Methods of testing of electrical machines. •Performance calculations of electrical machines. •Wealth of diverse solved examples in each chapter to illustrate the application of theory to practical problems. •Salient features of design of electrical machines. •Objective type questions to help students prepare for competitive exams.

Electrical Machines

A unique approach to sensorless control and regulator design of electric drives Based on the author's vast industry experience and collaborative works with other industries, Control of Electric Machine Drive Systems is packed with tested, implemented, and verified ideas that engineers can apply to everyday problems in the field. Originally published in Korean as a textbook, this highly practical updated version features the latest information on the control of electric machines and apparatus, as well as a new chapter on sensorless control of AC machines, a topic not covered in any other publication. The book

begins by explaining the features of the electric drive system and trends of development in related technologies, as well as the basic structure and operation principles of the electric machine. It also addresses steady state characteristics and control of the machines and the transformation of physical variables of AC machines using reference frame theory in order to provide a proper foundation for the material. The heart of the book reviews several control algorithms of electric machines and power converters, explaining active damping and how to regulate current, speed, and position in a feedback manner. Seung-Ki Sul introduces tricks to enhance the control performance of the electric machines, and the algorithm to detect the phase angle of an AC source and to control DC link voltages of power converters. Topics also covered are: Vector control Control algorithms for position/speed sensorless drive of AC machines Methods for identifying the parameters of electric machines and power converters The matrix algebra to model a three-phase AC machine in d-q-n axes Every chapter features exercise problems drawn from actual industry experience. The book also includes more than 300 figures and offers access to an FTP site, which provides MATLAB programs for selected problems. The book's practicality and realworld relatability make it an invaluable resource for professionals and engineers involved in the research and development of electric machine drive business, industrial drive designers, and senior undergraduate and graduate students. To obtain instructor materials please send an email to pressbooks@ieee.org To visit this book's FTP site to download MATLAB codes, please click on this link: ftp://ftp.wiley.com/public/sci_tech_med/electric_machine/ MATLAB codes are also downloadable from Wiley Booksupport Site at http://booksupport.wiley.com

Advancements in Electric Machines

Excerpt from Electrical Machinery: Principles, Operation and Management We want to make this a better and more helpful book each time it is revised in the future. Therefore, if any reader finds in it anything which he cannot understand, will he please write the author about it? Also, if you find any errors - some errors always, regardless Of how carefully the checking has been done, creep into every technical book - please advise us; they will be corrected in the next edition. Finally, we will be most grate ful for all suggestions for the future enlargement or improve ment of the book, in any manner whatsoever. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

Electronic Control of Switched Reluctance Machines

Adapted from an updated version of the author's classic Electric Power System Design and Analysis, with new material designed for the undergraduate student and professionals new to Power Engineering. The growing importance of renewable energy sources, control methods and mechanisms, and system restoration has created a need for a concise, comprehensive text that covers the concepts associated with electric power and energy systems. Introduction to Electric Power Systems fills that need, providing an up-to-date introduction to this dynamic field. The author begins with a discussion of the modern electric power system, centering on the technical aspects of power generation, transmission, distribution, and utilization. After providing an overview of electric power and machine theory fundamentals, he offers a practical treatment-focused on applications-of the major topics required for a solid background in the field, including synchronous machines, transformers, and electric motors. He also furnishes a unique look at activities related to power systems, such as power flow and control, stability, state estimation, and security assessment. A discussion of present and future directions of the electrical energy field rounds out the text. With its broad, up-to-date coverage, emphasis on applications, and integrated MATLAB scripts, Introduction to Electric Power Systems provides an ideal, practical introduction to the field-perfect for self-study or short-course work for professionals in related disciplines.

Analysis and Control of Electric Drives

The text starts with basic functionality and the role of electrical machines in their typical applications. The effort of applying coordinate transforms is justified by obtaining a more intuitive, concise and easy-to-use model. Mathematics reduced to a necessary minimum, priority is given to bringing up the system view and explaining the use and external characteristics of machines on their electrical

and mechanical ports. The aspects of machine design and construction are of secondary importance. Covering the most relevant concepts relating to machine size, torque and power, the book explains the losses and secondary effects, outlining cases and conditions where some secondary phenomena are neglected. While the goal of developing and using machine mathematical models, equivalent circuits and mechanical characteristics persists through the book, the focus is kept on physical insight of electromechanical conversion process. Design and construction of practical machines is discussed to the extent needed to understand the principles of operation, power losses and cooling, and the problems of power supply and control of electric machines. Details such as the slot shape and the disposition of permanent magnets are covered and their effects on the machine parameters and performance.

Electrical MacHinery; Principles, Operation and Management

The purpose of this book is to familiarize the reader with all aspects of electrical drives. It contains a comprehensive user-friendly introductory text.

ELECTRICAL MACHINES

Electrical Machinery