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This study guide is designed for students taking courses in DC electric machines, principles of electromechanical energy conversion, and magnetic circuit analysis. The textbook includes examples, questions, and exercises that will help electrical engineering students to review and sharpen their knowledge of the subject and enhance their performance in the classroom. Offering detailed solutions, multiple methods for solving problems, and clear explanations of concepts, this hands-on guide will improve student's problem-solving skills and basic and advanced understanding of the topics covered.

Matrix Analysis of Electrical Machinery, Second Edition is a 14-chapter edition that covers the systematic analysis of electrical machinery performance. This edition discusses the principles of various mathematical operations and their application to electrical machinery performance calculations. The introductory chapters deal with the matrix representation of algebraic equations and their application to static electrical networks. The following chapters describe the fundamentals of different transformers and rotating machines and present torque analysis in terms of the currents based on the principle of the conservation of energy. A chapter focuses on a number of linear transformations commonly used in machine analysis. This edition also describes the performance of other electrical machineries, such as direct current, single-phase and polyphase commutator, and alternating current machines. The concluding chapters cover the analysis of small oscillations and other machine problems. This edition is intended for readers who have some knowledge of or are concurrently studying the physical nature of electrical machines.

Presents applied theory and advanced simulation techniques for electric machines and drives This book combines the knowledge of experts from both academia and the software industry to present theories of multiphysics simulation by design for electrical machines, power electronics, and drives. The comprehensive design approach described within supports new applications required by technologies sustaining high drive efficiency. The highlighted framework considers the electric machine at the heart of the entire electric drive. The book also emphasizes the simulation by design concept—a concept that frames the entire highlighted design methodology, which is described and illustrated by various advanced simulation technologies. Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives begins with the basics of electrical machine design and manufacturing tolerances. It also discusses fundamental aspects of the state of the art design process and includes examples from industrial practice. It explains FEM-based analysis techniques for electrical machine design—providing details on how it can be employed in ANSYS Maxwell software. In addition, the book covers advanced magnetic material modeling capabilities employed in numerical computation; thermal analysis; automated optimization for electric machines; and power electronics and drive systems. This valuable resource: Delivers the multi-physics know-how based on practical electric machine design methodologies Provides an extensive overview of electric machine design optimization and its integration with power electronics and drives Incorporates case studies from industrial practice and research and development projects Multiphysics Simulation by Design for Electrical Machines, Power Electronics and Drives is an incredibly helpful book for design engineers, application and system engineers, and technical professionals. It will also benefit graduate engineering students with a strong interest in electric machines and drives.

Partial Differential Equations presents a balanced and comprehensive introduction to the concepts and techniques required to solve problems containing unknown functions of multiple variables. While focusing on the three most classical partial differential equations (PDEs)—the wave, heat, and Laplace equations—this detailed text also presents a broad practical perspective that merges mathematical concepts with real-world application in diverse areas including molecular structure, photon and electron interactions, radiation of electromagnetic waves, vibrations of a solid, and many more. Rigorous pedagogical tools aid in student comprehension; advanced topics are introduced frequently, with minimal technical jargon, and a wealth of exercises reinforce vital skills and invite additional self-study. Topics are presented in a logical progression, with major concepts such as wave propagation, heat and diffusion, electrostatics, and quantum mechanics placed in contexts familiar to students of various fields in science and engineering. By understanding the properties and applications of PDEs, students will be equipped to better analyze and interpret central processes of the natural world.

This seventh edition of Fitzgerald and Kingsley's Electric Machinery by Stephen Umans was developed recognizing the strength of this classic text since its first edition has been the emphasis on building an understanding of the fundamental physical principles underlying the performance of electric machines. Much has changed since the publication of the first edition, yet the basic physical principles remain the same, and this seventh edition is intended to retain the focus on these principles in the context of today's technology.

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.

The second edition of this must-have reference covers power quality issues in four parts, including new discussions related to renewable energy sys-

tems. The first part of the book provides background on causes, effects, standards, and measurements of power quality and harmonics. Once the basics are established the authors move on to harmonic modeling of power systems, including components and apparatus (electric machines). The final part of the book is devoted to power quality mitigation approaches and devices, and the fourth part extends the analysis to power quality solutions for renewable energy systems. Throughout the book worked examples and exercises provide practical applications, and tables, charts, and graphs offer useful data for the modeling and analysis of power quality issues. Provides theoretical and practical insight into power quality problems of electric machines and systems 134 practical application (example) problems with solutions 125 problems at the end of chapters dealing with practical applications 924 references, mostly journal articles and conference papers, as well as national and international standards and guidelines

Electrical Machines covers the theoretical and mathematical concepts of the most commonly used electrical machines in industry and home appliances. This book presents the practical usage and functioning of electrical machines in a way which is easily understandable by the readers. It provides a different approach from other books and presents a step by step procedure on how to start and run the machine on various load, operating, and testing conditions and connections. It also presents a complete set of readings, calculations, and graphs/plots performed on standard electrical machines with rated voltage and current. Each chapter contains answers to questions related to particular machines and testing conditions/operations, solutions to numerical problems, and some exercise problems for practice.

More than 50,000 copies of this powerful study guide sold in the first edition! Covering a broad range of topics, from simple DC magnetic circuits to electronic control of DC and AC motors, all the concepts and their applications are clearly explained and illustrated. Includes hundreds of problems with detailed solutions to help students learn quickly and raise test scores without investing unnecessary time. Ideal for undergraduate students of electrical engineering, for solo study, and as a refresher.

The second edition of this must-have reference covers power quality issues in four parts, including new discussions related to renewable energy systems. The first part of the book provides background on causes, effects, standards, and measurements of power quality and harmonics. Once the basics are established the authors move on to harmonic modeling of power systems, including components and apparatus (electric machines). The final part of the book is devoted to power quality mitigation approaches and devices, and the fourth part extends the analysis to power quality solutions for renewable energy systems. Throughout the book worked examples and exercises provide practical applications, and tables, charts, and graphs offer useful data for the modeling and analysis of power quality issues. Provides theoretical and practical insight into power quality problems of electric machines and systems 134 practical application (example) problems with solutions 125 problems at the end of chapters dealing with practical applications 924 references, mostly journal articles and conference papers, as well as national and international standards and guidelines.

An extensive and easy-to-read guide covering the fundamental concepts of electrical machines, highlighting transformers, motors, generators and magnetic circuits. It provides in-depth discussion on construction, working principles and applications of various electrical machines. The design of transformers, functioning of generators and performance of induction motors are explained through descriptive illustrations, step-by-step solved examples and mathematical derivations. A separate chapter on special purpose machines offers important topics such as servomotors, brushless motors and stepper motors, which is useful from industrial perspective to build a customized machine. Supported by 400 solved examples, 600 figures, and more than 1000 self-assessment exercises, this is an ideal text for one or two-semester undergraduate courses on electrical machines under electrical and electronics engineering.

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.

This book endeavors to break the stereotype that basic electrical machine courses are limited only to transformers, DC brush machines, induction machines, and wound-field synchronous machines. It is intended to serve as a textbook for basic courses on Electrical Machines covering the fundamentals of the electromechanical energy conversion, transformers, classical electrical machines, i.e., DC brush machines, induction machines, wound-field rotor synchronous machines and modern electrical machines, i.e., switched reluctance machines (SRM) and permanent magnet (PM) brushless machines. In addition to academic research and teaching, the author has worked for over 18 years in US high-technology corporate businesses providing solutions to problems such as design, simulation, manufacturing and laboratory testing of large variety of electrical machines for electric trac-

tion, energy generation, marine propulsion, and aerospace electric systems.

The HVDC Light[trademark] method of transmitting electric power. Introduces students to an important new way of carrying power to remote locations. Revised, reformatted Instructor's Manual. Provides instructors with a tool that is much easier to read. Clear, practical approach.

Industrial motion control is paramount in raising productivity and quality and in reducing energy and equipment maintenance costs in all industries. Electric drives share most of industrial motion control applications. This book presents a comprehensive view of modern (variable speed) electric drives, requiring no prior knowledge of power electronics or electric machinery. It serves as an excellent source to anyone seeking thorough knowledge on topology, performance, design elements, digital simulation programs (in MATLAB) and test results, as well as practical issues in industrial drives. An interactive CD-ROM version is attached, including: the entire text, for browsing problem solutions selected slides, for presentation 8 digital simulation MATLAB-Simulink programs of various drives Electric Drives represents a new philosophy on the subject, steering its readership through the numerous advances in technology and outlining ways for more improvement in the field.

Based upon years of teaching experience, M. Abdus Salam covers the fundamentals and important topics which can help students to develop a lasting and sound knowledge of electrical machines.

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.

This book contains problems in Electrical Machines & Power Systems (Problems with Solutions). I have used these and other problems in the class room for many years. In most of the solutions I have deliberately avoided giving theoretical explanations, because an average student should know the theory well before attempting to solve any problem. However, in each chapter, I have provided a brief introduction related to the chapter so that students are made aware of the contents of the chapter before reading the problems and their solutions. The introduction related to each chapter contains Objective type Questions and their answers. The introductions contain brief notes on the topics of the chapters and also include Indian Standards for testing and maintenance of substation, equipments, transformer, overhead lines, underground cables and materials.

The importance of various electrical machines is well known in the various engineering fields. The book provides comprehensive coverage of the synchronous generators (alternators), synchronous motors, three phase and single phase induction motors and various special machines. The book is structured to cover the key aspects of the course Electrical Machines - II. The book starts with the explanation of basics of synchronous generators including construction, winding details and e.m.f. equation. The book then explains the concept of armature reaction, phasor diagrams, regulation and various methods of finding the regulation of alternator. Stepwise explanation and simple techniques used to elaborate these methods is the feature of this book. The book further explains the concept of synchronization of alternators, two reaction theory and parallel operation of alternators. The chapter on synchronous motor provides the detailed discussion of construction, working principle, behavior on load, analysis of phasor diagram, Vee and Inverted Vee curves, hunting and applications. The book further explains the three phase induction motors in detail. It includes the construction, working, effect of slip, torque equation, torque ratios, torque-slip characteristics, losses, power flow, equivalent circuit, effect of harmonics on the performance and applications. This chapter includes the discussion of induction generator and synchronous induction motor. The detailed discussion of circle diagram is also included in the book. The book teaches the various starting methods, speed control methods and electrical braking methods of three phase induction motors. Finally, the book gives the explanation of various single phase induction motors and special machines such as reluctance motor, hysteresis motor, repulsion motor, servomotors and stepper motors. The discussion of magnetic levitation is also incorporated in the book. The book uses plain, lucid language to explain each topic. The book provides the logical method of explaining the various complicated topics and stepwise methods to make the understanding easy. Each chapter is well supported with necessary illustrations, self explanatory diagrams and variety of solved problems. The book explains the philosophy of the subject which makes the understanding of the concepts very clear and makes the subject more interesting.

This text contains sufficient material for a single semester core course in electric machines and energy conversion, while allowing some selectivity among the topics covered by the latter sections of Chapters 3-7 depending on a school's curriculum. The text can work for either a course in energy design principles and analysis with an optional design project, or for a capstone design course that follows an introductory course in energy device principles. A unique feature of "Electric Machines: Analysis and Design Applying MATLAB" is its integration of the popular interactive computer software MATLAB to handle the tedious calculations arising in electric machine analysis. As a result, more exact models of devices can be retained for analysis rather than the approximate models commonly introduced for the sake of computational simplicity.

In one complete volume, this essential reference presents an in-depth overview of the theoretical principles and techniques of electrical machine design. This timely new edition offers up-to-date theory and guidelines for the design of electrical machines, taking into account recent advances in permanent magnet machines as well as synchronous reluctance machines. New coverage includes: Brand new material on the ecological impact of the motors, covering the eco-design principles of rotating electrical machines An expanded section on the design of permanent magnet synchronous machines, now reporting on the design of tooth-coil, high-torque permanent magnet machines and their properties Large updates and new material on synchronous reluctance machines, air-gap inductance, losses in and resistivity of permanent magnets (PM), operating point of loaded PM circuit, PM machine design, and minimizing the losses in electrical machines> End-of-chapter exercises and new direct design examples with methods and solutions to real design problems> A supplementary website hosts two machine design examples created with MATHCAD: rotor surface magnet permanent magnet machine and squirrel cage induction machine calculations. Also a MATLAB code for optimizing the design of an induction motor is provided.

Outlining a step-by-step sequence of machine design, this book enables electrical machine designers to design rotating electrical machines. With a thorough treatment of all existing and emerging technologies in the field, it is a useful manual for professionals working in the diagnosis of electrical machines and drives. A rigorous introduction to the theoretical principles and techniques makes the book invaluable to senior electrical engineering students, postgraduates, researchers and university lecturers involved in electrical drives technology and electromechanical energy conversion.

A thoroughly updated introduction to electric machines and adjustable speed drives All machines have power requirements, and finding the right balance of economy and performance can be a challenge to engineers. Principles of Electric Machines with Power Electronic Applications provides a thorough grounding in the principles of electric machines and the closely related area of power electronics and adjustable speed drives. Designed for both students and professionals seeking a foundation in the fundamental structure of modern-day electric power systems from a technical perspective, this lucid, succinct guide has been completely revised and updated to cover: * The fundamental underpinnings of electromechanical energy conversion devices * Transformers * Induction machines * Synchronous machines * DC machines * Power electronic components, systems, and their applications to adjustable speed drives Enhanced by numerous solved problems, sample examinations and test sets, and computer-based solutions assisted by MATLAB scripts, this new edition of Principles of Electric Machines with Power Electronic Applications serves equally well as a practical reference and a handy self-study guide to help engineers maintain their professional edge in this essential field.

Market_Desc: · Electrical Engineers· Students· Professors Special Features: · The book has the step by step presentation that allows readers to fully understand each topic before moving on to the next. About The Book: This text combines the traditional areas of electric machinery with the latest in modern control and power electronics. A large number of topics have been added and revised to include state of the art coverage. Multi-machine systems, brushless motors and switched reluctance motors are now covered, as well as constant flux and constant current operation of induction motors. Additional material has been added on new solid state devices such as Insulated Gate Bipolar Transistors and MOS-Controlled Thyristors.

Introducing a new edition of the popular reference on machine analysis Now in a fully revised and expanded edition, this widely used reference on machine analysis boasts many changes designed to address the varied needs of engineers in the electric machinery, electric drives, and electric power industries. The authors draw on their own extensive research efforts, bringing all topics up to date and outlining a variety of new approaches they have developed over the past decade. Focusing on reference frame theory that has been at the core of this work since the first edition, this volume goes a step further, introducing new material relevant to machine design along with numerous techniques for making the derivation of equations more direct and easy to use. Coverage includes: Completely new chapters on winding functions and machine design that add a significant dimension not found in any other text A new formulation of machine equations for improving analysis and modeling of machines coupled to power electronic circuits Simplified techniques throughout, from the derivation of torque equations and synchronous machine analysis to the analysis of unbalanced operation A unique generalized approach to machine parameters identification A first-rate resource for engineers wishing to master cutting-edge techniques for machine analysis, Analysis of Electric Machinery and Drive Systems is also a highly useful guide for students in the field.

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. Important Notice: Media content referenced within the product description or the product text may not be available in the ebook version.

This book is intended for a course that combines machinery and power systems into one semester. It is designed to be flexible and to allow instructors to choose chapters a la carte, so the instructor controls the emphasis. The text gives students the information they need to become real-world engineers, focusing on principles and teaching how to use information as opposed to doing a lot of calculations that would rarely be done by a practicing engineer. The author compresses the material by focusing on its essence, underlying principles. MATLAB is used throughout the book in examples and problems.

A comprehensive text, combining all important concepts and topics of Electrical Machines and featuring exhaustive simulation models based on MATLAB/Simulink Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink provides readers with a basic understanding of all key concepts related to electrical machines (including working principles, equivalent circuit, and analysis). It elaborates the fundamentals and offers numerical problems for students to work through. Uniquely, this text includes simulation models of every type of machine described in the book, enabling students to design and analyse machines on their own. Unlike other books on the subject, this book meets all the needs of students in electrical machine courses. It balances analytical treatment, physical explanation, and hands-on examples and models with a range of difficulty levels. The authors present complex ideas in simple, easy-to-understand language, allowing students in all engineering disciplines to build a solid foundation in the principles of electrical machines. This book: Includes clear elaboration of fundamental concepts in the area of electrical machines, using simple language for optimal and enhanced learning Provides wide coverage of topics, aligning with the electrical machines syllabi of most international universities Contains extensive numerical problems and offers MATLAB/Simulink simulation models for the covered machine types Describes MATLAB/Simulink modelling procedure and introduces the modelling environment to novices Covers magnetic circuits, transformers, rotating machines, DC machines, electric vehicle motors, multiphase machine concept, winding design and details, finite element analysis, and more Electrical Machine Fundamentals with Numerical Simulation using MATLAB/Simulink is a well-balanced textbook perfect for undergraduate students in all engineering majors. Additionally, its comprehensive treatment of electrical machines makes it suitable as a reference for researchers in the field.

For this revision of their bestselling junior- and senior-level text, Guru & Hiziroglu have incorporated eleven years of cutting-edge developments in the field since Electric Machinery & Transformers was first published. Completely re-written, the new Second Edition also incorporates suggestions from students and instructors who have used the First Edition, making it the best text available for junior- and senior-level courses in electric machines. The new edition features a wealth of new and improved problems and examples, designed to complement the authors' overall goal of encouraging intuitive reasoning rather than rote memorization of material. Chapter 3, which presents the conversion of energy, now includes: analysis of magnetical-

ly coupled coils, induced emf in a coil rotating in a uniform magnetic field, induced emf in a coil rotating in a time-varying magnetic field, and the concept of the revolving field. All problems and examples have been rigorously tested using Mathcad.

Recent trends in engineering show increased emphasis on integrated analysis, design, and control of advanced electromechanical systems, and their scope continues to expand. Mechatronics—a breakthrough concept—has evolved to attack, integrate, and solve a variety of emerging problems in engineering, and there appears to be no end to its application. It has become essential for all engineers to understand its basic theoretical standpoints and practical applications. *Electromechanical Systems, Electric Machines, and Applied Mechatronics* presents a unique combination of traditional engineering topics and the latest technologies, integrated to stimulate new advances in the analysis and design of state-of-the-art electromechanical systems. With a focus on numerical and analytical methods, the author develops the rigorous theory of electromechanical systems and helps build problem-solving skills. He also stresses simulation as a critical aspect of developing and prototyping advanced systems. He uses the MATLAB™ environment for his examples and includes a MATLAB™ diskette with the book, thus providing a solid introduction to this standard engineering tool. Readable, interesting, and accessible, *Electromechanical Systems, Electric Machines, and Applied Mechatronics* develops a thorough understanding of the integrated perspectives in the design and analysis of electromechanical systems. It covers the basic concepts in mechatronics, and with numerous worked examples, prepares the reader to use the results in engineering practice. Readers who master this book will know what they are doing, why they are doing it, and how to do it.

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.

Electrical Machines with MATLAB® encapsulates the invaluable insight and experience that eminent instructor Turan Gönen has acquired in almost 40 years of teaching. With simple, versatile content that separates it from other texts on electrical machines, this book is an ideal self-study tool for advanced students in electrical and other areas of engineering. In response to the often inadequate, rushed coverage of fundamentals in most basic circuit analysis books and courses, this resource is intelligently designed, easy to read, and packed with in-depth information on crucial concepts. Topics include three-phase circuits, power measurement in AC circuits, magnetic circuits, transformers, and induction, synchronous, and direct-current machines. The book starts by reviewing more basic concepts, with numerous examples to clarify their application. It then explores new "buzzword"

topics and developments in the area of electrical machine applications and electric power systems, including: Renewable energy Wind energy and related conversion Solar energy Energy storage The smart grid Using International Systems (IS) units throughout, this cross-disciplinary design guide delves into commonly used vocabulary and symbols associated with electrical machinery. Several new appendices contain tools such as an extensive glossary to explain important terms. Outlining a wide range of information—and the many different ways to apply it—this book is an invaluable, multi-functional resource for students and professors, as well as practicing professionals looking to refresh and update their knowledge.

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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 (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.

Provides insight on both classical means and new trends in the application of power electronic and artificial intelligence techniques in power system operation and control This book presents advanced solutions for power system controllability improvement, transmission capability enhancement and operation planning. The book is organized into three parts. The first part describes the CSC-HVDC and VSC-HVDC technologies, the second part presents the FACTS devices, and the third part refers to the artificial intelligence techniques. All technologies and tools approached in this book are essential for power system development to comply with the smart grid requirements. Discusses detailed operating principles and diagrams, theory of modeling, control strategies and physical installations around the world of HVDC and FACTS systems Covers a wide range of Artificial Intelligence techniques that are successfully applied for many power system problems, from planning and monitoring to operation and control Each chapter is carefully edited, with drawings and illustrations that helps the reader to easily understand the principles of operation or application Advanced Solutions in Power Systems: HVDC, FACTS, and Artificial Intelligence is written for graduate students, researchers in transmission and distribution networks, and power system operation. This book also serves as a reference for professional software developers and practicing engineers.

Retaining The Student-Friendly Style Of The First Edition, This Unique Text Fills A Gap In The Available Electronics And Computer Technology Texts By Devoting More Time To Current Industrial Requirements. It Presents Ac Machines And Transformers Before Dc Machines, Motors Before Generators, Gives More Attention To Machine Characteristics, And Makes Extensive Use Of Nema Standards And Tables. The Self-Contained Nature Of Each Chapter Gives Instructors Significant Freedom In Course Development.