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Handbook of Electric Motors Permanent Magnet Synchronous Machines Electric Machines for Smart Grids Applications Fluid Power Pumps and Motors: Analysis, Design and Control Energy Efficiency in Motor Driven Systems Industrial Energy Management: Principles and Applications America's Energy Future Electric Motors & Control Techniques Sensorless AC Electric Motor Control Modeling and Simulation Energy Efficiency in Motor Driven Systems Build Your Own Electric Vehicle, Third Edition Energy-efficient Motor Systems Renewable and Efficient Electric Power Systems Energy Efficiency Improvements in Electric Motors and Drives Electrical Motor Products Energy-Efficient Electric Motors, Third Edition, Revised and Expanded Energy in Developing Countries Electric Motors and Drives Control of Permanent Magnet Synchronous Motors Electric Powertrain Cyclopedica of Applied Electricity: Motors; Measurements; Lighting World on the Edge Energy Efficient Electric Motor Selection Handbook Transformer and Inductor Design Handbook, Third Edition Electric Motor Handbook Assessment of Fuel Economy Technologies for Light-Duty Vehicles The Electrical Engineer Electrical Contacts New Trends in Electrical Vehicle Powertrains No-regret Potentials in Energy Conservation Energy-Efficient Electric Motors and their Applications Energy

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Efficiency Improvements in Smart Grid Components
Permanent Magnet Motor Technology
Permanent Magnet Motor Technology
Energy-Efficient Electric Motors, Revised and Expanded
Handbook of Small Electric Motors
Switched Reluctance Motor Drives
Electric Motor Control
Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles

Handbook of Electric Motors

(2) Do existing estimates of the no-regret potential stand up to re-evaluation within this framework? As a result of this analysis the size of previous estimates for no-regret potentials may be modified - in terms of energy savings or in financial terms. On the basis of these findings, we will approach the overriding third research question: (3) How large is the no-regret potential and what determines its size? The following chapter will provide a fuller account of the debate on no-regret potentials. This will be complemented by a detailed theory-based definition of no regret potentials in Chapter 2. The thesis will focus mostly on the micro-level of analysis. But we will also address the implications of our findings for the analysis of energy saving measures and policies at more aggregate levels, notably within a feasibility study for adapting a model which represents the level of the national economy. The debate on no-regret potentials 1 origin, context, issues The term "no-regret potentials" was coined during the debate on climate change. It designates

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opportunities for the reduction of greenhouse gas (GHG) emissions ". . . that are worth undertaking whether or not there are climate-related reasons for doing so. " (IPCC 1996, p. 271). In the IPCC's Third Assessment Report (TAR), no regret potentials are increasingly equated with GHG emission reduction potentials at negative (net) costs (IPCC 2001, p. 21).

Permanent Magnet Synchronous Machines

In this revised and expanded edition, Howard E. Jordan explains-in a clear manner-the technology of energy efficient electric motors including motor losses, testing, and efficiency labeling. He also discusses how to calculate the return on investment for an energy efficient motor in addition to several other subjects related to effective motor applications. New chapters explore permanent magnet synchronous motors and transistor pulse-width-modulated inverters. Engineers, purchasing managers, and executives who make decisions on motor selection will find this an invaluable reference.

Electric Machines for Smart Grids Applications

Revised and updated throughout, the second edition of Energy-Efficient Electric Motors provides guidelines for picking and using electric motors on an energy

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conservation and life-cycle cost basis - emphasizing both single- and three-phase motors in the 1- to 200-hp range that offer maximum opportunities for energy savings.;Maintaining the features of the first edition, this concise resource: explains current improvements in electric motor capabilities and recently adopted NEMA energy-efficient motor standards; contains a new section about the power factor with nonlinear loads; covers the performance of polyphase induction motors supplied by adjustable frequency power supplies for several types of loads, presents information on numerous kinds of power semiconductors used in variable-frequency power supply systems; provides expanded coverage comparing various types of adjustable speed drives when applied to constant torque and variable torque loads; and contains a new summary checklist criteria for selecting induction motors for adjustable frequency drive systems.;Generously illustrated with nearly 200 figures and tables, the second edition of Energy-Efficient Electric Motors is timely reading for electrical, electronics, mechanical, consulting, specifying, and plant engineers; plant and purchasing managers; original equipment, heating, ventilating, and air-conditioning manufacturers; and continuing-education courses in these disciplines.

Fluid Power Pumps and Motors: Analysis, Design and Control

Energy Efficiency in Motor Driven Systems

Electrical motor products reviews the energy efficiency management laws for electrical motor products in United States, European Union (EU) and China. The energy efficiency certification requirements for the electrical motor products vary from country to country and are summarised here. International standards, testing methods and certification requirements for specific electrical motor products are discussed, including electric motors, pumps and fans. Finally, methods for improving energy efficiency are examined. Reviews the energy efficiency management laws for electrical motor products in United States, European Union (EU) and China Highlights the importance of energy efficiency for electrical motor products Documents energy efficiency certification requirements for electrical motor products and how they vary from country to country

Industrial Energy Management: Principles and Applications

Electric Motor Control: DC, AC, and BLDC Motors introduces practical drive techniques of electric motors to enable stable and efficient control of many application systems, also covering basic principles of high-performance motor control techniques, driving methods, control theories and power converters. Electric motor drive systems play a critical role in home appliances, motor vehicles,

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robotics, aerospace and transportation, heating ventilating and cooling equipment's, robotics, industrial machinery and other commercial applications. The book provides engineers with drive techniques that will help them develop motor drive system for their applications. Includes practical solutions and control techniques for industrial motor drive applications currently in use Contains MATLAB/Simulink simulation files Enables engineers to understand the applications and advantages of electric motor drive systems

America's Energy Future

Electric Motors & Control Techniques

Sensorless AC Electric Motor Control

The importance of permanent magnet (PM) motor technology and its impact on electromechanical drives has grown exponentially since the publication of the bestselling second edition. The PM brushless motor market has grown considerably faster than the overall motion control market. This rapid growth makes it essential for electrical and electromechanical engineers and students to stay up-to-date on

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developments in modern electrical motors and drives, including their control, simulation, and CAD. Reflecting innovations in the development of PM motors for electromechanical drives, *Permanent Magnet Motor Technology: Design and Applications, Third Edition* demonstrates the construction of PM motor drives and supplies ready-to-implement solutions to common roadblocks along the way. This edition supplies fundamental equations and calculations for determining and evaluating system performance, efficiency, reliability, and cost. It explores modern computer-aided design of PM motors, including the finite element approach, and explains how to select PM motors to meet the specific requirements of electrical drives. The numerous examples, models, and diagrams provided in each chapter facilitate a lucid understanding of motor operations and characteristics. This 3rd edition of a bestselling reference has been thoroughly revised to include: Chapters on high speed motors and micromotors Advances in permanent magnet motor technology Additional numerical examples and illustrations An increased effort to bridge the gap between theory and industrial applications Modified research results The growing global trend toward energy conservation makes it quite possible that the era of the PM brushless motor drive is just around the corner. This reference book will give engineers, researchers, and graduate-level students the comprehensive understanding required to develop the breakthroughs that will push this exciting technology to the forefront.

Modeling and Simulation

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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 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

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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

Energy Efficiency in Motor Driven Systems

Motors use more than half of all electricity. This book outlines an approach for increasing motor and motor system efficiency through high-efficiency motors, optimized controls, improved component sizing and repair, better transmission hardware, and more comprehensive monitoring and maintenance. In addition to explaining technical opportunities in language understandable to non-engineers, the book reviews what is known about the existing motor stock and its use, chronicles experience to date with drive power programs and policies, and offers recommendations for future efforts. Full application of the measures described can cut U.S. electricity demand by up to 20 percent, save motor users and utilities

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billions of dollars, reduce pollutant emissions, and enhance productivity. The book was written by an interdisciplinary team of engineers, energy analysts, and program planners who collectively have over 50 years of experience in the energy efficiency field.

Build Your Own Electric Vehicle, Third Edition

This book reports the state of the art of energy-efficient electrical motor driven system technologies, which can be used now and in the near future to achieve significant and cost-effective energy savings. It includes the recent developments in advanced electrical motor end-use devices (pumps, fans and compressors) by some of the largest manufacturers. Policies and programs to promote the large scale penetration of energy-efficient technologies and the market transformation are featured in the book, describing the experiences carried out in different parts of the world. This extensive coverage includes contributions from relevant institutions in the Europe, North America, Latin America, Africa, Asia, Australia and New Zealand.

Energy-efficient Motor Systems

Renewable and Efficient Electric Power Systems

Electric Motors and Drives: Fundamentals, Types and Applications provides information regarding the inner workings of motor and drive system. The book is comprised of nine chapters that cover several aspects and types of motor and drive systems. Chapter 1 discusses electric motors, and Chapter 2 deals with power electronic converters for motor drives. Chapter 3 covers the conventional d.c. motors, while Chapter 4 tackles inductions motors – rotating field, slip, and torque. The book also talks about the operating characteristics of induction motors, and then deals with the inverter-fed induction motor drives. The stepping motor systems; the synchronous, switched reluctance, and brushless d.c. drives; and the motor/drive selection are also covered. The text will be of great use to individuals who wish to familiarize themselves with motor and drive systems.

Energy Efficiency Improvements in Electric Motors and Drives

This book is intended for academics and engineers who are working in universities, research institutes, utility and industry sectors wishing to enhance their idea and get new information about the energy efficiency developments in smart grid. The readers will gain special experience with deep information and new idea about the energy efficiency topics. This book includes lots of problems and solutions that can

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easily be understood and integrated into larger projects and researches. The book enables some studies about monitoring, management and measures related to smart grid components, Energy Efficiency Improvements in smart grid components and new intelligent Control strategies for Distributed energy resources, boosting PV systems, electrical vehicles, etc. It included optimization concepts for power system, promoting value propositions; protection in power system, etc. The book also has some recent developments in solar cell technologies, LEDs and non thermal plasma technology. As I enjoyed preparing this book I am sure that it will be very valuable for large sector of readers.

Electrical Motor Products

Energy-Efficient Electric Motors, Third Edition, Revised and Expanded

A COMPLETE GUIDE TO FLUID POWER PUMPS AND MOTORS Written by an expert in the field of fluid power, this book provides proven methods for analyzing, designing, and controlling high-performance axial-piston swash-plate type machinery. Fluid Power Pumps and Motors: Analysis, Design, and Control offers a comprehensive mechanical analysis of hydrostatic machines and presents

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meticulous design guidelines for machine components. Detailed diagrams and useful formulas are included throughout. Using the results and techniques employed in this practical resource will reduce product delivery lead-time and costs to increase overall efficiency. COVERAGE INCLUDES: Fluid properties | Fluid mechanics | Mechanical analysis Piston pressure | Steady-state results | Machine efficiency Designing a cylinder block, valve plate, piston, slipper, swash plate, and shaft | Displacement controlled pumps Pressure controlled pumps

Energy in Developing Countries

*A complete, definitive source for the design, manufacture, application, and testing of small electric motors less than ten horsepower *Gives motor design engineers, test technicians, and engineers top-to-bottom coverage of materials used in motor manufacturing, as well as how-to advice on selecting the right design and assembly method *Includes a full section on motor applications

Electric Motors and Drives

BUILD, CONVERT, OR BUY A STATE-OF-THE-ART ELECTRIC VEHICLE Thoroughly revised and expanded, Build Your Own Electric Vehicle, Third Edition, is your go-to guide for converting an internal combustion engine vehicle to electric or building

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an EV from the ground up. You'll also find out about the wide variety of EVs available for purchase and how they're being built. This new edition details all the latest breakthroughs, including AC propulsion and regenerative braking systems, intelligent controllers, batteries, and charging technologies. Filled with updated photos, this cutting-edge resource fully describes each component--motor, battery, controller, charger, and chassis--and provides illustrated, step-by-step instructions on how to assemble all the parts. Exclusive web content features current supplier and dealer lists. Custom-built for environmentalists, engineers, students, hobbyists, and mechanics, this hands-on guide puts you in the fast lane toward a cost-effective, reliable green machine. Build Your Own Electric Vehicle, Third Edition, covers: Environmental impact and energy savings The best EV for you--purchase trade-offs, conversion trade-offs, and conversion costs Chassis and design Different types of electric motors and controllers Lithium EV batteries Chargers and electrical systems EV builds and conversions Licensing and insuring your EV Driving and maintenance List of manufacturers and dealers regularly updated on website

Control of Permanent Magnet Synchronous Motors

Various combinations of commercially available technologies could greatly reduce fuel consumption in passenger cars, sport-utility vehicles, minivans, and other light-duty vehicles without compromising vehicle performance or safety. Assessment of

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Technologies for Improving Light Duty Vehicle Fuel Economy estimates the potential fuel savings and costs to consumers of available technology combinations for three types of engines: spark-ignition gasoline, compression-ignition diesel, and hybrid. According to its estimates, adopting the full combination of improved technologies in medium and large cars and pickup trucks with spark-ignition engines could reduce fuel consumption by 29 percent at an additional cost of \$2,200 to the consumer. Replacing spark-ignition engines with diesel engines and components would yield fuel savings of about 37 percent at an added cost of approximately \$5,900 per vehicle, and replacing spark-ignition engines with hybrid engines and components would reduce fuel consumption by 43 percent at an increase of \$6,000 per vehicle. The book focuses on fuel consumption--the amount of fuel consumed in a given driving distance--because energy savings are directly related to the amount of fuel used. In contrast, fuel economy measures how far a vehicle will travel with a gallon of fuel. Because fuel consumption data indicate money saved on fuel purchases and reductions in carbon dioxide emissions, the book finds that vehicle stickers should provide consumers with fuel consumption data in addition to fuel economy information.

Electric Powertrain

Written for professionals who work in electric motors; this covers updated traction applications; the latest on solid-state motor-drive controllers; electrical and

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mechanical parameters; specifications; shapes; performance; protection; and more. --

Cyclopedia of Applied Electricity: Motors; Measurements; Lighting

This book reports the state of the art of energy-efficient electrical motor driven system technologies, which can be used now and in the near future to achieve significant and cost-effective energy savings. It includes the recent developments in advanced electrical motor end-use devices (pumps, fans and compressors) by some of the largest manufacturers. Policies and programs to promote the large scale penetration of energy-efficient technologies and the market transformation are featured in the book, describing the experiences carried out in different parts of the world. This extensive coverage includes contributions from relevant institutions in the Europe, North America, Latin America, Africa, Asia, Australia and New Zealand.

World on the Edge

The electric vehicle and plug-in hybrid electric vehicle play a fundamental role in the forthcoming new paradigms of mobility and energy models. The electrification

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of the transport sector would lead to advantages in terms of energy efficiency and reduction of greenhouse gas emissions, but would also be a great opportunity for the introduction of renewable sources in the electricity sector. The chapters in this book show a diversity of current and new developments in the electrification of the transport sector seen from the electric vehicle point of view: first, the related technologies with design, control and supervision, second, the powertrain electric motor efficiency and reliability and, third, the deployment issues regarding renewable sources integration and charging facilities. This is precisely the purpose of this book, that is, to contribute to the literature about current research and development activities related to new trends in electric vehicle power trains.

Energy Efficient Electric Motor Selection Handbook

Various factors affect the performance of electrical contacts, including tribological, mechanical, electrical, and materials aspects. Although these behaviors have been studied for many years, they are not widely used or understood in practice. Combining approaches used across the globe, *Electrical Contacts: Fundamentals, Applications, and Technology* integrates advances in research and development in the tribological, material, and analytical aspects of electrical contacts with new data on electrical current transfer at the micro- and nanoscales. Taking an application-oriented approach, the authors illustrate how material characteristics, tribological behavior, and loading impact the degradation of contacts, formation of

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intermetallics, and overall reliability and performance. Coverage is divided broadly into three sections, with the first focused on mechanics, tribology, materials, current and heat transfer, and basic reliability issues of electrical contacts. The next section explores applications, such as power connections, electronic connections, and sliding contacts, while the final section presents the diagnostic and monitoring techniques used to investigate and measure phenomena occurring at electrical contact interfaces. Numerous references to current literature reflect the fact that this book is the most comprehensive survey in the field. Explore an impressive collection of data, theory, and practical applications in *Electrical Contacts: Fundamentals, Applications, and Technology*, a critical tool for anyone investigating or designing electrical equipment with improved performance and reliability in mind.

Transformer and Inductor Design Handbook, Third Edition

Industrial Energy Management: Principles and Applications provides an overall view of the energy management approach by following the stream of energy from factory boundaries to end users. All topics are examined from the point of view of plant users rather than from that of designers and only the basic concepts necessary to clarify the operation of the plants are outlined. *Industrial Energy Management: Principles and Applications* is written both as a textbook for university courses in engineering and as a work of reference for professionals in

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energy management. Readers are assumed to have a basic knowledge of thermodynamics, heat and mass transfer, electric systems and power electronics, as well as computer programming. This book can be used not only by technicians involved in the field of energy management but also by managers who may find it a useful tool for understanding investment proposals and even a spur to solicit new ones. Industrial Energy Management: Principles and Applications consists of 21 chapters concerning general principles of energy transformation and energy sources, transformation plants such as electrical substations and boiler plants, cogeneration plants, electrical and thermal fluid distribution lines, facilities plants such as pumps and fans, air compressors, cooling, HVAC and lighting systems, heat recovery equipment, principles of energy auditing and accounting by using computers, correlation between energy and waste, education in the field. At the end of the book a chapter has been dedicated to economic analysis of energy saving investments and evaluation is given of all the cases studied in the book.

Electric Motor Handbook

The why, what and how of the electric vehicle powertrain Empowers engineering professionals and students with the knowledge and skills required to engineer electric vehicle powertrain architectures, energy storage systems, power electronics converters and electric drives. The modern electric powertrain is relatively new for the automotive industry, and engineers are challenged with

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designing affordable, efficient and high-performance electric powertrains as the industry undergoes a technological evolution. Co-authored by two electric vehicle (EV) engineers with decades of experience designing and putting into production all of the powertrain technologies presented, this book provides readers with the hands-on knowledge, skills and expertise they need to rise to that challenge. This four-part practical guide provides a comprehensive review of battery, hybrid and fuel cell EV systems and the associated energy sources, power electronics, machines, and drives. The first part of the book begins with a historical overview of electromobility and the related environmental impacts motivating the development of the electric powertrain. Vehicular requirements for electromechanical propulsion are then presented. Battery electric vehicles (BEV), fuel cell electric vehicles (FCEV), and conventional and hybrid electric vehicles (HEV) are then described, contrasted and compared for vehicle propulsion. The second part of the book features in-depth analysis of the electric powertrain traction machines, with a particular focus on the induction machine and the surface- and interior-permanent magnet ac machines. The brushed dc machine is also considered due to its ease of operation and understanding, and its historical place, especially as the traction machine on NASA's Mars rovers. The third part of the book features the theory and applications for the propulsion, charging, accessory, and auxiliary power electronics converters. Chapters are presented on isolated and non-isolated dc-dc converters, traction inverters, and battery charging. The fourth part presents the introductory and applied electromagnetism required as a foundation throughout

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the book. • Introduces and holistically integrates the key EV powertrain technologies. • Provides a comprehensive overview of existing and emerging automotive solutions. • Provides experience-based expertise for vehicular and powertrain system and sub-system level study, design, and optimization. • Presents many examples of powertrain technologies from leading manufacturers. • Discusses the dc traction machines of the Mars rovers, the ultimate EVs from NASA. • Investigates the environmental motivating factors and impacts of electromobility. • Presents a structured university teaching stream from introductory undergraduate to postgraduate. • Includes real-world problems and assignments of use to design engineers, researchers, and students alike. • Features a companion website with numerous references, problems, solutions, and practical assignments. • Includes introductory material throughout the book for the general scientific reader. • Contains essential reading for government regulators and policy makers. Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles is an important professional resource for practitioners and researchers in the battery, hybrid, and fuel cell EV transportation industry. The book is a structured holistic textbook for the teaching of the fundamental theories and applications of energy sources, power electronics, and electric machines and drives to engineering undergraduate and postgraduate students. Textbook Structure and Suggested Teaching Curriculum This is primarily an engineering textbook covering the automotive powertrain, energy storage and energy conversion, power electronics, and electrical machines. A significant

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additional focus is placed on the engineering design, the energy for transportation, and the related environmental impacts. This textbook is an educational tool for practicing engineers and others, such as transportation policy planners and regulators. The modern automobile is used as the vehicle upon which to base the theory and applications, which makes the book a useful educational reference for our industry colleagues, from chemists to engineers. This material is also written to be of interest to the general reader, who may have little or no interest in the power electronics and machines. Introductory science, mathematics, and an inquiring mind suffice for some chapters. The general reader can read the introduction to each of the chapters and move to the next as soon as the material gets too advanced for him or her.

Part I Vehicles and Energy Sources Chapter 1 Electromobility and the Environment Chapter 2 Vehicle Dynamics Chapter 3 Batteries Chapter 4 Fuel Cells Chapter 5 Conventional and Hybrid Powertrains Part II Electrical Machines Chapter 6 Introduction to Traction Machines Chapter 7 The Brushed DC Machine Chapter 8 Induction Machines Chapter 9 Surface-permanent-magnet AC Machines Chapter 10: Interior-permanent-magnet AC Machines Part III Power Electronics Chapter 11 DC-DC Converters Chapter 12 Isolated DC-DC Converters Chapter 13 Traction Drives and Three-phase Inverters Chapter 14 Battery Charging Chapter 15 Control of the Electric Drive Part IV Basics Chapter 16 Introduction to Electromagnetism, Ferromagnetism, and Electromechanical Energy Conversion

The first third of the book (Chapters 1 to 6), plus parts of Chapters 14 and 16, can be taught to the general science or engineering student in the second

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or third year. It covers the introductory automotive material using basic concepts from mechanical, electrical, environmental, and electrochemical engineering. Chapter 14 on electrical charging and Chapter 16 on electromagnetism can also be used as a general introduction to electrical engineering. The basics of electromagnetism, ferromagnetism and electromechanical energy conversion (Chapter 16) and dc machines (Chapter 7) can be taught to second year (sophomore) engineering students who have completed introductory electrical circuits and physics. The third year (junior) students typically have covered ac circuit analysis, and so they can cover ac machines, such as the induction machine (Chapter 8) and the surface permanent-magnet ac machine (Chapter 9). As the students typically have studied control theory, they can investigate the control of the speed and torque loops of the motor drive (Chapter 15). Power electronics, featuring non-isolated buck and boost converters (Chapter 11), can also be introduced in the third year. The final-year (senior) students can then go on to cover the more advanced technologies of the interior-permanent-magnet ac machine (Chapter 10). Isolated power converters (Chapter 12), such as the full-bridge and resonant converters, inverters (Chapter 13), and power-factor-corrected battery chargers (Chapter 14), are covered in the power electronics section. This material can also be covered at the introductory postgraduate level. Various homework, simulation, and research exercises are presented throughout the textbook. The reader is encouraged to attempt these exercises as part of the learning experience. Instructors are encouraged to contact the author, John Hayes,

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direct to discuss course content or structure.

Assessment of Fuel Economy Technologies for Light-Duty Vehicles

Presenting current issues in electric motor design, installation, application, and performance, this second edition serves as the most authoritative and reliable guide to electric motor utilization and assessment in the commercial and industrial sectors. Covering topics ranging from motor energy and efficiency to computer-aided design and equipment selection, this reference assists professionals in all aspects of electric motor maintenance, repair, and optimization. It has been expanded by more than 40 percent to explore the most influential technologies in the field including electronic controls, superconducting generators, recent analytical tools, new computing capabilities, and special purpose motors.

The Electrical Engineer

Electrical Contacts

In this book, highly qualified scientists present their recent research motivated by

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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 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.

New Trends in Electrical Vehicle Powertrains

For multi-user PDF licensing, please contact customer service. Energy touches our lives in countless ways and its costs are felt when we fill up at the gas pump, pay our home heating bills, and keep businesses both large and small running. There are long-term costs as well: to the environment, as natural resources are depleted and pollution contributes to global climate change, and to national security and independence, as many of the world's current energy sources are increasingly concentrated in geopolitically unstable regions. The country's challenge is to develop an energy portfolio that addresses these concerns while still providing sufficient, affordable energy reserves for the nation. The United States has

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enormous resources to put behind solutions to this energy challenge; the dilemma is to identify which solutions are the right ones. Before deciding which energy technologies to develop, and on what timeline, we need to understand them better. America's Energy Future analyzes the potential of a wide range of technologies for generation, distribution, and conservation of energy. This book considers technologies to increase energy efficiency, coal-fired power generation, nuclear power, renewable energy, oil and natural gas, and alternative transportation fuels. It offers a detailed assessment of the associated impacts and projected costs of implementing each technology and categorizes them into three time frames for implementation.

No-regret Potentials in Energy Conservation

A solid, quantitative, practical introduction to a wide range of renewable energy systems—in a completely updated, new edition The second edition of Renewable and Efficient Electric Power Systems provides a solid, quantitative, practical introduction to a wide range of renewable energy systems. For each topic, essential theoretical background is introduced, practical engineering considerations associated with designing systems and predicting their performance are provided, and methods for evaluating the economics of these systems are presented. While the book focuses on the fastest growing, most promising wind and solar technologies, new material on tidal and wave power, small-scale hydroelectric

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power, geothermal and biomass systems is introduced. Both supply-side and demand-side technologies are blended in the final chapter, which introduces the emerging smart grid. As the fraction of our power generated by renewable resources increases, the role of demand-side management in helping maintain grid balance is explored. Renewable energy systems have become mainstream technologies and are now, literally, big business. Throughout this edition, more depth has been provided on the financial analysis of large-scale conventional and renewable energy projects. While grid-connected systems dominate the market today, off-grid systems are beginning to have a significant impact on emerging economies where electricity is a scarce commodity. Considerable attention is paid to the economics of all of these systems. This edition has been completely rewritten, updated, and reorganized. New material has been presented both in the form of new topics as well as in greater depth in some areas. The section on the fundamentals of electric power has been enhanced, making this edition a much better bridge to the more advanced courses in power that are returning to many electrical engineering programs. This includes an introduction to phasor notation, more emphasis on reactive power as well as real power, more on power converter and inverter electronics, and more material on generator technologies. Realizing that many students, as well as professionals, in this increasingly important field may have modest electrical engineering backgrounds, early chapters develop the skills and knowledge necessary to understand these important topics without the need for supplementary materials. With numerous completely worked examples

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throughout, the book has been designed to encourage self-instruction. The book includes worked examples for virtually every topic that lends itself to quantitative analysis. Each chapter ends with a problem set that provides additional practice. This is an essential resource for a mixed audience of engineering and other technology-focused individuals.

Energy-Efficient Electric Motors and their Applications

Extensively revised and expanded to present the state-of-the-art in the field of magnetic design, this third edition presents a practical approach to transformer and inductor design and covers extensively essential topics such as the area product, A_p , and core geometry, K_g . The book provides complete information on magnetic materials and core characteristics using step-by-step design examples and presents all the key components for the design of lightweight, high-frequency aerospace transformers or low-frequency commercial transformers. Written by a specialist with more than 47 years of experience in the field, this volume covers magnetic design theory with all of the relevant formulas.

Energy Efficiency Improvements in Smart Grid Components

Permanent magnet synchronous (PMS) motors stand at the forefront of electric

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motor development due to their energy saving capabilities and performance potential. The motors have been developed in response to mounting environmental crises and growing electricity prices, and they have enabled the emergence of motor drive applications like those found in electric and hybrid vehicles, fly by wire, and drones. Control of Permanent Magnet Synchronous Motors is a timely advancement along that path as the first comprehensive, self-contained, and thoroughly up-to-date book devoted solely to the control of PMS motors. It offers a deep and extended analysis, design, implementation, and performance evaluation of major motor control methods, including Vector, Direct Torque, Predictive, Deadbeat, and Combined Control, in a systematic and coherent manner. All major Sensorless Control and Parameter Estimation methods are also studied. The book places great emphasis on energy saving control schemes.

Permanent Magnet Motor Technology

This detailed reference provides guidelines for the selection and utilization of electric motors for improved reliability, performance, energy-efficiency, and life-cycle cost. Completely revised and expanded, the book reflects the recent state of the field, as well as recent developments in control electronics, the economics of energy-efficient motors and systems, and advanced power electronic drivers. It includes five new chapters covering key topics such as the fundamentals of power electronics applicable to electric motor drives, adjustable speed drives and their

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applications, advanced switched reluctance motor drives, and permanent magnet and brushless DC motor drives.

Permanent Magnet Motor Technology

In this urgent time, *World on the Edge* calls out the pivotal environmental issues and how to solve them now. We are in a race between political and natural tipping points. Can we close coal-fired power plants fast enough to save the Greenland ice sheet and avoid catastrophic sea level rise? Can we raise water productivity fast enough to halt the depletion of aquifers and avoid water-driven food shortages? Can we cope with peak water and peak oil at the same time? These are some of the issues Lester R. Brown skilfully distils in *World on the Edge*. Bringing decades of research and analysis into play, he provides the responses needed to reclaim our future.

Energy-Efficient Electric Motors, Revised and Expanded

Co-authored by a world-renowned expert in the field, *Permanent Magnet Motor Technology: Design and Applications, Second Edition* demonstrates the construction of PM motor drives and supplies ready-to-implement solutions for common roadblocks. The author presents fundamental equations and calculations

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to determine and evaluate system performance, efficiency, and reliability; explores modern computer-aided design of PM motors, including the finite element approach; and covers how to select PM motors to meet the specific requirements of electrical drives. The numerous examples, models, and diagrams provided in each chapter give the reader a clear understanding of motor operations and characteristics.

Handbook of Small Electric Motors

Interest in permanent magnet synchronous machines (PMSMs) is continuously increasing worldwide, especially with the increased use of renewable energy and the electrification of transports. This book contains the successful submissions of fifteen papers to a Special Issue of Energies on the subject area of “Permanent Magnet Synchronous Machines”. The focus is on permanent magnet synchronous machines and the electrical systems they are connected to. The presented work represents a wide range of areas. Studies of control systems, both for permanent magnet synchronous machines and for brushless DC motors, are presented and experimentally verified. Design studies of generators for wind power, wave power and hydro power are presented. Finite element method simulations and analytical design methods are used. The presented studies represent several of the different research fields on permanent magnet machines and electric drives.

Switched Reluctance Motor Drives

This monograph shows the reader how to avoid the burdens of sensor cost, reduced internal physical space, and system complexity in the control of AC motors. Many applications fields—electric vehicles, wind- and wave-energy converters and robotics, among them—will benefit. Sensorless AC Electric Motor Control describes the elimination of physical sensors and their replacement with observers, i.e., software sensors. Robustness is introduced to overcome problems associated with the unavoidable imperfection of knowledge of machine parameters—resistance, inertia, and so on—encountered in real systems. The details of a large number of speed- and/or position-sensorless ideas for different types of permanent-magnet synchronous motors and induction motors are presented along with several novel observer designs for electrical machines. Control strategies are developed using high-order, sliding-mode and quasi-continuous-sliding-mode techniques and two types of observer-controller schemes based on backstepping and sliding-mode techniques are described. Experimental results validate the performance of these observer and controller configurations with test trajectories of significance in difficult sensorless-AC-machine problems. Control engineers working with AC motors in a variety of industrial environments will find the space-and-cost-saving ideas detailed in Sensorless AC Electric Motor Control of much interest. Academic researchers and graduate students from electrical, mechanical and control-engineering backgrounds will be able to see how

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advanced theoretical control can be applied in meaningful real systems.

Electric Motor Control

The reduction of energy consumption through improvements in energy efficiency has become an important goal for all countries, in order to improve the efficiency of the economy, to increase energy supply security, and to reduce the emissions of CO and other pollutants caused by power generation. 2 Electric motors use over half of all electricity consumed in developed countries. Typically 60-80% of the electricity which is used in the industrial sector and about 35% of the electricity used in the commercial sector in the European Union is consumed by motors. In industry, a motor consumes an annual quantity of electricity which corresponds to approximately 5 times its purchase price, throughout its whole life of around ~ 12 to 20 years. Motors are by far the most important type of electric load. They are used in all sectors and in a wide range of applications, namely the following: fans, compressors, pumps, mills, winders, elevators, transports, home appliances, and office equipment, etc. It is their wide use that makes motor drive systems one of the main targets to achieve significant energy savings. As motors are the largest users of electrical energy, even small efficiency improvements will produce very large energy savings.

Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles

The light-duty vehicle fleet is expected to undergo substantial technological changes over the next several decades. New powertrain designs, alternative fuels, advanced materials and significant changes to the vehicle body are being driven by increasingly stringent fuel economy and greenhouse gas emission standards. By the end of the next decade, cars and light-duty trucks will be more fuel efficient, weigh less, emit less air pollutants, have more safety features, and will be more expensive to purchase relative to current vehicles. Though the gasoline-powered spark ignition engine will continue to be the dominant powertrain configuration even through 2030, such vehicles will be equipped with advanced technologies, materials, electronics and controls, and aerodynamics. And by 2030, the deployment of alternative methods to propel and fuel vehicles and alternative modes of transportation, including autonomous vehicles, will be well underway. What are these new technologies - how will they work, and will some technologies be more effective than others? Written to inform The United States Department of Transportation's National Highway Traffic Safety Administration (NHTSA) and Environmental Protection Agency (EPA) Corporate Average Fuel Economy (CAFE) and greenhouse gas (GHG) emission standards, this new report from the National Research Council is a technical evaluation of costs, benefits, and implementation

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issues of fuel reduction technologies for next-generation light-duty vehicles. Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles estimates the cost, potential efficiency improvements, and barriers to commercial deployment of technologies that might be employed from 2020 to 2030. This report describes these promising technologies and makes recommendations for their inclusion on the list of technologies applicable for the 2017-2025 CAFE standards.

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